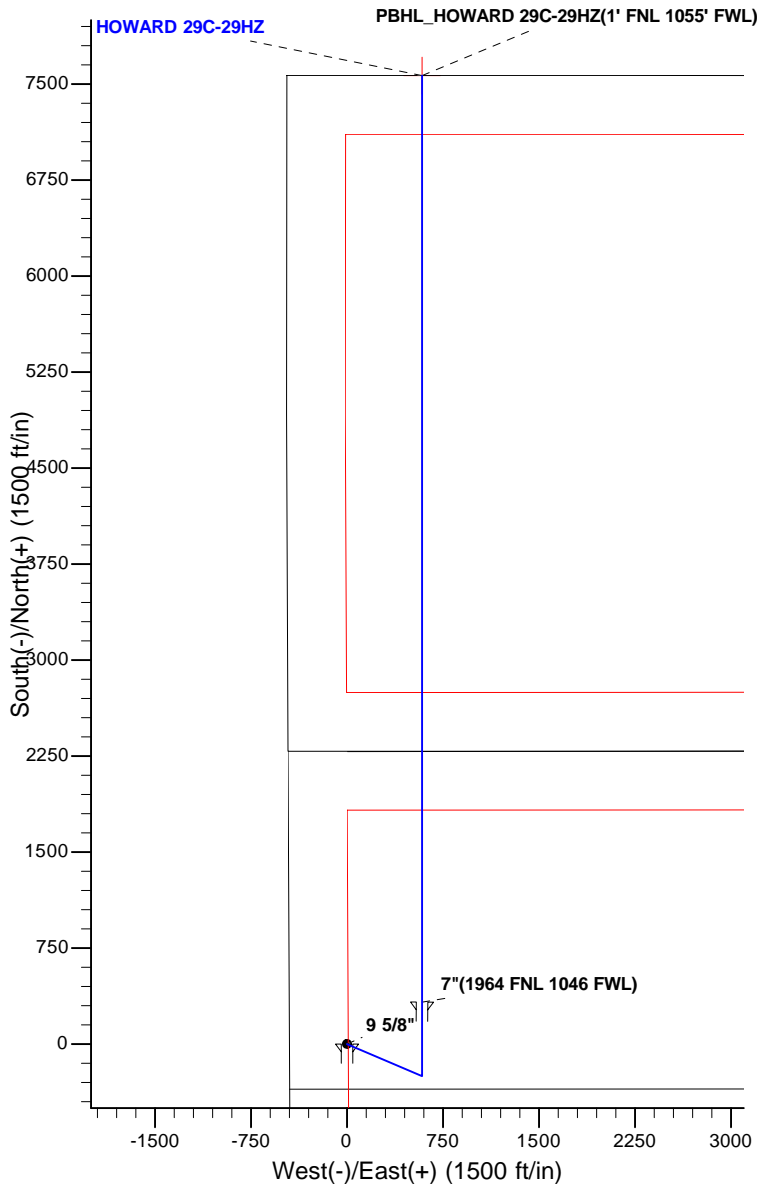
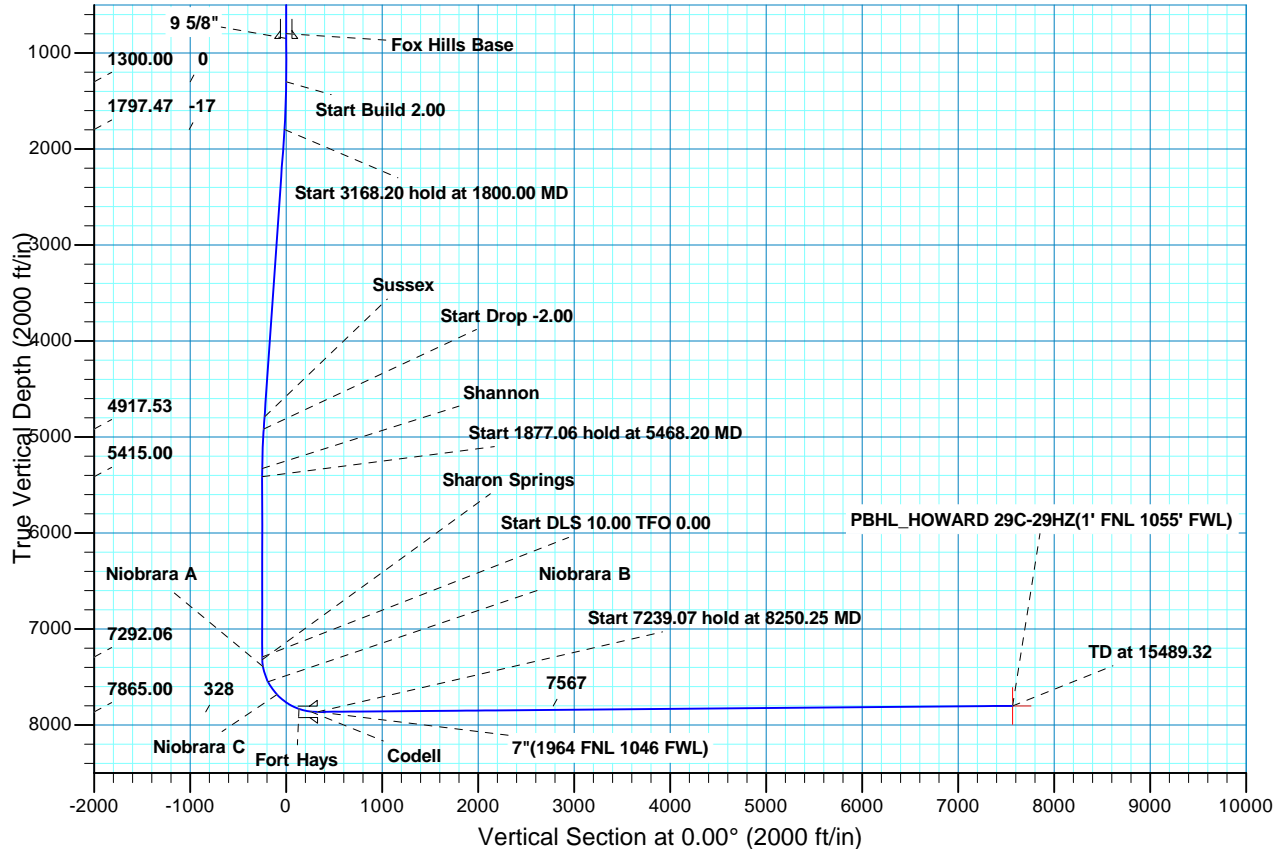


