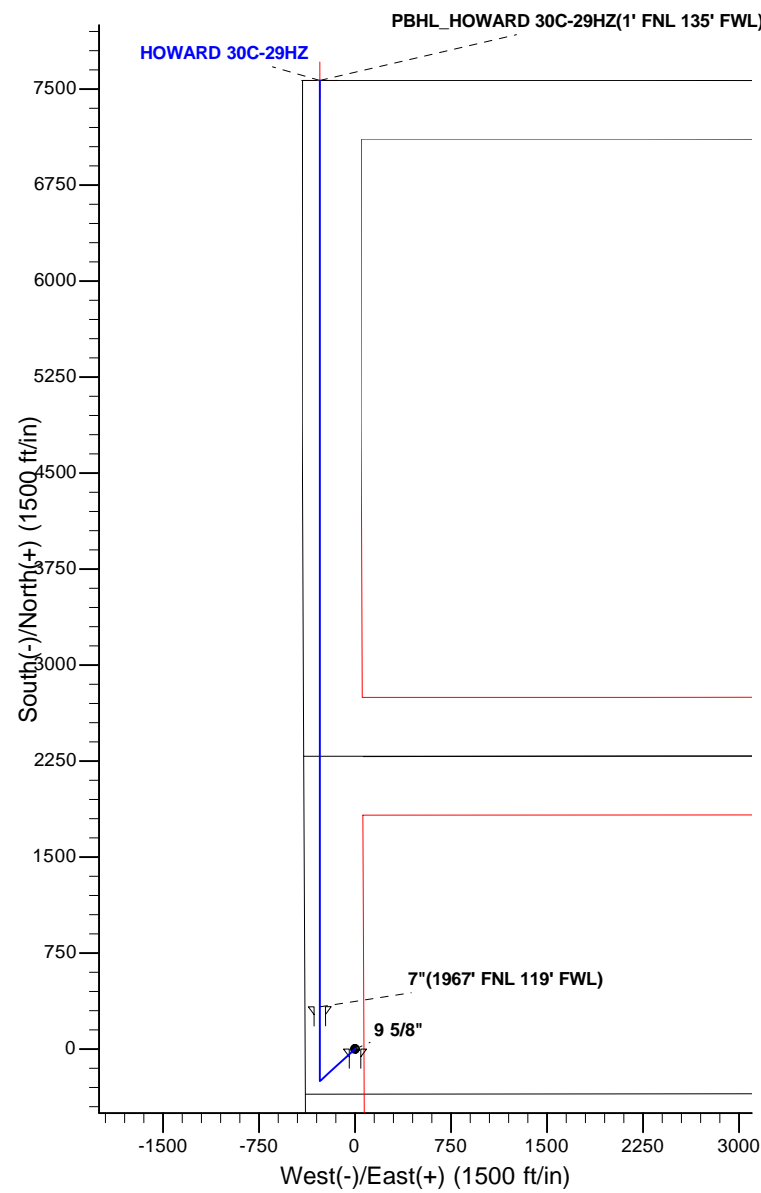
