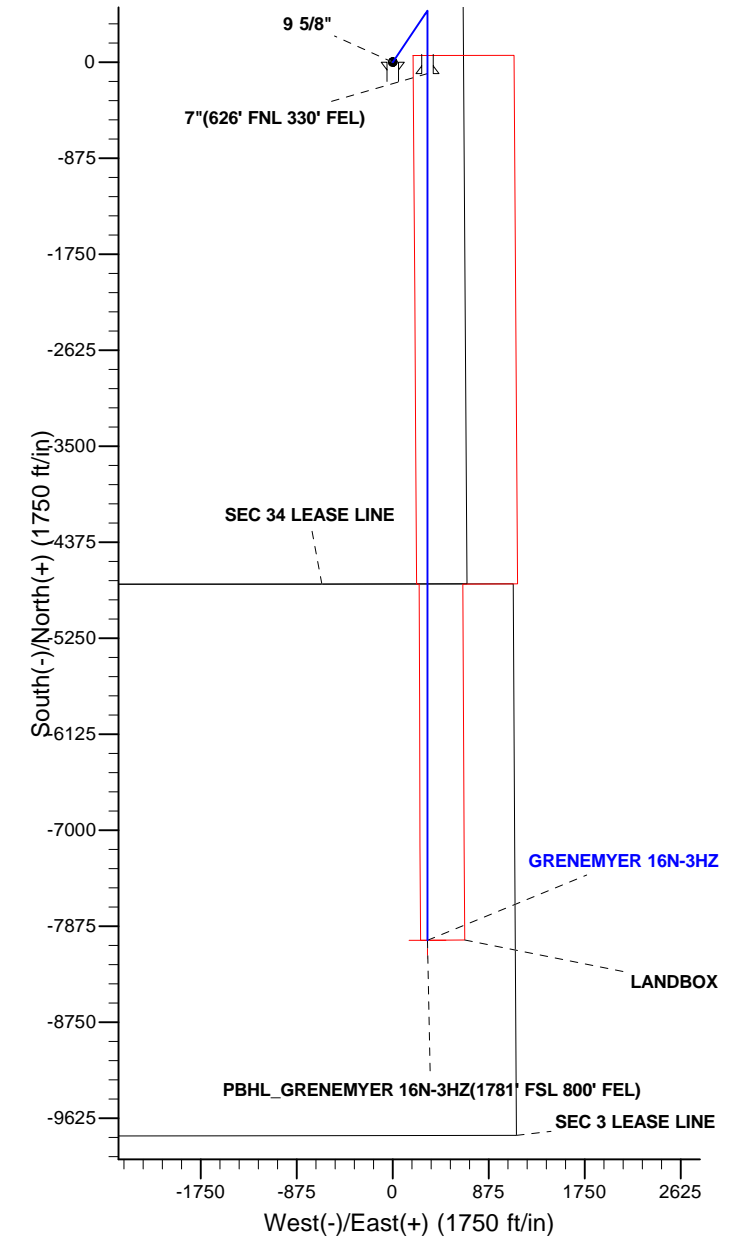
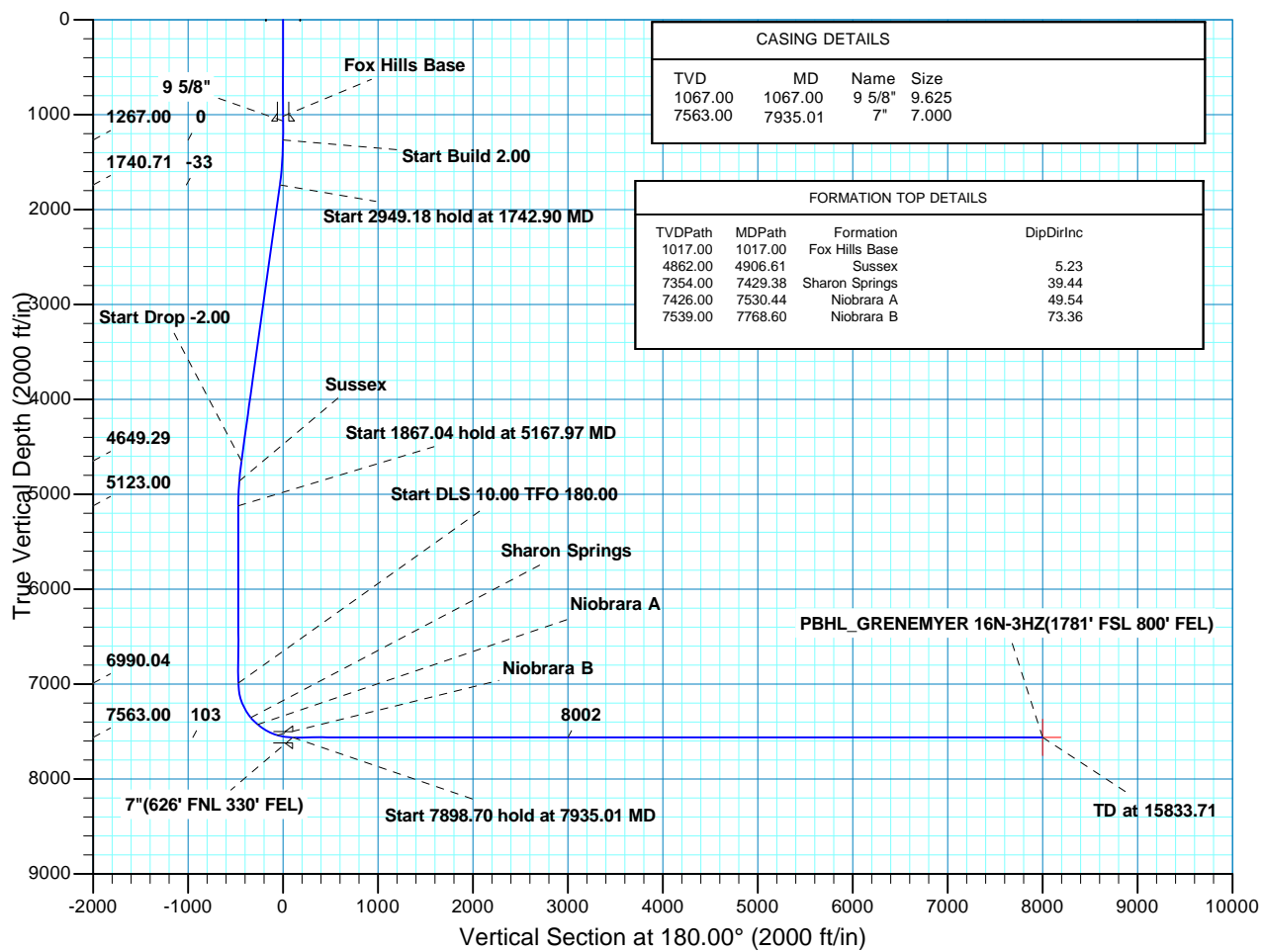


