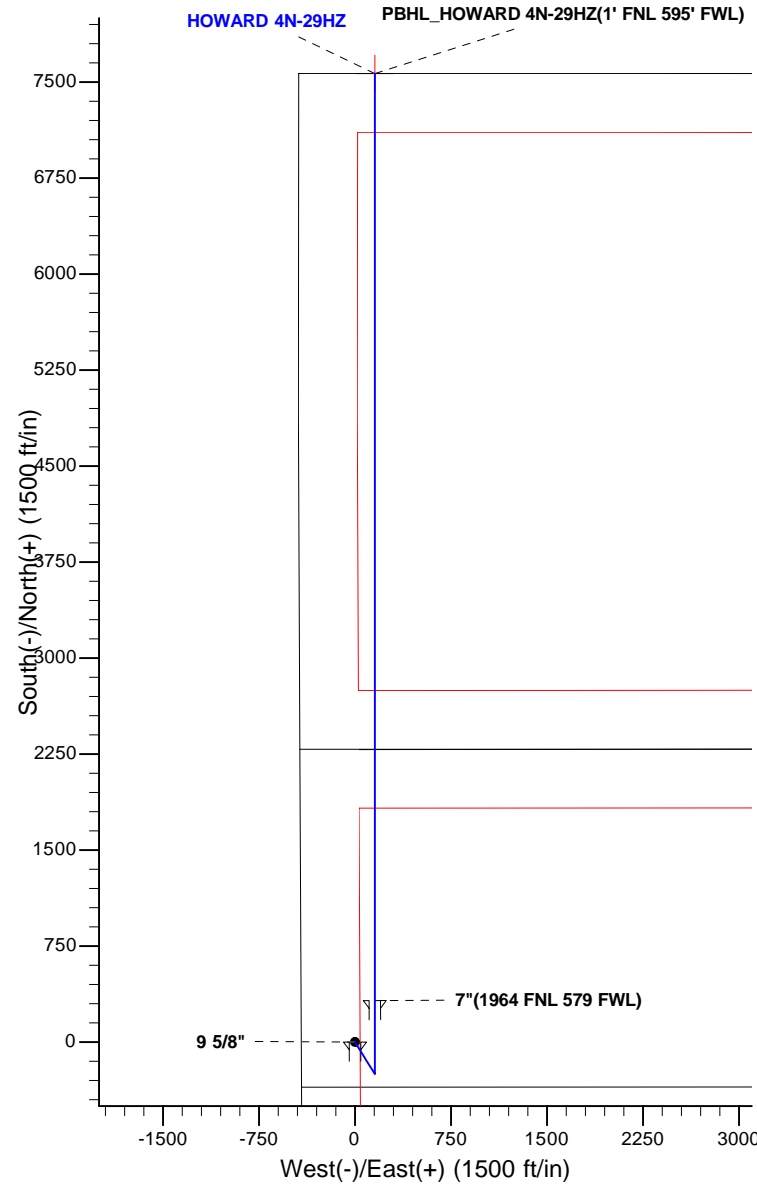




Project: COLORADO NORTHERN ZONE - 83
Site: HOWARD 5-32HZ
Well: HOWARD 4N-29HZ
Wellbore: OH
Design: PLAN #2 PRELIMINARY



WELL DETAILS: HOWARD 4N-29HZ											
GL 5031 & KB 17 @ 5048.00ft (ASSUMED)											
+N/-S		+E/-W		Northing		Easting		Latitude		Longitude	
0.00		0.00		1246489.32		3161838.14		40.0085520		-104.9222470	
SECTION DETAILS											
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target		
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
1400.00	0.00	0.00	1400.00	0.00	0.00	0.00	0.00	0.00	0.00		
1900.11	10.00	147.99	1897.57	-36.92	23.08	2.00	147.99	-36.92			
3096.14	10.00	147.99	3075.43	-213.08	133.18	0.00	0.00	-213.08			
3596.25	0.00	0.00	3573.00	-250.00	156.26	2.00	180.00	-250.00			
7039.29	0.00	0.00	7016.04	-250.00	156.26	0.00	0.00	-250.00			
7940.87	90.16	360.00	7589.00	324.54	156.26	10.00	360.00	324.54			
15183.09	90.16	360.00	7569.00	7566.73	156.26	0.00	0.007566.73	PBHL_HOWARD 4N-29HZ(1' FNL 595' FWL)			
FORMATION TOP DETAILS						CASING DETAILS					
TVDPath	MDPath	Formation			Inc		TVD	MD	Name	Size	
798.00	798.00	Fox Hills Base			0.00		848.00	848.00	9 5/8"	9.625	
4788.00	4811.25	Sussex			0.00		7589.00	7940.87	7"	7.000	
5328.00	5351.25	Shannon			0.00						
7323.00	7363.24	Sharon Springs			32.39						
7400.00	7460.07	Niobrara A			42.08						
7548.00	7721.23	Niobrara B			68.19						





