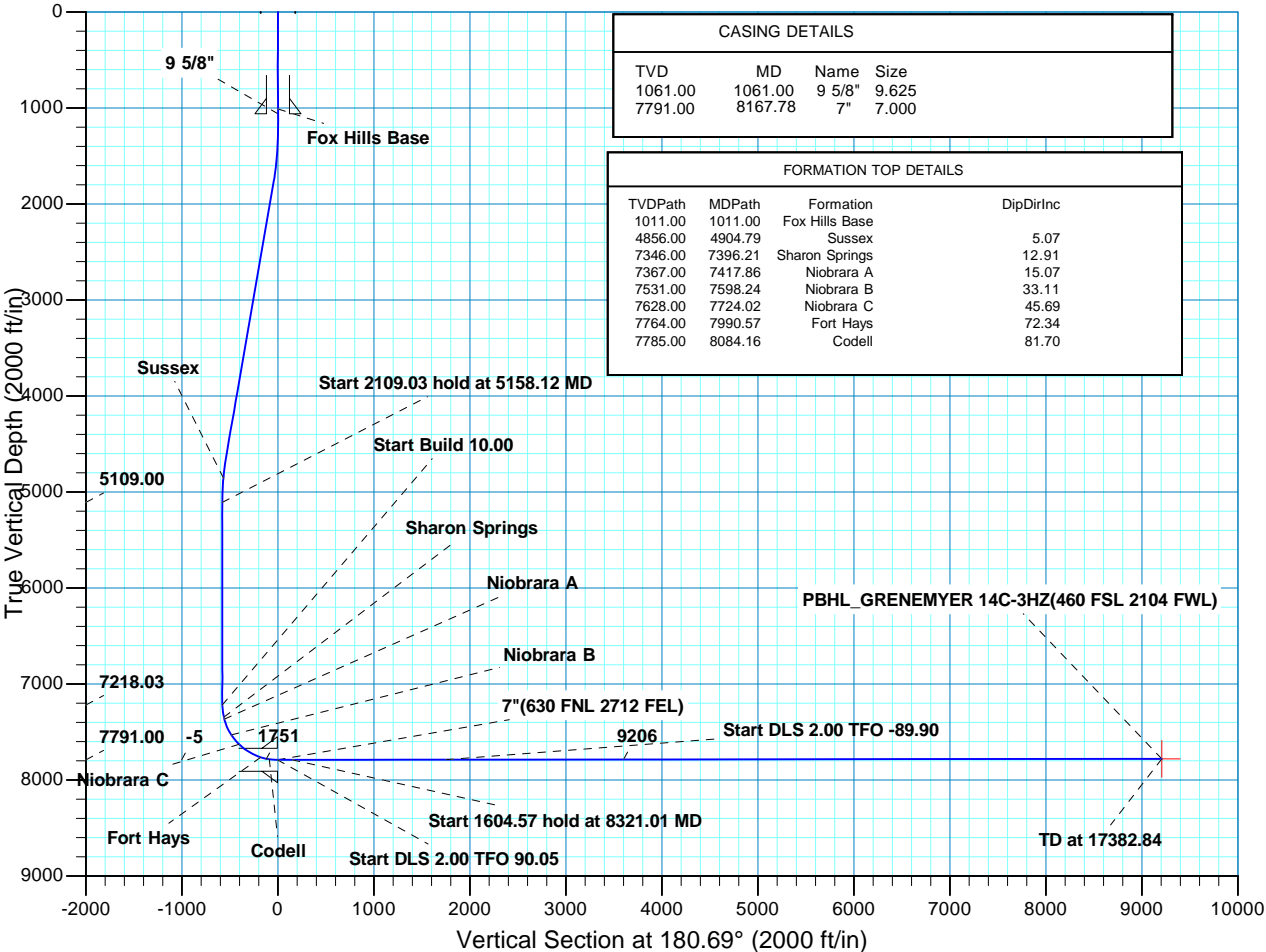




Project: COLORADO NORTHERN ZONE - 83
Site: GRENNEMYER 28-34HZ PAD
Well: GRENNEMYER 14C-3HZ
Wellbore: OH
Design: PLAN #1 PRELIMINARY