WELL DETAILS: GRENNEMYER 16N-3HZ									
GL 5055 & KB 17 @ 5072.00ft (Original Well Elev)									
	+N/-S	+E/-W		Northing	Easting		Latitude		Longitude
	0.00	0.00		1248366.48	3176596.09		40.0134290		-104.8695160
SECTION DETAILS									
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1267.00	0.00	0.00	1267.00	0.00	0.00	0.00	0.00	0.00	
1742.90	9.52	33.94	1740.71	32.72	22.02	2.00	33.94	-32.72	
4692.07	9.52	33.94	4649.29	437.28	294.31	0.00	0.00	-437.28	
5167.97	0.00	0.00	5123.00	470.00	316.33	2.00	180.00	-470.00	
7035.01	0.00	0.00	6990.04	470.00	316.33	0.00	0.00	-470.00	
7935.01	90.00	180.00	7563.00	-102.96	316.33	10.00	180.00	102.96	
15833.71	90.00	180.00	7563.00	-8001.66	316.33	0.00	0.00800166		PBHL_GRENNEMYER 16N-3HZ(1781' FSL 800' FEL)
DESIGN TARGET DETAILS									
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape	
PBHL	7563.00	-8001.66	316.33	1240367.29	3176969.30	39.9914630	-104.8683870	Point	
- plan hits target center									





