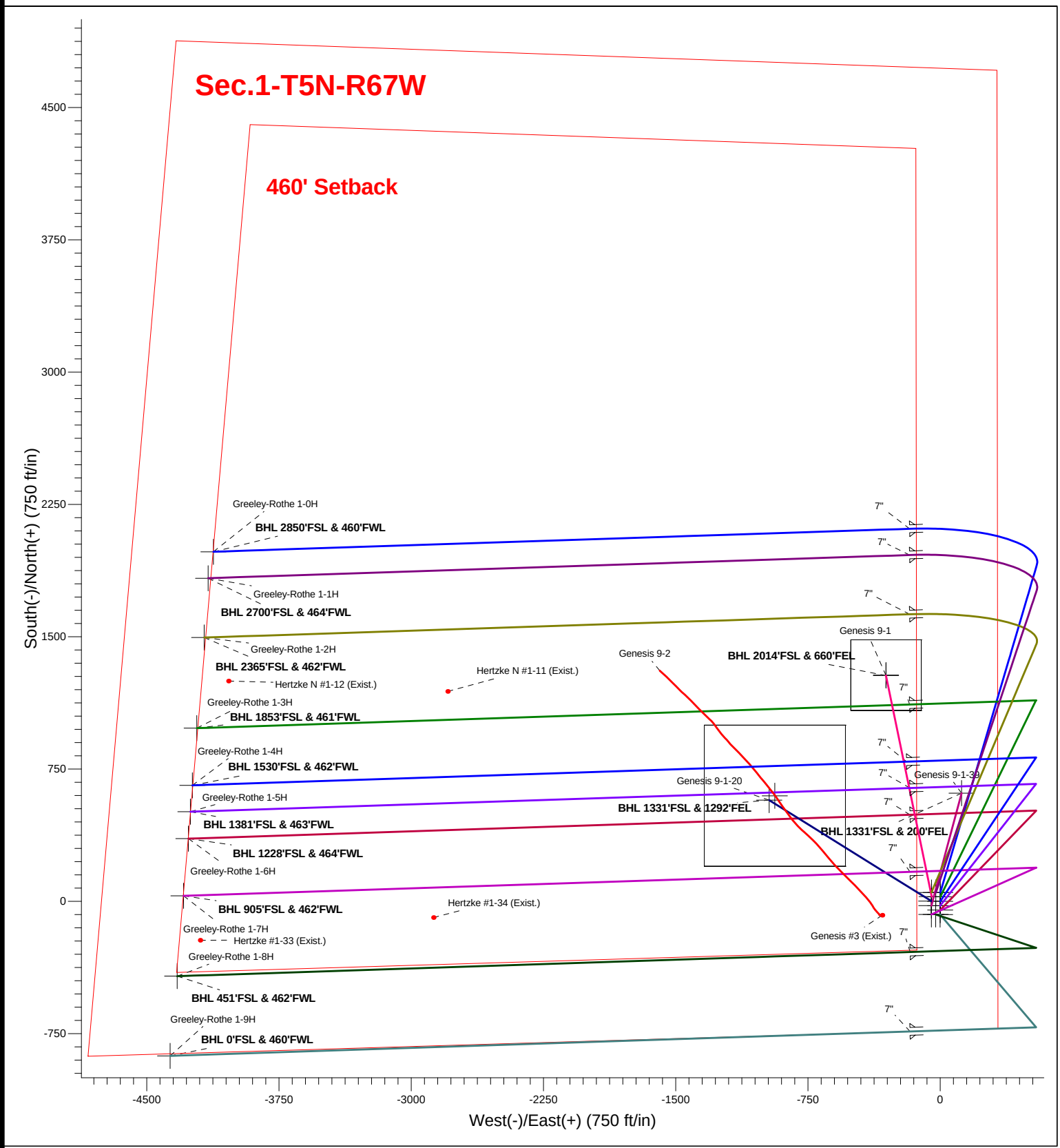
ENSIGN Directional

Surface Location: Greeley-Rothe Pad Sec.1-T5N-R67W

North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone
Ground Elevation: 4876.0

+N/-S	+E/-W	Northing	Easting	Latittude	Longitude	Slot
0.0	0.0	1397831.58	3185528.81	40.423536	-104.833615	

Design Version: Plan #2 (6-05-14)



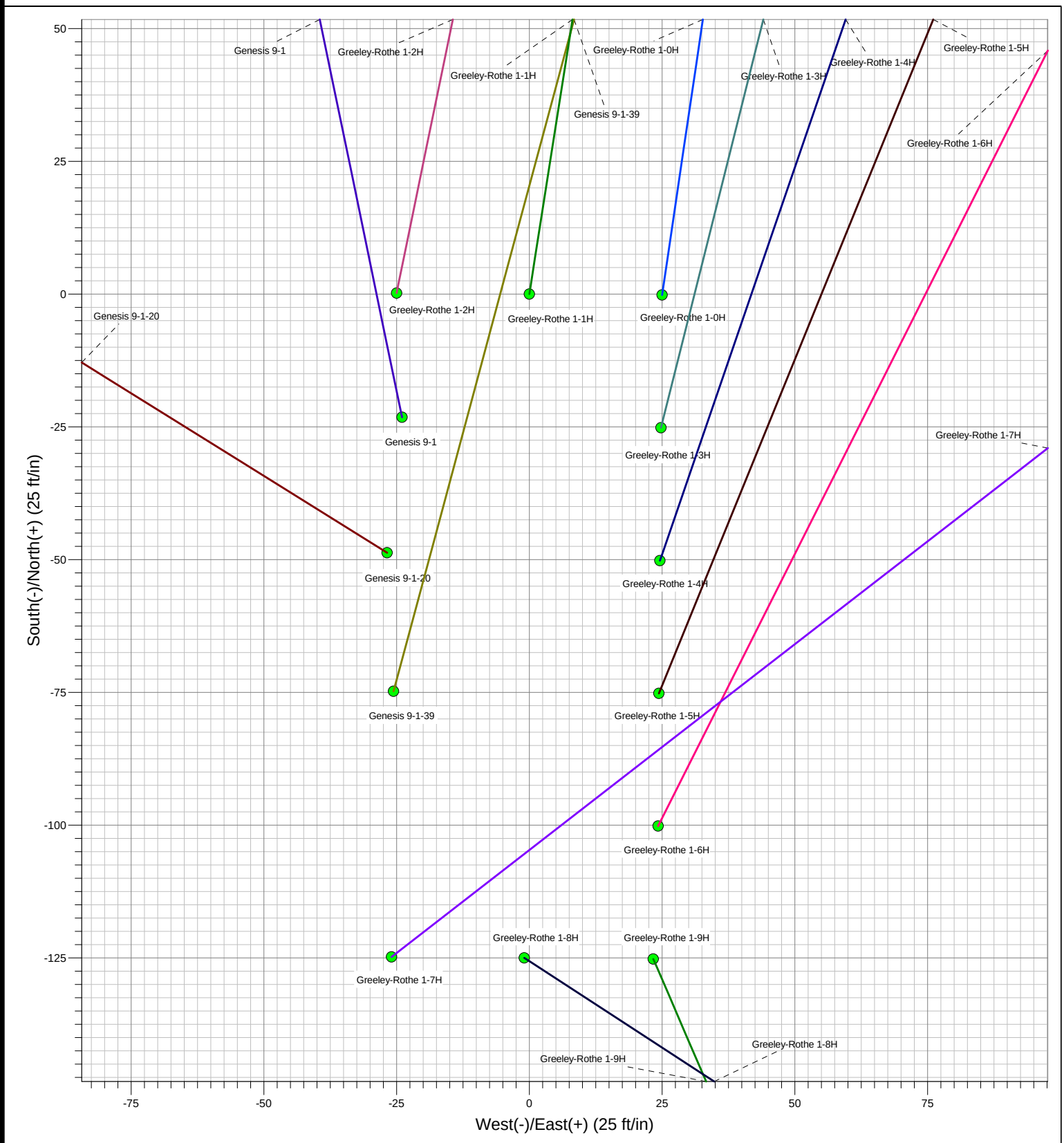
ENSIGN Directional

Surface Location: Greeley-Rothe Pad Sec.1-T5N-R67W

North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone
Ground Elevation: 4875.0

+N/-S	+E/-W	Northing	Easting	Latittude	Longitude	Slot
0.0	0.0	1397881.60	3185503.82	40.423674	-104.833704	

Design Version: Plan #2 (6-05-14)



KP KAUFFMAN

Well Name: **Greeley-Rothe 1-3H**

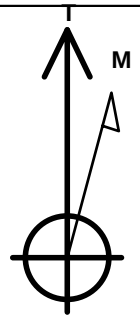
Surface Location: Greeley-Rothe Pad Sec.1-T5N-R67W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone
Ground Elevation: 4875.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1397856.61	3185528.81	40.423605	-104.833615	

RKB - 15' WELL @ 4890.0ft (RKB - 15')

WELLBORE TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
SHL 748FSL & 327'FEL	1.0	0.0	0.0	Point
BHL 1853'FSL & 461'FWL	7282.0	956.8	-4216.6	Point



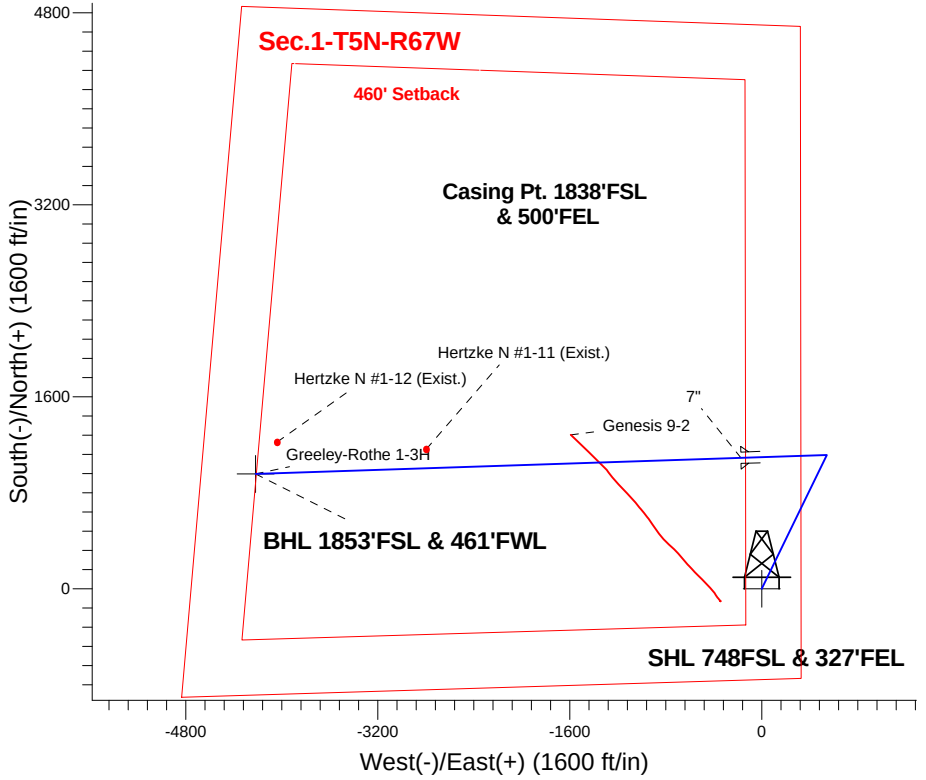
Azimuths to True North
Magnetic North: 8.51°

Magnetic Field
Strength: 52831.2snT
Dip Angle: 66.96°
Date: 5/7/2014
Model: IGRF2010

Greeley-Rothe Pad Sec.1-T5N-R67W
Greeley-Rothe 1-3H
Plan #2 (6-05-14)
15:25, June 06 2014

ANNOTATIONS

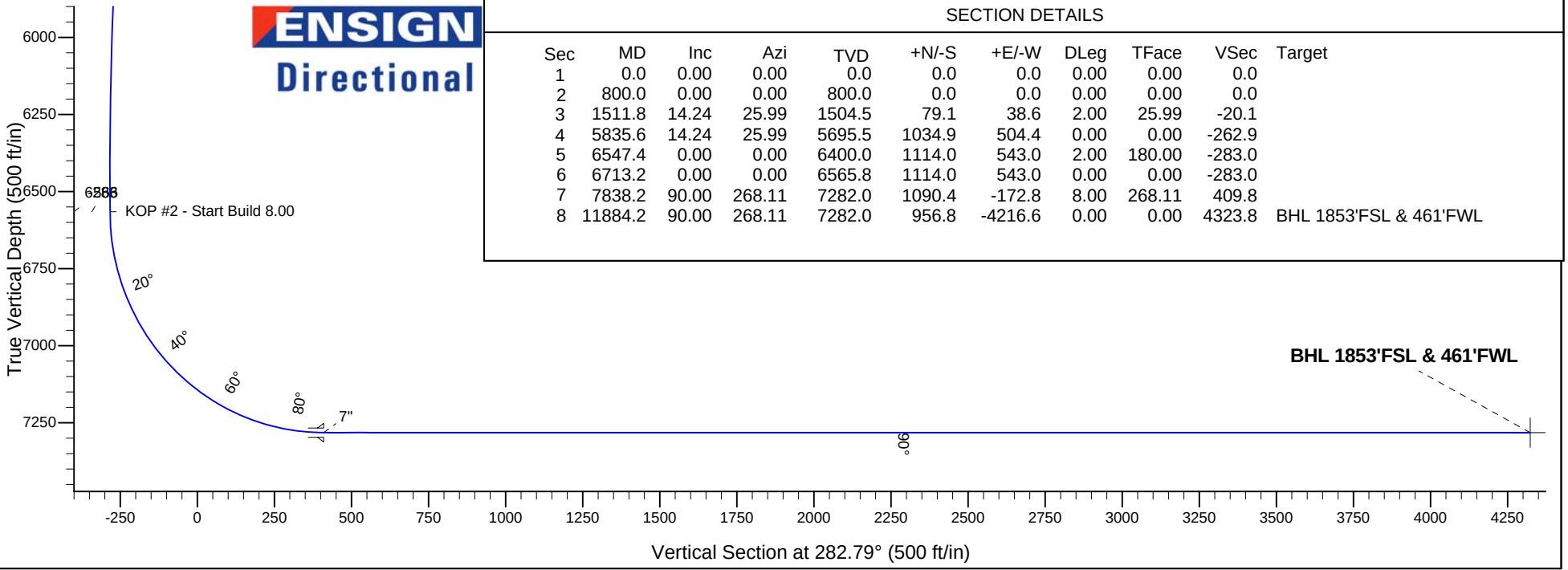
TVD	MD	Annotation
800.0	800.0	KOP - Start Build 2.00
5695.5	5835.6	Start Drop -2.00
6565.8	6713.2	KOP #2 - Start Build 8.00
7282.0	11884.2	TD at 11884.2



ENSIGN Directional

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	VSec	Target
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	800.0	0.00	0.00	800.0	0.0	0.0	0.00	0.00	0.0	
3	1511.8	14.24	25.99	1504.5	79.1	38.6	2.00	25.99	-20.1	
4	5835.6	14.24	25.99	5695.5	1034.9	504.4	0.00	0.00	-262.9	
5	6547.4	0.00	0.00	6400.0	1114.0	543.0	2.00	180.00	-283.0	
6	6713.2	0.00	0.00	6565.8	1114.0	543.0	0.00	0.00	-283.0	
7	7838.2	90.00	268.11	7282.0	1090.4	-172.8	8.00	268.11	409.8	
8	11884.2	90.00	268.11	7282.0	956.8	-4216.6	0.00	0.00	4323.8	BHL 1853'FSL & 461'FWL



KP KAUFFMAN

SEC.1-T5N-R67W
Greeley-Rothe Pad Sec.1-T5N-R67W
Greeley-Rothe 1-3H

Wellbore #1

Plan: Plan #2 (6-05-14)

Standard Planning Report

06 June, 2014

Database:	Landmark	**Local Co-ordinate Reference:**	Well Greeley-Rothe 1-3H
Company:	KP KAUFFMAN	**TVD Reference:**	WELL @ 4890.0ft (RKB - 15')
Project:	SEC.1-T5N-R67W	**MD Reference:**	WELL @ 4890.0ft (RKB - 15')
Site:	Greeley-Rothe Pad Sec.1-T5N-R67W	**North Reference:**	True
Well:	Greeley-Rothe 1-3H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #2 (6-05-14)		

Project SEC.1-T5N-R67W, Weld County, CO

Map System:	US State Plane 1983	**System Datum:**	Mean Sea Level
Geo Datum:	North American Datum 1983		Using Well Reference Point
Map Zone:	Colorado Northern Zone		Using geodetic scale factor

Site Greeley-Rothe Pad Sec.1-T5N-R67W

Site Position:		**Northing:**	1,397,880.45 ft	**Latitude:**	40.423670
From:	Lat/Long	**Easting:**	3,185,529.97 ft	**Longitude:**	-104.833610
Position Uncertainty:	0.0 ft	**Slot Radius:**	"	**Grid Convergence:**	0.43 °

Well Greeley-Rothe 1-3H

Well Position	**+N/-S**	-23.8 ft	**Northing:**	1,397,856.61 ft	**Latitude:**	40.423605
	+E/-W	-1.3 ft	**Easting:**	3,185,528.81 ft	**Longitude:**	-104.833615
Position Uncertainty		0.0 ft	**Wellhead Elevation:**	ft	**Ground Level:**	4,875.0 ft

Wellbore Wellbore #1

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	5/7/2014	8.51	66.96	52,831

Design Plan #2 (6-05-14)

Audit Notes:

Version:		**Phase:**	PROTOTYPE	**Tie On Depth:**	0.0

Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.0	0.0	0.0	282.79

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
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
800.0	0.00	0.00	800.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,511.8	14.24	25.99	1,504.5	79.1	38.6	2.00	2.00	0.00	25.99	
5,835.6	14.24	25.99	5,695.5	1,034.9	504.4	0.00	0.00	0.00	0.00	
6,547.4	0.00	0.00	6,400.0	1,114.0	543.0	2.00	-2.00	0.00	180.00	
6,713.2	0.00	0.00	6,565.8	1,114.0	543.0	0.00	0.00	0.00	0.00	
7,838.2	90.00	268.11	7,282.0	1,090.4	-172.8	8.00	8.00	0.00	268.11	
11,884.2	90.00	268.11	7,282.0	956.8	-4,216.6	0.00	0.00	0.00	0.00	BHL 1853'FSL & 46

Database:	Landmark	**Local Co-ordinate Reference:**	Well Greeley-Rothe 1-3H
Company:	KP KAUFFMAN	**TVD Reference:**	WELL @ 4890.0ft (RKB - 15')
Project:	SEC.1-T5N-R67W	**MD Reference:**	WELL @ 4890.0ft (RKB - 15')
Site:	Greeley-Rothe Pad Sec.1-T5N-R67W	**North Reference:**	True
Well:	Greeley-Rothe 1-3H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #2 (6-05-14)		

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)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
1.0	0.00	0.00	1.0	0.0	0.0	0.0	0.00	0.00	0.00
SHL 748FSL & 327'FEL									
100.0	0.00	0.00	100.0	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
300.0	0.00	0.00	300.0	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
500.0	0.00	0.00	500.0	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
700.0	0.00	0.00	700.0	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
KOP - Start Build 2.00									
900.0	2.00	25.99	900.0	1.6	0.8	-0.4	2.00	2.00	0.00
1,000.0	4.00	25.99	999.8	6.3	3.1	-1.6	2.00	2.00	0.00
1,100.0	6.00	25.99	1,099.5	14.1	6.9	-3.6	2.00	2.00	0.00
1,200.0	8.00	25.99	1,198.7	25.1	12.2	-6.4	2.00	2.00	0.00
1,300.0	10.00	25.99	1,297.5	39.1	19.1	-9.9	2.00	2.00	0.00
1,400.0	12.00	25.99	1,395.6	56.3	27.4	-14.3	2.00	2.00	0.00
1,500.0	14.00	25.99	1,493.1	76.5	37.3	-19.4	2.00	2.00	0.00
1,511.8	14.24	25.99	1,504.5	79.1	38.6	-20.1	2.00	2.00	0.00
1,600.0	14.24	25.99	1,590.0	98.6	48.1	-25.0	0.00	0.00	0.00
1,700.0	14.24	25.99	1,686.9	120.7	58.8	-30.7	0.00	0.00	0.00
1,800.0	14.24	25.99	1,783.8	142.8	69.6	-36.3	0.00	0.00	0.00
1,900.0	14.24	25.99	1,880.8	164.9	80.4	-41.9	0.00	0.00	0.00
2,000.0	14.24	25.99	1,977.7	187.0	91.2	-47.5	0.00	0.00	0.00
2,100.0	14.24	25.99	2,074.6	209.1	101.9	-53.1	0.00	0.00	0.00
2,200.0	14.24	25.99	2,171.6	231.2	112.7	-58.7	0.00	0.00	0.00
2,300.0	14.24	25.99	2,268.5	253.3	123.5	-64.4	0.00	0.00	0.00
2,400.0	14.24	25.99	2,365.4	275.4	134.3	-70.0	0.00	0.00	0.00
2,500.0	14.24	25.99	2,462.3	297.5	145.0	-75.6	0.00	0.00	0.00
2,600.0	14.24	25.99	2,559.3	319.6	155.8	-81.2	0.00	0.00	0.00
2,700.0	14.24	25.99	2,656.2	341.7	166.6	-86.8	0.00	0.00	0.00
2,800.0	14.24	25.99	2,753.1	363.9	177.4	-92.4	0.00	0.00	0.00
2,900.0	14.24	25.99	2,850.1	386.0	188.1	-98.1	0.00	0.00	0.00
3,000.0	14.24	25.99	2,947.0	408.1	198.9	-103.7	0.00	0.00	0.00
3,100.0	14.24	25.99	3,043.9	430.2	209.7	-109.3	0.00	0.00	0.00
3,200.0	14.24	25.99	3,140.9	452.3	220.5	-114.9	0.00	0.00	0.00
3,300.0	14.24	25.99	3,237.8	474.4	231.2	-120.5	0.00	0.00	0.00
3,400.0	14.24	25.99	3,334.7	496.5	242.0	-126.1	0.00	0.00	0.00
3,500.0	14.24	25.99	3,431.6	518.6	252.8	-131.8	0.00	0.00	0.00
3,600.0	14.24	25.99	3,528.6	540.7	263.6	-137.4	0.00	0.00	0.00
3,700.0	14.24	25.99	3,625.5	562.8	274.3	-143.0	0.00	0.00	0.00
3,800.0	14.24	25.99	3,722.4	584.9	285.1	-148.6	0.00	0.00	0.00
3,900.0	14.24	25.99	3,819.4	607.0	295.9	-154.2	0.00	0.00	0.00
4,000.0	14.24	25.99	3,916.3	629.1	306.7	-159.8	0.00	0.00	0.00
4,100.0	14.24	25.99	4,013.2	651.2	317.4	-165.5	0.00	0.00	0.00
4,200.0	14.24	25.99	4,110.1	673.3	328.2	-171.1	0.00	0.00	0.00
4,300.0	14.24	25.99	4,207.1	695.5	339.0	-176.7	0.00	0.00	0.00
4,400.0	14.24	25.99	4,304.0	717.6	349.8	-182.3	0.00	0.00	0.00
4,500.0	14.24	25.99	4,400.9	739.7	360.5	-187.9	0.00	0.00	0.00
4,600.0	14.24	25.99	4,497.9	761.8	371.3	-193.5	0.00	0.00	0.00
4,700.0	14.24	25.99	4,594.8	783.9	382.1	-199.1	0.00	0.00	0.00
4,800.0	14.24	25.99	4,691.7	806.0	392.9	-204.8	0.00	0.00	0.00
4,900.0	14.24	25.99	4,788.6	828.1	403.6	-210.4	0.00	0.00	0.00