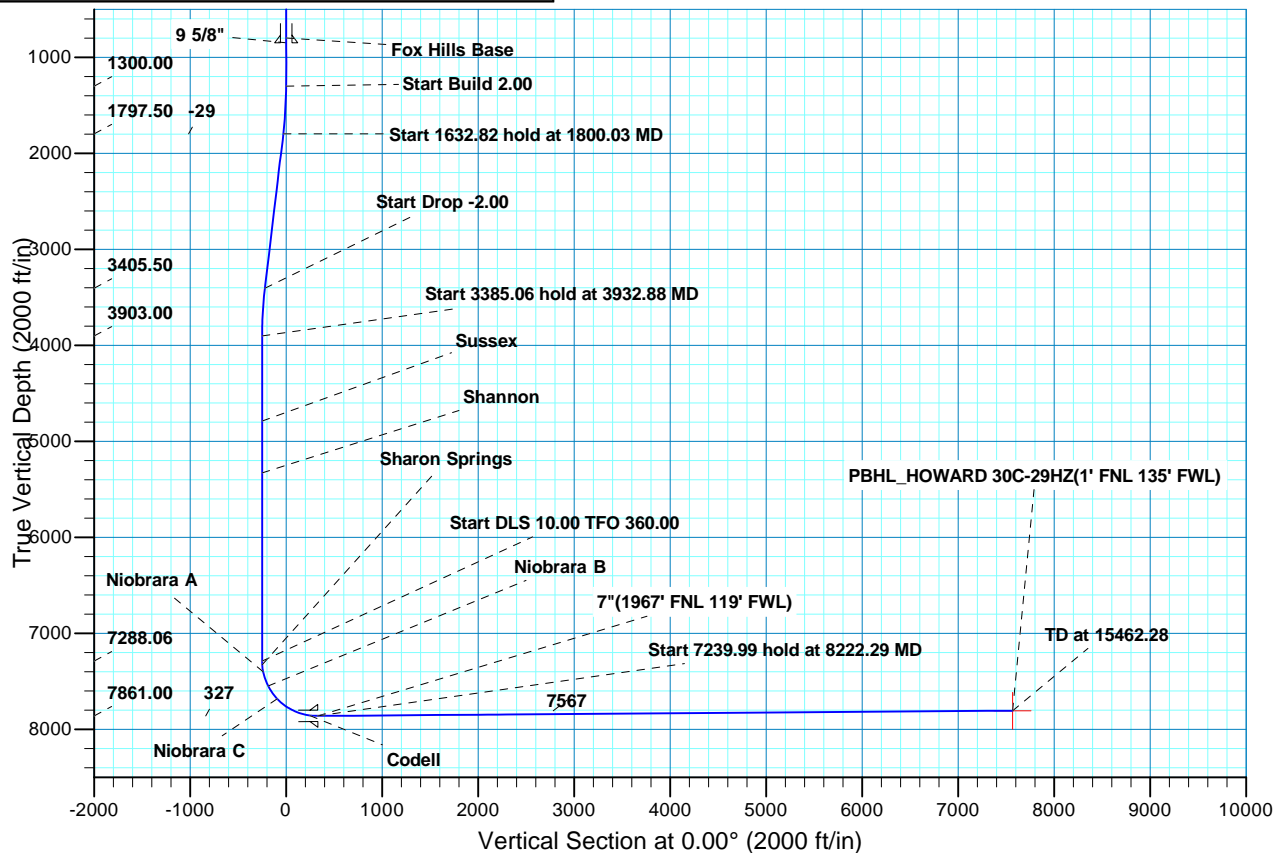