# Scientific Drilling

## **US ROCKIES REGION PLANNING**

**COLORADO NORTHERN ZONE - 83**

**GRENNEMYER 1-34HZ PAD**

**GRENNEMYER 16N-3HZ**

**OH**

**Plan: PLAN #1 PRELIMINARY**

## **Standard Planning Report**

**26 August, 2013**

<b>Database:</b>	EDM5000-RobertS-Local	<b>Local Co-ordinate Reference:</b>	Well GRENNEMYER 16N-3HZ
<b>Company:</b>	US ROCKIES REGION PLANNING	<b>TVD Reference:</b>	GL 5055 & KB 17 @ 5072.00ft (Original Well Elev)
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>MD Reference:</b>	GL 5055 & KB 17 @ 5072.00ft (Original Well Elev)
<b>Site:</b>	GRENNEMYER 1-34HZ PAD	<b>North Reference:</b>	True
<b>Well:</b>	GRENNEMYER 16N-3HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OH		
<b>Design:</b>	PLAN #1 PRELIMINARY		

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

Site						GRENNEMYER 1-34HZ PAD, NENE SECTION 34 T1N R67W											
Site Position:			Northing:			1,248,366.47 usft			Latitude:			40.0134290					
From:			Lat/Long			Easting:			3,176,596.09 usft			Longitude:			-104.8695160		
Position Uncertainty:			0.00 ft			Slot Radius:			13.200 in			Grid Convergence:			0.41		

Well	GRENNEMYER 16N-3HZ, 522 FNL 646 FEL					
Well Position	+N/-S	0.00 ft	Northing:	1,248,366.47 usft	Latitude:	40.0134290
	+E/-W	0.00 ft	Easting:	3,176,596.09 usft	Longitude:	-104.8695160
Position Uncertainty		0.00 ft	Wellhead Elevation:		Ground Level:	5,055.00 ft

<b>Wellbore</b>	OH				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	BGGM2013	2013/08/22	8.63	66.64	52,613

<b>Design</b>	PLAN #1 PRELIMINARY			
<b>Audit Notes:</b>				
<b>Version:</b>	<b>Phase:</b>	PLAN	<b>Tie On Depth:</b>	0.00
<b>Vertical Section:</b>	<b>Depth From (TVD) (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Direction (°)</b>
	0.00	0.00	0.00	180.00

<b>Plan Sections</b>										
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	
1,267.00	0.00	0.00	1,267.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,742.90	9.52	33.94	1,740.71	32.72	22.02	2.00	2.00	0.00	33.94	
4,692.07	9.52	33.94	4,649.29	437.28	294.31	0.00	0.00	0.00	0.00	
5,167.97	0.00	0.00	5,123.00	470.00	316.33	2.00	-2.00	0.00	180.00	
7,035.01	0.00	0.00	6,990.04	470.00	316.33	0.00	0.00	0.00	0.00	
7,935.01	90.00	180.00	7,563.00	-102.96	316.33	10.00	10.00	20.00	180.00	
15,833.71	90.00	180.00	7,563.00	-8,001.66	316.33	0.00	0.00	0.00	0.00	PBHL_GRENNEMYER