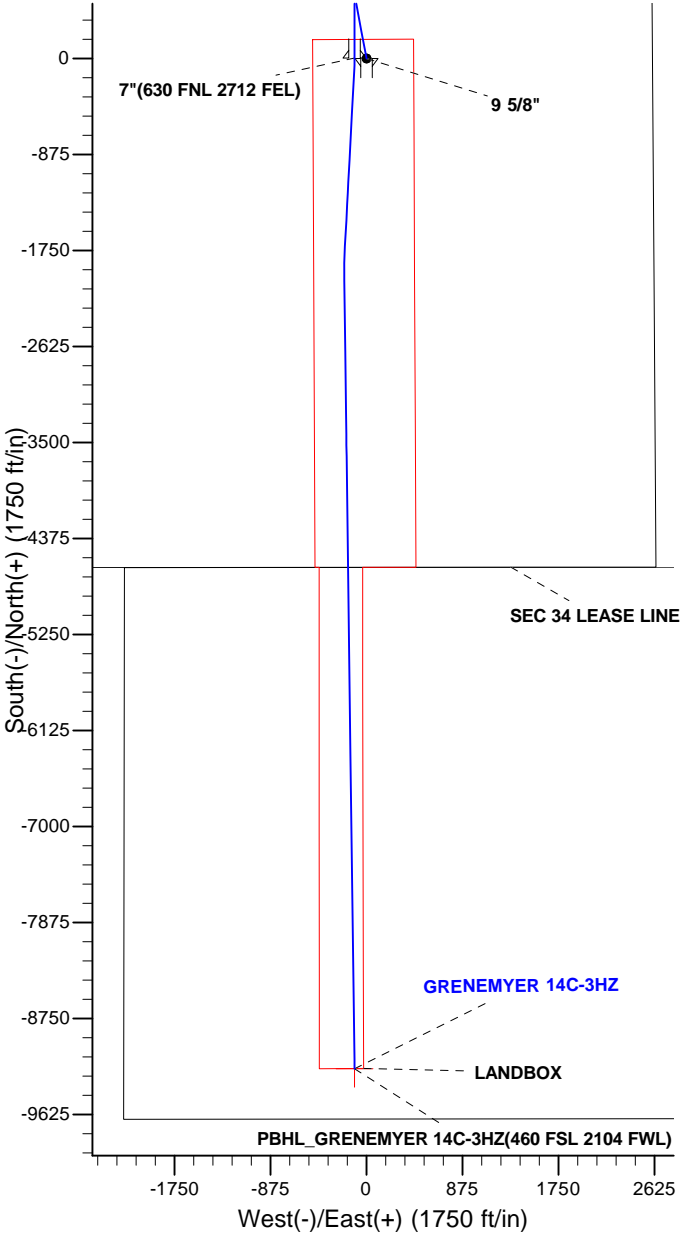


WELL DETAILS: GRENNEMYER 14C-3HZ											
GL 5049 & KB 17 @ 5066.00ft (ASSUMED)											
+N/-S		+E/-W		Northing		Easting		Latitude		Longitude	
0.00		0.00		1248232.78		3174638.25		40.0131000		-104.8765090	
SECTION DETAILS											
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target		
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
1261.00	0.00	0.00	1261.00	0.00	0.00	0.00	0.00	0.00	0.00		
1761.24	10.00	349.25	1758.70	42.80	-8.13	2.00	349.25	-42.70			
4657.89	10.00	349.25	4611.30	537.20	-101.99	0.00	0.00	-535.94			
5158.12	0.00	0.00	5109.00	580.00	-110.12	2.00	180.00	-578.64			
7267.15	0.00	0.00	7218.03	580.00	-110.12	0.00	0.00	-578.64			
8167.78	90.06	180.00	7791.00	6.43	-110.12	10.00	180.00	-5.11			
8321.01	90.06	183.06	7790.85	-146.73	-114.22	2.00	90.05	148.09			
9925.57	90.06	183.06	7789.25	-1749.00	-200.00	0.00	0.00	1751.27			
10115.76	90.06	179.26	7789.05	-1939.11	-203.86	2.00	-89.90	1941.41			
17382.84	90.06	179.26	7781.00	-9205.58	-110.12	0.00	0.009206.24		PBHL_GRENNEMYER 14C-3HZ(460 FSL 2104 FWL)		
DESIGN TARGET DETAILS											
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape			
PBHL	7781.00	-9205.58	-110.12	1239026.67	3174592.86	39.9878290	-104.8769020	Point			
- plan hits target center											



CASING DETAILS			
TVD	MD	Name	Size
1061.00	1061.00	9 5/8"	9.625
7791.00	8167.78	7"	7.000

FORMATION TOP DETAILS			
TVDPath	MDPath	Formation	DipDirInc
1011.00	1011.00	Fox Hills Base	
4856.00	4904.79	Sussex	5.07
7346.00	7396.21	Sharon Springs	12.91
7367.00	7417.86	Niobrara A	15.07
7531.00	7598.24	Niobrara B	33.11
7628.00	7724.02	Niobrara C	45.69
7764.00	7990.57	Fort Hays	72.34
7785.00	8084.16	Codell	81.70





