

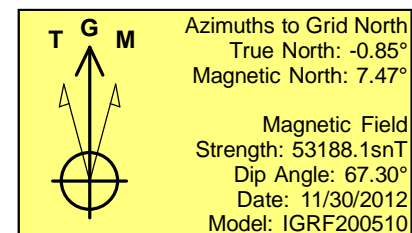
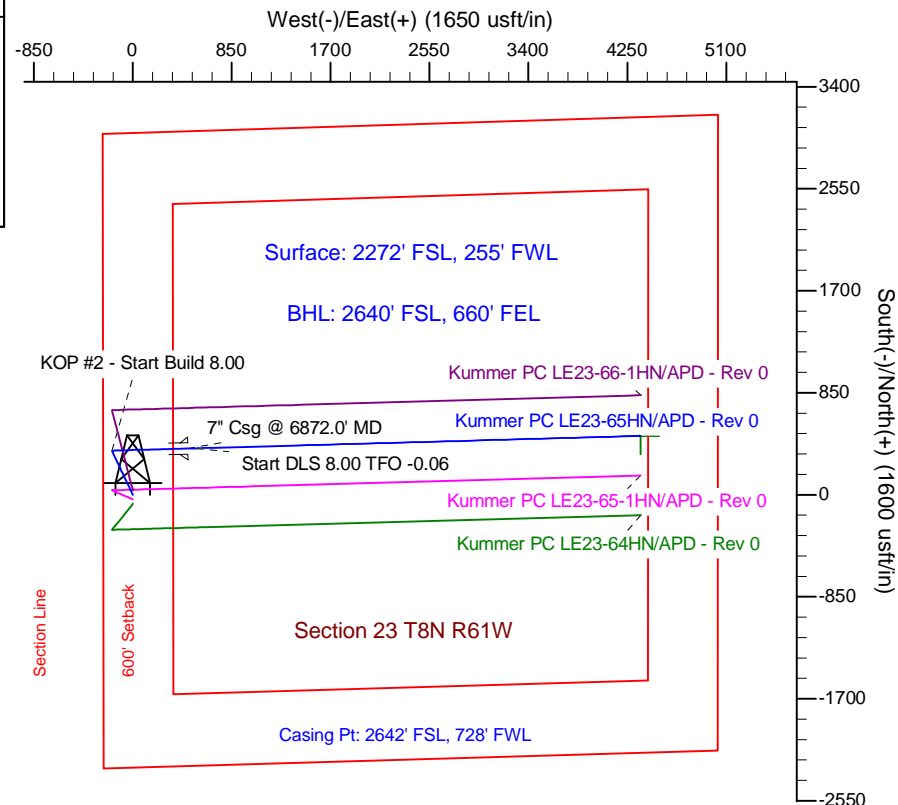
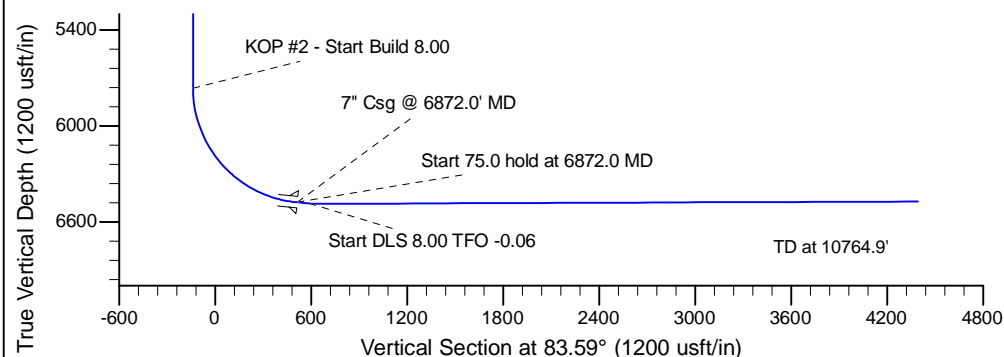
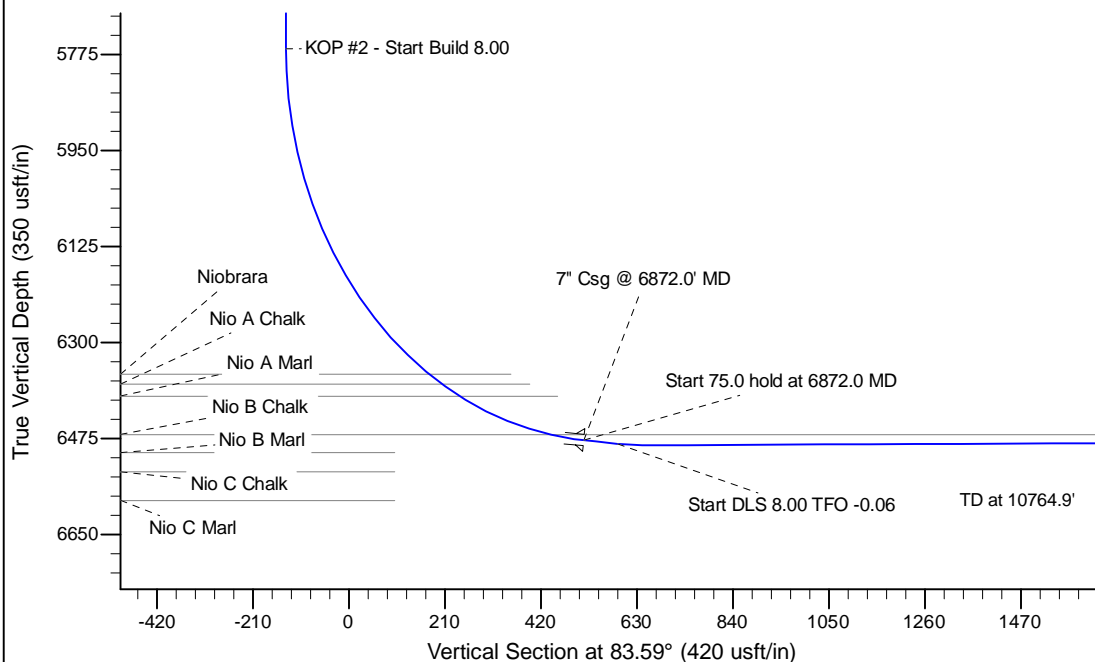
Project: Wattenberg Field
Site: LE (Sec.23-T08N-R61W) Weld County, CO
Well: Kummer PC LE23-65HN
Wellbore: Original Drilling
Design: APD - Rev 0