WELL DETAILS: HOWARD 29C-29HZ									
GL 5031 & KB 17 @ 5048.00ft (ASSUMED)									
		+N/-S	+E/-W	Northing	Easting	Latitude	Longitude		
		0.00	0.00	1246489.51	3161868.39	40.0085520	-104.9221390		
SECTION DETAILS									
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1300.00	0.00	0.00	1300.00	0.00	0.00	0.00	0.00	0.00	
1800.00	10.00	113.10	1797.47	-17.08	40.03	2.00	113.10	-17.08	
4968.20	10.00	113.10	4917.53	-232.92	546.08	0.00	0.00	-232.92	
5468.20	0.00	0.00	5415.00	-250.00	586.11	2.00	180.00	-250.00	
7345.26	0.00	0.00	7292.06	-250.00	586.11	0.00	0.00	-250.00	
8250.25	90.50	0.00	7865.00	327.94	586.11	10.00	0.00	327.94	
15489.32	90.50	0.00	7802.00	7566.74	586.11	0.00	0.007566.74		PBHL_HOWARD 29C-29HZ(1' FNL 1055' FWL)
FORMATION TOP DETAILS							CASING DETAILS		
TVDPath	MDPath	Formation		Inc					
798.00	798.00	Fox Hills Base		0.00					
4788.00	4836.67	Sussex		10.00					
5328.00	5381.19	Shannon		1.74					
7320.00	7373.21	Sharon Springs		2.80					
7393.00	7446.73	Niobrara A		10.15					
7550.00	7612.82	Niobrara B		26.76					
7685.00	7778.26	Niobrara C		43.30					
7833.00	8052.81	Fort Hays		70.76					
7861.00	8177.37	Codell		83.21					