Scientific Drilling

US ROCKIES REGION PLANNING

COLORADO NORTHERN ZONE - 83

HOWARD 5-32HZ

HOWARD 4N-29HZ

OH

Plan: PLAN #2 PRELIMINARY

Standard Planning Report

18 July, 2013

Database:	EDM5000-RobertS-Local	Local Co-ordinate Reference:	Well HOWARD 4N-29HZ
Company:	US ROCKIES REGION PLANNING	TVD Reference:	GL 5031 & KB 17 @ 5048.00ft (ASSUMED)
Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	GL 5031 & KB 17 @ 5048.00ft (ASSUMED)
Site:	HOWARD 5-32HZ	North Reference:	True
Well:	HOWARD 4N-29HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	PLAN #2 PRELIMINARY		

Project	COLORADO NORTHERN ZONE - 83, KERR MCGEE OIL & GAS ONSHORE LP		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		

Site	HOWARD 5-32HZ, SECTION 32 T1N R67W			
Site Position:		Northing:	1,246,488.76 usft	Latitude: 40.0085510
From:	Lat/Long	Easting:	3,161,808.17 usft	Longitude: -104.9223540
Position Uncertainty:	0.00 ft	Slot Radius:	13.200 in	Grid Convergence: 0.37 °

Well	HOWARD 4N-29HZ, 2287 FNL 420 FWL			
Well Position	+N/-S	0.36 ft	Northing:	1,246,489.31 usft
	+E/-W	29.97 ft	Easting:	3,161,838.14 usft
Position Uncertainty		0.00 ft	Wellhead Elevation:	Latitude: 40.0085520
				Longitude: -104.9222470
				Ground Level: 5,031.00 ft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2012	2013/04/08	8.72	66.62	52,620

Design	PLAN #2 PRELIMINARY			
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	0.00

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	
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,900.11	10.00	147.99	1,897.57	-36.92	23.08	2.00	2.00	0.00	147.99	
3,096.14	10.00	147.99	3,075.43	-213.08	133.18	0.00	0.00	0.00	0.00	
3,596.25	0.00	0.00	3,573.00	-250.00	156.26	2.00	-2.00	0.00	180.00	
7,039.29	0.00	0.00	7,016.04	-250.00	156.26	0.00	0.00	0.00	0.00	
7,940.87	90.16	360.00	7,589.00	324.54	156.26	10.00	10.00	0.00	360.00	
15,183.09	90.16	360.00	7,569.00	7,566.73	156.26	0.00	0.00	0.00	0.00	PBHL_HOWARD 4N-

Database:	EDM5000-RobertS-Local	Local Co-ordinate Reference:	Well HOWARD 4N-29HZ
Company:	US ROCKIES REGION PLANNING	TVD Reference:	GL 5031 & KB 17 @ 5048.00ft (ASSUMED)
Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	GL 5031 & KB 17 @ 5048.00ft (ASSUMED)
Site:	HOWARD 5-32HZ	North Reference:	True
Well:	HOWARD 4N-29HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	PLAN #2 PRELIMINARY		