Northern Region Drilling

Geodetic System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: Colorado Northern Zone
System Datum: Mean Sea Level

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	1800.0	0.00	0.00	1800.0	0.0	0.0	0.00	0.00	0.0	
3	2359.9	14.00	333.94	2354.4	61.1	-29.9	2.50	333.94	-22.9	
4	3490.8	14.00	333.94	3451.6	306.9	-150.1	0.00	0.00	-114.9	
5	4050.7	0.00	0.00	4006.0	368.0	-180.0	2.50	180.00	-137.8	
6	5809.5	0.00	0.00	5764.8	368.0	-180.0	0.00	0.00	-137.8	
7	6872.0	85.00	88.46	6478.3	385.6	473.5	8.00	88.46	513.6	
8	6947.0	85.00	88.46	6484.8	387.6	548.2	0.00	0.00	588.1	
9	7012.3	90.22	88.45	6487.5	389.3	613.4	8.00	-0.06	653.0	
10	10764.9	90.22	88.45	6473.1	490.5	4364.6	0.00	0.00	4392.1	Kummer PC LE23-65HN BHL 2640'FSL, 660'FEL



WELL DETAILS: Kummer PC LE23-65HN			
Ground Level:	4982.0	Latitude	40.646347
Northing	1481027.05	Easting	3365897.96
		Longitude	-104.181392
Plan: APD - Rev 0 (Kummer PC LE23-65HN/Original Drilling)			
Created By:	Carrie Willers	Date:	14:47, December 05 2012
Checked:		Date:	
Reviewed:		Date:	
Approved:		Date:	



Northern Region Drilling

Wattenberg Field

LE (08N-61W)

Kummer PC LE23-65HN

Original Drilling

Plan: APD - Rev 0

Standard Planning Report

05 December, 2012

Database:	EDM Production	Local Co-ordinate Reference:	Well Kummer PC LE23-65HN
Company:	Northern Region Drilling	TVD Reference:	WELL @ 4998.0usft (Original Well Elev)
Project:	Wattenberg Field	MD Reference:	WELL @ 4998.0usft (Original Well Elev)
Site:	LE (08N-61W)	North Reference:	Grid
Well:	Kummer PC LE23-65HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Drilling		
Design:	APD - Rev 0		

Project	Wattenberg Field, Weld County CO		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		Using geodetic scale factor

Site		LE (08N-61W)			
Site Position:		Northing:	1,482,042.88 usft	Latitude:	40.648980
From:	Lat/Long	Easting:	3,369,674.30 usft	Longitude:	-104.167730
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.86 °

Well	Kummer PC LE23-65HN					
Well Position	+N/-S	-1,015.8 usft	Northing:	1,481,027.06 usft	Latitude:	40.646347
	+E/-W	-3,776.4 usft	Easting:	3,365,897.96 usft	Longitude:	-104.181392
Position Uncertainty		0.0 usft	Wellhead Elevation:		Ground Level:	4,982.0 usft

Wellbore	Original Drilling				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	11/30/2012	8.32	67.30	53,188

Design	APD - Rev 0			
Audit Notes:				
Version:	Phase:	PROTOTYPE	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	83.59

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.00	0.00	0.00	0.00	
2,359.9	14.00	333.94	2,354.4	61.1	-29.9	2.50	2.50	0.00	333.94	
3,490.8	14.00	333.94	3,451.6	306.9	-150.1	0.00	0.00	0.00	0.00	
4,050.7	0.00	0.00	4,006.0	368.0	-180.0	2.50	-2.50	0.00	180.00	
5,809.5	0.00	0.00	5,764.8	368.0	-180.0	0.00	0.00	0.00	0.00	
6,872.0	85.00	88.46	6,478.3	385.6	473.5	8.00	8.00	0.00	88.46	
6,947.0	85.00	88.46	6,484.8	387.6	548.2	0.00	0.00	0.00	0.00	
7,012.3	90.22	88.45	6,487.5	389.3	613.4	8.00	8.00	-0.01	-0.06	
10,764.9	90.22	88.45	6,473.1	490.5	4,364.6	0.00	0.00	0.00	0.00	Kummer PC LE23-65

Database:	EDM Production	Local Co-ordinate Reference:	Well Kummer PC LE23-65HN
Company:	Northern Region Drilling	TVD Reference:	WELL @ 4998.0usft (Original Well Elev)
Project:	Wattenberg Field	MD Reference:	WELL @ 4998.0usft (Original Well Elev)
Site:	LE (08N-61W)	North Reference:	Grid
Well:	Kummer PC LE23-65HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Drilling		
Design:	APD - Rev 0		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
50.0	0.00	0.00	50.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
150.0	0.00	0.00	150.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
250.0	0.00	0.00	250.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
350.0	0.00	0.00	350.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
450.0	0.00	0.00	450.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
550.0	0.00	0.00	550.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
650.0	0.00	0.00	650.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
750.0	0.00	0.00	750.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
850.0	0.00	0.00	850.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
950.0	0.00	0.00	950.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
1,050.0	0.00	0.00	1,050.0	0.0	0.0	0.0	0.00	0.00	0.00
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	0.00
1,150.0	0.00	0.00	1,150.0	0.0	0.0	0.0	0.00	0.00	0.00
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	0.00
1,250.0	0.00	0.00	1,250.0	0.0	0.0	0.0	0.00	0.00	0.00
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	0.00
1,350.0	0.00	0.00	1,350.0	0.0	0.0	0.0	0.00	0.00	0.00
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	0.00
1,450.0	0.00	0.00	1,450.0	0.0	0.0	0.0	0.00	0.00	0.00
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.0	0.00	0.00	0.00
1,550.0	0.00	0.00	1,550.0	0.0	0.0	0.0	0.00	0.00	0.00
1,600.0	0.00	0.00	1,600.0	0.0	0.0	0.0	0.00	0.00	0.00
1,650.0	0.00	0.00	1,650.0	0.0	0.0	0.0	0.00	0.00	0.00
1,700.0	0.00	0.00	1,700.0	0.0	0.0	0.0	0.00	0.00	0.00
1,750.0	0.00	0.00	1,750.0	0.0	0.0	0.0	0.00	0.00	0.00
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.0	0.00	0.00	0.00
KOP - Start Build 2.50									
1,850.0	1.25	333.94	1,850.0	0.5	-0.2	-0.2	2.50	2.50	0.00
1,900.0	2.50	333.94	1,900.0	2.0	-1.0	-0.7	2.50	2.50	0.00
1,950.0	3.75	333.94	1,949.9	4.4	-2.2	-1.7	2.50	2.50	0.00
2,000.0	5.00	333.94	1,999.7	7.8	-3.8	-2.9	2.50	2.50	0.00
2,050.0	6.25	333.94	2,049.5	12.2	-6.0	-4.6	2.50	2.50	0.00
2,100.0	7.50	333.94	2,099.1	17.6	-8.6	-6.6	2.50	2.50	0.00
2,150.0	8.75	333.94	2,148.6	24.0	-11.7	-9.0	2.50	2.50	0.00
2,200.0	10.00	333.94	2,198.0	31.3	-15.3	-11.7	2.50	2.50	0.00
2,222.4	10.56	333.94	2,220.0	34.9	-17.1	-13.1	2.50	2.50	0.00
Pierre									
2,250.0	11.25	333.94	2,247.1	39.6	-19.3	-14.8	2.50	2.50	0.00
2,300.0	12.50	333.94	2,296.0	48.8	-23.9	-18.3	2.50	2.50	0.00
2,350.0	13.75	333.94	2,344.7	59.0	-28.9	-22.1	2.50	2.50	0.00
2,359.9	14.00	333.94	2,354.4	61.1	-29.9	-22.9	2.50	2.50	0.00
2,400.0	14.00	333.94	2,393.3	69.8	-34.2	-26.1	0.00	0.00	0.00
2,450.0	14.00	333.94	2,441.8	80.7	-39.5	-30.2	0.00	0.00	0.00