Database:	Landmark	**Local Co-ordinate Reference:**	Well Greeley-Rothe 1-3H
Company:	KP KAUFFMAN	**TVD Reference:**	WELL @ 4890.0ft (RKB - 15')
Project:	SEC.1-T5N-R67W	**MD Reference:**	WELL @ 4890.0ft (RKB - 15')
Site:	Greeley-Rothe Pad Sec.1-T5N-R67W	**North Reference:**	True
Well:	Greeley-Rothe 1-3H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #2 (6-05-14)		

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)
5,000.0	14.24	25.99	4,885.6	850.2	414.4	-216.0	0.00	0.00	0.00
5,100.0	14.24	25.99	4,982.5	872.3	425.2	-221.6	0.00	0.00	0.00
5,200.0	14.24	25.99	5,079.4	894.4	436.0	-227.2	0.00	0.00	0.00
5,300.0	14.24	25.99	5,176.4	916.5	446.7	-232.8	0.00	0.00	0.00
5,400.0	14.24	25.99	5,273.3	938.6	457.5	-238.5	0.00	0.00	0.00
5,500.0	14.24	25.99	5,370.2	960.7	468.3	-244.1	0.00	0.00	0.00
5,600.0	14.24	25.99	5,467.1	982.8	479.1	-249.7	0.00	0.00	0.00
5,700.0	14.24	25.99	5,564.1	1,004.9	489.8	-255.3	0.00	0.00	0.00
5,800.0	14.24	25.99	5,661.0	1,027.1	500.6	-260.9	0.00	0.00	0.00
5,835.6	14.24	25.99	5,695.5	1,034.9	504.5	-262.9	0.00	0.00	0.00
Start Drop -2.00									
5,900.0	12.95	25.99	5,758.1	1,048.5	511.1	-266.4	2.00	-2.00	0.00
6,000.0	10.95	25.99	5,855.9	1,067.1	520.2	-271.1	2.00	-2.00	0.00
6,100.0	8.95	25.99	5,954.4	1,082.7	527.7	-275.1	2.00	-2.00	0.00
6,200.0	6.95	25.99	6,053.5	1,095.1	533.8	-278.2	2.00	-2.00	0.00
6,300.0	4.95	25.99	6,152.9	1,104.4	538.3	-280.6	2.00	-2.00	0.00
6,400.0	2.95	25.99	6,252.7	1,110.6	541.3	-282.2	2.00	-2.00	0.00
6,500.0	0.95	25.99	6,352.6	1,113.6	542.8	-282.9	2.00	-2.00	0.00
6,547.4	0.00	0.00	6,400.0	1,114.0	543.0	-283.0	2.00	-2.00	0.00
6,600.0	0.00	0.00	6,452.6	1,114.0	543.0	-283.0	0.00	0.00	0.00
6,700.0	0.00	0.00	6,552.6	1,114.0	543.0	-283.0	0.00	0.00	0.00
6,713.2	0.00	0.00	6,565.8	1,114.0	543.0	-283.0	0.00	0.00	0.00
KOP #2 - Start Build 8.00									
6,800.0	6.94	268.11	6,652.4	1,113.8	537.7	-277.9	8.00	8.00	0.00
6,900.0	14.94	268.11	6,750.5	1,113.2	518.8	-259.6	8.00	8.00	0.00
7,000.0	22.94	268.11	6,845.0	1,112.1	486.4	-228.2	8.00	8.00	0.00
7,100.0	30.94	268.11	6,934.1	1,110.6	441.1	-184.4	8.00	8.00	0.00
7,200.0	38.94	268.11	7,016.0	1,108.7	383.9	-129.0	8.00	8.00	0.00
7,300.0	46.94	268.11	7,089.1	1,106.5	315.9	-63.2	8.00	8.00	0.00
7,400.0	54.94	268.11	7,152.1	1,103.9	238.3	11.9	8.00	8.00	0.00
7,500.0	62.94	268.11	7,203.6	1,101.1	152.8	94.7	8.00	8.00	0.00
7,600.0	70.94	268.11	7,242.8	1,098.1	60.9	183.6	8.00	8.00	0.00
7,700.0	78.94	268.11	7,268.7	1,094.9	-35.5	277.0	8.00	8.00	0.00
7,800.0	86.94	268.11	7,281.0	1,091.6	-134.6	372.9	8.00	8.00	0.00
7,838.2	90.00	268.11	7,282.0	1,090.4	-172.8	409.8	8.00	8.00	0.00
7"									
7,900.0	90.00	268.11	7,282.0	1,088.3	-234.6	469.6	0.00	0.00	0.00
8,000.0	90.00	268.11	7,282.0	1,085.0	-334.5	566.3	0.00	0.00	0.00
8,100.0	90.00	268.11	7,282.0	1,081.7	-434.5	663.1	0.00	0.00	0.00
8,200.0	90.00	268.11	7,282.0	1,078.4	-534.4	759.8	0.00	0.00	0.00
8,300.0	90.00	268.11	7,282.0	1,075.1	-634.4	856.5	0.00	0.00	0.00
8,400.0	90.00	268.11	7,282.0	1,071.8	-734.3	953.3	0.00	0.00	0.00
8,500.0	90.00	268.11	7,282.0	1,068.5	-834.2	1,050.0	0.00	0.00	0.00
8,600.0	90.00	268.11	7,282.0	1,065.2	-934.2	1,146.8	0.00	0.00	0.00
8,700.0	90.00	268.11	7,282.0	1,061.9	-1,034.1	1,243.5	0.00	0.00	0.00
8,800.0	90.00	268.11	7,282.0	1,058.6	-1,134.1	1,340.2	0.00	0.00	0.00
8,900.0	90.00	268.11	7,282.0	1,055.3	-1,234.0	1,437.0	0.00	0.00	0.00
9,000.0	90.00	268.11	7,282.0	1,052.0	-1,334.0	1,533.7	0.00	0.00	0.00
9,100.0	90.00	268.11	7,282.0	1,048.7	-1,433.9	1,630.4	0.00	0.00	0.00
9,200.0	90.00	268.11	7,282.0	1,045.4	-1,533.9	1,727.2	0.00	0.00	0.00
9,300.0	90.00	268.11	7,282.0	1,042.1	-1,633.8	1,823.9	0.00	0.00	0.00
9,400.0	90.00	268.11	7,282.0	1,038.8	-1,733.8	1,920.7	0.00	0.00	0.00
9,500.0	90.00	268.11	7,282.0	1,035.5	-1,833.7	2,017.4	0.00	0.00	0.00

Database:	Landmark	**Local Co-ordinate Reference:**	Well Greeley-Rothe 1-3H
Company:	KP KAUFFMAN	**TVD Reference:**	WELL @ 4890.0ft (RKB - 15')
Project:	SEC.1-T5N-R67W	**MD Reference:**	WELL @ 4890.0ft (RKB - 15')
Site:	Greeley-Rothe Pad Sec.1-T5N-R67W	**North Reference:**	True
Well:	Greeley-Rothe 1-3H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #2 (6-05-14)		

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)
9,600.0	90.00	268.11	7,282.0	1,032.2	-1,933.7	2,114.1	0.00	0.00	0.00
9,700.0	90.00	268.11	7,282.0	1,028.9	-2,033.6	2,210.9	0.00	0.00	0.00
9,800.0	90.00	268.11	7,282.0	1,025.6	-2,133.5	2,307.6	0.00	0.00	0.00
9,900.0	90.00	268.11	7,282.0	1,022.3	-2,233.5	2,404.3	0.00	0.00	0.00
10,000.0	90.00	268.11	7,282.0	1,019.0	-2,333.4	2,501.1	0.00	0.00	0.00
10,100.0	90.00	268.11	7,282.0	1,015.7	-2,433.4	2,597.8	0.00	0.00	0.00
10,200.0	90.00	268.11	7,282.0	1,012.4	-2,533.3	2,694.6	0.00	0.00	0.00
10,300.0	90.00	268.11	7,282.0	1,009.1	-2,633.3	2,791.3	0.00	0.00	0.00
10,400.0	90.00	268.11	7,282.0	1,005.8	-2,733.2	2,888.0	0.00	0.00	0.00
10,500.0	90.00	268.11	7,282.0	1,002.5	-2,833.2	2,984.8	0.00	0.00	0.00
10,600.0	90.00	268.11	7,282.0	999.2	-2,933.1	3,081.5	0.00	0.00	0.00
10,700.0	90.00	268.11	7,282.0	995.9	-3,033.1	3,178.2	0.00	0.00	0.00
10,800.0	90.00	268.11	7,282.0	992.6	-3,133.0	3,275.0	0.00	0.00	0.00
10,900.0	90.00	268.11	7,282.0	989.3	-3,232.9	3,371.7	0.00	0.00	0.00
11,000.0	90.00	268.11	7,282.0	986.0	-3,332.9	3,468.5	0.00	0.00	0.00
11,100.0	90.00	268.11	7,282.0	982.7	-3,432.8	3,565.2	0.00	0.00	0.00
11,200.0	90.00	268.11	7,282.0	979.4	-3,532.8	3,661.9	0.00	0.00	0.00
11,300.0	90.00	268.11	7,282.0	976.1	-3,632.7	3,758.7	0.00	0.00	0.00
11,400.0	90.00	268.11	7,282.0	972.8	-3,732.7	3,855.4	0.00	0.00	0.00
11,500.0	90.00	268.11	7,282.0	969.5	-3,832.6	3,952.1	0.00	0.00	0.00
11,600.0	90.00	268.11	7,282.0	966.2	-3,932.6	4,048.9	0.00	0.00	0.00
11,700.0	90.00	268.11	7,282.0	962.9	-4,032.5	4,145.6	0.00	0.00	0.00
11,800.0	90.00	268.11	7,282.0	959.6	-4,132.5	4,242.4	0.00	0.00	0.00
11,884.2	90.00	268.11	7,282.0	956.8	-4,216.6	4,323.8	0.00	0.00	0.00
TD at 11884.2 - BHL 1853'FSL & 461'FWL									

Casing Points

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
7,838.2	7,282.0	7"	7	7-1/2

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	Local Coordinates +E/-W (ft)	Comment
800.0	800.0	0.0	0.0	KOP - Start Build 2.00
5,835.6	5,695.5	1,034.9	504.5	Start Drop -2.00
6,713.2	6,565.8	1,114.0	543.0	KOP #2 - Start Build 8.00
11,884.2	7,282.0	956.8	-4,216.6	TD at 11884.2

ENSIGN Directional

KP KAUFFMAN

SEC.1-T5N-R67W
Greeley-Rothe Pad Sec.1-T5N-R67W
Greeley-Rothe 1-3H

Wellbore #1
Plan #2 (6-05-14)

Anticollision Report

06 June, 2014

Company:	KP KAUFFMAN	**Local Co-ordinate Reference:**	Well Greeley-Rothe 1-3H
Project:	SEC.1-T5N-R67W	**TVD Reference:**	WELL @ 4890.0ft (RKB - 15')
Reference Site:	Greeley-Rothe Pad Sec.1-T5N-R67W	**MD Reference:**	WELL @ 4890.0ft (RKB - 15')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Greeley-Rothe 1-3H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Landmark
Reference Design:	Plan #2 (6-05-14)	**Offset TVD Reference:**	Offset Datum

Reference	Plan #2 (6-05-14)		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	MD Interval 100.0ft	**Error Model:**	ISCWSA
Depth Range:	Unlimited	**Scan Method:**	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 500.0ft	**Error Surface:**	Elliptical Conic
Warning Levels Evaluated at:	2.00 **Sigma**		

Survey Tool Program **Date** 6/6/2014

From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.0	11,883.7	Plan #2 (6-05-14) (Wellbore #1)	MWD	MWD - Standard

Summary

Site Name Offset Well - Wellbore - Design	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
Genesis 9-1 Pad Sec.1-T5N-R67W						
Genesis #3 (Exist.) - Wellbore #1 - Wellbore #1	800.0	805.0	344.8	327.0	19.387	CC
Genesis #3 (Exist.) - Wellbore #1 - Wellbore #1	900.0	905.0	346.0	326.0	17.299	ES
Genesis #3 (Exist.) - Wellbore #1 - Wellbore #1	1,900.0	1,885.8	489.5	448.1	11.817	SF
Genesis 9-2 - Wellbore #1 - Wellbore #1	9,217.5	7,515.2	208.9	126.5	2.536	CC, ES, SF
Greeley-Rothe Pad Sec.1-T5N-R67W						
Genesis 9-1 - Wellbore #1 - Plan #2 (5-2-14)	766.3	767.3	48.8	45.6	15.150	CC
Genesis 9-1 - Wellbore #1 - Plan #2 (5-2-14)	800.0	801.0	48.8	45.4	14.471	ES
Genesis 9-1 - Wellbore #1 - Plan #2 (5-2-14)	7,967.5	7,455.1	169.2	125.7	3.890	SF
Genesis 9-1-20 - Wellbore #1 - Plan #1 (5-02-14)	800.0	801.0	56.7	53.3	16.802	CC, ES
Genesis 9-1-20 - Wellbore #1 - Plan #1 (5-02-14)	1,000.0	1,000.8	62.2	58.0	14.585	SF
Genesis 9-1-39 - Wellbore #1 - Plan #2 (6-05-14)	800.0	801.0	70.7	67.3	20.957	CC, ES
Genesis 9-1-39 - Wellbore #1 - Plan #2 (6-05-14)	5,100.0	5,119.8	451.4	424.5	16.730	SF
Greeley-Rothe 1-0H - Wellbore #1 - Plan #1 (6-5-14)	200.0	200.0	25.0	24.3	37.065	CC, ES
Greeley-Rothe 1-0H - Wellbore #1 - Plan #1 (6-5-14)	5,400.0	5,351.4	496.9	462.0	14.255	SF
Greeley-Rothe 1-1H - Wellbore #1 - Plan #2 (6-05-14)	400.0	400.0	35.3	33.8	22.464	CC, ES
Greeley-Rothe 1-1H - Wellbore #1 - Plan #2 (6-05-14)	5,900.0	5,865.8	440.8	401.9	11.325	SF
Greeley-Rothe 1-2H - Wellbore #1 - Plan #2 (6-05-14)	600.0	600.0	55.9	53.4	22.606	CC
Greeley-Rothe 1-2H - Wellbore #1 - Plan #2 (6-05-14)	700.0	699.8	56.0	53.1	19.194	ES
Greeley-Rothe 1-2H - Wellbore #1 - Plan #2 (6-05-14)	5,900.0	5,890.2	193.1	151.7	4.658	SF
Greeley-Rothe 1-4H - Wellbore #1 - Plan #2 (6-05-14)	800.0	801.0	25.0	21.7	7.419	CC, ES
Greeley-Rothe 1-4H - Wellbore #1 - Plan #2 (6-05-14)	11,884.2	11,863.8	323.2	70.5	1.279	Level 3, SF
Greeley-Rothe 1-5H - Wellbore #1 - Plan #2 (6-05-14)	800.0	801.0	50.0	46.6	14.827	CC, ES
Greeley-Rothe 1-5H - Wellbore #1 - Plan #2 (6-05-14)	11,884.2	11,925.1	485.0	237.7	1.961	SF
Greeley-Rothe 1-6H - Wellbore #1 - Plan #2 (6-05-14)	800.0	801.0	75.0	71.6	22.235	CC, ES
Greeley-Rothe 1-6H - Wellbore #1 - Plan #2 (6-05-14)	1,100.0	1,100.5	89.4	84.7	18.969	SF
Greeley-Rothe 1-7H - Wellbore #1 - Plan #2 (6-05-14)	800.0	801.0	111.8	108.4	33.145	CC, ES
Greeley-Rothe 1-7H - Wellbore #1 - Plan #2 (6-05-14)	1,100.0	1,100.5	127.5	122.8	27.071	SF
Greeley-Rothe 1-8H - Wellbore #1 - Plan #2 (6-05-14)	800.0	802.0	103.1	99.7	30.536	CC, ES
Greeley-Rothe 1-8H - Wellbore #1 - Plan #2 (6-05-14)	1,100.0	1,101.5	118.5	113.8	25.139	SF
Greeley-Rothe 1-9H - Wellbore #1 - Plan #2 (6-6-14)	800.0	802.0	100.1	96.7	29.637	CC, ES
Greeley-Rothe 1-9H - Wellbore #1 - Plan #2 (6-6-14)	1,100.0	1,100.0	115.7	111.0	24.658	SF
Hertzke #1-33 (Exist.) - Wellbore #1 - Wellbore #1						Out of range
Hertzke #1-34 (Exist.) - Wellbore #1 - Wellbore #1						Out of range
Hertzke N #1-11 (Exist.) - Wellbore #1 - Wellbore #1	10,454.9	7,287.0	160.7	65.1	1.681	CC, ES, SF
Hertzke N #1-12 (Exist.) - Wellbore #1 - Wellbore #1	11,695.9	7,310.0	260.9	131.2	2.011	CC
Hertzke N #1-12 (Exist.) - Wellbore #1 - Wellbore #1	11,700.0	7,310.0	261.0	131.1	2.010	ES, SF

Company:	KP KAUFFMAN	**Local Co-ordinate Reference:**	Well Greeley-Rothe 1-3H
Project:	SEC.1-T5N-R67W	**TVD Reference:**	WELL @ 4890.0ft (RKB - 15')
Reference Site:	Greeley-Rothe Pad Sec.1-T5N-R67W	**MD Reference:**	WELL @ 4890.0ft (RKB - 15')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Greeley-Rothe 1-3H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Landmark
Reference Design:	Plan #2 (6-05-14)	**Offset TVD Reference:**	Offset Datum

Summary

Site Name Offset Well - Wellbore - Design	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning

Offset Design Genesis 9-1 Pad Sec.1-T5N-R67W - Genesis #3 (Exist.) - Wellbore #1 - Wellbore #1

Offset Site Error: 0.0 ft

Survey Program: 7800-UNKNOWN

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	5.0	5.0	0.0	0.1	-107.50	-103.7	-328.9	344.8	344.7	0.10	3,441.301	
100.0	100.0	105.0	105.0	0.1	2.1	-107.50	-103.7	-328.9	344.8	342.6	2.21	155.844	
200.0	200.0	205.0	205.0	0.3	4.1	-107.50	-103.7	-328.9	344.8	340.4	4.44	77.708	
300.0	300.0	305.0	305.0	0.6	6.1	-107.50	-103.7	-328.9	344.8	338.2	6.66	51.758	
400.0	400.0	405.0	405.0	0.8	8.1	-107.50	-103.7	-328.9	344.8	335.9	8.89	38.801	
500.0	500.0	505.0	505.0	1.0	10.1	-107.50	-103.7	-328.9	344.8	333.7	11.11	31.032	
600.0	600.0	605.0	605.0	1.2	12.1	-107.50	-103.7	-328.9	344.8	331.5	13.34	25.855	
700.0	700.0	705.0	705.0	1.5	14.1	-107.50	-103.7	-328.9	344.8	329.3	15.56	22.159	
800.0	800.0	805.0	805.0	1.7	16.1	-107.50	-103.7	-328.9	344.8	327.0	17.79	19.387 CC	
900.0	900.0	905.0	905.0	1.9	18.1	-133.68	-103.7	-328.9	346.0	326.0	20.00	17.299 ES	
1,000.0	999.8	1,004.8	1,004.8	2.1	20.1	-134.24	-103.7	-328.9	349.7	327.5	22.20	15.749	
1,100.0	1,099.5	1,104.5	1,104.5	2.4	22.1	-135.16	-103.7	-328.9	355.8	331.4	24.38	14.593	
1,200.0	1,198.7	1,203.7	1,203.7	2.6	24.1	-136.38	-103.7	-328.9	364.6	338.0	26.54	13.738	
1,300.0	1,297.5	1,302.5	1,302.5	2.9	26.0	-137.86	-103.7	-328.9	376.1	347.4	28.66	13.123	
1,400.0	1,395.6	1,400.6	1,400.6	3.2	28.0	-139.54	-103.7	-328.9	390.5	359.8	30.74	12.703	
1,500.0	1,493.1	1,498.1	1,498.1	3.6	30.0	-141.35	-103.7	-328.9	408.1	375.3	32.78	12.449	
1,600.0	1,590.0	1,595.0	1,595.0	4.0	31.9	-143.35	-103.7	-328.9	427.7	392.8	34.92	12.248	
1,700.0	1,686.9	1,691.9	1,691.9	4.4	33.8	-145.21	-103.7	-328.9	447.9	410.8	37.09	12.077	
1,800.0	1,783.8	1,788.8	1,788.8	4.8	35.8	-146.91	-103.7	-328.9	468.5	429.3	39.26	11.935	
1,900.0	1,880.8	1,885.8	1,885.8	5.3	37.7	-148.47	-103.7	-328.9	489.5	448.1	41.42	11.817 SF	