<b>Database:</b>	EDM5000-RobertS-Local	<b>Local Co-ordinate Reference:</b>	Well GRENNEMYER 16N-3HZ
<b>Company:</b>	US ROCKIES REGION PLANNING	<b>TVD Reference:</b>	GL 5055 & KB 17 @ 5072.00ft (Original Well Elev)
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>MD Reference:</b>	GL 5055 & KB 17 @ 5072.00ft (Original Well Elev)
<b>Site:</b>	GRENNEMYER 1-34HZ PAD	<b>North Reference:</b>	True
<b>Well:</b>	GRENNEMYER 16N-3HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OH		
<b>Design:</b>	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
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00
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
1,017.00	0.00	0.00	1,017.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Fox Hills Base</b>									
1,067.00	0.00	0.00	1,067.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>9 5/8"</b>									
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
1,267.00	0.00	0.00	1,267.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Start Build 2.00</b>									
1,300.00	0.66	33.94	1,300.00	0.16	0.11	-0.16	2.00	2.00	0.00
1,400.00	2.66	33.94	1,399.95	2.56	1.72	-2.56	2.00	2.00	0.00
1,500.00	4.66	33.94	1,499.74	7.86	5.29	-7.86	2.00	2.00	0.00
1,600.00	6.66	33.94	1,599.25	16.04	10.79	-16.04	2.00	2.00	0.00
1,700.00	8.66	33.94	1,698.35	27.10	18.24	-27.10	2.00	2.00	0.00
1,742.90	9.52	33.94	1,740.71	32.72	22.02	-32.72	2.00	2.00	0.00
<b>Start 2949.18 hold at 1742.90 MD</b>									
1,800.00	9.52	33.94	1,797.03	40.55	27.29	-40.55	0.00	0.00	0.00
1,900.00	9.52	33.94	1,895.65	54.27	36.53	-54.27	0.00	0.00	0.00
2,000.00	9.52	33.94	1,994.27	67.99	45.76	-67.99	0.00	0.00	0.00
2,100.00	9.52	33.94	2,092.90	81.70	54.99	-81.70	0.00	0.00	0.00
2,200.00	9.52	33.94	2,191.52	95.42	64.22	-95.42	0.00	0.00	0.00
2,300.00	9.52	33.94	2,290.15	109.14	73.46	-109.14	0.00	0.00	0.00
2,400.00	9.52	33.94	2,388.77	122.86	82.69	-122.86	0.00	0.00	0.00
2,500.00	9.52	33.94	2,487.39	136.58	91.92	-136.58	0.00	0.00	0.00
2,600.00	9.52	33.94	2,586.02	150.29	101.16	-150.29	0.00	0.00	0.00
2,700.00	9.52	33.94	2,684.64	164.01	110.39	-164.01	0.00	0.00	0.00
2,800.00	9.52	33.94	2,783.26	177.73	119.62	-177.73	0.00	0.00	0.00
2,900.00	9.52	33.94	2,881.89	191.45	128.85	-191.45	0.00	0.00	0.00
3,000.00	9.52	33.94	2,980.51	205.17	138.09	-205.17	0.00	0.00	0.00
3,100.00	9.52	33.94	3,079.13	218.88	147.32	-218.88	0.00	0.00	0.00
3,200.00	9.52	33.94	3,177.76	232.60	156.55	-232.60	0.00	0.00	0.00
3,300.00	9.52	33.94	3,276.38	246.32	165.79	-246.32	0.00	0.00	0.00
3,400.00	9.52	33.94	3,375.00	260.04	175.02	-260.04	0.00	0.00	0.00
3,500.00	9.52	33.94	3,473.63	273.76	184.25	-273.76	0.00	0.00	0.00
3,600.00	9.52	33.94	3,572.25	287.47	193.48	-287.47	0.00	0.00	0.00
3,700.00	9.52	33.94	3,670.87	301.19	202.72	-301.19	0.00	0.00	0.00
3,800.00	9.52	33.94	3,769.50	314.91	211.95	-314.91	0.00	0.00	0.00
3,900.00	9.52	33.94	3,868.12	328.63	221.18	-328.63	0.00	0.00	0.00
4,000.00	9.52	33.94	3,966.74	342.34	230.42	-342.34	0.00	0.00	0.00
4,100.00	9.52	33.94	4,065.37	356.06	239.65	-356.06	0.00	0.00	0.00
4,200.00	9.52	33.94	4,163.99	369.78	248.88	-369.78	0.00	0.00	0.00
4,300.00	9.52	33.94	4,262.61	383.50	258.11	-383.50	0.00	0.00	0.00