Scientific Drilling

US ROCKIES REGION PLANNING

COLORADO NORTHERN ZONE - 83

GRENNEMYER 28-34HZ PAD

GRENNEMYER 14C-3HZ

OH

Plan: PLAN #1 PRELIMINARY

Standard Planning Report

26 August, 2013

Database:	EDM5000-RobertS-Local	Local Co-ordinate Reference:	Well GRENNEMYER 14C-3HZ
Company:	US ROCKIES REGION PLANNING	TVD Reference:	GL 5049 & KB 17 @ 5066.00ft (ASSUMED)
Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	GL 5049 & KB 17 @ 5066.00ft (ASSUMED)
Site:	GRENNEMYER 28-34HZ PAD	North Reference:	True
Well:	GRENNEMYER 14C-3HZ	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	GRENNEMYER 28-34HZ PAD, NWNE SEC 34 T1N R67W			
Site Position:		Northing:	1,248,232.78 usft	Latitude: 40.0131000
From:	Lat/Long	Easting:	3,174,638.25 usft	Longitude: -104.8765090
Position Uncertainty:	0.00 ft	Slot Radius:	13.200 in	Grid Convergence: 0.40 °

Well	GRENNEMYER 14C-3HZ, 636 FNL 2605 FEL			
Well Position	+N/-S	0.00 ft	Northing:	1,248,232.78 usft
	+E/-W	0.00 ft	Easting:	3,174,638.25 usft
Position Uncertainty		0.00 ft	Wellhead Elevation:	Ground Level: 5,049.00 ft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2013	2013/08/22	8.63	66.64	52,612

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	180.69

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	
1,261.00	0.00	0.00	1,261.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,761.24	10.00	349.25	1,758.70	42.80	-8.13	2.00	2.00	0.00	349.25	
4,657.89	10.00	349.25	4,611.30	537.20	-101.99	0.00	0.00	0.00	0.00	
5,158.12	0.00	0.00	5,109.00	580.00	-110.12	2.00	-2.00	0.00	180.00	
7,267.15	0.00	0.00	7,218.03	580.00	-110.12	0.00	0.00	0.00	0.00	
8,167.78	90.06	180.00	7,791.00	6.43	-110.12	10.00	10.00	0.00	180.00	
8,321.01	90.06	183.06	7,790.85	-146.73	-114.22	2.00	0.00	2.00	90.05	
9,925.57	90.06	183.06	7,789.25	-1,749.00	-200.00	0.00	0.00	0.00	0.00	
10,115.76	90.06	179.26	7,789.05	-1,939.11	-203.86	2.00	0.00	-2.00	-89.90	
17,382.84	90.06	179.26	7,781.00	-9,205.58	-110.12	0.00	0.00	0.00	0.00	PBHL_GRENNEMYER

Database:	EDM5000-RobertS-Local	Local Co-ordinate Reference:	Well GRENEMYER 14C-3HZ
Company:	US ROCKIES REGION PLANNING	TVD Reference:	GL 5049 & KB 17 @ 5066.00ft (ASSUMED)
Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	GL 5049 & KB 17 @ 5066.00ft (ASSUMED)
Site:	GRENEMYER 28-34HZ PAD	North Reference:	True
Well:	GRENEMYER 14C-3HZ	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
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
1,011.00	0.00	0.00	1,011.00	0.00	0.00	0.00	0.00	0.00	0.00
Fox Hills Base									