Company:	KP KAUFFMAN	**Local Co-ordinate Reference:**	Well Greeley-Rothe 1-3H
Project:	SEC.1-T5N-R67W	**TVD Reference:**	WELL @ 4890.0ft (RKB - 15')
Reference Site:	Greeley-Rothe Pad Sec.1-T5N-R67W	**MD Reference:**	WELL @ 4890.0ft (RKB - 15')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Greeley-Rothe 1-3H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Landmark
Reference Design:	Plan #2 (6-05-14)	**Offset TVD Reference:**	Offset Datum

Offset Design Genesis 9-1 Pad Sec.1-T5N-R67W - Genesis 9-2 - Wellbore #1 - Wellbore #1 — **Offset Site Error:** 0.0 ft

Survey Program: 78-MWD — **Offset Well Error:** 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	3.1	3.1	0.0	0.0	-106.78	-103.7	-343.9	359.2	359.2	0.00	N/A	
100.0	100.0	104.6	104.6	0.1	0.1	-106.88	-104.2	-343.4	358.8	358.6	0.26	1,404.813	
174.4	174.4	177.4	177.4	0.3	0.3	-106.84	-103.9	-343.3	358.7	358.1	0.57	626.441	
200.0	200.0	202.1	202.1	0.3	0.3	-106.78	-103.5	-343.4	358.7	358.0	0.68	525.462	
300.0	300.0	297.1	297.0	0.6	0.6	-106.25	-100.6	-345.1	359.5	358.4	1.11	322.638	
400.0	400.0	390.5	390.2	0.8	0.8	-105.39	-96.0	-349.0	362.2	360.6	1.56	232.320	
500.0	500.0	484.3	483.6	1.0	1.0	-104.11	-89.2	-355.0	366.6	364.5	2.03	180.754	
600.0	600.0	580.9	579.5	1.2	1.3	-102.51	-80.5	-362.9	372.5	370.0	2.53	147.247	
700.0	700.0	681.5	679.2	1.5	1.6	-100.77	-70.7	-371.5	378.9	375.8	3.07	123.604	
800.0	800.0	781.7	778.2	1.7	1.9	-98.58	-57.3	-380.0	385.1	381.4	3.62	106.262	
900.0	900.0	870.6	865.4	1.9	2.3	-122.28	-42.6	-388.9	394.0	389.9	4.10	96.057	
1,000.0	999.8	955.4	947.9	2.1	2.7	-120.18	-27.0	-399.9	408.1	403.4	4.65	87.813	
1,100.0	1,099.5	1,039.1	1,028.9	2.4	3.1	-118.34	-11.0	-413.8	427.8	422.6	5.20	82.205	
1,200.0	1,198.7	1,132.8	1,119.1	2.6	3.6	-116.63	8.0	-431.0	451.2	445.4	5.83	77.411	
1,300.0	1,297.5	1,230.6	1,212.9	2.9	4.0	-115.24	28.6	-449.3	476.6	470.1	6.47	73.688	
8,800.0	7,282.0	7,483.7	7,237.4	44.2	36.5	76.98	1,250.6	-1,555.8	465.8	394.7	71.04	6.556	
8,900.0	7,282.0	7,491.3	7,244.9	46.7	36.5	79.02	1,251.2	-1,556.4	379.3	305.5	73.80	5.140	
9,000.0	7,282.0	7,498.9	7,252.4	49.3	36.5	81.06	1,251.8	-1,557.0	301.1	224.6	76.54	3.934	
9,100.0	7,282.0	7,506.4	7,259.9	51.8	36.5	83.11	1,252.3	-1,557.5	239.5	160.3	79.25	3.022	
9,200.0	7,282.0	7,513.9	7,267.4	54.4	36.6	85.16	1,252.9	-1,558.1	209.6	127.7	81.92	2.559	
9,217.5	7,282.0	7,515.2	7,268.7	54.9	36.6	85.52	1,253.0	-1,558.2	208.9	126.5	82.38	2.536	CC, ES, SF
9,300.0	7,282.0	7,521.3	7,274.8	57.0	36.6	87.20	1,253.5	-1,558.7	224.5	140.0	84.53	2.656	
9,400.0	7,282.0	7,528.8	7,282.2	59.6	36.6	89.23	1,254.0	-1,559.3	277.1	190.0	87.07	3.182	
9,500.0	7,282.0	7,536.2	7,289.6	62.3	36.6	91.25	1,254.6	-1,559.8	350.7	261.2	89.53	3.917	
9,600.0	7,282.0	7,543.6	7,296.9	64.9	36.6	93.24	1,255.1	-1,560.4	434.9	343.0	91.92	4.732	

Company:	KP KAUFFMAN	**Local Co-ordinate Reference:**	Well Greeley-Rothe 1-3H
Project:	SEC.1-T5N-R67W	**TVD Reference:**	WELL @ 4890.0ft (RKB - 15')
Reference Site:	Greeley-Rothe Pad Sec.1-T5N-R67W	**MD Reference:**	WELL @ 4890.0ft (RKB - 15')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Greeley-Rothe 1-3H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Landmark
Reference Design:	Plan #2 (6-05-14)	**Offset TVD Reference:**	Offset Datum

Offset Design Greeley-Rothe Pad Sec.1-T5N-R67W - Genesis 9-1 - Wellbore #1 - Plan #2 (5-2-14) — **Offset Site Error:** 0.0 ft

Survey Program: 0-MWD — **Offset Well Error:** 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	1.0	1.0	0.0	0.0	-87.69	2.0	-48.8	48.8	48.8	0.00	N/A	
100.0	100.0	101.0	101.0	0.1	0.1	-87.69	2.0	-48.8	48.8	48.6	0.23	215.052	
200.0	200.0	201.0	201.0	0.3	0.3	-87.69	2.0	-48.8	48.8	48.1	0.68	72.160	
300.0	300.0	301.0	301.0	0.6	0.6	-87.69	2.0	-48.8	48.8	47.7	1.13	43.354	
400.0	400.0	401.0	401.0	0.8	0.8	-87.69	2.0	-48.8	48.8	47.2	1.58	30.985	
500.0	500.0	501.0	501.0	1.0	1.0	-87.69	2.0	-48.8	48.8	46.8	2.03	24.107	
600.0	600.0	601.0	601.0	1.2	1.2	-87.69	2.0	-48.8	48.8	46.3	2.47	19.728	
700.0	700.0	701.0	701.0	1.5	1.5	-87.69	2.0	-48.8	48.8	45.9	2.92	16.695	
766.3	766.3	767.3	767.3	1.6	1.6	-87.69	2.0	-48.8	48.8	45.6	3.22	15.150	CC
800.0	800.0	801.0	801.0	1.7	1.7	-87.69	2.0	-48.8	48.8	45.4	3.37	14.471	ES
900.0	900.0	900.6	900.6	1.9	1.9	-113.52	3.7	-49.1	49.9	46.1	3.82	13.079	
1,000.0	999.8	1,000.0	999.8	2.1	2.1	-113.15	8.8	-50.2	53.3	49.1	4.26	12.502	
1,100.0	1,099.5	1,099.4	1,098.9	2.4	2.4	-112.64	17.3	-51.9	58.9	54.2	4.73	12.471	
1,200.0	1,198.7	1,198.5	1,197.3	2.6	2.6	-112.07	29.1	-54.4	66.8	61.5	5.22	12.800	
1,300.0	1,297.5	1,297.4	1,294.9	2.9	2.9	-111.49	44.1	-57.5	76.8	71.1	5.75	13.348	
1,400.0	1,395.6	1,395.8	1,391.6	3.2	3.2	-110.94	62.4	-61.3	89.1	82.7	6.36	14.005	
1,500.0	1,493.1	1,493.9	1,487.1	3.6	3.6	-110.43	83.9	-65.7	103.5	96.4	7.04	14.689	
1,600.0	1,590.0	1,591.5	1,581.5	4.0	4.0	-109.61	108.4	-70.8	119.6	111.8	7.82	15.296	
1,700.0	1,686.9	1,689.7	1,675.8	4.4	4.4	-108.07	135.3	-76.3	136.5	127.8	8.66	15.763	
1,800.0	1,783.8	1,788.2	1,770.3	4.8	4.9	-106.82	162.3	-81.9	153.4	143.9	9.53	16.097	
1,900.0	1,880.8	1,886.7	1,864.9	5.3	5.4	-105.83	189.4	-87.5	170.5	160.1	10.43	16.341	
2,000.0	1,977.7	1,985.2	1,959.4	5.8	5.9	-105.02	216.4	-93.1	187.6	176.2	11.35	16.523	
2,100.0	2,074.6	2,083.7	2,053.9	6.2	6.4	-104.34	243.5	-98.7	204.7	192.4	12.29	16.660	
2,200.0	2,171.6	2,182.2	2,148.5	6.7	6.9	-103.76	270.5	-104.3	221.8	208.6	13.23	16.765	
2,300.0	2,268.5	2,280.7	2,243.0	7.2	7.5	-103.27	297.6	-109.9	239.0	224.8	14.18	16.846	
2,400.0	2,365.4	2,379.2	2,337.6	7.7	8.0	-102.85	324.6	-115.4	256.1	241.0	15.15	16.910	
2,500.0	2,462.3	2,477.7	2,432.1	8.2	8.5	-102.47	351.7	-121.0	273.3	257.2	16.11	16.961	
2,600.0	2,559.3	2,576.2	2,526.7	8.7	9.1	-102.15	378.7	-126.6	290.5	273.4	17.09	17.002	
2,700.0	2,656.2	2,674.7	2,621.2	9.2	9.6	-101.85	405.8	-132.2	307.7	289.6	18.06	17.035	
2,800.0	2,753.1	2,773.2	2,715.8	9.6	10.2	-101.59	432.8	-137.8	324.9	305.8	19.04	17.061	
2,900.0	2,850.1	2,871.7	2,810.3	10.1	10.7	-101.36	459.9	-143.4	342.1	322.1	20.02	17.083	
3,000.0	2,947.0	2,970.2	2,904.9	10.6	11.2	-101.15	486.9	-149.0	359.3	338.3	21.01	17.102	
3,100.0	3,043.9	3,068.7	2,999.4	11.1	11.8	-100.96	514.0	-154.6	376.5	354.5	22.00	17.117	
3,200.0	3,140.9	3,167.2	3,094.0	11.6	12.3	-100.78	541.0	-160.2	393.7	370.8	22.99	17.129	
3,300.0	3,237.8	3,265.7	3,188.5	12.1	12.9	-100.62	568.1	-165.7	411.0	387.0	23.98	17.139	
3,400.0	3,334.7	3,364.2	3,283.1	12.6	13.4	-100.47	595.1	-171.3	428.2	403.2	24.97	17.148	
3,500.0	3,431.6	3,462.7	3,377.6	13.1	14.0	-100.33	622.2	-176.9	445.4	419.5	25.96	17.155	
3,600.0	3,528.6	3,561.2	3,472.1	13.6	14.6	-100.21	649.2	-182.5	462.7	435.7	26.96	17.162	
3,700.0	3,625.5	3,659.7	3,566.7	14.1	15.1	-100.09	676.3	-188.1	479.9	451.9	27.95	17.167	
3,800.0	3,722.4	3,758.2	3,661.2	14.7	15.7	-99.98	703.3	-193.7	497.1	468.2	28.95	17.171	
7,500.0	7,203.6	7,376.7	7,204.6	26.0	28.3	39.26	1,255.2	-307.7	485.6	449.9	35.69	13.606	
7,600.0	7,242.8	7,415.8	7,243.8	25.8	28.3	54.98	1,255.2	-307.7	400.7	363.4	37.31	10.741	
7,700.0	7,268.7	7,441.8	7,269.7	25.6	28.4	73.18	1,255.2	-307.7	315.9	275.9	39.98	7.901	
7,800.0	7,281.0	7,454.0	7,282.0	25.5	28.4	86.98	1,255.2	-307.7	238.1	197.0	41.15	5.787	
7,900.0	7,282.0	7,455.1	7,283.0	25.6	28.4	90.00	1,255.2	-307.7	182.2	139.9	42.35	4.302	
7,967.5	7,282.0	7,455.1	7,283.0	26.1	28.4	90.00	1,255.2	-307.7	169.2	125.7	43.50	3.890	SF
8,000.0	7,282.0	7,455.1	7,283.0	26.5	28.4	90.00	1,255.2	-307.7	172.3	128.2	44.05	3.911	
8,100.0	7,282.0	7,455.1	7,283.0	28.2	28.4	90.00	1,255.2	-307.7	214.9	168.9	45.93	4.678	
8,200.0	7,282.0	7,455.1	7,283.0	30.3	28.4	90.00	1,255.2	-307.7	287.5	239.5	47.96	5.994	
8,300.0	7,282.0	7,455.1	7,283.0	32.4	28.4	90.00	1,255.2	-307.7	373.0	322.9	50.11	7.444	
8,400.0	7,282.0	7,455.1	7,283.0	34.6	28.4	90.00	1,255.2	-307.7	464.4	412.0	52.35	8.870	

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

Company:	KP KAUFFMAN	**Local Co-ordinate Reference:**	Well Greeley-Rothe 1-3H
Project:	SEC.1-T5N-R67W	**TVD Reference:**	WELL @ 4890.0ft (RKB - 15')
Reference Site:	Greeley-Rothe Pad Sec.1-T5N-R67W	**MD Reference:**	WELL @ 4890.0ft (RKB - 15')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Greeley-Rothe 1-3H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Landmark
Reference Design:	Plan #2 (6-05-14)	**Offset TVD Reference:**	Offset Datum

Offset Design Greeley-Rothe Pad Sec.1-T5N-R67W - Genesis 9-1-20 - Wellbore #1 - Plan #1 (5-02-14)

Offset Site Error: 0.0 ft

Survey Program: 0-MWD

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	1.0	1.0	0.0	0.0	-114.54	-23.5	-51.6	56.7	56.7	0.00	N/A	
100.0	100.0	101.0	101.0	0.1	0.1	-114.54	-23.5	-51.6	56.7	56.5	0.23	249.697	
200.0	200.0	201.0	201.0	0.3	0.3	-114.54	-23.5	-51.6	56.7	56.0	0.68	83.785	
300.0	300.0	301.0	301.0	0.6	0.6	-114.54	-23.5	-51.6	56.7	55.6	1.13	50.338	
400.0	400.0	401.0	401.0	0.8	0.8	-114.54	-23.5	-51.6	56.7	55.1	1.58	35.976	
500.0	500.0	501.0	501.0	1.0	1.0	-114.54	-23.5	-51.6	56.7	54.7	2.03	27.990	
600.0	600.0	601.0	601.0	1.2	1.2	-114.54	-23.5	-51.6	56.7	54.2	2.47	22.906	
700.0	700.0	701.0	701.0	1.5	1.5	-114.54	-23.5	-51.6	56.7	53.8	2.92	19.385	
800.0	800.0	801.0	801.0	1.7	1.7	-114.54	-23.5	-51.6	56.7	53.3	3.37	16.802	CC, ES
900.0	900.0	901.0	901.0	1.9	1.9	-141.60	-23.5	-51.6	58.0	54.2	3.82	15.189	
1,000.0	999.8	1,000.8	1,000.8	2.1	2.1	-144.55	-23.5	-51.6	62.2	58.0	4.27	14.585	SF
1,100.0	1,099.5	1,099.4	1,099.4	2.4	2.4	-147.31	-22.6	-53.0	70.3	65.6	4.70	14.940	
1,200.0	1,198.7	1,197.4	1,197.3	2.6	2.6	-148.52	-19.9	-57.3	82.9	77.7	5.14	16.117	
1,300.0	1,297.5	1,294.7	1,294.1	2.9	2.8	-148.59	-15.5	-64.4	99.9	94.3	5.59	17.858	
1,400.0	1,395.6	1,390.8	1,389.6	3.2	3.0	-147.96	-9.5	-74.2	121.2	115.1	6.07	19.982	
1,500.0	1,493.1	1,485.5	1,483.2	3.6	3.3	-146.99	-1.9	-86.4	146.8	140.2	6.57	22.346	
1,600.0	1,590.0	1,578.9	1,574.9	4.0	3.6	-145.92	7.3	-101.0	175.6	168.4	7.13	24.618	
1,700.0	1,686.9	1,671.2	1,665.1	4.4	3.9	-144.41	17.8	-118.0	205.8	198.1	7.74	26.588	
1,800.0	1,783.8	1,764.5	1,755.6	4.8	4.3	-142.72	29.8	-137.2	237.5	229.1	8.40	28.283	
1,900.0	1,880.8	1,859.1	1,847.3	5.3	4.7	-141.36	42.0	-156.9	269.4	260.3	9.08	29.667	
2,000.0	1,977.7	1,953.7	1,939.1	5.8	5.1	-140.28	54.2	-176.5	301.4	291.6	9.79	30.790	
2,100.0	2,074.6	2,048.3	2,030.8	6.2	5.5	-139.42	66.5	-196.2	333.5	323.0	10.51	31.741	
2,200.0	2,171.6	2,142.9	2,122.5	6.7	5.9	-138.70	78.7	-215.8	365.6	354.4	11.24	32.531	
2,300.0	2,268.5	2,237.5	2,214.2	7.2	6.4	-138.10	90.9	-235.5	397.8	385.8	11.98	33.198	
2,400.0	2,365.4	2,332.1	2,306.0	7.7	6.8	-137.59	103.2	-255.1	430.0	417.3	12.74	33.767	
2,500.0	2,462.3	2,426.7	2,397.7	8.2	7.3	-137.15	115.4	-274.8	462.3	448.8	13.49	34.256	
2,600.0	2,559.3	2,521.3	2,489.4	8.7	7.8	-136.77	127.7	-294.4	494.6	480.3	14.26	34.680	

Company:	KP KAUFFMAN	**Local Co-ordinate Reference:**	Well Greeley-Rothe 1-3H
Project:	SEC.1-T5N-R67W	**TVD Reference:**	WELL @ 4890.0ft (RKB - 15')
Reference Site:	Greeley-Rothe Pad Sec.1-T5N-R67W	**MD Reference:**	WELL @ 4890.0ft (RKB - 15')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Greeley-Rothe 1-3H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Landmark
Reference Design:	Plan #2 (6-05-14)	**Offset TVD Reference:**	Offset Datum

Offset Design Greeley-Rothe Pad Sec.1-T5N-R67W - Genesis 9-1-39 - Wellbore #1 - Plan #2 (6-05-14) — **Offset Site Error:** 0.0 ft