Scientific Drilling

US ROCKIES REGION PLANNING

COLORADO NORTHERN ZONE - 83

HOWARD 5-32HZ

HOWARD 29C-29HZ

OH

Plan: PLAN #1 PRELIMINARY

Standard Planning Report

18 July, 2013

Database:	EDM5000-RobertS-Local	Local Co-ordinate Reference:	Well HOWARD 29C-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 29C-29HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	PLAN #1 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 29C-29HZ, 2287' FNL 450' FWL			
Well Position	+N/-S	0.35 ft	Northing:	1,246,489.51 usft
	+E/-W	60.23 ft	Easting:	3,161,868.39 usft
Position Uncertainty		0.00 ft	Wellhead Elevation:	Latitude: 40.0085520
				Longitude: -104.9221390
				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 #1 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	
1,800.00	10.00	113.10	1,797.47	-17.08	40.03	2.00	2.00	0.00	113.10	
4,968.20	10.00	113.10	4,917.53	-232.92	546.08	0.00	0.00	0.00	0.00	
5,468.20	0.00	0.00	5,415.00	-250.00	586.11	2.00	-2.00	0.00	180.00	
7,345.26	0.00	0.00	7,292.06	-250.00	586.11	0.00	0.00	0.00	0.00	
8,250.25	90.50	0.00	7,865.00	327.94	586.11	10.00	10.00	0.00	0.00	
15,489.32	90.50	0.00	7,802.00	7,566.74	586.11	0.00	0.00	0.00	0.00	PBHL_HOWARD 29C

Database:	EDM5000-RobertS-Local	Local Co-ordinate Reference:	Well HOWARD 29C-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 29C-29HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	PLAN #1 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	113.10	1,399.98	-0.68	1.61	-0.68	2.00	2.00	0.00
1,500.00	4.00	113.10	1,499.84	-2.74	6.42	-2.74	2.00	2.00	0.00
1,600.00	6.00	113.10	1,599.45	-6.16	14.44	-6.16	2.00	2.00	0.00
1,700.00	8.00	113.10	1,698.70	-10.94	25.64	-10.94	2.00	2.00	0.00
1,800.00	10.00	113.10	1,797.47	-17.08	40.03	-17.08	2.00	2.00	0.00
Start 3168.20 hold at 1800.00 MD									
1,900.00	10.00	113.10	1,895.95	-23.89	56.01	-23.89	0.00	0.00	0.00
2,000.00	10.00	113.10	1,994.43	-30.70	71.98	-30.70	0.00	0.00	0.00
2,100.00	10.00	113.10	2,092.91	-37.51	87.95	-37.51	0.00	0.00	0.00
2,200.00	10.00	113.10	2,191.39	-44.33	103.92	-44.33	0.00	0.00	0.00
2,300.00	10.00	113.10	2,289.87	-51.14	119.90	-51.14	0.00	0.00	0.00
2,400.00	10.00	113.10	2,388.35	-57.95	135.87	-57.95	0.00	0.00	0.00
2,500.00	10.00	113.10	2,486.83	-64.77	151.84	-64.77	0.00	0.00	0.00
2,600.00	10.00	113.10	2,585.31	-71.58	167.81	-71.58	0.00	0.00	0.00
2,700.00	10.00	113.10	2,683.79	-78.39	183.79	-78.39	0.00	0.00	0.00
2,800.00	10.00	113.10	2,782.27	-85.21	199.76	-85.21	0.00	0.00	0.00
2,900.00	10.00	113.10	2,880.75	-92.02	215.73	-92.02	0.00	0.00	0.00
3,000.00	10.00	113.10	2,979.23	-98.83	231.70	-98.83	0.00	0.00	0.00
3,100.00	10.00	113.10	3,077.72	-105.64	247.68	-105.64	0.00	0.00	0.00
3,200.00	10.00	113.10	3,176.20	-112.46	263.65	-112.46	0.00	0.00	0.00
3,300.00	10.00	113.10	3,274.68	-119.27	279.62	-119.27	0.00	0.00	0.00
3,400.00	10.00	113.10	3,373.16	-126.08	295.59	-126.08	0.00	0.00	0.00
3,500.00	10.00	113.10	3,471.64	-132.90	311.57	-132.90	0.00	0.00	0.00
3,600.00	10.00	113.10	3,570.12	-139.71	327.54	-139.71	0.00	0.00	0.00
3,700.00	10.00	113.10	3,668.60	-146.52	343.51	-146.52	0.00	0.00	0.00
3,800.00	10.00	113.10	3,767.08	-153.34	359.48	-153.34	0.00	0.00	0.00
3,900.00	10.00	113.10	3,865.56	-160.15	375.46	-160.15	0.00	0.00	0.00
4,000.00	10.00	113.10	3,964.04	-166.96	391.43	-166.96	0.00	0.00	0.00
4,100.00	10.00	113.10	4,062.52	-173.77	407.40	-173.77	0.00	0.00	0.00
4,200.00	10.00	113.10	4,161.00	-180.59	423.38	-180.59	0.00	0.00	0.00
4,300.00	10.00	113.10	4,259.48	-187.40	439.35	-187.40	0.00	0.00	0.00
4,400.00	10.00	113.10	4,357.97	-194.21	455.32	-194.21	0.00	0.00	0.00
4,500.00	10.00	113.10	4,456.45	-201.03	471.29	-201.03	0.00	0.00	0.00
4,600.00	10.00	113.10	4,554.93	-207.84	487.27	-207.84	0.00	0.00	0.00
4,700.00	10.00	113.10	4,653.41	-214.65	503.24	-214.65	0.00	0.00	0.00