Database:	EDM Production	Local Co-ordinate Reference:	Well Kummer PC LE23-65HN
Company:	Northern Region Drilling	TVD Reference:	WELL @ 4998.0usft (Original Well Elev)
Project:	Wattenberg Field	MD Reference:	WELL @ 4998.0usft (Original Well Elev)
Site:	LE (08N-61W)	North Reference:	Grid
Well:	Kummer PC LE23-65HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Drilling		
Design:	APD - Rev 0		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
2,500.0	14.00	333.94	2,490.3	91.6	-44.8	-34.3	0.00	0.00	0.00
2,550.0	14.00	333.94	2,538.8	102.4	-50.1	-38.4	0.00	0.00	0.00
2,600.0	14.00	333.94	2,587.3	113.3	-55.4	-42.4	0.00	0.00	0.00
2,650.0	14.00	333.94	2,635.8	124.2	-60.7	-46.5	0.00	0.00	0.00
2,700.0	14.00	333.94	2,684.3	135.0	-66.0	-50.6	0.00	0.00	0.00
2,750.0	14.00	333.94	2,732.9	145.9	-71.4	-54.6	0.00	0.00	0.00
2,800.0	14.00	333.94	2,781.4	156.8	-76.7	-58.7	0.00	0.00	0.00
2,850.0	14.00	333.94	2,829.9	167.6	-82.0	-62.8	0.00	0.00	0.00
2,900.0	14.00	333.94	2,878.4	178.5	-87.3	-66.8	0.00	0.00	0.00
2,950.0	14.00	333.94	2,926.9	189.4	-92.6	-70.9	0.00	0.00	0.00
3,000.0	14.00	333.94	2,975.4	200.2	-97.9	-75.0	0.00	0.00	0.00
3,050.0	14.00	333.94	3,024.0	211.1	-103.2	-79.0	0.00	0.00	0.00
3,100.0	14.00	333.94	3,072.5	222.0	-108.6	-83.1	0.00	0.00	0.00
3,150.0	14.00	333.94	3,121.0	232.8	-113.9	-87.2	0.00	0.00	0.00
3,200.0	14.00	333.94	3,169.5	243.7	-119.2	-91.2	0.00	0.00	0.00
3,250.0	14.00	333.94	3,218.0	254.5	-124.5	-95.3	0.00	0.00	0.00
3,300.0	14.00	333.94	3,266.5	265.4	-129.8	-99.4	0.00	0.00	0.00
3,350.0	14.00	333.94	3,315.0	276.3	-135.1	-103.4	0.00	0.00	0.00
3,400.0	14.00	333.94	3,363.6	287.1	-140.4	-107.5	0.00	0.00	0.00
3,450.0	14.00	333.94	3,412.1	298.0	-145.8	-111.6	0.00	0.00	0.00
3,490.8	14.00	333.94	3,451.7	306.9	-150.1	-114.9	0.00	0.00	0.00
Start Drop -2.50									
3,500.0	13.77	333.94	3,460.6	308.9	-151.1	-115.6	2.51	-2.51	0.00
3,515.8	13.37	333.94	3,476.0	312.2	-152.7	-116.9	2.50	-2.50	0.00
Parkman									
3,550.0	12.52	333.94	3,509.3	319.1	-156.1	-119.5	2.50	-2.50	0.00
3,600.0	11.27	333.94	3,558.2	328.3	-160.6	-122.9	2.50	-2.50	0.00
3,650.0	10.02	333.94	3,607.3	336.6	-164.6	-126.0	2.50	-2.50	0.00
3,700.0	8.77	333.94	3,656.7	343.9	-168.2	-128.8	2.50	-2.50	0.00
3,750.0	7.52	333.94	3,706.2	350.3	-171.3	-131.2	2.50	-2.50	0.00
3,800.0	6.27	333.94	3,755.8	355.7	-174.0	-133.2	2.50	-2.50	0.00
3,850.0	5.02	333.94	3,805.6	360.1	-176.1	-134.8	2.50	-2.50	0.00
3,900.0	3.77	333.94	3,855.4	363.6	-177.8	-136.1	2.50	-2.50	0.00
3,950.0	2.52	333.94	3,905.3	366.0	-179.0	-137.0	2.50	-2.50	0.00
4,000.0	1.27	333.94	3,955.3	367.5	-179.8	-137.6	2.50	-2.50	0.00
4,050.0	0.02	333.94	4,005.3	368.0	-180.0	-137.8	2.50	-2.50	0.00
4,050.7	0.00	0.00	4,006.0	368.0	-180.0	-137.8	2.50	-2.50	0.00
4,100.0	0.00	0.00	4,055.3	368.0	-180.0	-137.8	0.00	0.00	0.00
4,150.0	0.00	0.00	4,105.3	368.0	-180.0	-137.8	0.00	0.00	0.00
4,200.0	0.00	0.00	4,155.3	368.0	-180.0	-137.8	0.00	0.00	0.00
4,250.0	0.00	0.00	4,205.3	368.0	-180.0	-137.8	0.00	0.00	0.00
4,300.0	0.00	0.00	4,255.3	368.0	-180.0	-137.8	0.00	0.00	0.00
4,350.0	0.00	0.00	4,305.3	368.0	-180.0	-137.8	0.00	0.00	0.00
4,400.0	0.00	0.00	4,355.3	368.0	-180.0	-137.8	0.00	0.00	0.00
4,450.0	0.00	0.00	4,405.3	368.0	-180.0	-137.8	0.00	0.00	0.00
4,500.0	0.00	0.00	4,455.3	368.0	-180.0	-137.8	0.00	0.00	0.00
4,550.0	0.00	0.00	4,505.3	368.0	-180.0	-137.8	0.00	0.00	0.00
4,587.7	0.00	0.00	4,543.0	368.0	-180.0	-137.8	0.00	0.00	0.00
Sussex									
4,600.0	0.00	0.00	4,555.3	368.0	-180.0	-137.8	0.00	0.00	0.00
4,650.0	0.00	0.00	4,605.3	368.0	-180.0	-137.8	0.00	0.00	0.00
4,700.0	0.00	0.00	4,655.3	368.0	-180.0	-137.8	0.00	0.00	0.00
4,750.0	0.00	0.00	4,705.3	368.0	-180.0	-137.8	0.00	0.00	0.00