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
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00
798.00	0.00	0.00	798.00	0.00	0.00	0.00	0.00	0.00	0.00
Fox Hills Base									
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00
848.00	0.00	0.00	848.00	0.00	0.00	0.00	0.00	0.00	0.00
9 5/8"									
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Build 2.00									
1,500.00	2.00	147.99	1,499.98	-1.48	0.92	-1.48	2.00	2.00	0.00
1,600.00	4.00	147.99	1,599.84	-5.92	3.70	-5.92	2.00	2.00	0.00
1,700.00	6.00	147.99	1,699.45	-13.31	8.32	-13.31	2.00	2.00	0.00
1,800.00	8.00	147.99	1,798.70	-23.64	14.78	-23.64	2.00	2.00	0.00
1,900.00	10.00	147.99	1,897.47	-36.91	23.07	-36.91	2.00	2.00	0.00
1,900.11	10.00	147.99	1,897.57	-36.92	23.08	-36.92	2.00	2.00	0.00
Start 1196.03 hold at 1900.11 MD									
2,000.00	10.00	147.99	1,995.95	-51.63	32.27	-51.63	0.00	0.00	0.00
2,100.00	10.00	147.99	2,094.43	-66.36	41.48	-66.36	0.00	0.00	0.00
2,200.00	10.00	147.99	2,192.91	-81.09	50.69	-81.09	0.00	0.00	0.00
2,300.00	10.00	147.99	2,291.39	-95.82	59.89	-95.82	0.00	0.00	0.00
2,400.00	10.00	147.99	2,389.87	-110.55	69.10	-110.55	0.00	0.00	0.00
2,500.00	10.00	147.99	2,488.35	-125.28	78.30	-125.28	0.00	0.00	0.00
2,600.00	10.00	147.99	2,586.83	-140.00	87.51	-140.00	0.00	0.00	0.00
2,700.00	10.00	147.99	2,685.31	-154.73	96.71	-154.73	0.00	0.00	0.00
2,800.00	10.00	147.99	2,783.79	-169.46	105.92	-169.46	0.00	0.00	0.00
2,900.00	10.00	147.99	2,882.27	-184.19	115.13	-184.19	0.00	0.00	0.00
3,000.00	10.00	147.99	2,980.75	-198.92	124.33	-198.92	0.00	0.00	0.00
3,096.14	10.00	147.99	3,075.43	-213.08	133.18	-213.08	0.00	0.00	0.00
Start Drop -2.00									
3,100.00	9.93	147.99	3,079.23	-213.64	133.54	-213.64	2.00	-2.00	0.00
3,200.00	7.93	147.99	3,178.01	-226.80	141.76	-226.80	2.00	-2.00	0.00
3,300.00	5.93	147.99	3,277.28	-237.02	148.15	-237.02	2.00	-2.00	0.00
3,400.00	3.93	147.99	3,376.90	-244.30	152.70	-244.30	2.00	-2.00	0.00
3,500.00	1.93	147.99	3,476.77	-248.63	155.40	-248.63	2.00	-2.00	0.00
3,596.25	0.00	0.00	3,573.00	-250.00	156.26	-250.00	2.00	-2.00	0.00
Start 3443.04 hold at 3596.25 MD									
3,600.00	0.00	0.00	3,576.75	-250.00	156.26	-250.00	0.00	0.00	0.00
3,700.00	0.00	0.00	3,676.75	-250.00	156.26	-250.00	0.00	0.00	0.00
3,800.00	0.00	0.00	3,776.75	-250.00	156.26	-250.00	0.00	0.00	0.00
3,900.00	0.00	0.00	3,876.75	-250.00	156.26	-250.00	0.00	0.00	0.00
4,000.00	0.00	0.00	3,976.75	-250.00	156.26	-250.00	0.00	0.00	0.00
4,100.00	0.00	0.00	4,076.75	-250.00	156.26	-250.00	0.00	0.00	0.00

Database:	EDM5000-RobertS-Local	Local Co-ordinate Reference:	Well HOWARD 4N-29HZ
Company:	US ROCKIES REGION PLANNING	TVD Reference:	GL 5031 & KB 17 @ 5048.00ft (ASSUMED)
Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	GL 5031 & KB 17 @ 5048.00ft (ASSUMED)
Site:	HOWARD 5-32HZ	North Reference:	True
Well:	HOWARD 4N-29HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	PLAN #2 PRELIMINARY		