Survey Program: 0-MWD — **Offset Well Error:** 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	1.0	1.0	0.0	0.0	-134.57	-49.6	-50.4	70.7	70.7	0.00	N/A	
100.0	100.0	101.0	101.0	0.1	0.1	-134.57	-49.6	-50.4	70.7	70.5	0.23	311.449	
200.0	200.0	201.0	201.0	0.3	0.3	-134.57	-49.6	-50.4	70.7	70.0	0.68	104.506	
300.0	300.0	301.0	301.0	0.6	0.6	-134.57	-49.6	-50.4	70.7	69.6	1.13	62.787	
400.0	400.0	401.0	401.0	0.8	0.8	-134.57	-49.6	-50.4	70.7	69.1	1.58	44.874	
500.0	500.0	501.0	501.0	1.0	1.0	-134.57	-49.6	-50.4	70.7	68.7	2.03	34.913	
600.0	600.0	601.0	601.0	1.2	1.2	-134.57	-49.6	-50.4	70.7	68.2	2.47	28.571	
700.0	700.0	701.0	701.0	1.5	1.5	-134.57	-49.6	-50.4	70.7	67.8	2.92	24.179	
800.0	800.0	801.0	801.0	1.7	1.7	-134.57	-49.6	-50.4	70.7	67.3	3.37	20.957	CC, ES
900.0	900.0	901.0	901.0	1.9	1.9	-161.01	-49.6	-50.4	72.4	68.5	3.82	18.931	
1,000.0	999.8	1,000.8	1,000.8	2.1	2.1	-162.24	-49.6	-50.4	77.3	73.1	4.27	18.120	
1,100.0	1,099.5	1,100.5	1,100.5	2.4	2.4	-163.97	-49.6	-50.4	85.7	81.0	4.71	18.188	
1,200.0	1,198.7	1,199.7	1,199.7	2.6	2.6	-165.89	-49.6	-50.4	97.4	92.3	5.15	18.922	
1,300.0	1,297.5	1,298.5	1,298.5	2.9	2.8	-167.76	-49.6	-50.4	112.7	107.1	5.59	20.173	
1,400.0	1,395.6	1,396.6	1,396.6	3.2	3.0	-169.46	-49.6	-50.4	131.4	125.4	6.02	21.834	
1,500.0	1,493.1	1,494.1	1,494.1	3.6	3.2	-170.92	-49.6	-50.4	153.6	147.1	6.45	23.821	
1,600.0	1,590.0	1,591.0	1,591.0	4.0	3.5	-172.16	-49.6	-50.4	177.9	171.0	6.90	25.770	
1,700.0	1,686.9	1,687.9	1,687.9	4.4	3.7	-173.11	-49.6	-50.4	202.3	194.9	7.37	27.456	
1,800.0	1,783.8	1,784.8	1,784.8	4.8	3.9	-173.86	-49.6	-50.4	226.7	218.9	7.84	28.932	
1,900.0	1,880.8	1,881.8	1,881.8	5.3	4.1	-174.46	-49.6	-50.4	251.2	242.9	8.31	30.232	
2,000.0	1,977.7	1,978.7	1,978.7	5.8	4.3	-174.95	-49.6	-50.4	275.7	266.9	8.78	31.385	
2,100.0	2,074.6	2,075.6	2,075.6	6.2	4.6	-175.36	-49.6	-50.4	300.2	291.0	9.26	32.413	
2,200.0	2,171.6	2,172.6	2,172.6	6.7	4.8	-175.71	-49.6	-50.4	324.7	315.0	9.74	33.335	
2,300.0	2,268.5	2,278.8	2,278.7	7.2	5.0	-175.99	-48.6	-50.1	348.4	338.1	10.24	34.016	
2,400.0	2,365.4	2,390.2	2,390.1	7.7	5.3	-176.09	-43.5	-48.7	368.5	357.7	10.75	34.278	
2,500.0	2,462.3	2,503.2	2,502.7	8.2	5.5	-176.00	-34.1	-46.2	384.9	373.6	11.27	34.159	
2,600.0	2,559.3	2,617.5	2,616.0	8.7	5.8	-175.75	-20.3	-42.5	397.5	385.7	11.79	33.700	
2,700.0	2,656.2	2,732.7	2,729.6	9.2	6.1	-175.34	-1.9	-37.6	406.2	393.9	12.33	32.941	
2,800.0	2,753.1	2,848.4	2,842.9	9.6	6.4	-174.78	20.9	-31.4	411.2	398.3	12.88	31.914	
2,900.0	2,850.1	2,958.0	2,949.3	10.1	6.7	-174.10	46.4	-24.6	412.5	399.1	13.43	30.721	
3,000.0	2,947.0	3,057.9	3,046.0	10.6	7.1	-173.45	70.4	-18.1	413.2	399.3	13.97	29.588	
3,100.0	3,043.9	3,157.8	3,142.8	11.1	7.4	-172.80	94.3	-11.7	414.0	399.5	14.51	28.527	
3,200.0	3,140.9	3,257.7	3,239.6	11.6	7.8	-172.16	118.3	-5.3	414.8	399.7	15.07	27.530	
3,300.0	3,237.8	3,357.6	3,336.3	12.1	8.2	-171.52	142.3	1.2	415.6	400.0	15.63	26.590	
3,400.0	3,334.7	3,457.5	3,433.1	12.6	8.6	-170.88	166.2	7.6	416.5	400.3	16.21	25.704	
3,500.0	3,431.6	3,557.4	3,529.8	13.1	9.0	-170.25	190.2	14.0	417.5	400.7	16.79	24.867	
3,600.0	3,528.6	3,657.3	3,626.6	13.6	9.4	-169.62	214.1	20.5	418.5	401.1	17.38	24.076	
3,700.0	3,625.5	3,757.1	3,723.4	14.1	9.8	-168.99	238.1	26.9	419.6	401.6	17.99	23.327	
3,800.0	3,722.4	3,857.0	3,820.1	14.7	10.3	-168.37	262.1	33.4	420.7	402.1	18.60	22.618	
3,900.0	3,819.4	3,956.9	3,916.9	15.2	10.7	-167.74	286.0	39.8	421.8	402.6	19.22	21.946	
4,000.0	3,916.3	4,056.8	4,013.6	15.7	11.2	-167.13	310.0	46.2	423.1	403.2	19.85	21.307	
4,100.0	4,013.2	4,156.7	4,110.4	16.2	11.6	-166.51	333.9	52.7	424.3	403.8	20.50	20.701	
4,200.0	4,110.1	4,256.6	4,207.2	16.7	12.1	-165.90	357.9	59.1	425.6	404.5	21.15	20.124	
4,300.0	4,207.1	4,356.5	4,303.9	17.2	12.5	-165.29	381.8	65.5	427.0	405.2	21.81	19.575	
4,400.0	4,304.0	4,456.4	4,400.7	17.7	13.0	-164.69	405.8	72.0	428.4	405.9	22.49	19.052	
4,500.0	4,400.9	4,556.2	4,497.4	18.2	13.5	-164.09	429.8	78.4	429.8	406.7	23.17	18.554	
4,600.0	4,497.9	4,656.1	4,594.2	18.7	14.0	-163.49	453.7	84.8	431.3	407.5	23.86	18.078	
4,700.0	4,594.8	4,756.0	4,690.9	19.2	14.4	-162.90	477.7	91.3	432.9	408.3	24.56	17.624	
4,800.0	4,691.7	4,855.9	4,787.7	19.7	14.9	-162.32	501.6	97.7	434.5	409.2	25.27	17.191	
4,900.0	4,788.6	4,944.1	4,873.5	20.2	15.2	-161.89	521.5	103.1	437.4	411.5	25.89	16.898	
5,000.0	4,885.6	5,032.1	4,959.6	20.7	15.5	-161.63	538.9	107.7	443.1	416.6	26.45	16.750	
5,100.0	4,982.5	5,119.8	5,046.0	21.2	15.8	-161.55	553.6	111.7	451.4	424.5	26.98	16.730	SF

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

Company:	KP KAUFFMAN	**Local Co-ordinate Reference:**	Well Greeley-Rothe 1-3H
Project:	SEC.1-T5N-R67W	**TVD Reference:**	WELL @ 4890.0ft (RKB - 15')
Reference Site:	Greeley-Rothe Pad Sec.1-T5N-R67W	**MD Reference:**	WELL @ 4890.0ft (RKB - 15')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Greeley-Rothe 1-3H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Landmark
Reference Design:	Plan #2 (6-05-14)	**Offset TVD Reference:**	Offset Datum

Offset Design Greeley-Rothe Pad Sec.1-T5N-R67W - Genesis 9-1-39 - Wellbore #1 - Plan #2 (6-05-14)

Offset Site Error: 0.0 ft

Survey Program: 0-MWD

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
5,200.0	5,079.4	5,207.0	5,132.3	21.7	16.1	-161.64	565.6	114.9	462.5	435.0	27.48	16.831	
5,300.0	5,176.4	5,300.0	5,224.7	22.2	16.3	-161.90	575.7	117.6	476.1	448.2	27.94	17.043	
5,400.0	5,273.3	5,379.5	5,303.9	22.7	16.5	-162.25	582.0	119.3	492.4	464.0	28.34	17.372	

Company:	KP KAUFFMAN	**Local Co-ordinate Reference:**	Well Greeley-Rothe 1-3H
Project:	SEC.1-T5N-R67W	**TVD Reference:**	WELL @ 4890.0ft (RKB - 15')
Reference Site:	Greeley-Rothe Pad Sec.1-T5N-R67W	**MD Reference:**	WELL @ 4890.0ft (RKB - 15')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Greeley-Rothe 1-3H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Landmark
Reference Design:	Plan #2 (6-05-14)	**Offset TVD Reference:**	Offset Datum

Offset Design Greeley-Rothe Pad Sec.1-T5N-R67W - Greeley-Rothe 1-0H - Wellbore #1 - Plan #1 (6-5-14) **Offset Site Error:** 0.0 ft

Survey Program: 0-MWD **Offset Well Error:** 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	0.45	25.0	0.2	25.0				
100.0	100.0	100.0	100.0	0.1	0.1	0.45	25.0	0.2	25.0	24.8	0.22	111.194	
200.0	200.0	200.0	200.0	0.3	0.3	0.45	25.0	0.2	25.0	24.3	0.67	37.065	CC, ES
300.0	300.0	299.1	299.1	0.6	0.6	1.46	26.6	0.7	26.7	25.5	1.12	23.737	
400.0	400.0	398.0	397.9	0.8	0.8	3.86	31.6	2.1	31.7	30.1	1.58	20.062	
500.0	500.0	496.4	495.9	1.0	1.0	6.51	39.7	4.5	40.2	38.1	2.05	19.635	
600.0	600.0	594.2	592.9	1.2	1.3	8.76	51.0	7.9	52.0	49.5	2.52	20.652	
700.0	700.0	691.0	688.6	1.5	1.6	10.47	65.2	12.1	67.3	64.3	3.01	22.399	
800.0	800.0	786.7	782.6	1.7	2.0	11.74	82.4	17.1	86.0	82.5	3.50	24.533	
900.0	900.0	881.4	875.0	1.9	2.4	-13.44	102.4	23.0	106.2	102.3	3.91	27.189	
1,000.0	999.8	975.6	966.1	2.1	2.8	-13.12	125.1	29.7	126.3	122.0	4.37	28.886	
1,100.0	1,099.5	1,069.1	1,055.8	2.4	3.3	-13.10	150.5	37.2	146.3	141.5	4.85	30.169	
1,200.0	1,198.7	1,165.9	1,148.0	2.6	3.8	-13.29	178.9	45.6	165.4	160.0	5.35	30.928	
1,300.0	1,297.5	1,264.7	1,242.0	2.9	4.4	-13.69	208.0	54.2	181.2	175.3	5.85	30.955	
1,400.0	1,395.6	1,363.9	1,336.4	3.2	5.0	-14.29	237.2	62.8	193.7	187.3	6.37	30.402	
1,500.0	1,493.1	1,463.4	1,431.1	3.6	5.6	-15.07	266.6	71.4	202.8	195.9	6.91	29.344	
1,600.0	1,590.0	1,563.1	1,526.0	4.0	6.2	-15.99	295.9	80.1	209.9	202.5	7.49	28.019	
1,700.0	1,686.9	1,662.8	1,620.8	4.4	6.8	-16.85	325.3	88.7	217.1	209.0	8.09	26.829	
1,800.0	1,783.8	1,762.5	1,715.7	4.8	7.4	-17.66	354.7	97.4	224.3	215.6	8.71	25.768	
1,900.0	1,880.8	1,862.2	1,810.6	5.3	8.0	-18.41	384.1	106.1	231.6	222.2	9.33	24.818	
2,000.0	1,977.7	1,961.8	1,905.4	5.8	8.6	-19.12	413.4	114.7	238.9	228.9	9.97	23.964	
2,100.0	2,074.6	2,061.5	2,000.3	6.2	9.2	-19.79	442.8	123.4	246.2	235.6	10.61	23.193	
2,200.0	2,171.6	2,161.2	2,095.2	6.7	9.8	-20.42	472.2	132.0	253.5	242.3	11.27	22.494	
2,300.0	2,268.5	2,260.9	2,190.0	7.2	10.4	-21.01	501.6	140.7	260.9	249.0	11.94	21.857	
2,400.0	2,365.4	2,360.6	2,284.9	7.7	11.0	-21.57	531.0	149.4	268.3	255.7	12.61	21.277	
2,500.0	2,462.3	2,460.3	2,379.8	8.2	11.6	-22.10	560.3	158.0	275.8	262.5	13.29	20.745	
2,600.0	2,559.3	2,560.0	2,474.7	8.7	12.3	-22.60	589.7	166.7	283.2	269.2	13.98	20.256	
2,700.0	2,656.2	2,659.7	2,569.5	9.2	12.9	-23.08	619.1	175.3	290.7	276.0	14.68	19.806	
2,800.0	2,753.1	2,759.4	2,664.4	9.6	13.5	-23.53	648.5	184.0	298.2	282.8	15.38	19.390	
2,900.0	2,850.1	2,859.1	2,759.3	10.1	14.1	-23.96	677.8	192.7	305.7	289.6	16.09	19.004	
3,000.0	2,947.0	2,958.8	2,854.1	10.6	14.7	-24.37	707.2	201.3	313.2	296.4	16.80	18.647	
3,100.0	3,043.9	3,058.5	2,949.0	11.1	15.3	-24.76	736.6	210.0	320.8	303.3	17.52	18.314	
3,200.0	3,140.9	3,158.1	3,043.9	11.6	15.9	-25.13	766.0	218.7	328.3	310.1	18.24	18.003	
3,300.0	3,237.8	3,257.8	3,138.7	12.1	16.5	-25.49	795.3	227.3	335.9	316.9	18.96	17.713	
3,400.0	3,334.7	3,357.5	3,233.6	12.6	17.1	-25.83	824.7	236.0	343.5	323.8	19.69	17.441	
3,500.0	3,431.6	3,457.2	3,328.5	13.1	17.7	-26.16	854.1	244.6	351.1	330.7	20.43	17.187	
3,600.0	3,528.6	3,556.9	3,423.4	13.6	18.4	-26.47	883.5	253.3	358.7	337.5	21.17	16.947	
3,700.0	3,625.5	3,656.6	3,518.2	14.1	19.0	-26.77	912.9	262.0	366.3	344.4	21.91	16.722	
3,800.0	3,722.4	3,756.3	3,613.1	14.7	19.6	-27.05	942.2	270.6	373.9	351.3	22.65	16.509	
3,900.0	3,819.4	3,856.0	3,708.0	15.2	20.2	-27.33	971.6	279.3	381.6	358.2	23.40	16.309	
4,000.0	3,916.3	3,955.7	3,802.8	15.7	20.8	-27.59	1,001.0	287.9	389.2	365.1	24.15	16.119	
4,100.0	4,013.2	4,055.4	3,897.7	16.2	21.4	-27.85	1,030.4	296.6	396.9	372.0	24.90	15.939	
4,200.0	4,110.1	4,155.1	3,992.6	16.7	22.0	-28.09	1,059.7	305.3	404.5	378.9	25.65	15.769	
4,300.0	4,207.1	4,254.8	4,087.5	17.2	22.6	-28.33	1,089.1	313.9	412.2	385.8	26.41	15.607	
4,400.0	4,304.0	4,354.4	4,182.3	17.7	23.2	-28.55	1,118.5	322.6	419.9	392.7	27.17	15.454	
4,500.0	4,400.9	4,454.1	4,277.2	18.2	23.8	-28.77	1,147.9	331.3	427.6	399.6	27.93	15.307	
4,600.0	4,497.9	4,553.8	4,372.1	18.7	24.5	-28.98	1,177.3	339.9	435.2	406.5	28.69	15.168	
4,700.0	4,594.8	4,653.5	4,466.9	19.2	25.1	-29.19	1,206.6	348.6	442.9	413.5	29.46	15.035	
4,800.0	4,691.7	4,753.2	4,561.8	19.7	25.7	-29.38	1,236.0	357.2	450.6	420.4	30.23	14.909	
4,900.0	4,788.6	4,852.9	4,656.7	20.2	26.3	-29.57	1,265.4	365.9	458.3	427.3	30.99	14.788	
5,000.0	4,885.6	4,952.6	4,751.5	20.7	26.9	-29.76	1,294.8	374.6	466.0	434.3	31.76	14.672	
5,100.0	4,982.5	5,052.3	4,846.4	21.2	27.5	-29.93	1,324.1	383.2	473.7	441.2	32.54	14.561	

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

Company:	KP KAUFFMAN	**Local Co-ordinate Reference:**	Well Greeley-Rothe 1-3H
Project:	SEC.1-T5N-R67W	**TVD Reference:**	WELL @ 4890.0ft (RKB - 15')
Reference Site:	Greeley-Rothe Pad Sec.1-T5N-R67W	**MD Reference:**	WELL @ 4890.0ft (RKB - 15')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Greeley-Rothe 1-3H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Landmark
Reference Design:	Plan #2 (6-05-14)	**Offset TVD Reference:**	Offset Datum

Offset Design Greeley-Rothe Pad Sec.1-T5N-R67W - Greeley-Rothe 1-0H - Wellbore #1 - Plan #1 (6-5-14)

Offset Site Error: 0.0 ft

Survey Program: 0-MWD

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
5,200.0	5,079.4	5,152.0	4,941.3	21.7	28.1	-30.11	1,353.5	391.9	481.5	448.2	33.31	14.455	
5,300.0	5,176.4	5,251.7	5,036.2	22.2	28.7	-30.27	1,382.9	400.5	489.2	455.1	34.08	14.353	
5,400.0	5,273.3	5,351.4	5,131.0	22.7	29.3	-30.44	1,412.3	409.2	496.9	462.0	34.86	14.255	SF

Company:	KP KAUFFMAN	**Local Co-ordinate Reference:**	Well Greeley-Rothe 1-3H
Project:	SEC.1-T5N-R67W	**TVD Reference:**	WELL @ 4890.0ft (RKB - 15')
Reference Site:	Greeley-Rothe Pad Sec.1-T5N-R67W	**MD Reference:**	WELL @ 4890.0ft (RKB - 15')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Greeley-Rothe 1-3H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Landmark
Reference Design:	Plan #2 (6-05-14)	**Offset TVD Reference:**	Offset Datum

Offset Design Greeley-Rothe Pad Sec.1-T5N-R67W - Greeley-Rothe 1-1H - Wellbore #1 - Plan #2 (6-05-14) — **Offset Site Error:** 0.0 ft

Survey Program: 0-MWD — **Offset Well Error:** 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	-44.58	25.2	-24.8	35.3				
100.0	100.0	100.0	100.0	0.1	0.1	-44.58	25.2	-24.8	35.3	35.1	0.22	157.245	
200.0	200.0	200.0	200.0	0.3	0.3	-44.58	25.2	-24.8	35.3	34.7	0.67	52.415	
300.0	300.0	300.0	300.0	0.6	0.6	-44.58	25.2	-24.8	35.3	34.2	1.12	31.449	
400.0	400.0	400.0	400.0	0.8	0.8	-44.58	25.2	-24.8	35.3	33.8	1.57	22.464	CC, ES
500.0	500.0	499.4	499.4	1.0	1.0	-42.14	26.8	-24.3	36.2	34.1	2.02	17.900	
600.0	600.0	598.6	598.4	1.2	1.2	-35.52	31.7	-22.6	39.0	36.5	2.47	15.779	
700.0	700.0	697.3	696.7	1.5	1.5	-26.60	39.8	-19.9	44.6	41.7	2.93	15.212	
800.0	800.0	795.2	794.0	1.7	1.7	-17.61	51.0	-16.2	53.8	50.4	3.41	15.769	
900.0	900.0	892.6	890.2	1.9	2.0	-36.66	65.2	-11.4	65.6	61.7	3.87	16.945	
1,000.0	999.8	989.5	985.3	2.1	2.4	-32.17	82.5	-5.7	78.1	73.7	4.34	17.997	
1,100.0	1,099.5	1,085.9	1,079.4	2.4	2.7	-29.20	102.7	1.1	91.0	86.2	4.82	18.899	
1,200.0	1,198.7	1,181.9	1,172.3	2.6	3.2	-27.21	125.8	8.8	104.2	98.9	5.31	19.635	
1,300.0	1,297.5	1,277.5	1,263.9	2.9	3.7	-25.86	151.7	17.4	117.5	111.6	5.81	20.211	
1,400.0	1,395.6	1,376.7	1,358.4	3.2	4.2	-25.17	180.1	26.9	129.3	123.0	6.35	20.371	
1,500.0	1,493.1	1,476.3	1,453.3	3.6	4.8	-25.21	208.7	36.5	138.1	131.2	6.91	19.993	
1,600.0	1,590.0	1,576.0	1,548.4	4.0	5.3	-25.66	237.4	46.0	144.9	137.4	7.53	19.252	
1,700.0	1,686.9	1,675.8	1,643.5	4.4	5.9	-26.09	266.0	55.6	151.7	143.5	8.16	18.582	
1,800.0	1,783.8	1,775.6	1,738.6	4.8	6.5	-26.48	294.6	65.2	158.5	149.7	8.82	17.980	
1,900.0	1,880.8	1,875.3	1,833.6	5.3	7.1	-26.83	323.3	74.7	165.3	155.9	9.48	17.440	
2,000.0	1,977.7	1,975.1	1,928.7	5.8	7.7	-27.16	351.9	84.3	172.2	162.0	10.16	16.953	
2,100.0	2,074.6	2,074.9	2,023.8	6.2	8.2	-27.46	380.6	93.9	179.0	168.2	10.84	16.514	
2,200.0	2,171.6	2,174.6	2,118.9	6.7	8.8	-27.74	409.2	103.4	185.8	174.3	11.53	16.117	
2,300.0	2,268.5	2,274.4	2,214.0	7.2	9.4	-28.01	437.8	113.0	192.7	180.5	12.23	15.757	
2,400.0	2,365.4	2,374.1	2,309.0	7.7	10.0	-28.25	466.5	122.6	199.5	186.6	12.93	15.428	
2,500.0	2,462.3	2,473.9	2,404.1	8.2	10.6	-28.47	495.1	132.1	206.4	192.7	13.64	15.128	
2,600.0	2,559.3	2,573.7	2,499.2	8.7	11.2	-28.69	523.8	141.7	213.2	198.9	14.36	14.853	
2,700.0	2,656.2	2,673.4	2,594.3	9.2	11.8	-28.89	552.4	151.3	220.1	205.0	15.07	14.601	
2,800.0	2,753.1	2,773.2	2,689.4	9.6	12.4	-29.07	581.0	160.8	227.0	211.2	15.80	14.368	
2,900.0	2,850.1	2,873.0	2,784.5	10.1	13.0	-29.25	609.7	170.4	233.8	217.3	16.52	14.153	
3,000.0	2,947.0	2,972.7	2,879.5	10.6	13.6	-29.42	638.3	179.9	240.7	223.4	17.25	13.954	
3,100.0	3,043.9	3,072.5	2,974.6	11.1	14.2	-29.57	667.0	189.5	247.5	229.6	17.98	13.769	
3,200.0	3,140.9	3,172.2	3,069.7	11.6	14.8	-29.72	695.6	199.1	254.4	235.7	18.71	13.597	
3,300.0	3,237.8	3,272.0	3,164.8	12.1	15.4	-29.86	724.2	208.6	261.3	241.8	19.45	13.436	
3,400.0	3,334.7	3,371.8	3,259.9	12.6	16.0	-29.99	752.9	218.2	268.2	248.0	20.18	13.286	
3,500.0	3,431.6	3,471.5	3,355.0	13.1	16.6	-30.12	781.5	227.8	275.0	254.1	20.92	13.145	
3,600.0	3,528.6	3,571.3	3,450.0	13.6	17.2	-30.24	810.2	237.3	281.9	260.2	21.66	13.013	
3,700.0	3,625.5	3,671.0	3,545.1	14.1	17.8	-30.36	838.8	246.9	288.8	266.4	22.41	12.889	
3,800.0	3,722.4	3,770.8	3,640.2	14.7	18.4	-30.47	867.5	256.5	295.6	272.5	23.15	12.772	
3,900.0	3,819.4	3,870.6	3,735.3	15.2	19.0	-30.57	896.1	266.0	302.5	278.6	23.89	12.661	
4,000.0	3,916.3	3,970.3	3,830.4	15.7	19.6	-30.67	924.7	275.6	309.4	284.8	24.64	12.557	
4,100.0	4,013.2	4,070.1	3,925.4	16.2	20.2	-30.77	953.4	285.2	316.3	290.9	25.39	12.458	
4,200.0	4,110.1	4,169.9	4,020.5	16.7	20.8	-30.86	982.0	294.7	323.2	297.0	26.13	12.365	
4,300.0	4,207.1	4,269.6	4,115.6	17.2	21.4	-30.94	1,010.7	304.3	330.0	303.1	26.88	12.276	
4,400.0	4,304.0	4,369.4	4,210.7	17.7	22.1	-31.03	1,039.3	313.8	336.9	309.3	27.63	12.192	
4,500.0	4,400.9	4,469.1	4,305.8	18.2	22.7	-31.11	1,067.9	323.4	343.8	315.4	28.39	12.112	
4,600.0	4,497.9	4,568.9	4,400.9	18.7	23.3	-31.19	1,096.6	333.0	350.7	321.5	29.14	12.035	
4,700.0	4,594.8	4,668.7	4,495.9	19.2	23.9	-31.26	1,125.2	342.5	357.6	327.7	29.89	11.962	
4,800.0	4,691.7	4,768.4	4,591.0	19.7	24.5	-31.33	1,153.9	352.1	364.4	333.8	30.64	11.893	
4,900.0	4,788.6	4,868.2	4,686.1	20.2	25.1	-31.40	1,182.5	361.7	371.3	339.9	31.40	11.827	
5,000.0	4,885.6	4,968.0	4,781.2	20.7	25.7	-31.47	1,211.1	371.2	378.2	346.1	32.15	11.763	
5,100.0	4,982.5	5,067.7	4,876.3	21.2	26.3	-31.53	1,239.8	380.8	385.1	352.2	32.91	11.702	