1,061.00	0.00	0.00	1,061.00	0.00	0.00	0.00	0.00	0.00	0.00
9 5/8"									
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
1,261.00	0.00	0.00	1,261.00	0.00	0.00	0.00	0.00	0.00	0.00
Start Build 2.00									
1,300.00	0.78	349.25	1,300.00	0.26	-0.05	-0.26	2.00	2.00	0.00
1,400.00	2.78	349.25	1,399.95	3.31	-0.63	-3.30	2.00	2.00	0.00
1,500.00	4.78	349.25	1,499.72	9.79	-1.86	-9.77	2.00	2.00	0.00
1,600.00	6.78	349.25	1,599.21	19.68	-3.74	-19.64	2.00	2.00	0.00
1,700.00	8.78	349.25	1,698.28	32.98	-6.26	-32.90	2.00	2.00	0.00
1,761.24	10.00	349.25	1,758.70	42.80	-8.13	-42.70	2.00	2.00	0.00
Start 2896.65 hold at 1761.24 MD									
1,800.00	10.00	349.25	1,796.87	49.42	-9.38	-49.30	0.00	0.00	0.00
1,900.00	10.00	349.25	1,895.35	66.48	-12.62	-66.33	0.00	0.00	0.00
2,000.00	10.00	349.25	1,993.83	83.55	-15.86	-83.36	0.00	0.00	0.00
2,100.00	10.00	349.25	2,092.31	100.62	-19.10	-100.38	0.00	0.00	0.00
2,200.00	10.00	349.25	2,190.79	117.69	-22.34	-117.41	0.00	0.00	0.00
2,300.00	10.00	349.25	2,289.27	134.76	-25.59	-134.44	0.00	0.00	0.00
2,400.00	10.00	349.25	2,387.75	151.82	-28.83	-151.47	0.00	0.00	0.00
2,500.00	10.00	349.25	2,486.23	168.89	-32.07	-168.50	0.00	0.00	0.00
2,600.00	10.00	349.25	2,584.71	185.96	-35.31	-185.52	0.00	0.00	0.00
2,700.00	10.00	349.25	2,683.19	203.03	-38.55	-202.55	0.00	0.00	0.00
2,800.00	10.00	349.25	2,781.67	220.10	-41.79	-219.58	0.00	0.00	0.00
2,900.00	10.00	349.25	2,880.15	237.16	-45.03	-236.61	0.00	0.00	0.00
3,000.00	10.00	349.25	2,978.62	254.23	-48.27	-253.64	0.00	0.00	0.00
3,100.00	10.00	349.25	3,077.10	271.30	-51.51	-270.66	0.00	0.00	0.00
3,200.00	10.00	349.25	3,175.58	288.37	-54.75	-287.69	0.00	0.00	0.00
3,300.00	10.00	349.25	3,274.06	305.44	-57.99	-304.72	0.00	0.00	0.00
3,400.00	10.00	349.25	3,372.54	322.50	-61.23	-321.75	0.00	0.00	0.00
3,500.00	10.00	349.25	3,471.02	339.57	-64.47	-338.78	0.00	0.00	0.00
3,600.00	10.00	349.25	3,569.50	356.64	-67.71	-355.80	0.00	0.00	0.00
3,700.00	10.00	349.25	3,667.98	373.71	-70.95	-372.83	0.00	0.00	0.00
3,800.00	10.00	349.25	3,766.46	390.78	-74.19	-389.86	0.00	0.00	0.00
3,900.00	10.00	349.25	3,864.94	407.84	-77.43	-406.89	0.00	0.00	0.00
4,000.00	10.00	349.25	3,963.42	424.91	-80.67	-423.92	0.00	0.00	0.00
4,100.00	10.00	349.25	4,061.90	441.98	-83.92	-440.94	0.00	0.00	0.00
4,200.00	10.00	349.25	4,160.38	459.05	-87.16	-457.97	0.00	0.00	0.00
4,300.00	10.00	349.25	4,258.86	476.12	-90.40	-475.00	0.00	0.00	0.00
4,400.00	10.00	349.25	4,357.34	493.18	-93.64	-492.03	0.00	0.00	0.00
4,500.00	10.00	349.25	4,455.81	510.25	-96.88	-509.06	0.00	0.00	0.00