Project: COLORADO NORTHERN ZONE - 83
Site: HOWARD 5-32HZ
Well: HOWARD 30C-29HZ
Wellbore: OH
Design: PLAN #2 PRELIMINARY



WELL DETAILS: HOWARD 30C-29HZ										
GL 5031 & KB 17 @ 5048.00ft (ASSUMED)										
		+N/-S	+E/-W	Northing	Easting	Latitude	Longitude			
		0.00	0.00	1246488.77	3161808.17	40.0085510	-104.9223540			
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		
1300.00	0.00	0.00	1300.00	0.00	0.00	0.00	0.00	0.00		
1800.03	10.00	227.58	1797.50	-29.36	-32.13	2.00	227.58	-29.36		
3432.85	10.00	227.58	3405.50	-220.64	-241.46	0.00	0.00	-220.64		
3932.88	0.00	0.00	3903.00	-250.00	-273.59	2.00	180.00	-250.00		
7317.94	0.00	0.00	7288.06	-250.00	-273.59	0.00	0.00	-250.00		
8222.29	90.44	360.00	7861.00	327.31	-273.59	10.00	360.00	327.31		
15462.28	90.44	360.00	7806.00	7567.09	-273.59	0.00	0.007567.09		PBHL_HOWARD 30C-29HZ(1' FNL 135' FWL)	
FORMATION TOP DETAILS							CASING DETAILS			
TVDPath	MDPath	Formation		Inc						
798.00	798.00	Fox Hills Base		0.00						
4788.00	4817.88	Sussex		0.00						
5328.00	5357.88	Shannon		0.00						
7327.00	7356.91	Sharon Springs		3.90						
7400.00	7430.60	Niobrara A		11.27						
7548.00	7587.74	Niobrara B		26.98						
7682.00	7752.31	Niobrara C		43.44						
7832.00	8034.81	Fort Hays		71.69						
7856.00	8142.06	Codell		82.41						
TVD	MD	Name	Size							
848.00	848.00	9 5/8"	9.625							
7860.98	8225.37	7"	7.000							