Database:	EDM5000-RobertS-Local	Local Co-ordinate Reference:	Well HOWARD 29C-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 29C-29HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	PLAN #1 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)
4,800.00	10.00	113.10	4,751.89	-221.46	519.21	-221.46	0.00	0.00	0.00
4,836.67	10.00	113.10	4,788.00	-223.96	525.07	-223.96	0.00	0.00	0.00
Sussex									
4,900.00	10.00	113.10	4,850.37	-228.28	535.18	-228.28	0.00	0.00	0.00
4,968.20	10.00	113.10	4,917.53	-232.92	546.08	-232.92	0.00	0.00	0.00
Start Drop -2.00									
5,000.00	9.36	113.10	4,948.88	-235.02	551.00	-235.02	2.00	-2.00	0.00
5,100.00	7.36	113.10	5,047.81	-240.73	564.38	-240.73	2.00	-2.00	0.00
5,200.00	5.36	113.10	5,147.19	-245.08	574.57	-245.08	2.00	-2.00	0.00
5,300.00	3.36	113.10	5,246.89	-248.06	581.57	-248.06	2.00	-2.00	0.00
5,381.19	1.74	113.10	5,328.00	-249.48	584.89	-249.48	2.00	-2.00	0.00
Shannon									
5,400.00	1.36	113.10	5,346.80	-249.68	585.36	-249.68	2.00	-2.00	0.00
5,468.20	0.00	0.00	5,415.00	-250.00	586.11	-250.00	2.00	-2.00	0.00
Start 1877.06 hold at 5468.20 MD									
5,500.00	0.00	0.00	5,446.80	-250.00	586.11	-250.00	0.00	0.00	0.00
5,600.00	0.00	0.00	5,546.80	-250.00	586.11	-250.00	0.00	0.00	0.00
5,700.00	0.00	0.00	5,646.80	-250.00	586.11	-250.00	0.00	0.00	0.00
5,800.00	0.00	0.00	5,746.80	-250.00	586.11	-250.00	0.00	0.00	0.00
5,900.00	0.00	0.00	5,846.80	-250.00	586.11	-250.00	0.00	0.00	0.00
6,000.00	0.00	0.00	5,946.80	-250.00	586.11	-250.00	0.00	0.00	0.00
6,100.00	0.00	0.00	6,046.80	-250.00	586.11	-250.00	0.00	0.00	0.00
6,200.00	0.00	0.00	6,146.80	-250.00	586.11	-250.00	0.00	0.00	0.00
6,300.00	0.00	0.00	6,246.80	-250.00	586.11	-250.00	0.00	0.00	0.00
6,400.00	0.00	0.00	6,346.80	-250.00	586.11	-250.00	0.00	0.00	0.00
6,500.00	0.00	0.00	6,446.80	-250.00	586.11	-250.00	0.00	0.00	0.00
6,600.00	0.00	0.00	6,546.80	-250.00	586.11	-250.00	0.00	0.00	0.00
6,700.00	0.00	0.00	6,646.80	-250.00	586.11	-250.00	0.00	0.00	0.00
6,800.00	0.00	0.00	6,746.80	-250.00	586.11	-250.00	0.00	0.00	0.00
6,900.00	0.00	0.00	6,846.80	-250.00	586.11	-250.00	0.00	0.00	0.00
7,000.00	0.00	0.00	6,946.80	-250.00	586.11	-250.00	0.00	0.00	0.00
7,100.00	0.00	0.00	7,046.80	-250.00	586.11	-250.00	0.00	0.00	0.00
7,200.00	0.00	0.00	7,146.80	-250.00	586.11	-250.00	0.00	0.00	0.00
7,300.00	0.00	0.00	7,246.80	-250.00	586.11	-250.00	0.00	0.00	0.00
7,345.26	0.00	0.00	7,292.06	-250.00	586.11	-250.00	0.00	0.00	0.00
Start DLS 10.00 TFO 0.00									
7,373.21	2.80	0.00	7,320.00	-249.32	586.11	-249.32	10.00	10.00	0.00
Sharon Springs									
7,400.00	5.47	0.00	7,346.71	-247.39	586.11	-247.39	10.00	10.00	0.00
7,446.73	10.15	0.00	7,393.00	-241.04	586.11	-241.04	10.00	10.00	0.00
Niobrara A									
7,500.00	15.47	0.00	7,444.92	-229.23	586.11	-229.23	10.00	10.00	0.00
7,600.00	25.47	0.00	7,538.49	-194.30	586.11	-194.30	10.00	10.00	0.00
7,612.82	26.76	0.00	7,550.00	-188.65	586.11	-188.65	10.00	10.00	0.00
Niobrara B									
7,700.00	35.47	0.00	7,624.57	-143.65	586.11	-143.65	10.00	10.00	0.00
7,778.26	43.30	0.00	7,685.00	-94.03	586.11	-94.03	10.00	10.00	0.00
Niobrara C									
7,800.00	45.47	0.00	7,700.54	-78.82	586.11	-78.82	10.00	10.00	0.00
7,900.00	55.47	0.00	7,764.10	-1.78	586.11	-1.78	10.00	10.00	0.00
8,000.00	65.47	0.00	7,813.32	85.12	586.11	85.12	10.00	10.00	0.00
8,052.81	70.76	0.00	7,833.00	134.11	586.11	134.11	10.00	10.00	0.00