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

Company:	KP KAUFFMAN	**Local Co-ordinate Reference:**	Well Greeley-Rothe 1-3H
Project:	SEC.1-T5N-R67W	**TVD Reference:**	WELL @ 4890.0ft (RKB - 15')
Reference Site:	Greeley-Rothe Pad Sec.1-T5N-R67W	**MD Reference:**	WELL @ 4890.0ft (RKB - 15')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Greeley-Rothe 1-3H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Landmark
Reference Design:	Plan #2 (6-05-14)	**Offset TVD Reference:**	Offset Datum

Offset Design Greeley-Rothe Pad Sec.1-T5N-R67W - Greeley-Rothe 1-1H - Wellbore #1 - Plan #2 (6-05-14)

Offset Site Error: 0.0 ft

Survey Program: 0-MWD

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
5,200.0	5,079.4	5,167.5	4,971.4	21.7	26.9	-31.59	1,268.4	390.4	392.0	358.3	33.66	11.644	
5,300.0	5,176.4	5,267.2	5,066.4	22.2	27.5	-31.65	1,297.1	399.9	398.9	364.4	34.42	11.588	
5,400.0	5,273.3	5,367.0	5,161.5	22.7	28.1	-31.71	1,325.7	409.5	405.7	370.6	35.18	11.535	
5,500.0	5,370.2	5,466.8	5,256.6	23.3	28.7	-31.77	1,354.3	419.1	412.6	376.7	35.93	11.483	
5,600.0	5,467.1	5,566.5	5,351.7	23.8	29.3	-31.82	1,383.0	428.6	419.5	382.8	36.69	11.434	
5,700.0	5,564.1	5,666.3	5,446.8	24.3	29.9	-31.87	1,411.6	438.2	426.4	389.0	37.45	11.386	
5,800.0	5,661.0	5,766.0	5,541.9	24.8	30.5	-31.92	1,440.3	447.7	433.3	395.1	38.21	11.341	
5,900.0	5,758.1	5,865.8	5,636.9	25.2	31.1	-31.98	1,468.9	457.3	440.8	401.9	38.92	11.325	SF
6,000.0	5,855.9	5,965.2	5,731.7	25.6	31.7	-31.86	1,497.4	466.8	451.1	411.6	39.47	11.427	
6,100.0	5,954.4	6,064.3	5,826.1	25.9	32.3	-31.56	1,525.9	476.3	464.3	424.4	39.90	11.636	
6,200.0	6,053.5	6,162.8	5,920.0	26.2	32.9	-31.10	1,554.2	485.8	480.5	440.3	40.21	11.949	
6,300.0	6,152.9	6,260.7	6,013.3	26.4	33.5	-30.51	1,582.3	495.2	499.7	459.3	40.42	12.365	

Company:	KP KAUFFMAN	**Local Co-ordinate Reference:**	Well Greeley-Rothe 1-3H
Project:	SEC.1-T5N-R67W	**TVD Reference:**	WELL @ 4890.0ft (RKB - 15')
Reference Site:	Greeley-Rothe Pad Sec.1-T5N-R67W	**MD Reference:**	WELL @ 4890.0ft (RKB - 15')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Greeley-Rothe 1-3H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Landmark
Reference Design:	Plan #2 (6-05-14)	**Offset TVD Reference:**	Offset Datum

Offset Design Greeley-Rothe Pad Sec.1-T5N-R67W - Greeley-Rothe 1-2H - Wellbore #1 - Plan #2 (6-05-14) — **Offset Site Error:** 0.0 ft

Survey Program: 0-MWD — **Offset Well Error:** 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	-63.02	25.4	-49.8	55.9				
100.0	100.0	100.0	100.0	0.1	0.1	-63.02	25.4	-49.8	55.9	55.7	0.22	248.670	
200.0	200.0	200.0	200.0	0.3	0.3	-63.02	25.4	-49.8	55.9	55.2	0.67	82.890	
300.0	300.0	300.0	300.0	0.6	0.6	-63.02	25.4	-49.8	55.9	54.8	1.12	49.734	
400.0	400.0	400.0	400.0	0.8	0.8	-63.02	25.4	-49.8	55.9	54.3	1.57	35.524	
500.0	500.0	500.0	500.0	1.0	1.0	-63.02	25.4	-49.8	55.9	53.9	2.02	27.630	
600.0	600.0	600.0	600.0	1.2	1.2	-63.02	25.4	-49.8	55.9	53.4	2.47	22.606	CC
700.0	700.0	699.8	699.8	1.5	1.5	-61.25	27.0	-49.1	56.0	53.1	2.92	19.194	ES
800.0	800.0	799.4	799.2	1.7	1.7	-56.02	31.7	-47.1	56.8	53.4	3.37	16.869	
900.0	900.0	898.7	898.1	1.9	1.9	-75.36	39.7	-43.8	58.6	54.8	3.83	15.326	
1,000.0	999.8	997.7	996.4	2.1	2.2	-69.28	50.7	-39.1	61.4	57.1	4.30	14.268	
1,100.0	1,099.5	1,096.5	1,094.0	2.4	2.5	-63.87	64.9	-33.1	64.9	60.1	4.80	13.505	
1,200.0	1,198.7	1,195.0	1,190.8	2.6	2.8	-59.15	82.1	-25.8	69.0	63.7	5.34	12.926	
1,300.0	1,297.5	1,293.4	1,286.6	2.9	3.2	-55.11	102.3	-17.3	73.7	67.8	5.91	12.463	
1,400.0	1,395.6	1,391.8	1,381.8	3.2	3.6	-51.70	125.4	-7.5	78.7	72.2	6.52	12.065	
1,500.0	1,493.1	1,491.7	1,478.0	3.6	4.0	-49.93	150.0	2.9	82.5	75.3	7.19	11.475	
1,600.0	1,590.0	1,591.6	1,574.4	4.0	4.5	-49.45	174.5	13.3	85.0	77.1	7.92	10.730	
1,700.0	1,686.9	1,691.6	1,670.7	4.4	5.0	-49.01	199.1	23.6	87.4	78.8	8.67	10.083	
1,800.0	1,783.8	1,791.6	1,767.1	4.8	5.5	-48.59	223.6	34.0	89.9	80.5	9.44	9.525	
1,900.0	1,880.8	1,891.6	1,863.4	5.3	6.0	-48.20	248.2	44.4	92.4	82.1	10.21	9.043	
2,000.0	1,977.7	1,991.5	1,959.8	5.8	6.6	-47.83	272.7	54.8	94.8	83.8	10.99	8.624	
2,100.0	2,074.6	2,091.5	2,056.1	6.2	7.1	-47.48	297.3	65.2	97.3	85.5	11.78	8.258	
2,200.0	2,171.6	2,191.5	2,152.5	6.7	7.6	-47.14	321.8	75.5	99.8	87.2	12.57	7.936	
2,300.0	2,268.5	2,291.4	2,248.8	7.2	8.1	-46.82	346.4	85.9	102.3	88.9	13.36	7.651	
2,400.0	2,365.4	2,391.4	2,345.2	7.7	8.7	-46.51	370.9	96.3	104.7	90.6	14.16	7.398	
2,500.0	2,462.3	2,491.4	2,441.5	8.2	9.2	-46.22	395.5	106.7	107.2	92.3	14.95	7.171	
2,600.0	2,559.3	2,591.3	2,537.9	8.7	9.7	-45.95	420.0	117.0	109.7	94.0	15.74	6.968	
2,700.0	2,656.2	2,691.3	2,634.2	9.2	10.3	-45.68	444.6	127.4	112.2	95.7	16.54	6.784	
2,800.0	2,753.1	2,791.3	2,730.6	9.6	10.8	-45.43	469.1	137.8	114.7	97.4	17.33	6.617	
2,900.0	2,850.1	2,891.2	2,826.9	10.1	11.3	-45.18	493.7	148.2	117.2	99.1	18.12	6.465	
3,000.0	2,947.0	2,991.2	2,923.3	10.6	11.9	-44.95	518.2	158.6	119.7	100.8	18.92	6.326	
3,100.0	3,043.9	3,091.2	3,019.6	11.1	12.4	-44.73	542.8	168.9	122.2	102.5	19.71	6.199	
3,200.0	3,140.9	3,191.1	3,116.0	11.6	12.9	-44.51	567.3	179.3	124.7	104.2	20.50	6.082	
3,300.0	3,237.8	3,291.1	3,212.3	12.1	13.5	-44.31	591.9	189.7	127.2	105.9	21.29	5.974	
3,400.0	3,334.7	3,391.1	3,308.7	12.6	14.0	-44.11	616.4	200.1	129.7	107.6	22.08	5.874	
3,500.0	3,431.6	3,491.0	3,405.0	13.1	14.6	-43.92	641.0	210.5	132.2	109.3	22.86	5.781	
3,600.0	3,528.6	3,591.0	3,501.4	13.6	15.1	-43.74	665.5	220.8	134.7	111.0	23.65	5.695	
3,700.0	3,625.5	3,691.0	3,597.7	14.1	15.6	-43.56	690.1	231.2	137.2	112.8	24.44	5.614	
3,800.0	3,722.4	3,790.9	3,694.1	14.7	16.2	-43.39	714.6	241.6	139.7	114.5	25.22	5.539	
3,900.0	3,819.4	3,890.9	3,790.4	15.2	16.7	-43.23	739.2	252.0	142.2	116.2	26.01	5.468	
4,000.0	3,916.3	3,990.9	3,886.8	15.7	17.3	-43.07	763.7	262.4	144.7	117.9	26.79	5.402	
4,100.0	4,013.2	4,090.8	3,983.1	16.2	17.8	-42.91	788.3	272.7	147.2	119.7	27.57	5.340	
4,200.0	4,110.1	4,190.8	4,079.5	16.7	18.3	-42.77	812.8	283.1	149.7	121.4	28.35	5.281	
4,300.0	4,207.1	4,290.8	4,175.8	17.2	18.9	-42.62	837.4	293.5	152.3	123.1	29.13	5.226	
4,400.0	4,304.0	4,390.7	4,272.2	17.7	19.4	-42.48	861.9	303.9	154.8	124.9	29.91	5.174	
4,500.0	4,400.9	4,490.7	4,368.5	18.2	20.0	-42.35	886.4	314.2	157.3	126.6	30.69	5.124	
4,600.0	4,497.9	4,590.7	4,464.9	18.7	20.5	-42.22	911.0	324.6	159.8	128.3	31.47	5.078	
4,700.0	4,594.8	4,690.6	4,561.2	19.2	21.0	-42.09	935.5	335.0	162.3	130.1	32.25	5.033	
4,800.0	4,691.7	4,790.6	4,657.6	19.7	21.6	-41.97	960.1	345.4	164.8	131.8	33.03	4.991	
4,900.0	4,788.6	4,890.6	4,753.9	20.2	22.1	-41.85	984.6	355.8	167.4	133.5	33.80	4.951	
5,000.0	4,885.6	4,990.5	4,850.3	20.7	22.7	-41.74	1,009.2	366.1	169.9	135.3	34.58	4.913	
5,100.0	4,982.5	5,090.5	4,946.6	21.2	23.2	-41.63	1,033.7	376.5	172.4	137.0	35.35	4.876	

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

Company:	KP KAUFFMAN	**Local Co-ordinate Reference:**	Well Greeley-Rothe 1-3H
Project:	SEC.1-T5N-R67W	**TVD Reference:**	WELL @ 4890.0ft (RKB - 15')
Reference Site:	Greeley-Rothe Pad Sec.1-T5N-R67W	**MD Reference:**	WELL @ 4890.0ft (RKB - 15')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Greeley-Rothe 1-3H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Landmark
Reference Design:	Plan #2 (6-05-14)	**Offset TVD Reference:**	Offset Datum

Offset Design Greeley-Rothe Pad Sec.1-T5N-R67W - Greeley-Rothe 1-2H - Wellbore #1 - Plan #2 (6-05-14)

Offset Site Error: 0.0 ft

Survey Program: 0-MWD

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
5,200.0	5,079.4	5,190.5	5,043.0	21.7	23.8	-41.52	1,058.3	386.9	174.9	138.8	36.13	4.841	
5,300.0	5,176.4	5,290.5	5,139.3	22.2	24.3	-41.41	1,082.8	397.3	177.4	140.5	36.90	4.808	
5,400.0	5,273.3	5,390.4	5,235.7	22.7	24.8	-41.31	1,107.4	407.7	180.0	142.3	37.68	4.776	
5,500.0	5,370.2	5,490.4	5,332.0	23.3	25.4	-41.21	1,131.9	418.0	182.5	144.0	38.45	4.746	
5,600.0	5,467.1	5,590.4	5,428.4	23.8	25.9	-41.12	1,156.5	428.4	185.0	145.8	39.22	4.717	
5,700.0	5,564.1	5,690.3	5,524.7	24.3	26.5	-41.02	1,181.0	438.8	187.5	147.5	39.99	4.689	
5,800.0	5,661.0	5,790.3	5,621.1	24.8	27.0	-40.93	1,205.6	449.2	190.0	149.3	40.76	4.662	
5,900.0	5,758.1	5,890.2	5,717.4	25.2	27.6	-40.73	1,230.1	459.6	193.1	151.7	41.46	4.658	SF
6,000.0	5,855.9	5,990.0	5,813.6	25.6	28.1	-39.97	1,254.6	469.9	198.7	156.8	41.84	4.749	
6,100.0	5,954.4	6,089.6	5,909.5	25.9	28.6	-38.67	1,279.1	480.2	207.0	165.0	41.97	4.933	
6,200.0	6,053.5	6,188.7	6,005.0	26.2	29.2	-36.96	1,303.4	490.5	218.2	176.3	41.86	5.212	
6,300.0	6,152.9	6,287.3	6,100.1	26.4	29.7	-34.97	1,327.6	500.8	232.5	190.9	41.58	5.590	
6,400.0	6,252.7	6,385.3	6,194.5	26.6	30.2	-32.82	1,351.7	511.0	249.9	208.7	41.17	6.069	
6,500.0	6,352.6	6,482.5	6,288.2	26.7	30.8	-30.62	1,375.6	521.0	270.6	229.9	40.68	6.653	
6,600.0	6,452.6	6,579.0	6,381.2	26.8	31.3	-2.40	1,399.3	531.1	294.3	239.8	54.54	5.397	
6,700.0	6,552.6	6,675.4	6,474.1	26.9	31.8	-0.36	1,422.9	541.1	318.8	263.1	55.69	5.724	
6,800.0	6,652.4	6,772.9	6,568.3	27.0	32.3	91.99	1,446.9	548.6	343.7	303.5	40.11	8.567	
6,900.0	6,750.5	6,872.9	6,665.2	27.0	32.7	92.15	1,471.0	543.6	368.7	328.5	40.22	9.167	
7,000.0	6,845.0	6,975.4	6,762.8	26.9	33.0	92.15	1,494.9	524.1	393.3	353.1	40.22	9.780	
7,100.0	6,934.1	7,080.6	6,859.3	26.8	33.2	92.04	1,518.0	489.4	417.0	376.9	40.13	10.391	
7,200.0	7,016.0	7,188.8	6,952.3	26.6	33.3	91.85	1,539.7	439.0	439.1	399.1	40.02	10.973	
7,300.0	7,089.1	7,300.0	7,039.3	26.4	33.3	91.61	1,559.4	372.8	459.2	419.2	39.99	11.481	
7,400.0	7,152.1	7,414.1	7,117.3	26.2	33.3	91.33	1,576.3	291.3	476.6	436.4	40.22	11.850	
7,500.0	7,203.6	7,531.0	7,183.2	26.0	33.2	91.03	1,589.7	195.9	490.9	450.0	40.88	12.008	

Company:	KP KAUFFMAN	**Local Co-ordinate Reference:**	Well Greeley-Rothe 1-3H
Project:	SEC.1-T5N-R67W	**TVD Reference:**	WELL @ 4890.0ft (RKB - 15')
Reference Site:	Greeley-Rothe Pad Sec.1-T5N-R67W	**MD Reference:**	WELL @ 4890.0ft (RKB - 15')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Greeley-Rothe 1-3H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Landmark
Reference Design:	Plan #2 (6-05-14)	**Offset TVD Reference:**	Offset Datum

Offset Design Greeley-Rothe Pad Sec.1-T5N-R67W - Greeley-Rothe 1-4H - Wellbore #1 - Plan #2 (6-05-14) — **Offset Site Error:** 0.0 ft