Scientific Drilling

US ROCKIES REGION PLANNING

COLORADO NORTHERN ZONE - 83

HOWARD 5-32HZ

HOWARD 30C-29HZ

OH

Plan: PLAN #2 PRELIMINARY

Standard Planning Report

18 July, 2013

Database:	EDM5000-RobertS-Local	Local Co-ordinate Reference:	Well HOWARD 30C-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 30C-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 30C-29HZ, 2287 FNL 390 FWL			
Well Position	+N/-S	0.00 ft	Northing:	1,246,488.76 usft
	+E/-W	0.00 ft	Easting:	3,161,808.17 usft
Position Uncertainty		0.00 ft	Wellhead Elevation:	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	
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,800.03	10.00	227.58	1,797.50	-29.36	-32.13	2.00	2.00	0.00	227.58	
3,432.85	10.00	227.58	3,405.50	-220.64	-241.46	0.00	0.00	0.00	0.00	
3,932.88	0.00	0.00	3,903.00	-250.00	-273.59	2.00	-2.00	0.00	180.00	
7,317.94	0.00	0.00	7,288.06	-250.00	-273.59	0.00	0.00	0.00	0.00	
8,222.29	90.44	360.00	7,861.00	327.31	-273.59	10.00	10.00	0.00	360.00	
15,462.28	90.44	360.00	7,806.00	7,567.09	-273.59	0.00	0.00	0.00	0.00	PBHL_HOWARD 30C