Database:	EDM Production	Local Co-ordinate Reference:	Well Kummer PC LE23-65HN
Company:	Northern Region Drilling	TVD Reference:	WELL @ 4998.0usft (Original Well Elev)
Project:	Wattenberg Field	MD Reference:	WELL @ 4998.0usft (Original Well Elev)
Site:	LE (08N-61W)	North Reference:	Grid
Well:	Kummer PC LE23-65HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Drilling		
Design:	APD - Rev 0		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,800.0	0.00	0.00	4,755.3	368.0	-180.0	-137.8	0.00	0.00	0.00
4,850.0	0.00	0.00	4,805.3	368.0	-180.0	-137.8	0.00	0.00	0.00
4,900.0	0.00	0.00	4,855.3	368.0	-180.0	-137.8	0.00	0.00	0.00
4,950.0	0.00	0.00	4,905.3	368.0	-180.0	-137.8	0.00	0.00	0.00
5,000.0	0.00	0.00	4,955.3	368.0	-180.0	-137.8	0.00	0.00	0.00
5,050.0	0.00	0.00	5,005.3	368.0	-180.0	-137.8	0.00	0.00	0.00
5,100.0	0.00	0.00	5,055.3	368.0	-180.0	-137.8	0.00	0.00	0.00
5,150.0	0.00	0.00	5,105.3	368.0	-180.0	-137.8	0.00	0.00	0.00
5,200.0	0.00	0.00	5,155.3	368.0	-180.0	-137.8	0.00	0.00	0.00
5,212.7	0.00	0.00	5,168.0	368.0	-180.0	-137.8	0.00	0.00	0.00
Shannon									
5,250.0	0.00	0.00	5,205.3	368.0	-180.0	-137.8	0.00	0.00	0.00
5,300.0	0.00	0.00	5,255.3	368.0	-180.0	-137.8	0.00	0.00	0.00
5,350.0	0.00	0.00	5,305.3	368.0	-180.0	-137.8	0.00	0.00	0.00
5,400.0	0.00	0.00	5,355.3	368.0	-180.0	-137.8	0.00	0.00	0.00
5,450.0	0.00	0.00	5,405.3	368.0	-180.0	-137.8	0.00	0.00	0.00
5,500.0	0.00	0.00	5,455.3	368.0	-180.0	-137.8	0.00	0.00	0.00
5,550.0	0.00	0.00	5,505.3	368.0	-180.0	-137.8	0.00	0.00	0.00
5,600.0	0.00	0.00	5,555.3	368.0	-180.0	-137.8	0.00	0.00	0.00
5,650.0	0.00	0.00	5,605.3	368.0	-180.0	-137.8	0.00	0.00	0.00
5,674.7	0.00	0.00	5,630.0	368.0	-180.0	-137.8	0.00	0.00	0.00
Teepee Buttes									
5,700.0	0.00	0.00	5,655.3	368.0	-180.0	-137.8	0.00	0.00	0.00
5,750.0	0.00	0.00	5,705.3	368.0	-180.0	-137.8	0.00	0.00	0.00
5,800.0	0.00	0.00	5,755.3	368.0	-180.0	-137.8	0.00	0.00	0.00
5,809.5	0.00	0.00	5,764.8	368.0	-180.0	-137.8	0.00	0.00	0.00
KOP #2 - Start Build 8.00									
5,850.0	3.24	88.46	5,805.3	368.0	-178.9	-136.6	8.00	8.00	0.00
5,900.0	7.24	88.46	5,855.1	368.2	-174.3	-132.1	8.00	8.00	0.00
5,950.0	11.24	88.46	5,904.4	368.4	-166.3	-124.1	8.00	8.00	0.00
6,000.0	15.24	88.46	5,953.1	368.7	-154.8	-112.7	8.00	8.00	0.00
6,050.0	19.24	88.46	6,000.8	369.1	-140.0	-97.9	8.00	8.00	0.00
6,100.0	23.24	88.46	6,047.4	369.6	-121.9	-79.9	8.00	8.00	0.00
6,150.0	27.24	88.46	6,092.6	370.1	-100.6	-58.6	8.00	8.00	0.00
6,200.0	31.24	88.46	6,136.2	370.8	-76.2	-34.3	8.00	8.00	0.00
6,250.0	35.24	88.46	6,178.1	371.5	-48.8	-7.0	8.00	8.00	0.00
6,300.0	39.24	88.46	6,217.9	372.3	-18.6	23.1	8.00	8.00	0.00
6,350.0	43.24	88.46	6,255.4	373.2	14.4	56.0	8.00	8.00	0.00
6,400.0	47.24	88.46	6,290.6	374.2	49.9	91.3	8.00	8.00	0.00
6,450.0	51.24	88.46	6,323.3	375.2	87.7	129.1	8.00	8.00	0.00
6,500.0	55.24	88.46	6,353.2	376.3	127.8	169.0	8.00	8.00	0.00
6,508.5	55.92	88.46	6,358.0	376.5	134.8	176.0	8.00	8.00	0.00
Niobrara									
6,541.8	58.58	88.46	6,376.0	377.2	162.7	203.8	8.00	8.00	0.00
Nio A Chalk									
6,550.0	59.24	88.46	6,380.2	377.4	169.8	210.9	8.00	8.00	0.00
6,586.3	62.14	88.46	6,398.0	378.3	201.4	242.4	8.00	8.00	0.00
Nio A Marl									
6,600.0	63.24	88.46	6,404.3	378.6	213.6	254.5	8.00	8.00	0.00
6,650.0	67.24	88.46	6,425.2	379.8	259.0	299.8	8.00	8.00	0.00
6,700.0	71.24	88.46	6,443.0	381.1	305.7	346.3	8.00	8.00	0.00
6,750.0	75.24	88.46	6,457.4	382.3	353.5	394.0	8.00	8.00	0.00
6,797.8	79.06	88.46	6,468.0	383.6	400.1	440.5	8.00	8.00	0.00