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<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>MD Reference:</b>	GL 5055 & KB 17 @ 5072.00ft (Original Well Elev)
<b>Site:</b>	GRENNEMYER 1-34HZ PAD	<b>North Reference:</b>	True
<b>Well:</b>	GRENNEMYER 16N-3HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OH		
<b>Design:</b>	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)	
4,400.00	9.52	33.94	4,361.24	397.22	267.35	-397.22	0.00	0.00	0.00	
4,500.00	9.52	33.94	4,459.86	410.93	276.58	-410.93	0.00	0.00	0.00	
4,600.00	9.52	33.94	4,558.48	424.65	285.81	-424.65	0.00	0.00	0.00	
4,692.07	9.52	33.94	4,649.29	437.28	294.31	-437.28	0.00	0.00	0.00	
<b>Start Drop -2.00</b>										
4,700.00	9.36	33.94	4,657.11	438.36	295.04	-438.36	2.00	-2.00	0.00	
4,800.00	7.36	33.94	4,756.04	450.42	303.16	-450.42	2.00	-2.00	0.00	
4,900.00	5.36	33.94	4,855.42	459.61	309.34	-459.61	2.00	-2.00	0.00	
4,906.61	5.23	33.94	4,862.00	460.12	309.68	-460.12	2.00	-2.00	0.00	
<b>Sussex</b>										
5,000.00	3.36	33.94	4,955.13	465.92	313.58	-465.92	2.00	-2.00	0.00	
5,100.00	1.36	33.94	5,055.04	469.33	315.88	-469.33	2.00	-2.00	0.00	
5,167.97	0.00	0.00	5,123.00	470.00	316.33	-470.00	2.00	-2.00	0.00	
<b>Start 1867.04 hold at 5167.97 MD</b>										
5,200.00	0.00	0.00	5,155.03	470.00	316.33	-470.00	0.00	0.00	0.00	
5,300.00	0.00	0.00	5,255.03	470.00	316.33	-470.00	0.00	0.00	0.00	
5,400.00	0.00	0.00	5,355.03	470.00	316.33	-470.00	0.00	0.00	0.00	
5,500.00	0.00	0.00	5,455.03	470.00	316.33	-470.00	0.00	0.00	0.00	
5,600.00	0.00	0.00	5,555.03	470.00	316.33	-470.00	0.00	0.00	0.00	
5,700.00	0.00	0.00	5,655.03	470.00	316.33	-470.00	0.00	0.00	0.00	
5,800.00	0.00	0.00	5,755.03	470.00	316.33	-470.00	0.00	0.00	0.00	
5,900.00	0.00	0.00	5,855.03	470.00	316.33	-470.00	0.00	0.00	0.00	
6,000.00	0.00	0.00	5,955.03	470.00	316.33	-470.00	0.00	0.00	0.00	
6,100.00	0.00	0.00	6,055.03	470.00	316.33	-470.00	0.00	0.00	0.00	
6,200.00	0.00	0.00	6,155.03	470.00	316.33	-470.00	0.00	0.00	0.00	
6,300.00	0.00	0.00	6,255.03	470.00	316.33	-470.00	0.00	0.00	0.00	
6,400.00	0.00	0.00	6,355.03	470.00	316.33	-470.00	0.00	0.00	0.00	
6,500.00	0.00	0.00	6,455.03	470.00	316.33	-470.00	0.00	0.00	0.00	
6,600.00	0.00	0.00	6,555.03	470.00	316.33	-470.00	0.00	0.00	0.00	
6,700.00	0.00	0.00	6,655.03	470.00	316.33	-470.00	0.00	0.00	0.00	
6,800.00	0.00	0.00	6,755.03	470.00	316.33	-470.00	0.00	0.00	0.00	
6,900.00	0.00	0.00	6,855.03	470.00	316.33	-470.00	0.00	0.00	0.00	
7,000.00	0.00	0.00	6,955.03	470.00	316.33	-470.00	0.00	0.00	0.00	
7,035.01	0.00	0.00	6,990.04	470.00	316.33	-470.00	0.00	0.00	0.00	
<b>Start DLS 10.00 TFO 180.00</b>										
7,100.00	6.50	180.00	7,054.89	466.32	316.33	-466.32	10.00	10.00	0.00	
7,200.00	16.50	180.00	7,152.76	446.41	316.33	-446.41	10.00	10.00	0.00	
7,300.00	26.50	180.00	7,245.68	409.81	316.33	-409.81	10.00	10.00	0.00	
7,400.00	36.50	180.00	7,330.84	357.62	316.33	-357.62	10.00	10.00	0.00	
7,429.38	39.44	180.00	7,354.00	339.55	316.33	-339.55	10.00	10.00	0.00	
<b>Sharon Springs</b>										
7,500.00	46.50	180.00	7,405.64	291.45	316.33	-291.45	10.00	10.00	0.00	
7,530.44	49.54	180.00	7,426.00	268.82	316.33	-268.82	10.00	10.00	0.00	
<b>Niobrara A</b>										
7,600.00	56.50	180.00	7,467.82	213.29	316.33	-213.29	10.00	10.00	0.00	
7,700.00	66.50	180.00	7,515.47	125.52	316.33	-125.52	10.00	10.00	0.00	
7,768.60	73.36	180.00	7,539.00	61.13	316.33	-61.13	10.00	10.00	0.00	
<b>Niobrara B</b>										
7,800.00	76.50	180.00	7,547.16	30.81	316.33	-30.81	10.00	10.00	0.00	
7,900.00	86.50	180.00	7,561.93	-67.97	316.33	67.97	10.00	10.00	0.00	
7,935.01	90.00	180.00	7,563.00	-102.96	316.33	102.96	10.00	10.00	0.00	