Database:	EDM5000-RobertS-Local	Local Co-ordinate Reference:	Well HOWARD 29C-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 29C-29HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	PLAN #1 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)
Fort Hays									
8,100.00	75.47	0.00	7,846.70	179.25	586.11	179.25	10.00	10.00	0.00
8,177.37	83.21	0.00	7,861.00	255.22	586.11	255.22	10.00	10.00	0.00
Codell									
8,200.00	85.47	0.00	7,863.23	277.74	586.11	277.74	10.00	10.00	0.00
8,250.25	90.50	0.00	7,865.00	327.95	586.11	327.95	10.00	10.00	0.00
Start 7239.07 hold at 8250.25 MD - 7"(1964 FNL 1046 FWL)									
8,300.00	90.50	0.00	7,864.56	377.69	586.11	377.69	0.00	0.00	0.00
8,400.00	90.50	0.00	7,863.69	477.69	586.11	477.69	0.00	0.00	0.00
8,500.00	90.50	0.00	7,862.82	577.69	586.11	577.69	0.00	0.00	0.00
8,600.00	90.50	0.00	7,861.95	677.68	586.11	677.68	0.00	0.00	0.00
8,700.00	90.50	0.00	7,861.08	777.68	586.11	777.68	0.00	0.00	0.00
8,800.00	90.50	0.00	7,860.21	877.67	586.11	877.67	0.00	0.00	0.00
8,900.00	90.50	0.00	7,859.34	977.67	586.11	977.67	0.00	0.00	0.00
9,000.00	90.50	0.00	7,858.47	1,077.67	586.11	1,077.67	0.00	0.00	0.00
9,100.00	90.50	0.00	7,857.60	1,177.66	586.11	1,177.66	0.00	0.00	0.00
9,200.00	90.50	0.00	7,856.73	1,277.66	586.11	1,277.66	0.00	0.00	0.00
9,300.00	90.50	0.00	7,855.86	1,377.66	586.11	1,377.66	0.00	0.00	0.00
9,400.00	90.50	0.00	7,854.99	1,477.65	586.11	1,477.65	0.00	0.00	0.00
9,500.00	90.50	0.00	7,854.12	1,577.65	586.11	1,577.65	0.00	0.00	0.00
9,600.00	90.50	0.00	7,853.25	1,677.64	586.11	1,677.64	0.00	0.00	0.00
9,700.00	90.50	0.00	7,852.38	1,777.64	586.11	1,777.64	0.00	0.00	0.00
9,800.00	90.50	0.00	7,851.51	1,877.64	586.11	1,877.64	0.00	0.00	0.00
9,900.00	90.50	0.00	7,850.64	1,977.63	586.11	1,977.63	0.00	0.00	0.00
10,000.00	90.50	0.00	7,849.77	2,077.63	586.11	2,077.63	0.00	0.00	0.00
10,100.00	90.50	0.00	7,848.90	2,177.63	586.11	2,177.63	0.00	0.00	0.00
10,200.00	90.50	0.00	7,848.03	2,277.62	586.11	2,277.62	0.00	0.00	0.00
10,300.00	90.50	0.00	7,847.16	2,377.62	586.11	2,377.62	0.00	0.00	0.00
10,400.00	90.50	0.00	7,846.29	2,477.61	586.11	2,477.61	0.00	0.00	0.00
10,500.00	90.50	0.00	7,845.42	2,577.61	586.11	2,577.61	0.00	0.00	0.00
10,600.00	90.50	0.00	7,844.55	2,677.61	586.11	2,677.61	0.00	0.00	0.00
10,700.00	90.50	0.00	7,843.68	2,777.60	586.11	2,777.60	0.00	0.00	0.00
10,800.00	90.50	0.00	7,842.81	2,877.60	586.11	2,877.60	0.00	0.00	0.00
10,900.00	90.50	0.00	7,841.94	2,977.60	586.11	2,977.60	0.00	0.00	0.00
11,000.00	90.50	0.00	7,841.07	3,077.59	586.11	3,077.59	0.00	0.00	0.00
11,100.00	90.50	0.00	7,840.20	3,177.59	586.11	3,177.59	0.00	0.00	0.00
11,200.00	90.50	0.00	7,839.33	3,277.58	586.11	3,277.58	0.00	0.00	0.00
11,300.00	90.50	0.00	7,838.46	3,377.58	586.11	3,377.58	0.00	0.00	0.00
11,400.00	90.50	0.00	7,837.59	3,477.58	586.11	3,477.58	0.00	0.00	0.00
11,500.00	90.50	0.00	7,836.72	3,577.57	586.11	3,577.57	0.00	0.00	0.00
11,600.00	90.50	0.00	7,835.85	3,677.57	586.11	3,677.57	0.00	0.00	0.00
11,700.00	90.50	0.00	7,834.98	3,777.57	586.11	3,777.57	0.00	0.00	0.00
11,800.00	90.50	0.00	7,834.11	3,877.56	586.11	3,877.56	0.00	0.00	0.00
11,900.00	90.50	0.00	7,833.24	3,977.56	586.11	3,977.56	0.00	0.00	0.00
12,000.00	90.50	0.00	7,832.37	4,077.55	586.11	4,077.55	0.00	0.00	0.00
12,100.00	90.50	0.00	7,831.49	4,177.55	586.11	4,177.55	0.00	0.00	0.00
12,200.00	90.50	0.00	7,830.62	4,277.55	586.11	4,277.55	0.00	0.00	0.00
12,300.00	90.50	0.00	7,829.75	4,377.54	586.11	4,377.54	0.00	0.00	0.00
12,400.00	90.50	0.00	7,828.88	4,477.54	586.11	4,477.54	0.00	0.00	0.00
12,500.00	90.50	0.00	7,828.01	4,577.53	586.11	4,577.53	0.00	0.00	0.00
12,600.00	90.50	0.00	7,827.14	4,677.53	586.11	4,677.53	0.00	0.00	0.00
12,700.00	90.50	0.00	7,826.27	4,777.53	586.11	4,777.53	0.00	0.00	0.00
12,800.00	90.50	0.00	7,825.40	4,877.52	586.11	4,877.52	0.00	0.00	0.00