Database:	EDM5000-RobertS-Local	Local Co-ordinate Reference:	Well HOWARD 30C-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 30C-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
Start Build 2.00									
1,400.00	2.00	227.58	1,399.98	-1.18	-1.29	-1.18	2.00	2.00	0.00
1,500.00	4.00	227.58	1,499.84	-4.71	-5.15	-4.71	2.00	2.00	0.00
1,600.00	6.00	227.58	1,599.45	-10.59	-11.59	-10.59	2.00	2.00	0.00
1,700.00	8.00	227.58	1,698.70	-18.81	-20.58	-18.81	2.00	2.00	0.00
1,800.00	10.00	227.58	1,797.47	-29.36	-32.13	-29.36	2.00	2.00	0.00
1,800.03	10.00	227.58	1,797.50	-29.36	-32.13	-29.36	2.00	2.00	0.00
Start 1632.82 hold at 1800.03 MD									
1,900.00	10.00	227.58	1,895.95	-41.07	-44.95	-41.07	0.00	0.00	0.00
2,000.00	10.00	227.58	1,994.43	-52.79	-57.77	-52.79	0.00	0.00	0.00
2,100.00	10.00	227.58	2,092.91	-64.50	-70.59	-64.50	0.00	0.00	0.00
2,200.00	10.00	227.58	2,191.39	-76.22	-83.41	-76.22	0.00	0.00	0.00
2,300.00	10.00	227.58	2,289.87	-87.93	-96.23	-87.93	0.00	0.00	0.00
2,400.00	10.00	227.58	2,388.35	-99.65	-109.05	-99.65	0.00	0.00	0.00
2,500.00	10.00	227.58	2,486.83	-111.36	-121.87	-111.36	0.00	0.00	0.00
2,600.00	10.00	227.58	2,585.31	-123.07	-134.69	-123.07	0.00	0.00	0.00
2,700.00	10.00	227.58	2,683.79	-134.79	-147.51	-134.79	0.00	0.00	0.00
2,800.00	10.00	227.58	2,782.27	-146.50	-160.33	-146.50	0.00	0.00	0.00
2,900.00	10.00	227.58	2,880.75	-158.22	-173.15	-158.22	0.00	0.00	0.00
3,000.00	10.00	227.58	2,979.23	-169.93	-185.97	-169.93	0.00	0.00	0.00
3,100.00	10.00	227.58	3,077.71	-181.65	-198.79	-181.65	0.00	0.00	0.00
3,200.00	10.00	227.58	3,176.19	-193.36	-211.61	-193.36	0.00	0.00	0.00
3,300.00	10.00	227.58	3,274.67	-205.08	-224.43	-205.08	0.00	0.00	0.00
3,400.00	10.00	227.58	3,373.15	-216.79	-237.25	-216.79	0.00	0.00	0.00
3,432.85	10.00	227.58	3,405.50	-220.64	-241.46	-220.64	0.00	0.00	0.00
Start Drop -2.00									
3,500.00	8.66	227.58	3,471.77	-227.98	-249.49	-227.98	2.00	-2.00	0.00
3,600.00	6.66	227.58	3,570.87	-236.97	-259.33	-236.97	2.00	-2.00	0.00
3,700.00	4.66	227.58	3,670.38	-243.62	-266.61	-243.62	2.00	-2.00	0.00
3,800.00	2.66	227.58	3,770.17	-247.92	-271.32	-247.92	2.00	-2.00	0.00
3,900.00	0.66	227.58	3,870.12	-249.87	-273.45	-249.87	2.00	-2.00	0.00
3,932.88	0.00	0.00	3,903.00	-250.00	-273.59	-250.00	2.00	-2.00	0.00
Start 3385.06 hold at 3932.88 MD									
4,000.00	0.00	0.00	3,970.12	-250.00	-273.59	-250.00	0.00	0.00	0.00
4,100.00	0.00	0.00	4,070.12	-250.00	-273.59	-250.00	0.00	0.00	0.00