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)
4,200.00	0.00	0.00	4,176.75	-250.00	156.26	-250.00	0.00	0.00	0.00
4,300.00	0.00	0.00	4,276.75	-250.00	156.26	-250.00	0.00	0.00	0.00
4,400.00	0.00	0.00	4,376.75	-250.00	156.26	-250.00	0.00	0.00	0.00
4,500.00	0.00	0.00	4,476.75	-250.00	156.26	-250.00	0.00	0.00	0.00
4,600.00	0.00	0.00	4,576.75	-250.00	156.26	-250.00	0.00	0.00	0.00
4,700.00	0.00	0.00	4,676.75	-250.00	156.26	-250.00	0.00	0.00	0.00
4,800.00	0.00	0.00	4,776.75	-250.00	156.26	-250.00	0.00	0.00	0.00
4,811.25	0.00	0.00	4,788.00	-250.00	156.26	-250.00	0.00	0.00	0.00
Sussex									
4,900.00	0.00	0.00	4,876.75	-250.00	156.26	-250.00	0.00	0.00	0.00
5,000.00	0.00	0.00	4,976.75	-250.00	156.26	-250.00	0.00	0.00	0.00
5,100.00	0.00	0.00	5,076.75	-250.00	156.26	-250.00	0.00	0.00	0.00
5,200.00	0.00	0.00	5,176.75	-250.00	156.26	-250.00	0.00	0.00	0.00
5,300.00	0.00	0.00	5,276.75	-250.00	156.26	-250.00	0.00	0.00	0.00
5,351.25	0.00	0.00	5,328.00	-250.00	156.26	-250.00	0.00	0.00	0.00
Shannon									
5,400.00	0.00	0.00	5,376.75	-250.00	156.26	-250.00	0.00	0.00	0.00
5,500.00	0.00	0.00	5,476.75	-250.00	156.26	-250.00	0.00	0.00	0.00
5,600.00	0.00	0.00	5,576.75	-250.00	156.26	-250.00	0.00	0.00	0.00
5,700.00	0.00	0.00	5,676.75	-250.00	156.26	-250.00	0.00	0.00	0.00
5,800.00	0.00	0.00	5,776.75	-250.00	156.26	-250.00	0.00	0.00	0.00
5,900.00	0.00	0.00	5,876.75	-250.00	156.26	-250.00	0.00	0.00	0.00
6,000.00	0.00	0.00	5,976.75	-250.00	156.26	-250.00	0.00	0.00	0.00
6,100.00	0.00	0.00	6,076.75	-250.00	156.26	-250.00	0.00	0.00	0.00
6,200.00	0.00	0.00	6,176.75	-250.00	156.26	-250.00	0.00	0.00	0.00
6,300.00	0.00	0.00	6,276.75	-250.00	156.26	-250.00	0.00	0.00	0.00
6,400.00	0.00	0.00	6,376.75	-250.00	156.26	-250.00	0.00	0.00	0.00
6,500.00	0.00	0.00	6,476.75	-250.00	156.26	-250.00	0.00	0.00	0.00
6,600.00	0.00	0.00	6,576.75	-250.00	156.26	-250.00	0.00	0.00	0.00
6,700.00	0.00	0.00	6,676.75	-250.00	156.26	-250.00	0.00	0.00	0.00
6,800.00	0.00	0.00	6,776.75	-250.00	156.26	-250.00	0.00	0.00	0.00
6,900.00	0.00	0.00	6,876.75	-250.00	156.26	-250.00	0.00	0.00	0.00
7,000.00	0.00	0.00	6,976.75	-250.00	156.26	-250.00	0.00	0.00	0.00
7,039.29	0.00	0.00	7,016.04	-250.00	156.26	-250.00	0.00	0.00	0.00
Start DLS 10.00 TFO 360.00									
7,100.00	6.07	360.00	7,076.64	-246.79	156.26	-246.79	10.00	10.00	0.00
7,200.00	16.07	360.00	7,174.65	-227.61	156.26	-227.61	10.00	10.00	0.00
7,300.00	26.07	360.00	7,267.85	-191.70	156.26	-191.70	10.00	10.00	0.00
7,363.24	32.39	360.00	7,323.00	-160.84	156.26	-160.84	10.00	10.00	0.00
Sharon Springs									
7,400.00	36.07	360.00	7,353.39	-140.16	156.26	-140.16	10.00	10.00	0.00
7,460.07	42.08	360.00	7,400.00	-102.31	156.26	-102.31	10.00	10.00	0.00
Niobrara A									
7,500.00	46.07	360.00	7,428.68	-74.54	156.26	-74.54	10.00	10.00	0.00
7,600.00	56.07	360.00	7,491.44	3.15	156.26	3.15	10.00	10.00	0.00
7,700.00	66.07	360.00	7,539.75	90.56	156.26	90.56	10.00	10.00	0.00
7,721.23	68.19	360.00	7,548.00	110.12	156.26	110.12	10.00	10.00	0.00
Niobrara B									
7,800.00	76.07	360.00	7,572.15	185.03	156.26	185.03	10.00	10.00	0.00
7,900.00	86.07	360.00	7,587.65	283.70	156.26	283.70	10.00	10.00	0.00
7,940.87	90.16	360.00	7,589.00	324.54	156.26	324.54	10.00	10.00	0.00
Start 7242.22 hold at 7940.87 MD - 7"(1964 FNL 579 FWL)									
8,000.00	90.16	360.00	7,588.83	383.67	156.26	383.67	0.00	0.00	0.00