Database:	EDM5000-RobertS-Local	Local Co-ordinate Reference:	Well HOWARD 29C-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 29C-29HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	PLAN #1 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)
12,900.00	90.50	0.00	7,824.53	4,977.52	586.11	4,977.52	0.00	0.00	0.00
13,000.00	90.50	0.00	7,823.66	5,077.52	586.11	5,077.52	0.00	0.00	0.00
13,100.00	90.50	0.00	7,822.79	5,177.51	586.11	5,177.51	0.00	0.00	0.00
13,200.00	90.50	0.00	7,821.92	5,277.51	586.11	5,277.51	0.00	0.00	0.00
13,300.00	90.50	0.00	7,821.05	5,377.50	586.11	5,377.50	0.00	0.00	0.00
13,400.00	90.50	0.00	7,820.18	5,477.50	586.11	5,477.50	0.00	0.00	0.00
13,500.00	90.50	0.00	7,819.31	5,577.50	586.11	5,577.50	0.00	0.00	0.00
13,600.00	90.50	0.00	7,818.44	5,677.49	586.11	5,677.49	0.00	0.00	0.00
13,700.00	90.50	0.00	7,817.57	5,777.49	586.11	5,777.49	0.00	0.00	0.00
13,800.00	90.50	0.00	7,816.70	5,877.49	586.11	5,877.49	0.00	0.00	0.00
13,900.00	90.50	0.00	7,815.83	5,977.48	586.11	5,977.48	0.00	0.00	0.00
14,000.00	90.50	0.00	7,814.96	6,077.48	586.11	6,077.48	0.00	0.00	0.00
14,100.00	90.50	0.00	7,814.09	6,177.47	586.11	6,177.47	0.00	0.00	0.00
14,200.00	90.50	0.00	7,813.22	6,277.47	586.11	6,277.47	0.00	0.00	0.00
14,300.00	90.50	0.00	7,812.35	6,377.47	586.11	6,377.47	0.00	0.00	0.00
14,400.00	90.50	0.00	7,811.48	6,477.46	586.11	6,477.46	0.00	0.00	0.00
14,500.00	90.50	0.00	7,810.61	6,577.46	586.11	6,577.46	0.00	0.00	0.00
14,600.00	90.50	0.00	7,809.74	6,677.46	586.11	6,677.46	0.00	0.00	0.00
14,700.00	90.50	0.00	7,808.87	6,777.45	586.11	6,777.45	0.00	0.00	0.00
14,800.00	90.50	0.00	7,808.00	6,877.45	586.11	6,877.45	0.00	0.00	0.00
14,900.00	90.50	0.00	7,807.13	6,977.44	586.11	6,977.44	0.00	0.00	0.00
15,000.00	90.50	0.00	7,806.26	7,077.44	586.11	7,077.44	0.00	0.00	0.00
15,100.00	90.50	0.00	7,805.39	7,177.44	586.11	7,177.44	0.00	0.00	0.00
15,200.00	90.50	0.00	7,804.52	7,277.43	586.11	7,277.43	0.00	0.00	0.00
15,300.00	90.50	0.00	7,803.65	7,377.43	586.11	7,377.43	0.00	0.00	0.00
15,400.00	90.50	0.00	7,802.78	7,477.43	586.11	7,477.43	0.00	0.00	0.00
15,489.32	90.50	0.00	7,802.00	7,566.74	586.11	7,566.74	0.00	0.00	0.00
TD at 15489.32 - PBHL_HOWARD 29C-29HZ(1' FNL 1055' FWL)									