Survey Program: 0-MWD — **Offset Well Error:** 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	1.0	1.0	0.0	0.0	-179.55	-25.0	-0.2	25.0	25.0	0.00	N/A	
100.0	100.0	101.0	101.0	0.1	0.1	-179.55	-25.0	-0.2	25.0	24.8	0.23	110.254	
200.0	200.0	201.0	201.0	0.3	0.3	-179.55	-25.0	-0.2	25.0	24.4	0.68	36.995	
300.0	300.0	301.0	301.0	0.6	0.6	-179.55	-25.0	-0.2	25.0	23.9	1.13	22.227	
400.0	400.0	401.0	401.0	0.8	0.8	-179.55	-25.0	-0.2	25.0	23.5	1.58	15.885	
500.0	500.0	501.0	501.0	1.0	1.0	-179.55	-25.0	-0.2	25.0	23.0	2.03	12.359	
600.0	600.0	601.0	601.0	1.2	1.2	-179.55	-25.0	-0.2	25.0	22.6	2.47	10.114	
700.0	700.0	701.0	701.0	1.5	1.5	-179.55	-25.0	-0.2	25.0	22.1	2.92	8.559	
800.0	800.0	801.0	801.0	1.7	1.7	-179.55	-25.0	-0.2	25.0	21.7	3.37	7.419	CC, ES
900.0	900.0	901.0	901.0	1.9	1.9	156.07	-25.0	-0.2	26.6	22.8	3.82	6.963	
1,000.0	999.8	1,000.8	1,000.8	2.1	2.1	159.90	-25.0	-0.2	31.5	27.2	4.27	7.372	
1,100.0	1,099.5	1,101.7	1,101.7	2.4	2.4	163.15	-23.5	0.8	38.1	33.4	4.71	8.095	
1,200.0	1,198.7	1,202.8	1,202.6	2.6	2.6	164.83	-19.1	3.8	45.0	39.9	5.15	8.742	
1,300.0	1,297.5	1,304.1	1,303.6	2.9	2.8	165.54	-11.6	8.8	52.0	46.4	5.59	9.306	
1,400.0	1,395.6	1,405.7	1,404.4	3.2	3.1	165.63	-1.2	15.7	59.1	53.1	6.04	9.792	
1,500.0	1,493.1	1,507.5	1,504.9	3.6	3.3	165.29	12.3	24.7	66.3	59.8	6.50	10.204	
1,600.0	1,590.0	1,609.6	1,605.0	4.0	3.7	164.38	28.7	35.6	72.3	65.3	7.02	10.305	
1,700.0	1,686.9	1,712.0	1,704.7	4.4	4.0	162.49	48.2	48.6	75.1	67.5	7.58	9.906	
1,800.0	1,783.8	1,814.3	1,803.4	4.8	4.4	159.48	70.6	63.6	74.8	66.6	8.21	9.111	
1,900.0	1,880.8	1,915.4	1,900.0	5.3	4.9	155.15	95.4	80.1	71.9	62.9	8.93	8.051	
2,000.0	1,977.7	2,015.2	1,995.2	5.8	5.4	150.26	120.3	96.7	69.0	59.2	9.75	7.073	
2,100.0	2,074.6	2,115.0	2,090.4	6.2	5.9	144.99	145.1	113.3	66.6	55.9	10.69	6.230	
2,200.0	2,171.6	2,214.7	2,185.6	6.7	6.5	139.38	170.0	129.8	64.9	53.1	11.75	5.519	
2,300.0	2,268.5	2,314.5	2,280.8	7.2	7.0	133.52	194.9	146.4	63.8	50.8	12.92	4.935	
2,400.0	2,365.4	2,414.3	2,375.9	7.7	7.6	127.53	219.8	163.0	63.3	49.2	14.17	4.470	
2,408.7	2,373.9	2,423.0	2,384.3	7.7	7.6	127.00	222.0	164.5	63.3	49.1	14.28	4.435	
2,500.0	2,462.3	2,514.1	2,471.1	8.2	8.1	121.52	244.7	179.6	63.6	48.2	15.47	4.113	
2,600.0	2,559.3	2,613.8	2,566.3	8.7	8.7	115.62	269.6	196.2	64.6	47.8	16.78	3.850	
2,700.0	2,656.2	2,713.6	2,661.5	9.2	9.3	109.96	294.5	212.8	66.3	48.2	18.07	3.666	
2,800.0	2,753.1	2,813.4	2,756.7	9.6	9.8	104.63	319.4	229.4	68.5	49.2	19.32	3.547	
2,900.0	2,850.1	2,913.2	2,851.9	10.1	10.4	99.67	344.2	246.0	71.3	50.8	20.50	3.479	
3,000.0	2,947.0	3,013.0	2,947.1	10.6	11.0	95.12	369.1	262.6	74.6	53.0	21.62	3.453	
3,100.0	3,043.9	3,112.7	3,042.3	11.1	11.6	90.98	394.0	279.2	78.4	55.7	22.67	3.457	
3,200.0	3,140.9	3,212.5	3,137.5	11.6	12.2	87.23	418.9	295.8	82.5	58.8	23.67	3.485	
3,300.0	3,237.8	3,312.3	3,232.6	12.1	12.8	83.85	443.8	312.4	86.9	62.3	24.61	3.531	
3,400.0	3,334.7	3,412.1	3,327.8	12.6	13.4	80.80	468.7	328.9	91.6	66.1	25.52	3.590	
3,500.0	3,431.6	3,511.8	3,423.0	13.1	14.0	78.06	493.6	345.5	96.6	70.2	26.39	3.659	
3,600.0	3,528.6	3,611.6	3,518.2	13.6	14.5	75.59	518.5	362.1	101.7	74.5	27.23	3.734	
3,700.0	3,625.5	3,711.4	3,613.4	14.1	15.1	73.36	543.3	378.7	107.0	78.9	28.06	3.813	
3,800.0	3,722.4	3,811.2	3,708.6	14.7	15.7	71.34	568.2	395.3	112.4	83.6	28.86	3.896	
3,900.0	3,819.4	3,910.9	3,803.8	15.2	16.3	69.52	593.1	411.9	118.0	88.4	29.66	3.980	
4,000.0	3,916.3	4,010.7	3,899.0	15.7	16.9	67.85	618.0	428.5	123.7	93.3	30.44	4.064	
4,100.0	4,013.2	4,110.5	3,994.1	16.2	17.5	66.34	642.9	445.1	129.5	98.3	31.21	4.149	
4,200.0	4,110.1	4,210.3	4,089.3	16.7	18.1	64.95	667.8	461.7	135.4	103.4	31.98	4.232	
4,300.0	4,207.1	4,311.3	4,185.8	17.2	18.7	63.80	692.7	478.3	141.1	108.3	32.74	4.309	
4,400.0	4,304.0	4,414.1	4,284.9	17.7	19.1	63.73	715.5	493.5	145.2	111.6	33.59	4.321	
4,500.0	4,400.9	4,516.9	4,384.9	18.2	19.5	64.86	735.4	506.7	147.3	112.6	34.65	4.250	
4,600.0	4,497.9	4,619.5	4,485.5	18.7	19.9	67.18	752.2	518.0	147.6	111.7	35.89	4.112	
4,700.0	4,594.8	4,721.6	4,586.2	19.2	20.2	70.72	766.0	527.1	146.5	109.2	37.28	3.929	
4,800.0	4,691.7	4,823.0	4,686.8	19.7	20.5	75.58	776.7	534.3	144.5	105.8	38.77	3.728	
4,900.0	4,788.6	4,923.4	4,786.7	20.2	20.7	81.83	784.4	539.4	142.7	102.4	40.22	3.547	
4,985.9	4,871.9	5,008.7	4,871.9	20.6	20.8	88.30	788.6	542.2	141.9	100.7	41.27	3.440	

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

Company:	KP KAUFFMAN	**Local Co-ordinate Reference:**	Well Greeley-Rothe 1-3H
Project:	SEC.1-T5N-R67W	**TVD Reference:**	WELL @ 4890.0ft (RKB - 15')
Reference Site:	Greeley-Rothe Pad Sec.1-T5N-R67W	**MD Reference:**	WELL @ 4890.0ft (RKB - 15')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Greeley-Rothe 1-3H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Landmark
Reference Design:	Plan #2 (6-05-14)	**Offset TVD Reference:**	Offset Datum

Offset Design Greeley-Rothe Pad Sec.1-T5N-R67W - Greeley-Rothe 1-4H - Wellbore #1 - Plan #2 (6-05-14)

Offset Site Error: 0.0 ft

Survey Program: 0-MWD

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
5,000.0	4,885.6	5,022.6	4,885.8	20.7	20.8	89.45	789.1	542.5	142.0	100.6	41.41	3.429	
5,100.0	4,982.5	5,120.4	4,983.5	21.2	21.0	98.22	790.9	543.8	143.8	101.7	42.07	3.418	
5,200.0	5,079.4	5,217.3	5,080.4	21.7	21.1	107.31	791.0	543.8	149.4	107.4	42.07	3.552	
5,300.0	5,176.4	5,314.2	5,177.4	22.2	21.2	115.60	791.0	543.8	158.7	117.1	41.55	3.819	
5,400.0	5,273.3	5,411.1	5,274.3	22.7	21.3	122.89	791.0	543.8	171.0	130.3	40.75	4.197	
5,500.0	5,370.2	5,508.1	5,371.2	23.3	21.4	129.16	791.0	543.8	185.8	145.9	39.86	4.661	
5,600.0	5,467.1	5,605.0	5,468.1	23.8	21.5	134.48	791.0	543.8	202.5	163.5	39.01	5.190	
5,700.0	5,564.1	5,701.9	5,565.1	24.3	21.6	138.98	791.0	543.8	220.7	182.4	38.28	5.765	
5,800.0	5,661.0	5,798.9	5,662.0	24.8	21.8	142.79	791.0	543.8	240.0	202.3	37.68	6.369	
5,900.0	5,758.1	5,896.0	5,759.1	25.2	21.9	146.09	791.0	543.8	259.6	222.4	37.19	6.980	
6,000.0	5,855.9	5,993.8	5,856.9	25.6	22.0	148.65	791.0	543.8	277.2	240.3	36.85	7.523	
6,100.0	5,954.4	6,092.3	5,955.4	25.9	22.1	150.56	791.0	543.8	292.1	255.5	36.66	7.970	
6,200.0	6,053.5	6,191.3	6,054.5	26.2	22.2	151.95	791.0	543.8	304.3	267.7	36.58	8.318	
6,300.0	6,152.9	6,290.8	6,153.9	26.4	22.4	152.93	791.0	543.8	313.5	276.9	36.59	8.567	
6,400.0	6,252.7	6,390.5	6,253.7	26.6	22.5	153.54	791.0	543.8	319.6	283.0	36.67	8.717	
6,500.0	6,352.6	6,490.5	6,353.6	26.7	22.6	153.84	791.0	543.8	322.7	285.9	36.80	8.770	
6,600.0	6,452.6	6,590.5	6,453.6	26.8	22.8	179.86	791.0	543.8	323.0	276.8	46.18	6.994	
6,700.0	6,552.6	6,690.5	6,553.6	26.9	22.9	179.86	791.0	543.8	323.0	276.6	46.45	6.955	
6,800.0	6,652.4	6,789.3	6,652.2	27.0	23.0	-88.24	790.8	538.6	323.0	285.5	37.58	8.596	
6,900.0	6,750.5	6,887.9	6,749.0	27.0	23.0	-88.26	790.2	520.0	323.0	285.4	37.59	8.593	
7,000.0	6,845.0	6,986.6	6,842.3	26.9	22.9	-88.32	789.1	488.3	323.0	285.6	37.46	8.623	
7,100.0	6,934.1	7,085.3	6,930.5	26.8	22.8	-88.41	787.7	444.1	323.0	285.8	37.26	8.670	
7,200.0	7,016.0	7,184.1	7,011.8	26.6	22.6	-88.53	785.8	388.1	323.0	285.9	37.08	8.710	
7,300.0	7,089.1	7,283.0	7,084.7	26.4	22.4	-88.67	783.6	321.4	323.0	285.9	37.08	8.711	
7,400.0	7,152.1	7,382.0	7,147.8	26.2	22.2	-88.84	781.1	245.2	323.0	285.6	37.40	8.635	
7,500.0	7,203.6	7,481.2	7,199.8	26.0	22.0	-89.04	778.3	160.9	323.0	284.7	38.21	8.453	
7,600.0	7,242.8	7,580.5	7,239.8	25.8	21.8	-89.25	775.3	70.1	322.9	283.3	39.60	8.155	
7,700.0	7,268.7	7,680.0	7,266.8	25.6	21.7	-89.48	772.1	-25.5	322.9	281.3	41.62	7.759	
7,789.9	7,280.4	7,769.6	7,279.6	25.5	21.9	-89.69	769.2	-114.0	322.9	279.0	43.93	7.351	
7,800.0	7,281.0	7,779.7	7,280.4	25.5	22.0	-89.72	768.9	-124.1	322.9	278.7	44.21	7.305	
7,900.0	7,282.0	7,879.6	7,282.0	25.6	23.4	-89.82	765.6	-223.9	322.9	275.7	47.25	6.834	
8,000.0	7,282.0	7,979.6	7,282.0	26.5	25.2	-89.82	762.3	-323.8	322.9	272.2	50.72	6.368	
8,100.0	7,282.0	8,079.6	7,282.0	28.2	27.2	-89.82	759.0	-423.8	323.0	268.4	54.53	5.923	
8,200.0	7,282.0	8,179.6	7,282.0	30.3	29.3	-89.82	755.6	-523.7	323.0	264.3	58.63	5.508	
8,300.0	7,282.0	8,279.6	7,282.0	32.4	31.5	-89.82	752.3	-623.7	323.0	260.0	62.96	5.129	
8,400.0	7,282.0	8,379.6	7,282.0	34.6	33.8	-89.82	749.0	-723.6	323.0	255.5	67.49	4.786	
8,500.0	7,282.0	8,479.6	7,282.0	37.0	36.2	-89.82	745.7	-823.6	323.0	250.8	72.16	4.476	
8,600.0	7,282.0	8,579.6	7,282.0	39.3	38.6	-89.82	742.4	-923.5	323.0	246.0	76.95	4.197	
8,700.0	7,282.0	8,679.6	7,282.0	41.8	41.1	-89.82	739.1	-1,023.5	323.0	241.1	81.85	3.946	
8,800.0	7,282.0	8,779.6	7,282.0	44.2	43.6	-89.82	735.8	-1,123.4	323.0	236.2	86.84	3.720	
8,900.0	7,282.0	8,879.6	7,282.0	46.7	46.2	-89.82	732.5	-1,223.3	323.0	231.1	91.89	3.515	
9,000.0	7,282.0	8,979.6	7,282.0	49.3	48.7	-89.82	729.2	-1,323.3	323.0	226.0	97.01	3.330	
9,100.0	7,282.0	9,079.6	7,282.0	51.8	51.3	-89.82	725.9	-1,423.2	323.0	220.9	102.17	3.162	
9,200.0	7,282.0	9,179.6	7,282.0	54.4	53.9	-89.82	722.6	-1,523.2	323.0	215.7	107.38	3.008	
9,300.0	7,282.0	9,279.6	7,282.0	57.0	56.5	-89.82	719.3	-1,623.1	323.0	210.4	112.63	2.868	
9,400.0	7,282.0	9,379.6	7,282.0	59.6	59.2	-89.82	716.0	-1,723.1	323.0	205.1	117.91	2.740	
9,500.0	7,282.0	9,479.6	7,282.0	62.3	61.8	-89.82	712.6	-1,823.0	323.1	199.8	123.22	2.622	
9,600.0	7,282.0	9,579.6	7,282.0	64.9	64.5	-89.82	709.3	-1,923.0	323.1	194.5	128.55	2.513	
9,700.0	7,282.0	9,679.6	7,282.0	67.6	67.2	-89.82	706.0	-2,022.9	323.1	189.2	133.90	2.413	
9,800.0	7,282.0	9,779.6	7,282.0	70.2	69.9	-89.82	702.7	-2,122.9	323.1	183.8	139.28	2.320	
9,900.0	7,282.0	9,879.6	7,282.0	72.9	72.6	-89.82	699.4	-2,222.8	323.1	178.4	144.67	2.233	
10,000.0	7,282.0	9,979.6	7,282.0	75.6	75.3	-89.82	696.1	-2,322.7	323.1	173.0	150.07	2.153	

Company:	KP KAUFFMAN	**Local Co-ordinate Reference:**	Well Greeley-Rothe 1-3H
Project:	SEC.1-T5N-R67W	**TVD Reference:**	WELL @ 4890.0ft (RKB - 15')
Reference Site:	Greeley-Rothe Pad Sec.1-T5N-R67W	**MD Reference:**	WELL @ 4890.0ft (RKB - 15')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Greeley-Rothe 1-3H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Landmark
Reference Design:	Plan #2 (6-05-14)	**Offset TVD Reference:**	Offset Datum

Offset Design Greeley-Rothe Pad Sec.1-T5N-R67W - Greeley-Rothe 1-4H - Wellbore #1 - Plan #2 (6-05-14)

Offset Site Error: 0.0 ft

Survey Program: 0-MWD

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
10,100.0	7,282.0	10,079.6	7,282.0	78.3	78.0	-89.82	692.8	-2,422.7	323.1	167.6	155.49	2.078	
10,200.0	7,282.0	10,179.6	7,282.0	81.0	80.7	-89.82	689.5	-2,522.6	323.1	162.2	160.93	2.008	
10,300.0	7,282.0	10,279.6	7,282.0	83.7	83.4	-89.82	686.2	-2,622.6	323.1	156.7	166.37	1.942	
10,400.0	7,282.0	10,379.6	7,282.0	86.4	86.1	-89.82	682.9	-2,722.5	323.1	151.3	171.82	1.881	
10,500.0	7,282.0	10,479.6	7,282.0	89.1	88.9	-89.82	679.6	-2,822.5	323.1	145.8	177.29	1.823	
10,600.0	7,282.0	10,579.6	7,282.0	91.8	91.6	-89.82	676.3	-2,922.4	323.1	140.4	182.76	1.768	
10,700.0	7,282.0	10,679.6	7,282.0	94.6	94.3	-89.82	673.0	-3,022.4	323.1	134.9	188.24	1.717	
10,800.0	7,282.0	10,779.6	7,282.0	97.3	97.1	-89.82	669.6	-3,122.3	323.1	129.4	193.72	1.668	
10,900.0	7,282.0	10,879.6	7,282.0	100.0	99.8	-89.82	666.3	-3,222.3	323.2	123.9	199.22	1.622	
11,000.0	7,282.0	10,979.6	7,282.0	102.8	102.6	-89.82	663.0	-3,322.2	323.2	118.4	204.71	1.579	
11,100.0	7,282.0	11,079.6	7,282.0	105.5	105.3	-89.82	659.7	-3,422.1	323.2	113.0	210.22	1.537	
11,200.0	7,282.0	11,179.6	7,282.0	108.3	108.1	-89.82	656.4	-3,522.1	323.2	107.5	215.73	1.498	Level 3
11,300.0	7,282.0	11,279.6	7,282.0	111.0	110.8	-89.82	653.1	-3,622.0	323.2	101.9	221.24	1.461	Level 3
11,400.0	7,282.0	11,379.6	7,282.0	113.7	113.6	-89.82	649.8	-3,722.0	323.2	96.4	226.76	1.425	Level 3
11,500.0	7,282.0	11,479.6	7,282.0	116.5	116.4	-89.82	646.5	-3,821.9	323.2	90.9	232.28	1.391	Level 3
11,600.0	7,282.0	11,579.6	7,282.0	119.3	119.1	-89.82	643.2	-3,921.9	323.2	85.4	237.80	1.359	Level 3
11,700.0	7,282.0	11,679.6	7,282.0	122.0	121.9	-89.82	639.9	-4,021.8	323.2	79.9	243.33	1.328	Level 3
11,800.0	7,282.0	11,779.6	7,282.0	124.8	124.6	-89.82	636.6	-4,121.8	323.2	74.4	248.86	1.299	Level 3
11,884.2	7,282.0	11,863.8	7,282.0	126.3	127.0	-89.82	633.8	-4,205.9	323.2	70.5	252.68	1.279	Level 3, SF

Company:	KP KAUFFMAN	**Local Co-ordinate Reference:**	Well Greeley-Rothe 1-3H
Project:	SEC.1-T5N-R67W	**TVD Reference:**	WELL @ 4890.0ft (RKB - 15')
Reference Site:	Greeley-Rothe Pad Sec.1-T5N-R67W	**MD Reference:**	WELL @ 4890.0ft (RKB - 15')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Greeley-Rothe 1-3H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Landmark
Reference Design:	Plan #2 (6-05-14)	**Offset TVD Reference:**	Offset Datum

Offset Design Greeley-Rothe Pad Sec.1-T5N-R67W - Greeley-Rothe 1-5H - Wellbore #1 - Plan #2 (6-05-14) — **Offset Site Error:** 0.0 ft