Database:	EDM Production	Local Co-ordinate Reference:	Well Kummer PC LE23-65HN
Company:	Northern Region Drilling	TVD Reference:	WELL @ 4998.0usft (Original Well Elev)
Project:	Wattenberg Field	MD Reference:	WELL @ 4998.0usft (Original Well Elev)
Site:	LE (08N-61W)	North Reference:	Grid
Well:	Kummer PC LE23-65HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Drilling		
Design:	APD - Rev 0		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
Nio B Chalk									
6,800.0	79.24	88.46	6,468.4	383.7	402.3	442.6	8.00	8.00	0.00
6,850.0	83.24	88.46	6,476.0	385.0	451.7	491.8	8.00	8.00	0.00
6,872.0	85.00	88.46	6,478.3	385.6	473.5	513.6	8.00	8.00	0.00
Start 75.0 hold at 6872.0 MD - 7" Csg @ 6872.0' MD									
6,900.0	85.00	88.46	6,480.7	386.3	501.4	541.4	0.00	0.00	0.00
6,947.0	85.00	88.46	6,484.8	387.6	548.2	588.1	0.00	0.00	0.00
Start DLS 8.00 TFO -0.06									
6,950.0	85.24	88.46	6,485.1	387.7	551.2	591.1	8.00	8.00	-0.01
7,000.0	89.24	88.46	6,487.5	389.0	601.1	640.8	8.00	8.00	-0.01
7,012.3	90.22	88.45	6,487.5	389.3	613.4	653.0	8.00	8.00	-0.01
7,050.0	90.22	88.45	6,487.4	390.4	651.1	690.6	0.00	0.00	0.00
7,100.0	90.22	88.45	6,487.2	391.7	701.1	740.5	0.00	0.00	0.00
7,150.0	90.22	88.45	6,487.0	393.0	751.1	790.3	0.00	0.00	0.00
7,200.0	90.22	88.45	6,486.8	394.4	801.1	840.1	0.00	0.00	0.00
7,250.0	90.22	88.45	6,486.6	395.7	851.0	889.9	0.00	0.00	0.00
7,300.0	90.22	88.45	6,486.4	397.1	901.0	939.7	0.00	0.00	0.00
7,350.0	90.22	88.45	6,486.2	398.4	951.0	989.5	0.00	0.00	0.00
7,400.0	90.22	88.45	6,486.0	399.8	1,001.0	1,039.4	0.00	0.00	0.00
7,450.0	90.22	88.45	6,485.9	401.1	1,051.0	1,089.2	0.00	0.00	0.00
7,500.0	90.22	88.45	6,485.7	402.5	1,100.9	1,139.0	0.00	0.00	0.00
7,550.0	90.22	88.45	6,485.5	403.8	1,150.9	1,188.8	0.00	0.00	0.00
7,600.0	90.22	88.45	6,485.3	405.2	1,200.9	1,238.6	0.00	0.00	0.00
7,650.0	90.22	88.45	6,485.1	406.5	1,250.9	1,288.5	0.00	0.00	0.00
7,700.0	90.22	88.45	6,484.9	407.9	1,300.9	1,338.3	0.00	0.00	0.00
7,750.0	90.22	88.45	6,484.7	409.2	1,350.9	1,388.1	0.00	0.00	0.00
7,800.0	90.22	88.45	6,484.5	410.6	1,400.8	1,437.9	0.00	0.00	0.00
7,850.0	90.22	88.45	6,484.3	411.9	1,450.8	1,487.7	0.00	0.00	0.00
7,900.0	90.22	88.45	6,484.1	413.3	1,500.8	1,537.6	0.00	0.00	0.00
7,950.0	90.22	88.45	6,483.9	414.6	1,550.8	1,587.4	0.00	0.00	0.00
8,000.0	90.22	88.45	6,483.7	416.0	1,600.8	1,637.2	0.00	0.00	0.00
8,050.0	90.22	88.45	6,483.5	417.3	1,650.7	1,687.0	0.00	0.00	0.00
8,100.0	90.22	88.45	6,483.4	418.7	1,700.7	1,736.8	0.00	0.00	0.00
8,150.0	90.22	88.45	6,483.2	420.0	1,750.7	1,786.7	0.00	0.00	0.00
8,200.0	90.22	88.45	6,483.0	421.4	1,800.7	1,836.5	0.00	0.00	0.00
8,250.0	90.22	88.45	6,482.8	422.7	1,850.7	1,886.3	0.00	0.00	0.00
8,300.0	90.22	88.45	6,482.6	424.1	1,900.6	1,936.1	0.00	0.00	0.00
8,350.0	90.22	88.45	6,482.4	425.4	1,950.6	1,985.9	0.00	0.00	0.00
8,400.0	90.22	88.45	6,482.2	426.8	2,000.6	2,035.8	0.00	0.00	0.00
8,450.0	90.22	88.45	6,482.0	428.1	2,050.6	2,085.6	0.00	0.00	0.00
8,500.0	90.22	88.45	6,481.8	429.4	2,100.6	2,135.4	0.00	0.00	0.00
8,550.0	90.22	88.45	6,481.6	430.8	2,150.6	2,185.2	0.00	0.00	0.00
8,600.0	90.22	88.45	6,481.4	432.1	2,200.5	2,235.0	0.00	0.00	0.00
8,650.0	90.22	88.45	6,481.2	433.5	2,250.5	2,284.9	0.00	0.00	0.00
8,700.0	90.22	88.45	6,481.0	434.8	2,300.5	2,334.7	0.00	0.00	0.00
8,750.0	90.22	88.45	6,480.9	436.2	2,350.5	2,384.5	0.00	0.00	0.00
8,800.0	90.22	88.45	6,480.7	437.5	2,400.5	2,434.3	0.00	0.00	0.00
8,850.0	90.22	88.45	6,480.5	438.9	2,450.4	2,484.1	0.00	0.00	0.00
8,900.0	90.22	88.45	6,480.3	440.2	2,500.4	2,533.9	0.00	0.00	0.00
8,950.0	90.22	88.45	6,480.1	441.6	2,550.4	2,583.8	0.00	0.00	0.00
9,000.0	90.22	88.45	6,479.9	442.9	2,600.4	2,633.6	0.00	0.00	0.00
9,050.0	90.22	88.45	6,479.7	444.3	2,650.4	2,683.4	0.00	0.00	0.00
9,100.0	90.22	88.45	6,479.5	445.6	2,700.4	2,733.2	0.00	0.00	0.00