Database:	EDM5000-RobertS-Local	Local Co-ordinate Reference:	Well HOWARD 4N-29HZ
Company:	US ROCKIES REGION PLANNING	TVD Reference:	GL 5031 & KB 17 @ 5048.00ft (ASSUMED)
Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	GL 5031 & KB 17 @ 5048.00ft (ASSUMED)
Site:	HOWARD 5-32HZ	North Reference:	True
Well:	HOWARD 4N-29HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	PLAN #2 PRELIMINARY		

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)
8,100.00	90.16	360.00	7,588.56	483.67	156.26	483.67	0.00	0.00	0.00
8,200.00	90.16	360.00	7,588.28	583.67	156.26	583.67	0.00	0.00	0.00
8,300.00	90.16	360.00	7,588.00	683.67	156.26	683.67	0.00	0.00	0.00
8,400.00	90.16	360.00	7,587.73	783.67	156.26	783.67	0.00	0.00	0.00
8,500.00	90.16	360.00	7,587.45	883.66	156.26	883.66	0.00	0.00	0.00
8,600.00	90.16	360.00	7,587.18	983.66	156.26	983.66	0.00	0.00	0.00
8,700.00	90.16	360.00	7,586.90	1,083.66	156.26	1,083.66	0.00	0.00	0.00
8,800.00	90.16	360.00	7,586.62	1,183.66	156.26	1,183.66	0.00	0.00	0.00
8,900.00	90.16	360.00	7,586.35	1,283.66	156.26	1,283.66	0.00	0.00	0.00
9,000.00	90.16	360.00	7,586.07	1,383.66	156.26	1,383.66	0.00	0.00	0.00
9,100.00	90.16	360.00	7,585.80	1,483.66	156.26	1,483.66	0.00	0.00	0.00
9,200.00	90.16	360.00	7,585.52	1,583.66	156.26	1,583.66	0.00	0.00	0.00
9,300.00	90.16	360.00	7,585.24	1,683.66	156.26	1,683.66	0.00	0.00	0.00
9,400.00	90.16	360.00	7,584.97	1,783.66	156.26	1,783.66	0.00	0.00	0.00
9,500.00	90.16	360.00	7,584.69	1,883.66	156.26	1,883.66	0.00	0.00	0.00
9,600.00	90.16	360.00	7,584.41	1,983.66	156.26	1,983.66	0.00	0.00	0.00
9,700.00	90.16	360.00	7,584.14	2,083.66	156.26	2,083.66	0.00	0.00	0.00
9,800.00	90.16	360.00	7,583.86	2,183.66	156.26	2,183.66	0.00	0.00	0.00
9,900.00	90.16	360.00	7,583.59	2,283.66	156.26	2,283.66	0.00	0.00	0.00
10,000.00	90.16	360.00	7,583.31	2,383.66	156.26	2,383.66	0.00	0.00	0.00
10,100.00	90.16	360.00	7,583.03	2,483.66	156.26	2,483.66	0.00	0.00	0.00
10,200.00	90.16	360.00	7,582.76	2,583.66	156.26	2,583.66	0.00	0.00	0.00
10,300.00	90.16	360.00	7,582.48	2,683.66	156.26	2,683.66	0.00	0.00	0.00
10,400.00	90.16	360.00	7,582.21	2,783.66	156.26	2,783.66	0.00	0.00	0.00
10,500.00	90.16	360.00	7,581.93	2,883.66	156.26	2,883.66	0.00	0.00	0.00
10,600.00	90.16	360.00	7,581.65	2,983.66	156.26	2,983.66	0.00	0.00	0.00
10,700.00	90.16	360.00	7,581.38	3,083.66	156.26	3,083.66	0.00	0.00	0.00