<b>Database:</b>	EDM5000-RobertS-Local	<b>Local Co-ordinate Reference:</b>	Well GRENNYER 16N-3HZ
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<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>MD Reference:</b>	GL 5055 & KB 17 @ 5072.00ft (Original Well Elev)
<b>Site:</b>	GRENNYER 1-34HZ PAD	<b>North Reference:</b>	True
<b>Well:</b>	GRENNYER 16N-3HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OH		
<b>Design:</b>	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)
Start 7898.70 hold at 7935.01 MD - 7"(626' FNL 330' FEL)									
8,000.00	90.00	180.00	7,563.00	-167.95	316.33	167.95	0.00	0.00	0.00
8,100.00	90.00	180.00	7,563.00	-267.95	316.33	267.95	0.00	0.00	0.00
8,200.00	90.00	180.00	7,563.00	-367.95	316.33	367.95	0.00	0.00	0.00
8,300.00	90.00	180.00	7,563.00	-467.95	316.33	467.95	0.00	0.00	0.00
8,400.00	90.00	180.00	7,563.00	-567.95	316.33	567.95	0.00	0.00	0.00
8,500.00	90.00	180.00	7,563.00	-667.95	316.33	667.95	0.00	0.00	0.00
8,600.00	90.00	180.00	7,563.00	-767.95	316.33	767.95	0.00	0.00	0.00
8,700.00	90.00	180.00	7,563.00	-867.95	316.33	867.95	0.00	0.00	0.00
8,800.00	90.00	180.00	7,563.00	-967.95	316.33	967.95	0.00	0.00	0.00
8,900.00	90.00	180.00	7,563.00	-1,067.95	316.33	1,067.95	0.00	0.00	0.00
9,000.00	90.00	180.00	7,563.00	-1,167.95	316.33	1,167.95	0.00	0.00	0.00
9,100.00	90.00	180.00	7,563.00	-1,267.95	316.33	1,267.95	0.00	0.00	0.00
9,200.00	90.00	180.00	7,563.00	-1,367.95	316.33	1,367.95	0.00	0.00	0.00
9,300.00	90.00	180.00	7,563.00	-1,467.95	316.33	1,467.95	0.00	0.00	0.00
9,400.00	90.00	180.00	7,563.00	-1,567.95	316.33	1,567.95	0.00	0.00	0.00
9,500.00	90.00	180.00	7,563.00	-1,667.95	316.33	1,667.95	0.00	0.00	0.00
9,600.00	90.00	180.00	7,563.00	-1,767.95	316.33	1,767.95	0.00	0.00	0.00
9,700.00	90.00	180.00	7,563.00	-1,867.95	316.33	1,867.95	0.00	0.00	0.00
9,800.00	90.00	180.00	7,563.00	-1,967.95	316.33	1,967.95	0.00	0.00	0.00
9,900.00	90.00	180.00	7,563.00	-2,067.95	316.33	2,067.95	0.00	0.00	0.00
10,000.00	90.00	180.00	7,563.00	-2,167.95	316.33	2,167.95	0.00	0.00	0.00
10,100.00	90.00	180.00	7,563.00	-2,267.95	316.33	2,267.95	0.00	0.00	0.00
10,200.00	90.00	180.00	7,563.00	-2,367.95	316.33	2,367.95	0.00	0.00	0.00
10,300.00	90.00	180.00	7,563.00	-2,467.95	316.33	2,467.95	0.00	0.00	0.00
10,400.00	90.00	180.00	7,563.00	-2,567.95	316.33	2,567.95	0.00	0.00	0.00
10,500.00	90.00	180.00	7,563.00	-2,667.95	316.33	2,667.95	0.00	0.00	0.00
10,600.00	90.00	180.00	7,563.00	-2,767.95	316.33	2,767.95	0.00	0.00	0.00
10,700.00	90.00	180.00	7,563.00	-2,867.95	316.33	2,867.95	0.00	0.00	0.00
10,800.00	90.00	180.00	7,563.00	-2,967.95	316.33	2,967.95	0.00	0.00	0.00
10,900.00	90.00	180.00	7,563.00	-3,067.95	316.33	3,067.95	0.00	0.00	0.00
11,000.00	90.00	180.00	7,563.00	-3,167.95	316.33	3,167.95	0.00	0.00	0.00
11,100.00	90.00	180.00	7,563.00	-3,267.95	316.33	3,267.95	0.00	0.00	0.00
11,200.00	90.00	180.00	7,563.00	-3,367.95	316.33	3,367.95	0.00	0.00	0.00
11,300.00	90.00	180.00	7,563.00	-3,467.95	316.33	3,467.95	0.00	0.00	0.00
11,400.00	90.00	180.00	7,563.00	-3,567.95	316.33	3,567.95	0.00	0.00	0.00
11,500.00	90.00	180.00	7,563.00	-3,667.95	316.33	3,667.95	0.00	0.00	0.00
11,600.00	90.00	180.00	7,563.00	-3,767.95	316.33	3,767.95	0.00	0.00	0.00
11,700.00	90.00	180.00	7,563.00	-3,867.95	316.33	3,867.95	0.00	0.00	0.00
11,800.00	90.00	180.00	7,563.00	-3,967.95	316.33	3,967.95	0.00	0.00	0.00
11,900.00	90.00	180.00	7,563.00	-4,067.95	316.33	4,067.95	0.00	0.00	0.00
12,000.00	90.00	180.00	7,563.00	-4,167.95	316.33	4,167.95	0.00	0.00	0.00
12,100.00	90.00	180.00	7,563.00	-4,267.95	316.33	4,267.95	0.00	0.00	0.00
12,200.00	90.00	180.00	7,563.00	-4,367.95	316.33	4,367.95	0.00	0.00	0.00
12,300.00	90.00	180.00	7,563.00	-4,467.95	316.33	4,467.95	0.00	0.00	0.00
12,400.00	90.00	180.00	7,563.00	-4,567.95	316.33	4,567.95	0.00	0.00	0.00
12,500.00	90.00	180.00	7,563.00	-4,667.95	316.33	4,667.95	0.00	0.00	0.00
12,600.00	90.00	180.00	7,563.00	-4,767.95	316.33	4,767.95	0.00	0.00	0.00
12,700.00	90.00	180.00	7,563.00	-4,867.95	316.33	4,867.95	0.00	0.00	0.00
12,800.00	90.00	180.00	7,563.00	-4,967.95	316.33	4,967.95	0.00	0.00	0.00
12,900.00	90.00	180.00	7,563.00	-5,067.95	316.33	5,067.95	0.00	0.00	0.00
13,000.00	90.00	180.00	7,563.00	-5,167.95	316.33	5,167.95	0.00	0.00	0.00