Database:	EDM5000-RobertS-Local	Local Co-ordinate Reference:	Well HOWARD 30C-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 30C-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	4,170.12	-250.00	-273.59	-250.00	0.00	0.00	0.00
4,300.00	0.00	0.00	4,270.12	-250.00	-273.59	-250.00	0.00	0.00	0.00
4,400.00	0.00	0.00	4,370.12	-250.00	-273.59	-250.00	0.00	0.00	0.00
4,500.00	0.00	0.00	4,470.12	-250.00	-273.59	-250.00	0.00	0.00	0.00
4,600.00	0.00	0.00	4,570.12	-250.00	-273.59	-250.00	0.00	0.00	0.00
4,700.00	0.00	0.00	4,670.12	-250.00	-273.59	-250.00	0.00	0.00	0.00
4,800.00	0.00	0.00	4,770.12	-250.00	-273.59	-250.00	0.00	0.00	0.00
4,817.88	0.00	0.00	4,788.00	-250.00	-273.59	-250.00	0.00	0.00	0.00
Sussex									
4,900.00	0.00	0.00	4,870.12	-250.00	-273.59	-250.00	0.00	0.00	0.00
5,000.00	0.00	0.00	4,970.12	-250.00	-273.59	-250.00	0.00	0.00	0.00
5,100.00	0.00	0.00	5,070.12	-250.00	-273.59	-250.00	0.00	0.00	0.00
5,200.00	0.00	0.00	5,170.12	-250.00	-273.59	-250.00	0.00	0.00	0.00
5,300.00	0.00	0.00	5,270.12	-250.00	-273.59	-250.00	0.00	0.00	0.00
5,357.88	0.00	0.00	5,328.00	-250.00	-273.59	-250.00	0.00	0.00	0.00
Shannon									
5,400.00	0.00	0.00	5,370.12	-250.00	-273.59	-250.00	0.00	0.00	0.00
5,500.00	0.00	0.00	5,470.12	-250.00	-273.59	-250.00	0.00	0.00	0.00
5,600.00	0.00	0.00	5,570.12	-250.00	-273.59	-250.00	0.00	0.00	0.00
5,700.00	0.00	0.00	5,670.12	-250.00	-273.59	-250.00	0.00	0.00	0.00
5,800.00	0.00	0.00	5,770.12	-250.00	-273.59	-250.00	0.00	0.00	0.00
5,900.00	0.00	0.00	5,870.12	-250.00	-273.59	-250.00	0.00	0.00	0.00
6,000.00	0.00	0.00	5,970.12	-250.00	-273.59	-250.00	0.00	0.00	0.00
6,100.00	0.00	0.00	6,070.12	-250.00	-273.59	-250.00	0.00	0.00	0.00
6,200.00	0.00	0.00	6,170.12	-250.00	-273.59	-250.00	0.00	0.00	0.00
6,300.00	0.00	0.00	6,270.12	-250.00	-273.59	-250.00	0.00	0.00	0.00
6,400.00	0.00	0.00	6,370.12	-250.00	-273.59	-250.00	0.00	0.00	0.00
6,500.00	0.00	0.00	6,470.12	-250.00	-273.59	-250.00	0.00	0.00	0.00
6,600.00	0.00	0.00	6,570.12	-250.00	-273.59	-250.00	0.00	0.00	0.00
6,700.00	0.00	0.00	6,670.12	-250.00	-273.59	-250.00	0.00	0.00	0.00
6,800.00	0.00	0.00	6,770.12	-250.00	-273.59	-250.00	0.00	0.00	0.00
6,900.00	0.00	0.00	6,870.12	-250.00	-273.59	-250.00	0.00	0.00	0.00
7,000.00	0.00	0.00	6,970.12	-250.00	-273.59	-250.00	0.00	0.00	0.00
7,100.00	0.00	0.00	7,070.12	-250.00	-273.59	-250.00	0.00	0.00	0.00
7,200.00	0.00	0.00	7,170.12	-250.00	-273.59	-250.00	0.00	0.00	0.00
7,300.00	0.00	0.00	7,270.12	-250.00	-273.59	-250.00	0.00	0.00	0.00
7,317.94	0.00	0.00	7,288.06	-250.00	-273.59	-250.00	0.00	0.00	0.00
Start DLS 10.00 TFO 360.00									
7,356.91	3.90	360.00	7,327.00	-248.68	-273.59	-248.68	10.00	10.00	0.00
Sharon Springs									
7,400.00	8.21	360.00	7,369.84	-244.13	-273.59	-244.13	10.00	10.00	0.00
7,430.60	11.27	360.00	7,400.00	-238.96	-273.59	-238.96	10.00	10.00	0.00
Niobrara A									
7,500.00	18.21	360.00	7,467.07	-221.32	-273.59	-221.32	10.00	10.00	0.00
7,587.74	26.98	360.00	7,548.00	-187.64	-273.59	-187.64	10.00	10.00	0.00
Niobrara B									
7,600.00	28.21	360.00	7,558.87	-181.96	-273.59	-181.96	10.00	10.00	0.00
7,700.00	38.21	360.00	7,642.43	-127.27	-273.59	-127.27	10.00	10.00	0.00
7,752.31	43.44	360.00	7,682.00	-93.09	-273.59	-93.09	10.00	10.00	0.00
Niobrara C									
7,800.00	48.21	360.00	7,715.23	-58.89	-273.59	-58.89	10.00	10.00	0.00
7,900.00	58.21	360.00	7,775.04	21.09	-273.59	21.09	10.00	10.00	0.00
8,000.00	68.21	360.00	7,820.07	110.24	-273.59	110.24	10.00	10.00	0.00