10,800.00	90.16	360.00	7,581.10	3,183.66	156.26	3,183.66	0.00	0.00	0.00
10,900.00	90.16	360.00	7,580.83	3,283.66	156.26	3,283.66	0.00	0.00	0.00
11,000.00	90.16	360.00	7,580.55	3,383.66	156.26	3,383.66	0.00	0.00	0.00
11,100.00	90.16	360.00	7,580.27	3,483.65	156.26	3,483.65	0.00	0.00	0.00
11,200.00	90.16	360.00	7,580.00	3,583.65	156.26	3,583.65	0.00	0.00	0.00
11,300.00	90.16	360.00	7,579.72	3,683.65	156.26	3,683.65	0.00	0.00	0.00
11,400.00	90.16	360.00	7,579.45	3,783.65	156.26	3,783.65	0.00	0.00	0.00
11,500.00	90.16	360.00	7,579.17	3,883.65	156.26	3,883.65	0.00	0.00	0.00
11,600.00	90.16	360.00	7,578.89	3,983.65	156.26	3,983.65	0.00	0.00	0.00
11,700.00	90.16	360.00	7,578.62	4,083.65	156.26	4,083.65	0.00	0.00	0.00
11,800.00	90.16	360.00	7,578.34	4,183.65	156.26	4,183.65	0.00	0.00	0.00
11,900.00	90.16	360.00	7,578.06	4,283.65	156.26	4,283.65	0.00	0.00	0.00
12,000.00	90.16	360.00	7,577.79	4,383.65	156.26	4,383.65	0.00	0.00	0.00
12,100.00	90.16	360.00	7,577.51	4,483.65	156.26	4,483.65	0.00	0.00	0.00
12,200.00	90.16	360.00	7,577.24	4,583.65	156.26	4,583.65	0.00	0.00	0.00
12,300.00	90.16	360.00	7,576.96	4,683.65	156.26	4,683.65	0.00	0.00	0.00
12,400.00	90.16	360.00	7,576.68	4,783.65	156.26	4,783.65	0.00	0.00	0.00
12,500.00	90.16	360.00	7,576.41	4,883.65	156.26	4,883.65	0.00	0.00	0.00
12,600.00	90.16	360.00	7,576.13	4,983.65	156.26	4,983.65	0.00	0.00	0.00
12,700.00	90.16	360.00	7,575.86	5,083.65	156.26	5,083.65	0.00	0.00	0.00
12,800.00	90.16	360.00	7,575.58	5,183.65	156.26	5,183.65	0.00	0.00	0.00
12,900.00	90.16	360.00	7,575.30	5,283.65	156.26	5,283.65	0.00	0.00	0.00
13,000.00	90.16	360.00	7,575.03	5,383.65	156.26	5,383.65	0.00	0.00	0.00
13,100.00	90.16	360.00	7,574.75	5,483.65	156.26	5,483.65	0.00	0.00	0.00
13,200.00	90.16	360.00	7,574.48	5,583.65	156.26	5,583.65	0.00	0.00	0.00
13,300.00	90.16	360.00	7,574.20	5,683.65	156.26	5,683.65	0.00	0.00	0.00
13,400.00	90.16	360.00	7,573.92	5,783.65	156.26	5,783.65	0.00	0.00	0.00

Database:	EDM5000-RobertS-Local	Local Co-ordinate Reference:	Well HOWARD 4N-29HZ
Company:	US ROCKIES REGION PLANNING	TVD Reference:	GL 5031 & KB 17 @ 5048.00ft (ASSUMED)
Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	GL 5031 & KB 17 @ 5048.00ft (ASSUMED)
Site:	HOWARD 5-32HZ	North Reference:	True
Well:	HOWARD 4N-29HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	PLAN #2 PRELIMINARY		