Database:	EDM Production	Local Co-ordinate Reference:	Well Kummer PC LE23-65HN
Company:	Northern Region Drilling	TVD Reference:	WELL @ 4998.0usft (Original Well Elev)
Project:	Wattenberg Field	MD Reference:	WELL @ 4998.0usft (Original Well Elev)
Site:	LE (08N-61W)	North Reference:	Grid
Well:	Kummer PC LE23-65HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Drilling		
Design:	APD - Rev 0		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
9,150.0	90.22	88.45	6,479.3	447.0	2,750.3	2,783.0	0.00	0.00	0.00	
9,200.0	90.22	88.45	6,479.1	448.3	2,800.3	2,832.9	0.00	0.00	0.00	
9,250.0	90.22	88.45	6,478.9	449.7	2,850.3	2,882.7	0.00	0.00	0.00	
9,300.0	90.22	88.45	6,478.7	451.0	2,900.3	2,932.5	0.00	0.00	0.00	
9,350.0	90.22	88.45	6,478.5	452.4	2,950.3	2,982.3	0.00	0.00	0.00	
9,400.0	90.22	88.45	6,478.4	453.7	3,000.2	3,032.1	0.00	0.00	0.00	
9,450.0	90.22	88.45	6,478.2	455.1	3,050.2	3,082.0	0.00	0.00	0.00	
9,500.0	90.22	88.45	6,478.0	456.4	3,100.2	3,131.8	0.00	0.00	0.00	
9,550.0	90.22	88.45	6,477.8	457.8	3,150.2	3,181.6	0.00	0.00	0.00	
9,600.0	90.22	88.45	6,477.6	459.1	3,200.2	3,231.4	0.00	0.00	0.00	
9,650.0	90.22	88.45	6,477.4	460.5	3,250.1	3,281.2	0.00	0.00	0.00	
9,700.0	90.22	88.45	6,477.2	461.8	3,300.1	3,331.1	0.00	0.00	0.00	
9,750.0	90.22	88.45	6,477.0	463.2	3,350.1	3,380.9	0.00	0.00	0.00	
9,800.0	90.22	88.45	6,476.8	464.5	3,400.1	3,430.7	0.00	0.00	0.00	
9,850.0	90.22	88.45	6,476.6	465.9	3,450.1	3,480.5	0.00	0.00	0.00	
9,900.0	90.22	88.45	6,476.4	467.2	3,500.1	3,530.3	0.00	0.00	0.00	
9,950.0	90.22	88.45	6,476.2	468.5	3,550.0	3,580.2	0.00	0.00	0.00	
10,000.0	90.22	88.45	6,476.0	469.9	3,600.0	3,630.0	0.00	0.00	0.00	
10,050.0	90.22	88.45	6,475.9	471.2	3,650.0	3,679.8	0.00	0.00	0.00	
10,100.0	90.22	88.45	6,475.7	472.6	3,700.0	3,729.6	0.00	0.00	0.00	
10,150.0	90.22	88.45	6,475.5	473.9	3,750.0	3,779.4	0.00	0.00	0.00	
10,200.0	90.22	88.45	6,475.3	475.3	3,799.9	3,829.3	0.00	0.00	0.00	
10,250.0	90.22	88.45	6,475.1	476.6	3,849.9	3,879.1	0.00	0.00	0.00	
10,300.0	90.22	88.45	6,474.9	478.0	3,899.9	3,928.9	0.00	0.00	0.00	
10,350.0	90.22	88.45	6,474.7	479.3	3,949.9	3,978.7	0.00	0.00	0.00	
10,400.0	90.22	88.45	6,474.5	480.7	3,999.9	4,028.5	0.00	0.00	0.00	
10,450.0	90.22	88.45	6,474.3	482.0	4,049.8	4,078.3	0.00	0.00	0.00	
10,500.0	90.22	88.45	6,474.1	483.4	4,099.8	4,128.2	0.00	0.00	0.00	
10,550.0	90.22	88.45	6,473.9	484.7	4,149.8	4,178.0	0.00	0.00	0.00	
10,600.0	90.22	88.45	6,473.7	486.1	4,199.8	4,227.8	0.00	0.00	0.00	
10,650.0	90.22	88.45	6,473.5	487.4	4,249.8	4,277.6	0.00	0.00	0.00	
10,700.0	90.22	88.45	6,473.3	488.8	4,299.8	4,327.4	0.00	0.00	0.00	
10,750.0	90.22	88.45	6,473.2	490.1	4,349.7	4,377.3	0.00	0.00	0.00	
10,764.9	90.22	88.45	6,473.1	490.5	4,364.6	4,392.1	0.00	0.00	0.00	
TD at 10764.9 - Kummer PC LE23-65HN BHL 2640°FSL, 660°FEL										

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude		Longitude
- hit/miss target										
- Shape										
Kummer PC LE23-65HN	0.00	0.00	6,473.1	490.5	4,364.6	1,481,517.57	3,370,262.50	40.647514		-104.165639
- plan hits target center										
- Point										