<b>Database:</b>	EDM5000-RobertS-Local	<b>Local Co-ordinate Reference:</b>	Well GRENNEMYER 16N-3HZ
<b>Company:</b>	US ROCKIES REGION PLANNING	<b>TVD Reference:</b>	GL 5055 & KB 17 @ 5072.00ft (Original Well Elev)
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>MD Reference:</b>	GL 5055 & KB 17 @ 5072.00ft (Original Well Elev)
<b>Site:</b>	GRENNEMYER 1-34HZ PAD	<b>North Reference:</b>	True
<b>Well:</b>	GRENNEMYER 16N-3HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OH		
<b>Design:</b>	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)	
13,100.00	90.00	180.00	7,563.00	-5,267.95	316.33	5,267.95	0.00	0.00	0.00	
13,200.00	90.00	180.00	7,563.00	-5,367.95	316.33	5,367.95	0.00	0.00	0.00	
13,300.00	90.00	180.00	7,563.00	-5,467.95	316.33	5,467.95	0.00	0.00	0.00	
13,400.00	90.00	180.00	7,563.00	-5,567.95	316.33	5,567.95	0.00	0.00	0.00	
13,500.00	90.00	180.00	7,563.00	-5,667.95	316.33	5,667.95	0.00	0.00	0.00	
13,600.00	90.00	180.00	7,563.00	-5,767.95	316.33	5,767.95	0.00	0.00	0.00	
13,700.00	90.00	180.00	7,563.00	-5,867.95	316.33	5,867.95	0.00	0.00	0.00	
13,800.00	90.00	180.00	7,563.00	-5,967.95	316.33	5,967.95	0.00	0.00	0.00	
13,900.00	90.00	180.00	7,563.00	-6,067.95	316.33	6,067.95	0.00	0.00	0.00	
14,000.00	90.00	180.00	7,563.00	-6,167.95	316.33	6,167.95	0.00	0.00	0.00	
14,100.00	90.00	180.00	7,563.00	-6,267.95	316.33	6,267.95	0.00	0.00	0.00	
14,200.00	90.00	180.00	7,563.00	-6,367.95	316.33	6,367.95	0.00	0.00	0.00	
14,300.00	90.00	180.00	7,563.00	-6,467.95	316.33	6,467.95	0.00	0.00	0.00	
14,400.00	90.00	180.00	7,563.00	-6,567.95	316.33	6,567.95	0.00	0.00	0.00	
14,500.00	90.00	180.00	7,563.00	-6,667.95	316.33	6,667.95	0.00	0.00	0.00	
14,600.00	90.00	180.00	7,563.00	-6,767.95	316.33	6,767.95	0.00	0.00	0.00	
14,700.00	90.00	180.00	7,563.00	-6,867.95	316.33	6,867.95	0.00	0.00	0.00	
14,800.00	90.00	180.00	7,563.00	-6,967.95	316.33	6,967.95	0.00	0.00	0.00	
14,900.00	90.00	180.00	7,563.00	-7,067.95	316.33	7,067.95	0.00	0.00	0.00	
15,000.00	90.00	180.00	7,563.00	-7,167.95	316.33	7,167.95	0.00	0.00	0.00	
15,100.00	90.00	180.00	7,563.00	-7,267.95	316.33	7,267.95	0.00	0.00	0.00	
15,200.00	90.00	180.00	7,563.00	-7,367.95	316.33	7,367.95	0.00	0.00	0.00	
15,300.00	90.00	180.00	7,563.00	-7,467.95	316.33	7,467.95	0.00	0.00	0.00	
15,400.00	90.00	180.00	7,563.00	-7,567.95	316.33	7,567.95	0.00	0.00	0.00	
15,500.00	90.00	180.00	7,563.00	-7,667.95	316.33	7,667.95	0.00	0.00	0.00	
15,600.00	90.00	180.00	7,563.00	-7,767.95	316.33	7,767.95	0.00	0.00	0.00	
15,700.00	90.00	180.00	7,563.00	-7,867.95	316.33	7,867.95	0.00	0.00	0.00	
15,800.00	90.00	180.00	7,563.00	-7,967.95	316.33	7,967.95	0.00	0.00	0.00	
15,833.71	90.00	180.00	7,563.00	-8,001.66	316.33	8,001.66	0.00	0.00	0.00	
TD at 15833.71 - PBHL_GRENNEMYER 16N-3HZ(1781' FSL 800' FEL)										