Database:	EDM5000-RobertS-Local	Local Co-ordinate Reference:	Well HOWARD 30C-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 30C-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)
8,034.81	71.69	360.00	7,832.00	142.93	-273.59	142.93	10.00	10.00	0.00
Fort Hays									
8,100.00	78.21	360.00	7,848.92	205.85	-273.59	205.85	10.00	10.00	0.00
8,142.06	82.41	360.00	7,856.00	247.30	-273.59	247.30	10.00	10.00	0.00
Codell									
8,200.00	88.21	360.00	7,860.74	305.02	-273.59	305.02	10.00	10.00	0.00
8,222.29	90.44	360.00	7,861.00	327.31	-273.59	327.31	10.00	10.00	0.00
Start 7239.99 hold at 8222.29 MD									
8,225.37	90.44	360.00	7,860.98	330.39	-273.59	330.39	0.00	0.00	0.00
7"(1967' FNL 119' FWL)									
8,300.00	90.44	360.00	7,860.41	405.02	-273.59	405.02	0.00	0.00	0.00
8,400.00	90.44	360.00	7,859.65	505.01	-273.59	505.01	0.00	0.00	0.00
8,500.00	90.44	360.00	7,858.89	605.01	-273.59	605.01	0.00	0.00	0.00
8,600.00	90.44	360.00	7,858.13	705.01	-273.59	705.01	0.00	0.00	0.00
8,700.00	90.44	360.00	7,857.37	805.00	-273.59	805.00	0.00	0.00	0.00
8,800.00	90.44	360.00	7,856.61	905.00	-273.59	905.00	0.00	0.00	0.00
8,900.00	90.44	360.00	7,855.85	1,005.00	-273.59	1,005.00	0.00	0.00	0.00
9,000.00	90.44	360.00	7,855.09	1,105.00	-273.59	1,105.00	0.00	0.00	0.00
9,100.00	90.44	360.00	7,854.33	1,204.99	-273.59	1,204.99	0.00	0.00	0.00
9,200.00	90.44	360.00	7,853.57	1,304.99	-273.59	1,304.99	0.00	0.00	0.00
9,300.00	90.44	360.00	7,852.81	1,404.99	-273.59	1,404.99	0.00	0.00	0.00
9,400.00	90.44	360.00	7,852.05	1,504.98	-273.59	1,504.98	0.00	0.00	0.00
9,500.00	90.44	360.00	7,851.29	1,604.98	-273.59	1,604.98	0.00	0.00	0.00
9,600.00	90.44	360.00	7,850.54	1,704.98	-273.59	1,704.98	0.00	0.00	0.00
9,700.00	90.44	360.00	7,849.78	1,804.98	-273.59	1,804.98	0.00	0.00	0.00
9,800.00	90.44	360.00	7,849.02	1,904.97	-273.59	1,904.97	0.00	0.00	0.00
9,900.00	90.44	360.00	7,848.26	2,004.97	-273.59	2,004.97	0.00	0.00	0.00
10,000.00	90.44	360.00	7,847.50	2,104.97	-273.59	2,104.97	0.00	0.00	0.00
10,100.00	90.44	360.00	7,846.74	2,204.96	-273.59	2,204.96	0.00	0.00	0.00
10,200.00	90.44	360.00	7,845.98	2,304.96	-273.59	2,304.96	0.00	0.00	0.00
10,300.00	90.44	360.00	7,845.22	2,404.96	-273.59	2,404.96	0.00	0.00	0.00
10,400.00	90.44	360.00	7,844.46	2,504.96	-273.59	2,504.96	0.00	0.00	0.00
10,500.00	90.44	360.00	7,843.70	2,604.95	-273.59	2,604.95	0.00	0.00	0.00
10,600.00	90.44	360.00	7,842.94	2,704.95	-273.59	2,704.95	0.00	0.00	0.00
10,700.00	90.44	360.00	7,842.18	2,804.95	-273.59	2,804.95	0.00	0.00	0.00
10,800.00	90.44	360.00	7,841.42	2,904.94	-273.59	2,904.94	0.00	0.00	0.00
10,900.00	90.44	360.00	7,840.66	3,004.94	-273.59	3,004.94	0.00	0.00	0.00
11,000.00	90.44	360.00	7,839.90	3,104.94	-273.59	3,104.94	0.00	0.00	0.00
11,100.00	90.44	360.00	7,839.14	3,204.94	-273.59	3,204.94	0.00	0.00	0.00
11,200.00	90.44	360.00	7,838.38	3,304.93	-273.59	3,304.93	0.00	0.00	0.00
11,300.00	90.44	360.00	7,837.62	3,404.93	-273.59	3,404.93	0.00	0.00	0.00
11,400.00	90.44	360.00	7,836.86	3,504.93	-273.59	3,504.93	0.00	0.00	0.00
11,500.00	90.44	360.00	7,836.10	3,604.92	-273.59	3,604.92	0.00	0.00	0.00
11,600.00	90.44	360.00	7,835.34	3,704.92	-273.59	3,704.92	0.00	0.00	0.00
11,700.00	90.44	360.00	7,834.58	3,804.92	-273.59	3,804.92	0.00	0.00	0.00
11,800.00	90.44	360.00	7,833.82	3,904.92	-273.59	3,904.92	0.00	0.00	0.00
11,900.00	90.44	360.00	7,833.06	4,004.91	-273.59	4,004.91	0.00	0.00	0.00
12,000.00	90.44	360.00	7,832.30	4,104.91	-273.59	4,104.91	0.00	0.00	0.00
12,100.00	90.44	360.00	7,831.54	4,204.91	-273.59	4,204.91	0.00	0.00	0.00
12,200.00	90.44	360.00	7,830.78	4,304.90	-273.59	4,304.90	0.00	0.00	0.00
12,300.00	90.44	360.00	7,830.02	4,404.90	-273.59	4,404.90	0.00	0.00	0.00
12,400.00	90.44	360.00	7,829.26	4,504.90	-273.59	4,504.90	0.00	0.00	0.00
12,500.00	90.44	360.00	7,828.50	4,604.89	-273.59	4,604.89	0.00	0.00	0.00