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
PBHL_HOWARD 29C-2	0.00	0.00	7,802.00	7,566.74	586.11	1,254,059.89	3,162,405.18	40.0293240	-104.9200460
- hit/miss target									
- Shape									
- 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	
8,250.25	7,865.00	7"(1964 FNL 1046 FWL)	7.000	7.500	

Database:	EDM5000-RobertS-Local	Local Co-ordinate Reference:	Well HOWARD 29C-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 29C-29HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	PLAN #1 PRELIMINARY		

Formations					
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
798.00	798.00	Fox Hills Base			
4,836.67	4,788.00	Sussex			
5,381.19	5,328.00	Shannon			
7,373.21	7,320.00	Sharon Springs			
7,446.73	7,393.00	Niobrara A			
7,612.82	7,550.00	Niobrara B			
7,778.26	7,685.00	Niobrara C			
8,052.81	7,833.00	Fort Hays			
8,177.37	7,861.00	Codell			

Plan Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
1,300.00	1,300.00	0.00	0.00	Start Build 2.00	
1,800.00	1,797.47	-17.08	40.03	Start 3168.20 hold at 1800.00 MD	
4,968.20	4,917.53	-232.92	546.08	Start Drop -2.00	
5,468.20	5,415.00	-250.00	586.11	Start 1877.06 hold at 5468.20 MD	
7,345.26	7,292.06	-250.00	586.11	Start DLS 10.00 TFO 0.00	
8,250.25	7,865.00	327.94	586.11	Start 7239.07 hold at 8250.25 MD	
15,489.32	7,802.00	7,566.74	586.11	TD at 15489.32	