Casing Points						Casing Diameter (")	Hole Diameter (")
Measured Depth (usft)	Vertical Depth (usft)	Name					
6,872.0	6,478.3	7" Csg @ 6872.0' MD				7	8-3/4

Database:	EDM Production	Local Co-ordinate Reference:	Well Kummer PC LE23-65HN
Company:	Northern Region Drilling	TVD Reference:	WELL @ 4998.0usft (Original Well Elev)
Project:	Wattenberg Field	MD Reference:	WELL @ 4998.0usft (Original Well Elev)
Site:	LE (08N-61W)	North Reference:	Grid
Well:	Kummer PC LE23-65HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	Original Drilling		
Design:	APD - Rev 0		

Formations					
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
2,222.4	2,220.0	Pierre		0.00	
3,515.8	3,476.0	Parkman		0.00	
4,587.7	4,543.0	Sussex		0.00	
5,212.7	5,168.0	Shannon		0.00	
5,674.7	5,630.0	Teepee Buttes		0.00	
6,508.5	6,358.0	Niobrara		0.00	
6,541.8	6,376.0	Nio A Chalk		0.00	
6,586.3	6,398.0	Nio A Marl		0.00	
6,797.8	6,468.0	Nio B Chalk		0.00	

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,800.0	1,800.0	0.0	0.0	KOP - Start Build 2.50
3,490.8	3,451.6	61.1	-29.9	Start Drop -2.50
5,809.5	5,764.8	306.9	-150.1	KOP #2 - Start Build 8.00
6,872.0	6,478.3	368.0	-180.0	Start 75.0 hold at 6872.0 MD
6,947.0	6,484.8	368.0	-180.0	Start DLS 8.00 TFO -0.06
10,764.9	6,473.1	385.6	473.5	TD at 10764.9



Northern Region Drilling

Wattenberg Field

LE (08N-61W)

Kummer PC LE23-65HN

Original Drilling

APD - Rev 0

Anticollision Summary Report

05 December, 2012

Company:	Northern Region Drilling	Local Co-ordinate Reference:	Well Kummer PC LE23-65HN
Project:	Wattenberg Field	TVD Reference:	WELL @ 4998.0usft (Original Well Elev)
Reference Site:	LE (08N-61W)	MD Reference:	WELL @ 4998.0usft (Original Well Elev)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Kummer PC LE23-65HN	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.54 sigma
Reference Wellbore	Original Drilling	Database:	EDM Production
Reference Design:	APD - Rev 0	Offset TVD Reference:	Offset Datum

Reference	APD - Rev 0		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	Stations	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 10,000.0 usft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma	Casing Method:	Not applied

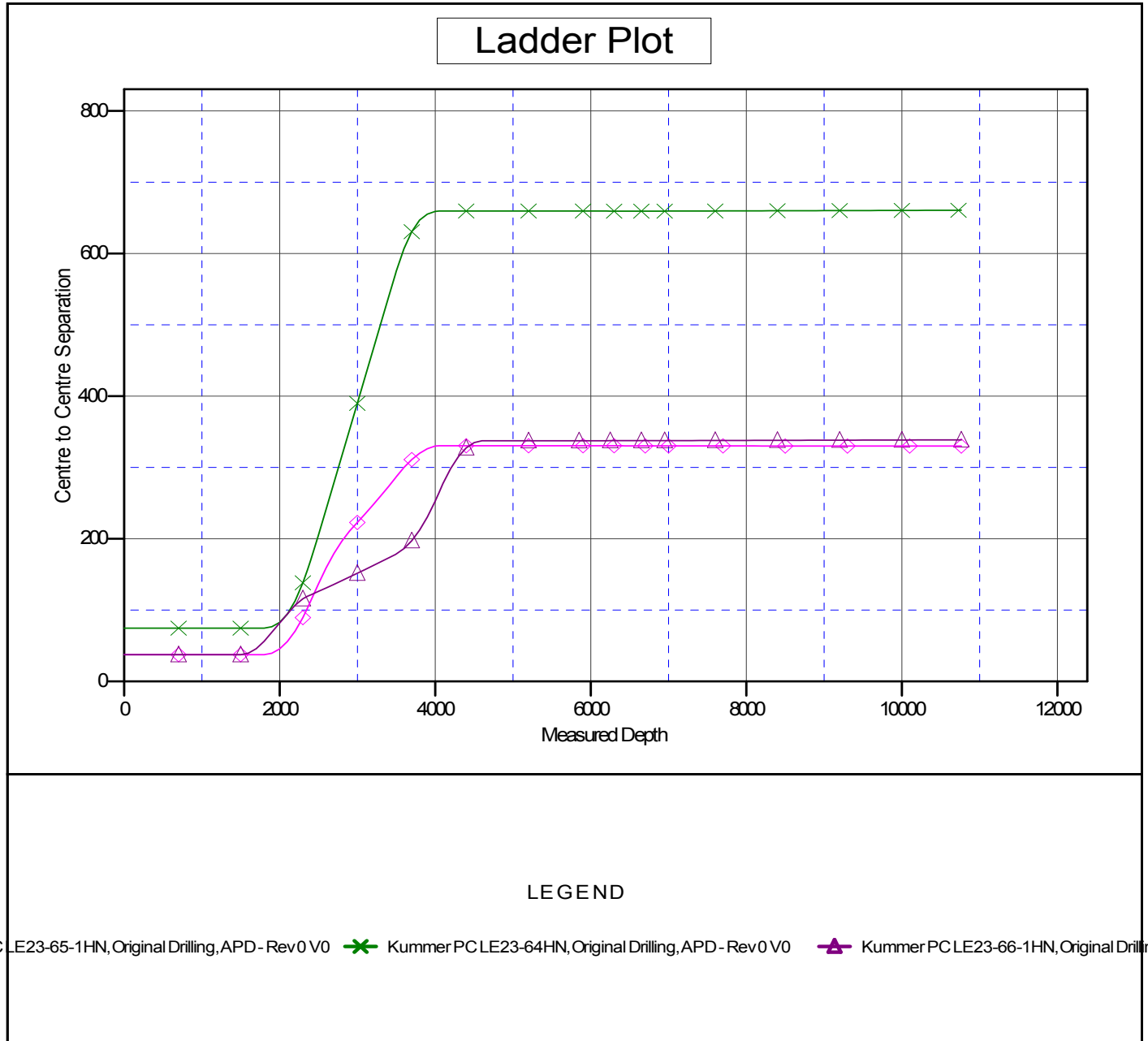
Survey Tool Program	Date	12/5/2012		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.0	10,764.4	APD - Rev 0 (Original Drilling)	MWD	MWD - Standard