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_GRENNEMYER 16N-3HZ	0.00	0.00	7,563.00	-8,001.66	316.33	1,240,367.28	3,176,969.31	39.9914630	-104.8683870
- plan hits target center									
- Point									

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (in)	Hole Diameter (in)	
1,067.00	1,067.00	9 5/8"	9.625	12.250	
7,935.01	7,563.00	7"(626' FNL 330' FEL)	7.000	7.500	

<b>Database:</b>	EDM5000-RobertS-Local	<b>Local Co-ordinate Reference:</b>	Well GRENEMYER 16N-3HZ
<b>Company:</b>	US ROCKIES REGION PLANNING	<b>TVD Reference:</b>	GL 5055 & KB 17 @ 5072.00ft (Original Well Elev)
<b>Project:</b>	COLORADO NORTHERN ZONE - 83	<b>MD Reference:</b>	GL 5055 & KB 17 @ 5072.00ft (Original Well Elev)
<b>Site:</b>	GRENEMYER 1-34HZ PAD	<b>North Reference:</b>	True
<b>Well:</b>	GRENEMYER 16N-3HZ	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	OH		
<b>Design:</b>	PLAN #1 PRELIMINARY		

Formations						
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)	
1,017.00	1,017.00	Fox Hills Base				
4,906.61	4,862.00	Sussex				
7,429.38	7,354.00	Sharon Springs				
7,530.44	7,426.00	Niobrara A				
7,768.60	7,539.00	Niobrara B				

Plan Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
1,267.00	1,267.00	0.00	0.00	Start Build 2.00	
1,742.90	1,740.71	32.72	22.02	Start 2949.18 hold at 1742.90 MD	
4,692.07	4,649.29	437.28	294.31	Start Drop -2.00	
5,167.97	5,123.00	470.00	316.33	Start 1867.04 hold at 5167.97 MD	
7,035.01	6,990.04	470.00	316.33	Start DLS 10.00 TFO 180.00	
7,935.01	7,563.00	-102.96	316.33	Start 7898.70 hold at 7935.01 MD	
15,833.71	7,563.00	-8,001.66	316.33	TD at 15833.71	