Database:	EDM5000-RobertS-Local	Local Co-ordinate Reference:	Well HOWARD 30C-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 30C-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)
12,600.00	90.44	360.00	7,827.74	4,704.89	-273.59	4,704.89	0.00	0.00	0.00
12,700.00	90.44	360.00	7,826.98	4,804.89	-273.59	4,804.89	0.00	0.00	0.00
12,800.00	90.44	360.00	7,826.23	4,904.89	-273.59	4,904.89	0.00	0.00	0.00
12,900.00	90.44	360.00	7,825.47	5,004.88	-273.59	5,004.88	0.00	0.00	0.00
13,000.00	90.44	360.00	7,824.71	5,104.88	-273.59	5,104.88	0.00	0.00	0.00
13,100.00	90.44	360.00	7,823.95	5,204.88	-273.59	5,204.88	0.00	0.00	0.00
13,200.00	90.44	360.00	7,823.19	5,304.87	-273.59	5,304.87	0.00	0.00	0.00
13,300.00	90.44	360.00	7,822.43	5,404.87	-273.59	5,404.87	0.00	0.00	0.00
13,400.00	90.44	360.00	7,821.67	5,504.87	-273.59	5,504.87	0.00	0.00	0.00
13,500.00	90.44	360.00	7,820.91	5,604.87	-273.59	5,604.87	0.00	0.00	0.00
13,600.00	90.44	360.00	7,820.15	5,704.86	-273.59	5,704.86	0.00	0.00	0.00
13,700.00	90.44	360.00	7,819.39	5,804.86	-273.59	5,804.86	0.00	0.00	0.00
13,800.00	90.44	360.00	7,818.63	5,904.86	-273.59	5,904.86	0.00	0.00	0.00
13,900.00	90.44	360.00	7,817.87	6,004.85	-273.59	6,004.85	0.00	0.00	0.00
14,000.00	90.44	360.00	7,817.11	6,104.85	-273.59	6,104.85	0.00	0.00	0.00
14,100.00	90.44	360.00	7,816.35	6,204.85	-273.59	6,204.85	0.00	0.00	0.00
14,200.00	90.44	360.00	7,815.59	6,304.85	-273.59	6,304.85	0.00	0.00	0.00
14,300.00	90.44	360.00	7,814.83	6,404.84	-273.59	6,404.84	0.00	0.00	0.00
14,400.00	90.44	360.00	7,814.07	6,504.84	-273.59	6,504.84	0.00	0.00	0.00
14,500.00	90.44	360.00	7,813.31	6,604.84	-273.59	6,604.84	0.00	0.00	0.00
14,600.00	90.44	360.00	7,812.55	6,704.83	-273.59	6,704.83	0.00	0.00	0.00
14,700.00	90.44	360.00	7,811.79	6,804.83	-273.59	6,804.83	0.00	0.00	0.00
14,800.00	90.44	360.00	7,811.03	6,904.83	-273.59	6,904.83	0.00	0.00	0.00
14,900.00	90.44	360.00	7,810.27	7,004.83	-273.59	7,004.83	0.00	0.00	0.00
15,000.00	90.44	360.00	7,809.51	7,104.82	-273.59	7,104.82	0.00	0.00	0.00
15,100.00	90.44	360.00	7,808.75	7,204.82	-273.59	7,204.82	0.00	0.00	0.00
15,200.00	90.44	360.00	7,807.99	7,304.82	-273.59	7,304.82	0.00	0.00	0.00
15,300.00	90.44	360.00	7,807.23	7,404.81	-273.59	7,404.81	0.00	0.00	0.00
15,400.00	90.44	360.00	7,806.47	7,504.81	-273.59	7,504.81	0.00	0.00	0.00
15,462.28	90.44	360.00	7,806.00	7,567.09	-273.59	7,567.09	0.00	0.00	0.00
TD at 15462.28 - PBHL_HOWARD 30C-29HZ(1' FNL 135' 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 30C-2	0.00	0.00	7,806.00	7,567.09	-273.59	1,254,053.89	3,161,485.29	40.0293240	-104.9233310
- 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	
8,225.37	7,860.98	7"(1967' FNL 119' FWL)	7.000	7.500	

Database:	EDM5000-RobertS-Local	Local Co-ordinate Reference:	Well HOWARD 30C-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 30C-29HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	PLAN #2 PRELIMINARY		

Formations					
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
798.00	798.00	Fox Hills Base			
4,817.88	4,788.00	Sussex			
5,357.88	5,328.00	Shannon			
7,356.91	7,327.00	Sharon Springs			
7,430.60	7,400.00	Niobrara A			
7,587.74	7,548.00	Niobrara B			
7,752.31	7,682.00	Niobrara C			
8,034.81	7,832.00	Fort Hays			
8,142.06	7,856.00	Codell			

Plan Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
1,300.00	1,300.00	0.00	0.00	Start Build 2.00
1,800.03	1,797.50	-29.36	-32.13	Start 1632.82 hold at 1800.03 MD
3,432.85	3,405.50	-220.64	-241.46	Start Drop -2.00
3,932.88	3,903.00	-250.00	-273.59	Start 3385.06 hold at 3932.88 MD
7,317.94	7,288.06	-250.00	-273.59	Start DLS 10.00 TFO 360.00
8,222.29	7,861.00	327.31	-273.59	Start 7239.99 hold at 8222.29 MD
15,462.28	7,806.00	7,567.09	-273.59	TD at 15462.28