Survey Program: 0-MWD — **Offset Well Error:** 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	1.0	1.0	0.0	0.0	-179.55	-50.0	-0.4	50.0	50.0	0.00	N/A	
100.0	100.0	101.0	101.0	0.1	0.1	-179.55	-50.0	-0.4	50.0	49.8	0.23	220.347	
200.0	200.0	201.0	201.0	0.3	0.3	-179.55	-50.0	-0.4	50.0	49.3	0.68	73.937	
300.0	300.0	301.0	301.0	0.6	0.6	-179.55	-50.0	-0.4	50.0	48.9	1.13	44.421	
400.0	400.0	401.0	401.0	0.8	0.8	-179.55	-50.0	-0.4	50.0	48.4	1.58	31.748	
500.0	500.0	501.0	501.0	1.0	1.0	-179.55	-50.0	-0.4	50.0	48.0	2.03	24.700	
600.0	600.0	601.0	601.0	1.2	1.2	-179.55	-50.0	-0.4	50.0	47.5	2.47	20.213	
700.0	700.0	701.0	701.0	1.5	1.5	-179.55	-50.0	-0.4	50.0	47.1	2.92	17.106	
800.0	800.0	801.0	801.0	1.7	1.7	-179.55	-50.0	-0.4	50.0	46.6	3.37	14.827	CC, ES
900.0	900.0	901.0	901.0	1.9	1.9	155.28	-50.0	-0.4	51.6	47.8	3.82	13.500	
1,000.0	999.8	1,000.8	1,000.8	2.1	2.1	157.47	-50.0	-0.4	56.4	52.1	4.27	13.211	
1,100.0	1,099.5	1,100.5	1,100.5	2.4	2.4	160.38	-50.0	-0.4	64.5	59.8	4.71	13.690	
1,200.0	1,198.7	1,199.7	1,199.7	2.6	2.6	163.39	-50.0	-0.4	76.1	71.0	5.16	14.765	
1,300.0	1,297.5	1,301.3	1,301.3	2.9	2.8	165.70	-48.6	0.7	89.7	84.1	5.59	16.029	
1,400.0	1,395.6	1,403.4	1,403.3	3.2	3.0	166.98	-44.3	4.1	103.5	97.5	6.03	17.170	
1,500.0	1,493.1	1,506.0	1,505.5	3.6	3.3	167.58	-37.2	9.7	117.5	111.1	6.47	18.170	
1,600.0	1,590.0	1,609.3	1,607.9	4.0	3.5	167.63	-27.1	17.7	130.4	123.4	6.95	18.756	
1,700.0	1,686.9	1,713.3	1,710.5	4.4	3.8	167.05	-14.0	28.0	140.0	132.5	7.46	18.758	
1,800.0	1,783.8	1,817.8	1,813.0	4.8	4.1	165.90	2.1	40.7	146.4	138.4	8.00	18.289	
1,900.0	1,880.8	1,917.9	1,910.7	5.3	4.5	164.54	19.1	54.0	151.0	142.4	8.56	17.627	
2,000.0	1,977.7	2,017.7	2,008.2	5.8	4.8	163.26	36.1	67.4	155.6	146.5	9.14	17.022	
2,100.0	2,074.6	2,117.5	2,105.7	6.2	5.2	162.06	53.0	80.7	160.4	150.6	9.74	16.459	
2,200.0	2,171.6	2,217.4	2,203.2	6.7	5.6	160.93	70.0	94.1	165.2	154.8	10.36	15.940	
2,300.0	2,268.5	2,317.2	2,300.6	7.2	6.0	159.87	86.9	107.4	170.1	159.1	11.00	15.460	
2,400.0	2,365.4	2,417.0	2,398.1	7.7	6.4	158.86	103.9	120.8	175.0	163.3	11.65	15.016	
2,500.0	2,462.3	2,516.9	2,495.6	8.2	6.8	157.91	120.8	134.1	180.0	167.7	12.32	14.605	
2,600.0	2,559.3	2,616.7	2,593.1	8.7	7.2	157.01	137.8	147.4	185.0	172.0	13.00	14.225	
2,700.0	2,656.2	2,716.5	2,690.5	9.2	7.6	156.15	154.7	160.8	190.1	176.4	13.70	13.873	
2,800.0	2,753.1	2,816.4	2,788.0	9.6	8.1	155.34	171.7	174.1	195.2	180.8	14.41	13.547	
2,900.0	2,850.1	2,916.2	2,885.5	10.1	8.5	154.58	188.6	187.5	200.3	185.2	15.13	13.244	
3,000.0	2,947.0	3,016.0	2,982.9	10.6	8.9	153.85	205.6	200.8	205.5	189.7	15.85	12.962	
3,100.0	3,043.9	3,115.9	3,080.4	11.1	9.4	153.16	222.5	214.2	210.7	194.1	16.59	12.700	
3,200.0	3,140.9	3,215.7	3,177.9	11.6	9.8	152.50	239.5	227.5	216.0	198.6	17.34	12.456	
3,300.0	3,237.8	3,315.5	3,275.4	12.1	10.2	151.87	256.4	240.9	221.2	203.1	18.09	12.228	
3,400.0	3,334.7	3,415.4	3,372.8	12.6	10.7	151.27	273.4	254.2	226.5	207.7	18.85	12.015	
3,500.0	3,431.6	3,515.2	3,470.3	13.1	11.1	150.70	290.3	267.5	231.8	212.2	19.62	11.815	
3,600.0	3,528.6	3,615.0	3,567.8	13.6	11.6	150.16	307.3	280.9	237.2	216.8	20.40	11.628	
3,700.0	3,625.5	3,714.9	3,665.3	14.1	12.0	149.63	324.2	294.2	242.5	221.4	21.18	11.453	
3,800.0	3,722.4	3,814.7	3,762.7	14.7	12.5	149.14	341.2	307.6	247.9	226.0	21.96	11.288	
3,900.0	3,819.4	3,914.5	3,860.2	15.2	12.9	148.66	358.1	320.9	253.3	230.6	22.75	11.133	
4,000.0	3,916.3	4,014.4	3,957.7	15.7	13.4	148.20	375.1	334.3	258.7	235.2	23.55	10.987	
4,100.0	4,013.2	4,114.2	4,055.2	16.2	13.8	147.76	392.0	347.6	264.2	239.8	24.35	10.850	
4,200.0	4,110.1	4,214.0	4,152.6	16.7	14.3	147.34	409.0	361.0	269.6	244.5	25.15	10.720	
4,300.0	4,207.1	4,313.9	4,250.1	17.2	14.7	146.94	425.9	374.3	275.1	249.1	25.96	10.597	
4,400.0	4,304.0	4,413.7	4,347.6	17.7	15.2	146.55	442.9	387.6	280.5	253.8	26.77	10.480	
4,500.0	4,400.9	4,513.5	4,445.1	18.2	15.6	146.17	459.8	401.0	286.0	258.4	27.58	10.370	
4,600.0	4,497.9	4,613.4	4,542.5	18.7	16.1	145.81	476.8	414.3	291.5	263.1	28.40	10.265	
4,700.0	4,594.8	4,713.2	4,640.0	19.2	16.5	145.47	493.7	427.7	297.0	267.8	29.22	10.166	
4,800.0	4,691.7	4,813.0	4,737.5	19.7	17.0	145.13	510.7	441.0	302.5	272.5	30.04	10.071	
4,900.0	4,788.6	4,912.9	4,834.9	20.2	17.5	144.81	527.6	454.4	308.1	277.2	30.86	9.981	
5,000.0	4,885.6	5,012.7	4,932.4	20.7	17.9	144.50	544.6	467.7	313.6	281.9	31.69	9.896	
5,100.0	4,982.5	5,112.5	5,029.9	21.2	18.4	144.20	561.5	481.1	319.1	286.6	32.52	9.814	

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

Company:	KP KAUFFMAN	**Local Co-ordinate Reference:**	Well Greeley-Rothe 1-3H
Project:	SEC.1-T5N-R67W	**TVD Reference:**	WELL @ 4890.0ft (RKB - 15')
Reference Site:	Greeley-Rothe Pad Sec.1-T5N-R67W	**MD Reference:**	WELL @ 4890.0ft (RKB - 15')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Greeley-Rothe 1-3H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Landmark
Reference Design:	Plan #2 (6-05-14)	**Offset TVD Reference:**	Offset Datum

Offset Design Greeley-Rothe Pad Sec.1-T5N-R67W - Greeley-Rothe 1-5H - Wellbore #1 - Plan #2 (6-05-14) — **Offset Site Error:** 0.0 ft

Survey Program: 0-MWD — **Offset Well Error:** 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
5,200.0	5,079.4	5,212.3	5,127.4	21.7	18.8	143.91	578.5	494.4	324.7	291.4	33.35	9.736	
5,300.0	5,176.4	5,309.0	5,221.8	22.2	19.2	143.68	594.7	507.1	330.5	296.3	34.13	9.682	
5,400.0	5,273.3	5,400.0	5,311.2	22.7	19.5	143.79	608.0	517.6	338.1	303.4	34.74	9.733	
5,500.0	5,370.2	5,493.6	5,403.7	23.3	19.8	144.26	619.3	526.6	347.9	312.6	35.22	9.876	
5,600.0	5,467.1	5,585.0	5,494.4	23.8	20.0	145.05	628.1	533.5	359.8	324.2	35.59	10.109	
5,700.0	5,564.1	5,675.7	5,584.7	24.3	20.2	146.11	634.6	538.6	374.0	338.2	35.86	10.432	
5,800.0	5,661.0	5,765.4	5,674.3	24.8	20.4	147.38	638.8	541.9	390.6	354.6	36.03	10.842	
5,900.0	5,758.1	5,854.2	5,763.0	25.2	20.5	148.89	640.8	543.5	409.0	372.9	36.10	11.330	
6,000.0	5,855.9	5,948.1	5,856.9	25.6	20.6	150.41	641.0	543.6	426.8	390.7	36.10	11.822	
6,100.0	5,954.4	6,046.6	5,955.4	25.9	20.8	151.66	641.0	543.6	442.0	405.8	36.16	12.224	
6,200.0	6,053.5	6,145.7	6,054.5	26.2	20.9	152.60	641.0	543.6	454.2	418.0	36.25	12.529	
6,300.0	6,152.9	6,245.1	6,153.9	26.4	21.0	153.27	641.0	543.6	463.5	427.1	36.38	12.738	
6,400.0	6,252.7	6,344.9	6,253.7	26.6	21.2	153.71	641.0	543.6	469.6	433.1	36.54	12.853	
6,500.0	6,352.6	6,444.8	6,353.6	26.7	21.3	153.92	641.0	543.6	472.7	436.0	36.71	12.875	
6,600.0	6,452.6	6,544.8	6,453.6	26.8	21.5	179.93	641.0	543.6	473.0	428.3	44.73	10.576	
6,700.0	6,552.6	6,644.8	6,553.6	26.9	21.6	179.93	641.0	543.6	473.0	428.0	45.00	10.511	
6,800.0	6,652.4	6,744.6	6,653.4	27.0	21.8	-88.83	641.0	543.6	472.9	435.1	37.75	12.526	
6,865.6	6,717.1	6,809.3	6,718.1	27.0	21.8	-90.00	640.9	542.5	472.8	434.6	38.17	12.386	
6,900.0	6,750.5	6,843.4	6,752.1	27.0	21.9	-90.65	640.9	539.8	472.8	434.4	38.38	12.321	
7,000.0	6,845.0	6,944.0	6,851.1	26.9	21.9	-92.51	640.3	522.3	473.2	434.5	38.79	12.201	
7,100.0	6,934.1	7,047.0	6,948.9	26.8	21.8	-94.35	639.2	490.4	474.2	435.2	38.97	12.169	
7,200.0	7,016.0	7,152.4	7,043.1	26.6	21.7	-96.11	637.7	443.5	475.5	436.6	38.96	12.207	
7,300.0	7,089.1	7,260.2	7,131.4	26.4	21.5	-97.77	635.7	381.8	477.2	438.4	38.87	12.279	
7,400.0	7,152.1	7,370.4	7,211.0	26.2	21.2	-99.27	633.2	305.8	479.1	440.2	38.88	12.322	
7,500.0	7,203.6	7,482.9	7,279.2	26.0	21.0	-100.58	630.2	216.5	481.0	441.8	39.24	12.257	
7,600.0	7,242.8	7,597.4	7,333.5	25.8	20.9	-101.67	626.9	115.8	482.8	442.6	40.19	12.012	
7,700.0	7,268.7	7,713.7	7,371.4	25.6	20.9	-102.50	623.3	6.1	484.2	442.3	41.92	11.553	
7,800.0	7,281.0	7,831.2	7,391.2	25.5	21.7	-103.06	619.5	-109.5	485.3	440.8	44.44	10.921	
7,900.0	7,282.0	7,940.9	7,394.0	25.6	23.4	-103.22	615.9	-219.0	485.5	438.0	47.51	10.219	
8,000.0	7,282.0	8,040.9	7,394.0	26.5	25.1	-103.22	612.6	-319.0	485.5	434.7	50.86	9.547	
8,100.0	7,282.0	8,140.9	7,394.0	28.2	27.1	-103.22	609.3	-418.9	485.5	431.0	54.55	8.901	
8,200.0	7,282.0	8,240.9	7,394.0	30.3	29.2	-103.22	606.0	-518.9	485.5	427.0	58.51	8.297	
8,300.0	7,282.0	8,340.9	7,394.0	32.4	31.4	-103.22	602.8	-618.8	485.5	422.8	62.71	7.742	
8,400.0	7,282.0	8,440.9	7,394.0	34.6	33.7	-103.22	599.5	-718.8	485.5	418.4	67.09	7.237	
8,500.0	7,282.0	8,540.9	7,394.0	37.0	36.0	-103.22	596.2	-818.7	485.5	413.8	71.61	6.779	
8,600.0	7,282.0	8,640.9	7,394.0	39.3	38.4	-103.22	592.9	-918.7	485.4	409.2	76.26	6.365	
8,700.0	7,282.0	8,740.9	7,394.0	41.8	40.9	-103.22	589.6	-1,018.6	485.4	404.4	81.02	5.992	
8,800.0	7,282.0	8,840.9	7,394.0	44.2	43.4	-103.22	586.3	-1,118.6	485.4	399.6	85.85	5.654	
8,900.0	7,282.0	8,940.9	7,394.0	46.7	45.9	-103.22	583.0	-1,218.5	485.4	394.6	90.76	5.348	
9,000.0	7,282.0	9,040.9	7,394.0	49.3	48.5	-103.22	579.7	-1,318.4	485.4	389.7	95.73	5.070	
9,100.0	7,282.0	9,140.9	7,394.0	51.8	51.1	-103.22	576.5	-1,418.4	485.4	384.6	100.75	4.818	
9,200.0	7,282.0	9,240.9	7,394.0	54.4	53.7	-103.22	573.2	-1,518.3	485.4	379.6	105.82	4.587	
9,300.0	7,282.0	9,340.9	7,394.0	57.0	56.3	-103.22	569.9	-1,618.3	485.4	374.4	110.92	4.376	
9,400.0	7,282.0	9,440.9	7,394.0	59.6	58.9	-103.22	566.6	-1,718.2	485.3	369.3	116.05	4.182	
9,500.0	7,282.0	9,540.9	7,394.0	62.3	61.6	-103.22	563.3	-1,818.2	485.3	364.1	121.22	4.004	
9,600.0	7,282.0	9,640.9	7,394.0	64.9	64.3	-103.22	560.0	-1,918.1	485.3	358.9	126.41	3.839	
9,700.0	7,282.0	9,740.9	7,394.0	67.6	66.9	-103.22	556.7	-2,018.1	485.3	353.7	131.62	3.687	
9,800.0	7,282.0	9,840.9	7,394.0	70.2	69.6	-103.22	553.4	-2,118.0	485.3	348.4	136.85	3.546	
9,900.0	7,282.0	9,940.9	7,394.0	72.9	72.3	-103.22	550.2	-2,218.0	485.3	343.2	142.10	3.415	
10,000.0	7,282.0	10,040.9	7,394.0	75.6	75.0	-103.22	546.9	-2,317.9	485.3	337.9	147.37	3.293	
10,100.0	7,282.0	10,140.9	7,394.0	78.3	77.7	-103.22	543.6	-2,417.9	485.3	332.6	152.64	3.179	
10,200.0	7,282.0	10,240.9	7,394.0	81.0	80.4	-103.22	540.3	-2,517.8	485.2	327.3	157.94	3.072	

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

Company:	KP KAUFFMAN	**Local Co-ordinate Reference:**	Well Greeley-Rothe 1-3H
Project:	SEC.1-T5N-R67W	**TVD Reference:**	WELL @ 4890.0ft (RKB - 15')
Reference Site:	Greeley-Rothe Pad Sec.1-T5N-R67W	**MD Reference:**	WELL @ 4890.0ft (RKB - 15')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Greeley-Rothe 1-3H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Landmark
Reference Design:	Plan #2 (6-05-14)	**Offset TVD Reference:**	Offset Datum

Offset Design Greeley-Rothe Pad Sec.1-T5N-R67W - Greeley-Rothe 1-5H - Wellbore #1 - Plan #2 (6-05-14)

Offset Site Error: 0.0 ft

Survey Program: 0-MWD

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
10,300.0	7,282.0	10,340.9	7,394.0	83.7	83.2	-103.22	537.0	-2,617.7	485.2	322.0	163.24	2.973	
10,400.0	7,282.0	10,440.9	7,394.0	86.4	85.9	-103.22	533.7	-2,717.7	485.2	316.7	168.55	2.879	
10,500.0	7,282.0	10,540.9	7,394.0	89.1	88.6	-103.22	530.4	-2,817.6	485.2	311.3	173.88	2.791	
10,600.0	7,282.0	10,640.9	7,394.0	91.8	91.4	-103.23	527.2	-2,917.6	485.2	306.0	179.21	2.707	
10,700.0	7,282.0	10,740.9	7,394.0	94.6	94.1	-103.23	523.9	-3,017.5	485.2	300.6	184.55	2.629	
10,800.0	7,282.0	10,840.9	7,394.0	97.3	96.8	-103.23	520.6	-3,117.5	485.2	295.3	189.89	2.555	
10,900.0	7,282.0	10,940.9	7,394.0	100.0	99.6	-103.23	517.3	-3,217.4	485.2	289.9	195.24	2.485	
11,000.0	7,282.0	11,040.9	7,394.0	102.8	102.3	-103.23	514.0	-3,317.4	485.1	284.5	200.60	2.418	
11,100.0	7,282.0	11,140.9	7,394.0	105.5	105.1	-103.23	510.7	-3,417.3	485.1	279.2	205.97	2.355	
11,200.0	7,282.0	11,240.9	7,394.0	108.3	107.8	-103.23	507.4	-3,517.3	485.1	273.8	211.34	2.295	
11,300.0	7,282.0	11,340.9	7,394.0	111.0	110.6	-103.23	504.1	-3,617.2	485.1	268.4	216.71	2.238	
11,400.0	7,282.0	11,440.9	7,394.0	113.7	113.3	-103.23	500.9	-3,717.1	485.1	263.0	222.09	2.184	
11,500.0	7,282.0	11,540.9	7,394.0	116.5	116.1	-103.23	497.6	-3,817.1	485.1	257.6	227.47	2.132	
11,600.0	7,282.0	11,640.9	7,394.0	119.3	118.9	-103.23	494.3	-3,917.0	485.1	252.2	232.86	2.083	
11,700.0	7,282.0	11,740.9	7,394.0	122.0	121.6	-103.23	491.0	-4,017.0	485.0	246.8	238.25	2.036	
11,800.0	7,282.0	11,840.9	7,394.0	124.8	124.4	-103.23	487.7	-4,116.9	485.0	241.4	243.64	1.991	
11,884.2	7,282.0	11,925.1	7,394.0	126.3	126.7	-103.23	484.9	-4,201.1	485.0	237.7	247.37	1.961	SF

Company:	KP KAUFFMAN	**Local Co-ordinate Reference:**	Well Greeley-Rothe 1-3H
Project:	SEC.1-T5N-R67W	**TVD Reference:**	WELL @ 4890.0ft (RKB - 15')
Reference Site:	Greeley-Rothe Pad Sec.1-T5N-R67W	**MD Reference:**	WELL @ 4890.0ft (RKB - 15')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Greeley-Rothe 1-3H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Landmark
Reference Design:	Plan #2 (6-05-14)	**Offset TVD Reference:**	Offset Datum

Offset Design Greeley-Rothe Pad Sec.1-T5N-R67W - Greeley-Rothe 1-6H - Wellbore #1 - Plan #2 (6-05-14) — **Offset Site Error:** 0.0 ft

Survey Program: 0-MWD — **Offset Well Error:** 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	1.0	1.0	0.0	0.0	-179.57	-75.0	-0.6	75.0	75.0	0.00	N/A	
100.0	100.0	101.0	101.0	0.1	0.1	-179.57	-75.0	-0.6	75.0	74.8	0.23	330.439	
200.0	200.0	201.0	201.0	0.3	0.3	-179.57	-75.0	-0.6	75.0	74.3	0.68	110.878	
300.0	300.0	301.0	301.0	0.6	0.6	-179.57	-75.0	-0.6	75.0	73.9	1.13	66.616	
400.0	400.0	401.0	401.0	0.8	0.8	-179.57	-75.0	-0.6	75.0	73.4	1.58	47.610	
500.0	500.0	501.0	501.0	1.0	1.0	-179.57	-75.0	-0.6	75.0	73.0	2.03	37.041	
600.0	600.0	601.0	601.0	1.2	1.2	-179.57	-75.0	-0.6	75.0	72.5	2.47	30.313	
700.0	700.0	701.0	701.0	1.5	1.5	-179.57	-75.0	-0.6	75.0	72.1	2.92	25.653	
800.0	800.0	801.0	801.0	1.7	1.7	-179.57	-75.0	-0.6	75.0	71.6	3.37	22.235	CC, ES
900.0	900.0	901.0	901.0	1.9	1.9	154.99	-75.0	-0.6	76.6	72.8	3.82	20.038	
1,000.0	999.8	1,000.8	1,000.8	2.1	2.1	156.51	-75.0	-0.6	81.4	77.1	4.27	19.059	
1,100.0	1,099.5	1,100.5	1,100.5	2.4	2.4	158.68	-75.0	-0.6	89.4	84.7	4.71	18.969	SF
1,200.0	1,198.7	1,199.7	1,199.7	2.6	2.6	161.12	-75.0	-0.6	100.9	95.7	5.16	19.560	
1,300.0	1,297.5	1,298.5	1,298.5	2.9	2.8	163.53	-75.0	-0.6	115.8	110.2	5.60	20.689	
1,400.0	1,395.6	1,396.6	1,396.6	3.2	3.0	165.75	-75.0	-0.6	134.2	128.2	6.03	22.246	
1,500.0	1,493.1	1,494.1	1,494.1	3.6	3.2	167.68	-75.0	-0.6	156.2	149.7	6.47	24.149	
1,600.0	1,590.0	1,591.0	1,591.0	4.0	3.5	169.34	-75.0	-0.6	180.3	173.3	6.92	26.032	
1,700.0	1,686.9	1,693.8	1,693.8	4.4	3.7	170.48	-73.9	0.5	203.2	195.8	7.40	27.473	
1,800.0	1,783.8	1,798.8	1,798.6	4.8	3.9	170.95	-70.1	4.2	223.1	215.2	7.88	28.325	
1,900.0	1,880.8	1,905.1	1,904.5	5.3	4.2	170.92	-63.3	10.7	239.7	231.3	8.37	28.639	
2,000.0	1,977.7	2,012.4	2,011.0	5.8	4.4	170.49	-53.7	20.0	253.1	244.2	8.88	28.488	
2,100.0	2,074.6	2,120.4	2,117.5	6.2	4.7	169.68	-41.1	32.2	263.1	253.7	9.42	27.946	
2,200.0	2,171.6	2,219.9	2,215.4	6.7	5.0	168.81	-28.2	44.7	271.6	261.7	9.95	27.293	
2,300.0	2,268.5	2,319.5	2,313.3	7.2	5.3	167.99	-15.3	57.1	280.2	269.7	10.50	26.687	
2,400.0	2,365.4	2,419.0	2,411.3	7.7	5.6	167.22	-2.4	69.6	288.8	277.7	11.06	26.115	
2,500.0	2,462.3	2,518.6	2,509.2	8.2	5.9	166.50	10.5	82.1	297.4	285.8	11.63	25.579	
2,600.0	2,559.3	2,618.1	2,607.1	8.7	6.2	165.81	23.4	94.5	306.1	293.9	12.21	25.076	
2,700.0	2,656.2	2,717.7	2,705.0	9.2	6.6	165.17	36.3	107.0	314.8	302.0	12.80	24.604	
2,800.0	2,753.1	2,817.2	2,803.0	9.6	6.9	164.56	49.2	119.5	323.6	310.2	13.39	24.160	
2,900.0	2,850.1	2,916.8	2,900.9	10.1	7.3	163.98	62.1	132.0	332.4	318.4	14.00	23.743	
3,000.0	2,947.0	3,016.4	2,998.8	10.6	7.6	163.43	75.0	144.4	341.3	326.7	14.61	23.351	
3,100.0	3,043.9	3,115.9	3,096.7	11.1	8.0	162.91	87.9	156.9	350.1	334.9	15.24	22.982	
3,200.0	3,140.9	3,215.5	3,194.7	11.6	8.4	162.41	100.8	169.4	359.0	343.2	15.86	22.634	
3,300.0	3,237.8	3,315.0	3,292.6	12.1	8.7	161.94	113.8	181.9	368.0	351.5	16.50	22.306	
3,400.0	3,334.7	3,414.6	3,390.5	12.6	9.1	161.49	126.7	194.3	376.9	359.8	17.13	21.997	
3,500.0	3,431.6	3,514.1	3,488.5	13.1	9.5	161.06	139.6	206.8	385.9	368.1	17.78	21.704	
3,600.0	3,528.6	3,613.7	3,586.4	13.6	9.8	160.65	152.5	219.3	394.9	376.4	18.43	21.428	
3,700.0	3,625.5	3,713.3	3,684.3	14.1	10.2	160.26	165.4	231.7	403.9	384.8	19.08	21.166	
3,800.0	3,722.4	3,812.8	3,782.2	14.7	10.6	159.89	178.3	244.2	412.9	393.2	19.74	20.918	
3,900.0	3,819.4	3,912.4	3,880.2	15.2	11.0	159.53	191.2	256.7	421.9	401.5	20.40	20.683	
4,000.0	3,916.3	4,011.9	3,978.1	15.7	11.4	159.19	204.1	269.2	431.0	409.9	21.07	20.459	
4,100.0	4,013.2	4,111.5	4,076.0	16.2	11.8	158.86	217.0	281.6	440.1	418.3	21.74	20.247	
4,200.0	4,110.1	4,211.0	4,173.9	16.7	12.1	158.54	229.9	294.1	449.2	426.7	22.41	20.045	
4,300.0	4,207.1	4,310.6	4,271.9	17.2	12.5	158.24	242.8	306.6	458.3	435.2	23.08	19.853	
4,400.0	4,304.0	4,410.2	4,369.8	17.7	12.9	157.95	255.7	319.0	467.4	443.6	23.76	19.670	
4,500.0	4,400.9	4,509.7	4,467.7	18.2	13.3	157.67	268.6	331.5	476.5	452.1	24.44	19.495	
4,600.0	4,497.9	4,609.3	4,565.6	18.7	13.7	157.40	281.5	344.0	485.6	460.5	25.13	19.328	
4,700.0	4,594.8	4,708.8	4,663.6	19.2	14.1	157.14	294.4	356.5	494.8	469.0	25.81	19.169	