Database:	EDM5000-RobertS-Local	Local Co-ordinate Reference:	Well GRENNEMYER 14C-3HZ
Company:	US ROCKIES REGION PLANNING	TVD Reference:	GL 5049 & KB 17 @ 5066.00ft (ASSUMED)
Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	GL 5049 & KB 17 @ 5066.00ft (ASSUMED)
Site:	GRENNEMYER 28-34HZ PAD	North Reference:	True
Well:	GRENNEMYER 14C-3HZ	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)
4,600.00	10.00	349.25	4,554.29	527.32	-100.12	-526.09	0.00	0.00	0.00
4,657.89	10.00	349.25	4,611.30	537.20	-101.99	-535.94	0.00	0.00	0.00
Start Drop -2.00									
4,700.00	9.16	349.25	4,652.83	544.09	-103.30	-542.81	2.00	-2.00	0.00
4,800.00	7.16	349.25	4,751.81	558.04	-105.95	-556.73	2.00	-2.00	0.00
4,900.00	5.16	349.25	4,851.22	568.58	-107.95	-567.25	2.00	-2.00	0.00
4,904.79	5.07	349.25	4,856.00	569.00	-108.03	-567.67	2.00	-2.00	0.00
Sussex									
5,000.00	3.16	349.25	4,950.96	575.71	-109.31	-574.37	2.00	-2.00	0.00
5,100.00	1.16	349.25	5,050.88	579.42	-110.01	-578.06	2.00	-2.00	0.00
5,158.12	0.00	0.00	5,109.00	580.00	-110.12	-578.64	2.00	-2.00	0.00
Start 2109.03 hold at 5158.12 MD									
5,200.00	0.00	0.00	5,150.88	580.00	-110.12	-578.64	0.00	0.00	0.00
5,300.00	0.00	0.00	5,250.88	580.00	-110.12	-578.64	0.00	0.00	0.00
5,400.00	0.00	0.00	5,350.88	580.00	-110.12	-578.64	0.00	0.00	0.00
5,500.00	0.00	0.00	5,450.88	580.00	-110.12	-578.64	0.00	0.00	0.00
5,600.00	0.00	0.00	5,550.88	580.00	-110.12	-578.64	0.00	0.00	0.00
5,700.00	0.00	0.00	5,650.88	580.00	-110.12	-578.64	0.00	0.00	0.00
5,800.00	0.00	0.00	5,750.88	580.00	-110.12	-578.64	0.00	0.00	0.00
5,900.00	0.00	0.00	5,850.88	580.00	-110.12	-578.64	0.00	0.00	0.00
6,000.00	0.00	0.00	5,950.88	580.00	-110.12	-578.64	0.00	0.00	0.00
6,100.00	0.00	0.00	6,050.88	580.00	-110.12	-578.64	0.00	0.00	0.00
6,200.00	0.00	0.00	6,150.88	580.00	-110.12	-578.64	0.00	0.00	0.00
6,300.00	0.00	0.00	6,250.88	580.00	-110.12	-578.64	0.00	0.00	0.00
6,400.00	0.00	0.00	6,350.88	580.00	-110.12	-578.64	0.00	0.00	0.00
6,500.00	0.00	0.00	6,450.88	580.00	-110.12	-578.64	0.00	0.00	0.00
6,600.00	0.00	0.00	6,550.88	580.00	-110.12	-578.64	0.00	0.00	0.00
6,700.00	0.00	0.00	6,650.88	580.00	-110.12	-578.64	0.00	0.00	0.00
6,800.00	0.00	0.00	6,750.88	580.00	-110.12	-578.64	0.00	0.00	0.00
6,900.00	0.00	0.00	6,850.88	580.00	-110.12	-578.64	0.00	0.00	0.00
7,000.00	0.00	0.00	6,950.88	580.00	-110.12	-578.64	0.00	0.00	0.00
7,100.00	0.00	0.00	7,050.88	580.00	-110.12	-578.64	0.00	0.00	0.00
7,200.00	0.00	0.00	7,150.88	580.00	-110.12	-578.64	0.00	0.00	0.00
7,267.15	0.00	0.00	7,218.03	580.00	-110.12	-578.64	0.00	0.00	0.00
Start Build 10.00									
7,300.00	3.28	180.00	7,250.86	579.06	-110.12	-577.70	10.00	10.00	0.00
7,396.21	12.91	180.00	7,346.00	565.53	-110.12	-564.17	10.00	10.00	0.00
Sharon Springs									
7,400.00	13.28	180.00	7,349.69	564.67	-110.12	-563.31	10.00	10.00	0.00
7,417.86	15.07	180.00	7,367.00	560.30	-110.12	-558.94	10.00	10.00	0.00
Niobrara A									
7,500.00	23.28	180.00	7,444.52	533.34	-110.12	-531.98	10.00	10.00	0.00
7,598.25	33.11	180.00	7,531.00	486.97	-110.12	-485.62	10.00	10.00	0.00
Niobrara B									
7,600.00	33.28	180.00	7,532.47	486.01	-110.12	-484.66	10.00	10.00	0.00
7,700.00	43.28	180.00	7,610.86	424.14	-110.12	-422.79	10.00	10.00	0.00
7,724.02	45.69	180.00	7,628.00	407.31	-110.12	-405.96	10.00	10.00	0.00
Niobrara C									
7,800.00	53.28	180.00	7,677.33	349.59	-110.12	-348.24	10.00	10.00	0.00
7,900.00	63.28	180.00	7,729.83	264.63	-110.12	-263.29	10.00	10.00	0.00
7,990.57	72.34	180.00	7,764.00	180.85	-110.12	-179.52	10.00	10.00	0.00
Fort Hays									
8,000.00	73.28	180.00	7,766.79	171.84	-110.12	-170.51	10.00	10.00	0.00