Summary						
Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
LE (08N-61W)						
Kummer PC LE23-64HN - Original Drilling - APD - Rev 0	1,800.0	1,800.0	74.7	66.9	9.538	CC, ES
Kummer PC LE23-64HN - Original Drilling - APD - Rev 0	10,764.9	10,742.6	661.0	412.2	2.657	SF
Kummer PC LE23-65-1HN - Original Drilling - APD - Rev	1,800.0	1,800.0	37.5	29.7	4.793	CC, ES
Kummer PC LE23-65-1HN - Original Drilling - APD - Rev	10,764.9	10,735.5	330.1	81.0	1.325	Level 3, SF
Kummer PC LE23-66-1HN - Original Drilling - APD - Rev	1,500.0	1,500.0	37.5	31.1	5.790	CC, ES
Kummer PC LE23-66-1HN - Original Drilling - APD - Rev	10,764.9	10,795.1	338.8	89.9	1.361	Level 3, SF

Company:	Northern Region Drilling	Local Co-ordinate Reference:	Well Kummer PC LE23-65HN
Project:	Wattenberg Field	TVD Reference:	WELL @ 4998.0usft (Original Well Elev)
Reference Site:	LE (08N-61W)	MD Reference:	WELL @ 4998.0usft (Original Well Elev)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Kummer PC LE23-65HN	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.54 sigma
Reference Wellbore	Original Drilling	Database:	EDM Production
Reference Design:	APD - Rev 0	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 4998.0usft (Original Well Ele)
Offset Depths are relative to Offset Datum
Central Meridian is -105.500000

Coordinates are relative to: Kummer PC LE23-65HN
Coordinate System is US State Plane 1983, Colorado Northern Zone
Grid Convergence at Surface is: 0.85°

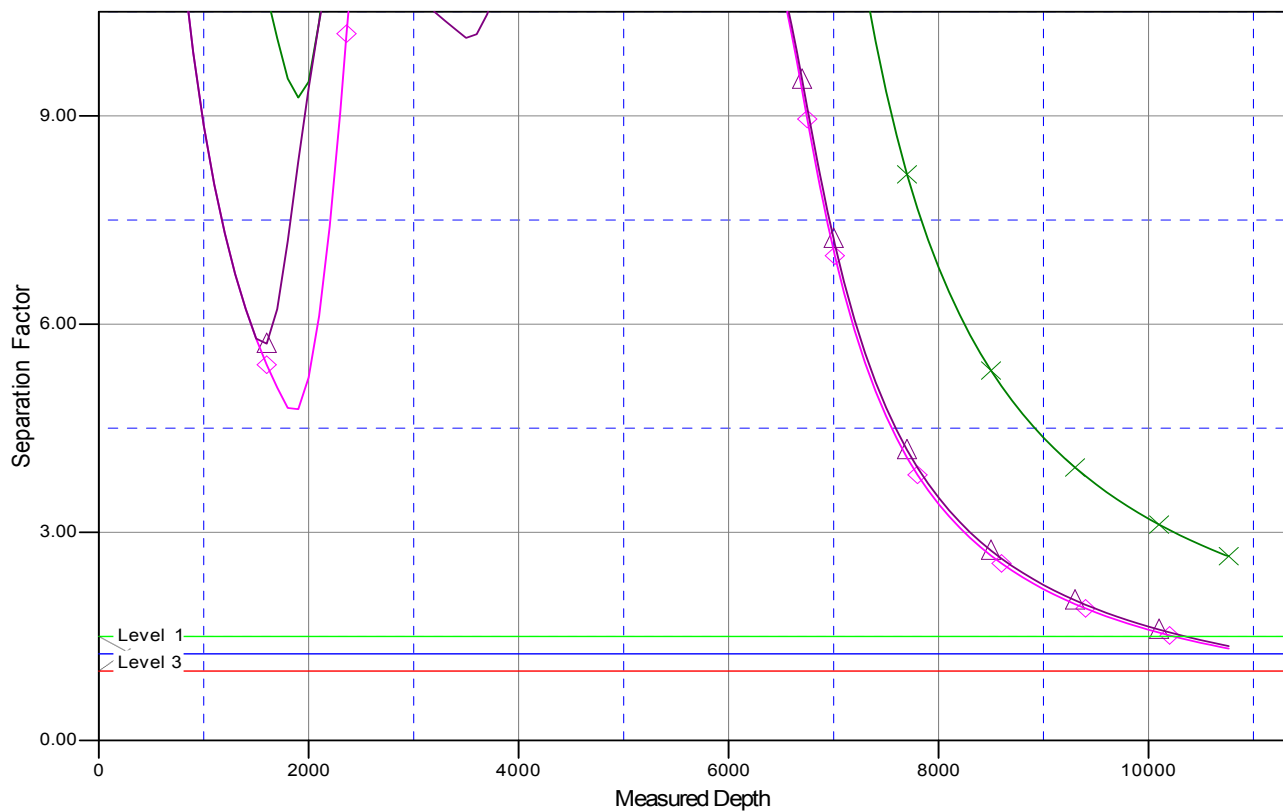


Company:	Northern Region Drilling	Local Co-ordinate Reference:	Well Kummer PC LE23-65HN
Project:	Wattenberg Field	TVD Reference:	WELL @ 4998.0usft (Original Well Elev)
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Reference Design:	APD - Rev 0	Offset TVD Reference:	Offset Datum



Reference Depths are relative to WELL @ 4998.0usft (Original Well Ele
Offset Depths are relative to Offset Datum
Central Meridian is -105.500000

Coordinates are relative to: Kummer PC LE23-65HN
Coordinate System is US State Plane 1983, Colorado Northern Zone
Grid Convergence at Surface is: 0.85°

Separation Factor Plot



LEGEND

C_LE23-65-1HN, Original Drilling, APD - Rev 0 V0  Kummer PCLE23-64HN, Original Drilling, APD - Rev 0 V0  Kummer PCLE23-66-1HN, Original Drilling