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)
13,500.00	90.16	360.00	7,573.65	5,883.65	156.26	5,883.65	0.00	0.00	0.00
13,600.00	90.16	360.00	7,573.37	5,983.65	156.26	5,983.65	0.00	0.00	0.00
13,700.00	90.16	360.00	7,573.09	6,083.64	156.26	6,083.64	0.00	0.00	0.00
13,800.00	90.16	360.00	7,572.82	6,183.64	156.26	6,183.64	0.00	0.00	0.00
13,900.00	90.16	360.00	7,572.54	6,283.64	156.26	6,283.64	0.00	0.00	0.00
14,000.00	90.16	360.00	7,572.27	6,383.64	156.26	6,383.64	0.00	0.00	0.00
14,100.00	90.16	360.00	7,571.99	6,483.64	156.26	6,483.64	0.00	0.00	0.00
14,200.00	90.16	360.00	7,571.71	6,583.64	156.26	6,583.64	0.00	0.00	0.00
14,300.00	90.16	360.00	7,571.44	6,683.64	156.26	6,683.64	0.00	0.00	0.00
14,400.00	90.16	360.00	7,571.16	6,783.64	156.26	6,783.64	0.00	0.00	0.00
14,500.00	90.16	360.00	7,570.89	6,883.64	156.26	6,883.64	0.00	0.00	0.00
14,600.00	90.16	360.00	7,570.61	6,983.64	156.26	6,983.64	0.00	0.00	0.00
14,700.00	90.16	360.00	7,570.33	7,083.64	156.26	7,083.64	0.00	0.00	0.00
14,800.00	90.16	360.00	7,570.06	7,183.64	156.26	7,183.64	0.00	0.00	0.00
14,900.00	90.16	360.00	7,569.78	7,283.64	156.26	7,283.64	0.00	0.00	0.00
15,000.00	90.16	360.00	7,569.51	7,383.64	156.26	7,383.64	0.00	0.00	0.00
15,100.00	90.16	360.00	7,569.23	7,483.64	156.26	7,483.64	0.00	0.00	0.00
15,183.09	90.16	360.00	7,569.00	7,566.73	156.26	7,566.73	0.00	0.00	0.00
TD at 15183.09 - PBHL_HOWARD 4N-29HZ(1' FNL 595' FWL)									

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- hit/miss target									
- Shape									
PBHL_HOWARD 4N-29	0.00	0.00	7,569.00	7,566.73	156.26	1,254,056.89	3,161,945.09	40.0293240	-104.9216890
- plan hits target center									
- Point									

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (in)	Hole Diameter (in)	
848.00	848.00	9 5/8"	9.625	12.250	
7,940.87	7,589.00	7"(1964 FNL 579 FWL)	7.000	7.500	

Formations						
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)	
798.00	798.00	Fox Hills Base				
4,811.25	4,788.00	Sussex				
5,351.25	5,328.00	Shannon				
7,363.24	7,323.00	Sharon Springs				
7,460.07	7,400.00	Niobrara A				
7,721.23	7,548.00	Niobrara B				

Database:	EDM5000-RobertS-Local	Local Co-ordinate Reference:	Well HOWARD 4N-29HZ
Company:	US ROCKIES REGION PLANNING	TVD Reference:	GL 5031 & KB 17 @ 5048.00ft (ASSUMED)
Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	GL 5031 & KB 17 @ 5048.00ft (ASSUMED)
Site:	HOWARD 5-32HZ	North Reference:	True
Well:	HOWARD 4N-29HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	PLAN #2 PRELIMINARY		

Plan Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
1,400.00	1,400.00	0.00	0.00	Start Build 2.00
1,900.11	1,897.57	-36.92	23.08	Start 1196.03 hold at 1900.11 MD
3,096.14	3,075.43	-213.08	133.18	Start Drop -2.00
3,596.25	3,573.00	-250.00	156.26	Start 3443.04 hold at 3596.25 MD
7,039.29	7,016.04	-250.00	156.26	Start DLS 10.00 TFO 360.00
7,940.87	7,589.00	324.54	156.26	Start 7242.22 hold at 7940.87 MD
15,183.09	7,569.00	7,566.73	156.26	TD at 15183.09