Database:	EDM5000-RobertS-Local	Local Co-ordinate Reference:	Well GRENNEMYER 14C-3HZ
Company:	US ROCKIES REGION PLANNING	TVD Reference:	GL 5049 & KB 17 @ 5066.00ft (ASSUMED)
Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	GL 5049 & KB 17 @ 5066.00ft (ASSUMED)
Site:	GRENNEMYER 28-34HZ PAD	North Reference:	True
Well:	GRENNEMYER 14C-3HZ	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)
8,084.16	81.70	180.00	7,785.00	89.76	-110.12	-88.43	10.00	10.00	0.00
Codell									
8,100.00	83.28	180.00	7,787.07	74.05	-110.12	-72.73	10.00	10.00	0.00
8,167.78	90.06	180.00	7,791.00	6.43	-110.12	-5.11	10.00	10.00	0.00
Start DLS 2.00 TFO 90.05 - 7"(630 FNL 2712 FEL)									
8,200.00	90.06	180.64	7,790.97	-25.79	-110.30	27.11	2.00	0.00	2.00
8,300.00	90.06	182.64	7,790.87	-125.75	-113.17	127.09	2.00	0.00	2.00
8,321.01	90.06	183.06	7,790.85	-146.73	-114.22	148.09	2.00	0.00	2.00
Start 1604.57 hold at 8321.01 MD									
8,400.00	90.06	183.06	7,790.77	-225.61	-118.44	227.01	0.00	0.00	0.00
8,500.00	90.06	183.06	7,790.67	-325.46	-123.79	326.92	0.00	0.00	0.00
8,600.00	90.06	183.06	7,790.57	-425.32	-129.13	426.84	0.00	0.00	0.00
8,700.00	90.06	183.06	7,790.47	-525.18	-134.48	526.75	0.00	0.00	0.00
8,800.00	90.06	183.06	7,790.37	-625.04	-139.82	626.66	0.00	0.00	0.00
8,900.00	90.06	183.06	7,790.27	-724.89	-145.17	726.58	0.00	0.00	0.00
9,000.00	90.06	183.06	7,790.17	-824.75	-150.52	826.49	0.00	0.00	0.00
9,100.00	90.06	183.06	7,790.07	-924.61	-155.86	926.40	0.00	0.00	0.00
9,200.00	90.06	183.06	7,789.97	-1,024.46	-161.21	1,026.32	0.00	0.00	0.00
9,300.00	90.06	183.06	7,789.87	-1,124.32	-166.56	1,126.23	0.00	0.00	0.00
9,400.00	90.06	183.06	7,789.77	-1,224.18	-171.90	1,226.15	0.00	0.00	0.00
9,500.00	90.06	183.06	7,789.67	-1,324.03	-177.25	1,326.06	0.00	0.00	0.00
9,600.00	90.06	183.06	7,789.57	-1,423.89	-182.59	1,425.97	0.00	0.00	0.00
9,700.00	90.06	183.06	7,789.47	-1,523.75	-187.94	1,525.89	0.00	0.00	0.00
9,800.00	90.06	183.06	7,789.38	-1,623.60	-193.29	1,625.80	0.00	0.00	0.00
9,900.00	90.06	183.06	7,789.28	-1,723.46	-198.63	1,725.71	0.00	0.00	0.00
9,925.57	90.06	183.06	7,789.25	-1,749.00	-200.00	1,751.27	0.00	0.00	0.00
Start DLS 2.00 TFO -89.90									
10,000.00	90.06	181.58	7,789.17	-1,823.36	-203.01	1,825.66	2.00	0.00	-2.00
10,100.00	90.06	179.58	7,789.07	-1,923.35	-204.02	1,925.65	2.00	0.00	-2.00
10,115.76	90.06	179.26	7,789.05	-1,939.11	-203.86	1,941.41	2.00	0.00	-2.00
Start 7267.08 hold at 10115.76 MD									
10,200.00	90.06	179.26	7,788.96	-2,023.34	-202.77	2,025.62	0.00	0.00	0.00
10,300.00	90.06	179.26	7,788.85	-2,123.34	-201.48	2,125.59	0.00	0.00	0.00
10,400.00	90.06	179.26	7,788.74	-2,223.33	-200.19	2,225.56	0.00	0.00	0.00
10,500.00	90.06	179.26	7,788.62	-2,323.32	-198.90	2,325.53	0.00	0.00	0.00
10,600.00	90.06	179.26	7,788.51	-2,423.31	-197.61	2,425.50	0.00	0.00	0.00
10,700.00	90.06	179.26	7,788.40	-2,523.30	-196.32	2,525.47	0.00	0.00	0.00
10,800.00	90.06	179.26	7,788.29	-2,623.29	-195.03	2,625.44	0.00	0.00	0.00
10,900.00	90.06	179.26	7,788.18	-2,723.29	-193.74	2,725.41	0.00	0.00	0.00
11,000.00	90.06	179.26	7,788.07	-2,823.28	-192.45	2,825.38	0.00	0.00	0.00
11,100.00	90.06	179.26	7,787.96	-2,923.27	-191.16	2,925.35	0.00	0.00	0.00
11,200.00	90.06	179.26	7,787.85	-3,023.26	-189.87	3,025.32	0.00	0.00	0.00
11,300.00	90.06	179.26	7,787.74	-3,123.25	-188.58	3,125.28	0.00	0.00	0.00
11,400.00	90.06	179.26	7,787.63	-3,223.24	-187.29	3,225.25	0.00	0.00	0.00
11,500.00	90.06	179.26	7,787.52	-3,323.24	-186.00	3,325.22	0.00	0.00	0.00
11,600.00	90.06	179.26	7,787.41	-3,423.23	-184.71	3,425.19	0.00	0.00	0.00
11,700.00	90.06	179.26	7,787.30	-3,523.22	-183.42	3,525.16	0.00	0.00	0.00
11,800.00	90.06	179.26	7,787.18	-3,623.21	-182.13	3,625.13	0.00	0.00	0.00
11,900.00	90.06	179.26	7,787.07	-3,723.20	-180.84	3,725.10	0.00	0.00	0.00
12,000.00	90.06	179.26	7,786.96	-3,823.19	-179.55	3,825.07	0.00	0.00	0.00
12,100.00	90.06	179.26	7,786.85	-3,923.18	-178.26	3,925.04	0.00	0.00	0.00
12,200.00	90.06	179.26	7,786.74	-4,023.18	-176.97	4,025.01	0.00	0.00	0.00
12,300.00	90.06	179.26	7,786.63	-4,123.17	-175.68	4,124.97	0.00	0.00	0.00

Database:	EDM5000-RobertS-Local	Local Co-ordinate Reference:	Well GRENNEMYER 14C-3HZ
Company:	US ROCKIES REGION PLANNING	TVD Reference:	GL 5049 & KB 17 @ 5066.00ft (ASSUMED)
Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	GL 5049 & KB 17 @ 5066.00ft (ASSUMED)
Site:	GRENNEMYER 28-34HZ PAD	North Reference:	True
Well:	GRENNEMYER 14C-3HZ	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)
12,400.00	90.06	179.26	7,786.52	-4,223.16	-174.39	4,224.94	0.00	0.00	0.00
12,500.00	90.06	179.26	7,786.41	-4,323.15	-173.10	4,324.91	0.00	0.00	0.00
12,600.00	90.06	179.26	7,786.30	-4,423.14	-171.81	4,424.88	0.00	0.00	0.00
12,700.00	90.06	179.26	7,786.19	-4,523.13	-170.52	4,524.85	0.00	0.00	0.00
12,800.00	90.06	179.26	7,786.08	-4,623.13	-169.23	4,624.82	0.00	0.00	0.00
12,900.00	90.06	179.26	7,785.97	-4,723.12	-167.94	4,724.79	0.00	0.00	0.00
13,000.00	90.06	179.26	7,785.86	-4,823.11	-166.65	4,824.76	0.00	0.00	0.00
13,100.00	90.06	179.26	7,785.74	-4,923.10	-165.36	4,924.73	0.00	0.00	0.00
13,200.00	90.06	179.26	7,785.63	-5,023.09	-164.07	5,024.70	0.00	0.00	0.00
13,300.00	90.06	179.26	7,785.52	-5,123.08	-162.78	5,124.66	0.00	0.00	0.00
13,400.00	90.06	179.26	7,785.41	-5,223.08	-161.50	5,224.63	0.00	0.00	0.00
13,500.00	90.06	179.26	7,785.30	-5,323.07	-160.21	5,324.60	0.00	0.00	0.00
13,600.00	90.06	179.26	7,785.19	-5,423.06	-158.92	5,424.57	0.00	0.00	0.00
13,700.00	90.06	179.26	7,785.08	-5,523.05	-157.63	5,524.54	0.00	0.00	0.00
13,800.00	90.06	179.26	7,784.97	-5,623.04	-156.34	5,624.51	0.00	0.00	0.00
13,900.00	90.06	179.26	7,784.86	-5,723.03	-155.05	5,724.48	0.00	0.00	0.00
14,000.00	90.06	179.26	7,784.75	-5,823.03	-153.76	5,824.45	0.00	0.00	0.00
14,100.00	90.06	179.26	7,784.64	-5,923.02	-152.47	5,924.42	0.00	0.00	0.00
14,200.00	90.06	179.26	7,784.53	-6,023.01	-151.18	6,024.39	0.00	0.00	0.00
14,300.00	90.06	179.26	7,784.42	-6,123.00	-149.89	6,124.36	0.00	0.00	0.00
14,400.00	90.06	179.26	7,784.30	-6,222.99	-148.60	6,224.32	0.00	0.00	0.00
14,500.00	90.06	179.26	7,784.19	-6,322.98	-147.31	6,324.29	0.00	0.00	0.00
14,600.00	90.06	179.26	7,784.08	-6,422.98	-146.02	6,424.26	0.00	0.00	0.00
14,700.00	90.06	179.26	7,783.97	-6,522.97	-144.73	6,524.23	0.00	0.00	0.00
14,800.00	90.06	179.26	7,783.86	-6,622.96	-143.44	6,624.20	0.00	0.00	0.00
14,900.00	90.06	179.26	7,783.75	-6,722.95	-142.15	6,724.17	0.00	0.00	0.00
15,000.00	90.06	179.26	7,783.64	-6,822.94	-140.86	6,824.14	0.00	0.00	0.00
15,100.00	90.06	179.26	7,783.53	-6,922.93	-139.57	6,924.11	0.00	0.00	0.00
15,200.00	90.06	179.26	7,783.42	-7,022.93	-138.28	7,024.08	0.00	0.00	0.00
15,300.00	90.06	179.26	7,783.31	-7,122.92	-136.99	7,124.05	0.00	0.00	0.00
15,400.00	90.06	179.26	7,783.20	-7,222.91	-135.70	7,224.01	0.00	0.00	0.00
15,500.00	90.06	179.26	7,783.09	-7,322.90	-134.41	7,323.98	0.00	0.00	0.00
15,600.00	90.06	179.26	7,782.98	-7,422.89	-133.12	7,423.95	0.00	0.00	0.00
15,700.00	90.06	179.26	7,782.86	-7,522.88	-131.83	7,523.92	0.00	0.00	0.00
15,800.00	90.06	179.26	7,782.75	-7,622.87	-130.54	7,623.89	0.00	0.00	0.00
15,900.00	90.06	179.26	7,782.64	-7,722.87	-129.25	7,723.86	0.00	0.00	0.00
16,000.00	90.06	179.26	7,782.53	-7,822.86	-127.96	7,823.83	0.00	0.00	0.00
16,100.00	90.06	179.26	7,782.42	-7,922.85	-126.67	7,923.80	0.00	0.00	0.00
16,200.00	90.06	179.26	7,782.31	-8,022.84	-125.38	8,023.77	0.00	0.00	0.00
16,300.00	90.06	179.26	7,782.20	-8,122.83	-124.09	8,123.74	0.00	0.00	0.00
16,400.00	90.06	179.26	7,782.09	-8,222.82	-122.80	8,223.71	0.00	0.00	0.00
16,500.00	90.06	179.26	7,781.98	-8,322.82	-121.51	8,323.67	0.00	0.00	0.00
16,600.00	90.06	179.26	7,781.87	-8,422.81	-120.22	8,423.64	0.00	0.00	0.00
16,700.00	90.06	179.26	7,781.76	-8,522.80	-118.93	8,523.61	0.00	0.00	0.00
16,800.00	90.06	179.26	7,781.65	-8,622.79	-117.64	8,623.58	0.00	0.00	0.00
16,900.00	90.06	179.26	7,781.54	-8,722.78	-116.35	8,723.55	0.00	0.00	0.00
17,000.00	90.06	179.26	7,781.42	-8,822.77	-115.06	8,823.52	0.00	0.00	0.00
17,100.00	90.06	179.26	7,781.31	-8,922.77	-113.77	8,923.49	0.00	0.00	0.00
17,200.00	90.06	179.26	7,781.20	-9,022.76	-112.48	9,023.46	0.00	0.00	0.00
17,300.00	90.06	179.26	7,781.09	-9,122.75	-111.19	9,123.43	0.00	0.00	0.00
17,382.84	90.06	179.26	7,781.00	-9,205.58	-110.12	9,206.24	0.00	0.00	0.00
TD at 17382.84 - PBHL_GRENNEMYER 14C-3HZ(460 FSL 2104 FWL)									

Database:	EDM5000-RobertS-Local	Local Co-ordinate Reference:	Well GRENEMYER 14C-3HZ
Company:	US ROCKIES REGION PLANNING	TVD Reference:	GL 5049 & KB 17 @ 5066.00ft (ASSUMED)
Project:	COLORADO NORTHERN ZONE - 83	MD Reference:	GL 5049 & KB 17 @ 5066.00ft (ASSUMED)
Site:	GRENEMYER 28-34HZ PAD	North Reference:	True
Well:	GRENEMYER 14C-3HZ	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	PLAN #1 PRELIMINARY		

Design Targets									
Target Name	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- hit/miss target	(°)	(°)	(ft)	(ft)	(ft)	(usft)	(usft)		
- Shape									
PBHL_GRENEMYER 14	0.00	0.00	7,781.00	-9,205.58	-110.12	1,239,026.67	3,174,592.86	39.9878290	-104.8769020
- plan hits target center									
- Point									

Casing Points					
Measured Depth	Vertical Depth	Name		Casing Diameter	Hole Diameter
(ft)	(ft)			(in)	(in)
1,061.00	1,061.00	9 5/8"		9.625	12.250
8,167.78	7,791.00	7"(630 FNL 2712 FEL)		7.000	7.500

Formations						
Measured Depth	Vertical Depth	Name	Lithology	Dip	Dip Direction	
(ft)	(ft)			(°)	(°)	
1,011.00	1,011.00	Fox Hills Base				
4,904.79	4,856.00	Sussex				
7,396.21	7,346.00	Sharon Springs				
7,417.86	7,367.00	Niobrara A				
7,598.25	7,531.00	Niobrara B				
7,724.02	7,628.00	Niobrara C				
7,990.57	7,764.00	Fort Hays				
8,084.16	7,785.00	Codell				

Plan Annotations					
Measured Depth	Vertical Depth	Local Coordinates			
(ft)	(ft)	+N/-S	+E/-W	Comment	
(ft)	(ft)	(ft)	(ft)		
1,261.00	1,261.00	0.00	0.00	Start Build 2.00	
1,761.24	1,758.70	42.80	-8.13	Start 2896.65 hold at 1761.24 MD	
4,657.89	4,611.30	537.20	-101.99	Start Drop -2.00	
5,158.12	5,109.00	580.00	-110.12	Start 2109.03 hold at 5158.12 MD	
7,267.15	7,218.03	580.00	-110.12	Start Build 10.00	
8,167.78	7,791.00	6.43	-110.12	Start DLS 2.00 TFO 90.05	
8,321.01	7,790.85	-146.73	-114.22	Start 1604.57 hold at 8321.01 MD	
9,925.57	7,789.25	-1,749.00	-200.00	Start DLS 2.00 TFO -89.90	
10,115.76	7,789.05	-1,939.11	-203.86	Start 7267.08 hold at 10115.76 MD	
17,382.84	7,781.00	-9,205.58	-110.12	TD at 17382.84	