Company:	KP KAUFFMAN	**Local Co-ordinate Reference:**	Well Greeley-Rothe 1-3H
Project:	SEC.1-T5N-R67W	**TVD Reference:**	WELL @ 4890.0ft (RKB - 15')
Reference Site:	Greeley-Rothe Pad Sec.1-T5N-R67W	**MD Reference:**	WELL @ 4890.0ft (RKB - 15')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Greeley-Rothe 1-3H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Landmark
Reference Design:	Plan #2 (6-05-14)	**Offset TVD Reference:**	Offset Datum

Offset Design Greeley-Rothe Pad Sec.1-T5N-R67W - Greeley-Rothe 1-7H - Wellbore #1 - Plan #2 (6-05-14) — **Offset Site Error:** 0.0 ft

Survey Program: 0-MWD — **Offset Well Error:** 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	1.0	1.0	0.0	0.0	-153.01	-99.6	-50.8	111.8	111.8	0.00	N/A	
100.0	100.0	101.0	101.0	0.1	0.1	-153.01	-99.6	-50.8	111.8	111.6	0.23	492.582	
200.0	200.0	201.0	201.0	0.3	0.3	-153.01	-99.6	-50.8	111.8	111.1	0.68	165.285	
300.0	300.0	301.0	301.0	0.6	0.6	-153.01	-99.6	-50.8	111.8	110.7	1.13	99.303	
400.0	400.0	401.0	401.0	0.8	0.8	-153.01	-99.6	-50.8	111.8	110.2	1.58	70.971	
500.0	500.0	501.0	501.0	1.0	1.0	-153.01	-99.6	-50.8	111.8	109.8	2.03	55.217	
600.0	600.0	601.0	601.0	1.2	1.2	-153.01	-99.6	-50.8	111.8	109.3	2.47	45.187	
700.0	700.0	701.0	701.0	1.5	1.5	-153.01	-99.6	-50.8	111.8	108.9	2.92	38.240	
800.0	800.0	801.0	801.0	1.7	1.7	-153.01	-99.6	-50.8	111.8	108.4	3.37	33.145	CC, ES
900.0	900.0	901.0	901.0	1.9	1.9	-179.01	-99.6	-50.8	113.6	109.7	3.82	29.713	
1,000.0	999.8	1,000.8	1,000.8	2.1	2.1	-179.05	-99.6	-50.8	118.8	114.5	4.27	27.836	
1,100.0	1,099.5	1,100.5	1,100.5	2.4	2.4	-179.11	-99.6	-50.8	127.5	122.8	4.71	27.071	SF
1,200.0	1,198.7	1,199.7	1,199.7	2.6	2.6	-179.18	-99.6	-50.8	139.7	134.6	5.15	27.131	
1,300.0	1,297.5	1,298.5	1,298.5	2.9	2.8	-179.26	-99.6	-50.8	155.3	149.8	5.58	27.820	
1,400.0	1,395.6	1,396.6	1,396.6	3.2	3.0	-179.34	-99.6	-50.8	174.4	168.4	6.01	28.999	
1,500.0	1,493.1	1,494.1	1,494.1	3.6	3.2	-179.41	-99.6	-50.8	196.9	190.5	6.44	30.566	
1,600.0	1,590.0	1,591.0	1,591.0	4.0	3.5	-179.47	-99.6	-50.8	221.5	214.6	6.90	32.109	
1,700.0	1,686.9	1,687.9	1,687.9	4.4	3.7	-179.53	-99.6	-50.8	246.1	238.7	7.36	33.423	
1,800.0	1,783.8	1,784.8	1,784.8	4.8	3.9	-179.57	-99.6	-50.8	270.7	262.8	7.83	34.562	
1,900.0	1,880.8	1,888.8	1,888.8	5.3	4.1	-179.78	-99.1	-49.5	294.3	286.0	8.31	35.415	
2,000.0	1,977.7	1,995.2	1,995.1	5.8	4.4	179.57	-96.9	-44.7	315.2	306.4	8.79	35.863	
2,100.0	2,074.6	2,102.6	2,102.0	6.2	4.6	178.55	-93.1	-36.2	333.4	324.1	9.28	35.916	
2,200.0	2,171.6	2,210.7	2,209.3	6.7	4.8	177.19	-87.7	-23.9	348.9	339.1	9.79	35.619	
2,300.0	2,268.5	2,319.2	2,316.4	7.2	5.1	175.50	-80.5	-7.9	361.8	351.5	10.33	35.013	
2,400.0	2,365.4	2,424.6	2,419.7	7.7	5.4	173.57	-72.1	11.0	372.6	361.7	10.90	34.173	
2,500.0	2,462.3	2,523.3	2,516.3	8.2	5.7	171.77	-63.9	29.5	383.1	371.6	11.48	33.363	
2,600.0	2,559.3	2,622.0	2,612.9	8.7	6.1	170.06	-55.6	48.1	394.0	381.9	12.09	32.590	
2,700.0	2,656.2	2,720.8	2,709.6	9.2	6.4	168.45	-47.4	66.6	405.2	392.5	12.72	31.854	
2,800.0	2,753.1	2,819.5	2,806.2	9.6	6.7	166.92	-39.1	85.1	416.7	403.3	13.37	31.157	
2,900.0	2,850.1	2,918.2	2,902.8	10.1	7.1	165.48	-30.9	103.6	428.5	414.4	14.05	30.499	
3,000.0	2,947.0	3,017.0	2,999.5	10.6	7.5	164.11	-22.6	122.1	440.5	425.8	14.74	29.878	
3,100.0	3,043.9	3,115.7	3,096.1	11.1	7.9	162.82	-14.4	140.6	452.8	437.4	15.46	29.295	
3,200.0	3,140.9	3,214.4	3,192.7	11.6	8.2	161.59	-6.2	159.1	465.3	449.1	16.19	28.746	
3,300.0	3,237.8	3,313.2	3,289.3	12.1	8.6	160.43	2.1	177.6	478.0	461.1	16.93	28.232	
3,400.0	3,334.7	3,411.9	3,386.0	12.6	9.0	159.33	10.3	196.2	490.9	473.2	17.69	27.750	

Company:	KP KAUFFMAN	**Local Co-ordinate Reference:**	Well Greeley-Rothe 1-3H
Project:	SEC.1-T5N-R67W	**TVD Reference:**	WELL @ 4890.0ft (RKB - 15')
Reference Site:	Greeley-Rothe Pad Sec.1-T5N-R67W	**MD Reference:**	WELL @ 4890.0ft (RKB - 15')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Greeley-Rothe 1-3H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Landmark
Reference Design:	Plan #2 (6-05-14)	**Offset TVD Reference:**	Offset Datum

Offset Design Greeley-Rothe Pad Sec.1-T5N-R67W - Greeley-Rothe 1-8H - Wellbore #1 - Plan #2 (6-05-14)

Offset Site Error: 0.0 ft

Survey Program: 0-MWD

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	2.0	2.0	0.0	0.0	-165.53	-99.8	-25.8	103.1	103.1	0.00	N/A	
100.0	100.0	102.0	102.0	0.1	0.1	-165.53	-99.8	-25.8	103.1	102.9	0.23	449.665	
200.0	200.0	202.0	202.0	0.3	0.3	-165.53	-99.8	-25.8	103.1	102.4	0.68	151.874	
300.0	300.0	302.0	302.0	0.6	0.6	-165.53	-99.8	-25.8	103.1	102.0	1.13	91.366	
400.0	400.0	402.0	402.0	0.8	0.8	-165.53	-99.8	-25.8	103.1	101.5	1.58	65.336	
500.0	500.0	502.0	502.0	1.0	1.0	-165.53	-99.8	-25.8	103.1	101.1	2.03	50.849	
600.0	600.0	602.0	602.0	1.2	1.2	-165.53	-99.8	-25.8	103.1	100.6	2.48	41.621	
700.0	700.0	702.0	702.0	1.5	1.5	-165.53	-99.8	-25.8	103.1	100.2	2.93	35.227	
800.0	800.0	802.0	802.0	1.7	1.7	-165.53	-99.8	-25.8	103.1	99.7	3.38	30.536	CC, ES
900.0	900.0	902.0	902.0	1.9	1.9	168.66	-99.8	-25.8	104.8	101.0	3.82	27.402	
1,000.0	999.8	1,001.8	1,001.8	2.1	2.1	169.18	-99.8	-25.8	109.9	105.7	4.27	25.742	
1,100.0	1,099.5	1,101.5	1,101.5	2.4	2.4	169.94	-99.8	-25.8	118.5	113.8	4.71	25.139	SF
1,200.0	1,198.7	1,200.7	1,200.7	2.6	2.6	170.84	-99.8	-25.8	130.5	125.4	5.15	25.324	
1,300.0	1,297.5	1,299.4	1,299.4	2.9	2.8	171.08	-100.4	-24.1	146.0	140.4	5.57	26.194	
1,400.0	1,395.6	1,397.4	1,397.2	3.2	3.0	170.25	-102.0	-19.3	165.0	159.0	5.98	27.570	
1,500.0	1,493.1	1,494.5	1,493.9	3.6	3.2	168.72	-104.6	-11.4	187.5	181.1	6.41	29.253	
1,600.0	1,590.0	1,590.6	1,589.4	4.0	3.4	166.80	-108.2	-0.5	212.4	205.5	6.89	30.840	
1,700.0	1,686.9	1,686.2	1,683.9	4.4	3.7	164.52	-112.8	13.3	237.9	230.5	7.41	32.118	
1,800.0	1,783.8	1,782.4	1,778.8	4.8	3.9	162.43	-117.7	28.2	263.9	255.9	7.96	33.139	
1,900.0	1,880.8	1,878.6	1,873.7	5.3	4.2	160.71	-122.6	43.1	290.1	281.6	8.54	33.970	
2,000.0	1,977.7	1,974.7	1,968.5	5.8	4.5	159.27	-127.6	58.0	316.5	307.4	9.14	34.646	
2,100.0	2,074.6	2,070.9	2,063.4	6.2	4.8	158.06	-132.5	72.9	343.1	333.4	9.75	35.199	
2,200.0	2,171.6	2,167.1	2,158.3	6.7	5.1	157.02	-137.5	87.8	369.8	359.5	10.37	35.654	
2,300.0	2,268.5	2,263.2	2,253.1	7.2	5.5	156.12	-142.4	102.7	396.7	385.6	11.01	36.027	
2,400.0	2,365.4	2,359.4	2,348.0	7.7	5.8	155.33	-147.3	117.6	423.6	411.9	11.65	36.342	
2,500.0	2,462.3	2,455.5	2,442.9	8.2	6.1	154.64	-152.3	132.5	450.5	438.2	12.31	36.605	
2,600.0	2,559.3	2,551.7	2,537.8	8.7	6.5	154.02	-157.2	147.4	477.5	464.6	12.97	36.827	

Company:	KP KAUFFMAN	**Local Co-ordinate Reference:**	Well Greeley-Rothe 1-3H
Project:	SEC.1-T5N-R67W	**TVD Reference:**	WELL @ 4890.0ft (RKB - 15')
Reference Site:	Greeley-Rothe Pad Sec.1-T5N-R67W	**MD Reference:**	WELL @ 4890.0ft (RKB - 15')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Greeley-Rothe 1-3H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Landmark
Reference Design:	Plan #2 (6-05-14)	**Offset TVD Reference:**	Offset Datum

Offset Design Greeley-Rothe Pad Sec.1-T5N-R67W - Greeley-Rothe 1-9H - Wellbore #1 - Plan #2 (6-6-14)

Offset Site Error: 0.0 ft

Survey Program: 0-MWD

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	2.0	2.0	0.0	0.0	-179.17	-100.0	-1.4	100.1	100.1	0.00	N/A	
100.0	100.0	102.0	102.0	0.1	0.1	-179.17	-100.0	-1.4	100.1	99.8	0.23	436.424	
200.0	200.0	202.0	202.0	0.3	0.3	-179.17	-100.0	-1.4	100.1	99.4	0.68	147.401	
300.0	300.0	302.0	302.0	0.6	0.6	-179.17	-100.0	-1.4	100.1	98.9	1.13	88.676	
400.0	400.0	402.0	402.0	0.8	0.8	-179.17	-100.0	-1.4	100.1	98.5	1.58	63.412	
500.0	500.0	502.0	502.0	1.0	1.0	-179.17	-100.0	-1.4	100.1	98.0	2.03	49.352	
600.0	600.0	602.0	602.0	1.2	1.2	-179.17	-100.0	-1.4	100.1	97.6	2.48	40.395	
700.0	700.0	702.0	702.0	1.5	1.5	-179.17	-100.0	-1.4	100.1	97.1	2.93	34.190	
800.0	800.0	802.0	802.0	1.7	1.7	-179.17	-100.0	-1.4	100.1	96.7	3.38	29.637	CC, ES
900.0	900.0	902.0	902.0	1.9	1.9	155.25	-100.0	-1.4	101.6	97.8	3.82	26.575	
1,000.0	999.8	1,001.8	1,001.8	2.1	2.1	156.39	-100.0	-1.4	106.4	102.1	4.27	24.916	
1,100.0	1,099.5	1,100.0	1,100.0	2.4	2.3	157.44	-101.4	-0.3	115.7	111.0	4.69	24.658	SF
1,200.0	1,198.7	1,194.5	1,194.4	2.6	2.5	157.79	-105.1	2.8	130.6	125.5	5.10	25.626	
1,300.0	1,297.5	1,289.1	1,288.6	2.9	2.7	157.64	-111.1	8.0	151.1	145.5	5.52	27.379	
1,400.0	1,395.6	1,381.9	1,380.8	3.2	2.9	157.15	-119.4	15.0	176.9	170.9	5.95	29.717	
1,500.0	1,493.1	1,472.5	1,470.4	3.6	3.1	156.47	-129.6	23.8	208.0	201.6	6.41	32.468	
1,600.0	1,590.0	1,562.9	1,559.3	4.0	3.4	155.86	-141.9	34.2	243.0	236.1	6.91	35.195	
1,700.0	1,686.9	1,656.3	1,651.1	4.4	3.7	155.32	-155.0	45.4	278.6	271.2	7.43	37.516	
1,800.0	1,783.8	1,749.7	1,742.9	4.8	4.0	154.89	-168.1	56.6	314.1	306.2	7.96	39.457	
1,900.0	1,880.8	1,843.2	1,834.8	5.3	4.3	154.56	-181.3	67.8	349.7	341.2	8.51	41.088	
2,000.0	1,977.7	1,936.6	1,926.6	5.8	4.7	154.28	-194.4	79.0	385.3	376.2	9.08	42.448	
2,100.0	2,074.6	2,030.1	2,018.4	6.2	5.0	154.06	-207.6	90.3	420.9	411.2	9.65	43.625	
2,200.0	2,171.6	2,123.5	2,110.3	6.7	5.4	153.87	-220.7	101.5	456.5	446.2	10.23	44.629	
2,300.0	2,268.5	2,217.0	2,202.1	7.2	5.7	153.70	-233.8	112.7	492.1	481.2	10.82	45.496	

Company:	KP KAUFFMAN	**Local Co-ordinate Reference:**	Well Greeley-Rothe 1-3H
Project:	SEC.1-T5N-R67W	**TVD Reference:**	WELL @ 4890.0ft (RKB - 15')
Reference Site:	Greeley-Rothe Pad Sec.1-T5N-R67W	**MD Reference:**	WELL @ 4890.0ft (RKB - 15')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Greeley-Rothe 1-3H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Landmark
Reference Design:	Plan #2 (6-05-14)	**Offset TVD Reference:**	Offset Datum

Offset Design Greeley-Rothe Pad Sec.1-T5N-R67W - Hertzke N #1-11 (Exist.) - Wellbore #1 - Wellbore #1 — **Offset Site Error:** 0.0 ft

Survey Program: 7304-MWD — **Offset Well Error:** 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
10,000.0	7,282.0	7,287.0	7,287.0	75.6	8.2	90.00	1,164.6	-2,793.4	482.4	399.2	83.24	5.796	
10,100.0	7,282.0	7,287.0	7,287.0	78.3	8.2	90.00	1,164.6	-2,793.4	389.6	303.6	85.94	4.533	
10,200.0	7,282.0	7,287.0	7,287.0	81.0	8.2	90.00	1,164.6	-2,793.4	301.3	212.7	88.65	3.399	
10,300.0	7,282.0	7,287.0	7,287.0	83.7	8.2	90.00	1,164.6	-2,793.4	223.2	131.8	91.37	2.443	
10,400.0	7,282.0	7,287.0	7,287.0	86.4	8.2	90.00	1,164.6	-2,793.4	169.8	75.7	94.10	1.805	
10,454.9	7,282.0	7,287.0	7,287.0	87.9	8.2	90.00	1,164.6	-2,793.4	160.7	65.1	95.59	1.681	CC, ES, SF
10,500.0	7,282.0	7,287.0	7,287.0	89.1	8.2	90.00	1,164.6	-2,793.4	166.9	70.1	96.83	1.724	
10,600.0	7,282.0	7,287.0	7,287.0	91.8	8.2	90.00	1,164.6	-2,793.4	216.6	117.0	99.56	2.175	
10,700.0	7,282.0	7,287.0	7,287.0	94.6	8.2	90.00	1,164.6	-2,793.4	293.1	190.8	102.30	2.865	
10,800.0	7,282.0	7,287.0	7,287.0	97.3	8.2	90.00	1,164.6	-2,793.4	380.7	275.7	105.04	3.625	
10,900.0	7,282.0	7,287.0	7,287.0	100.0	8.2	90.00	1,164.6	-2,793.4	473.3	365.5	107.78	4.391	

Company:	KP KAUFFMAN	**Local Co-ordinate Reference:**	Well Greeley-Rothe 1-3H
Project:	SEC.1-T5N-R67W	**TVD Reference:**	WELL @ 4890.0ft (RKB - 15')
Reference Site:	Greeley-Rothe Pad Sec.1-T5N-R67W	**MD Reference:**	WELL @ 4890.0ft (RKB - 15')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Greeley-Rothe 1-3H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Landmark
Reference Design:	Plan #2 (6-05-14)	**Offset TVD Reference:**	Offset Datum

Offset Design Greeley-Rothe Pad Sec.1-T5N-R67W - Hertzke N #1-12 (Exist.) - Wellbore #1 - Wellbore #1 — **Offset Site Error:** 0.0 ft

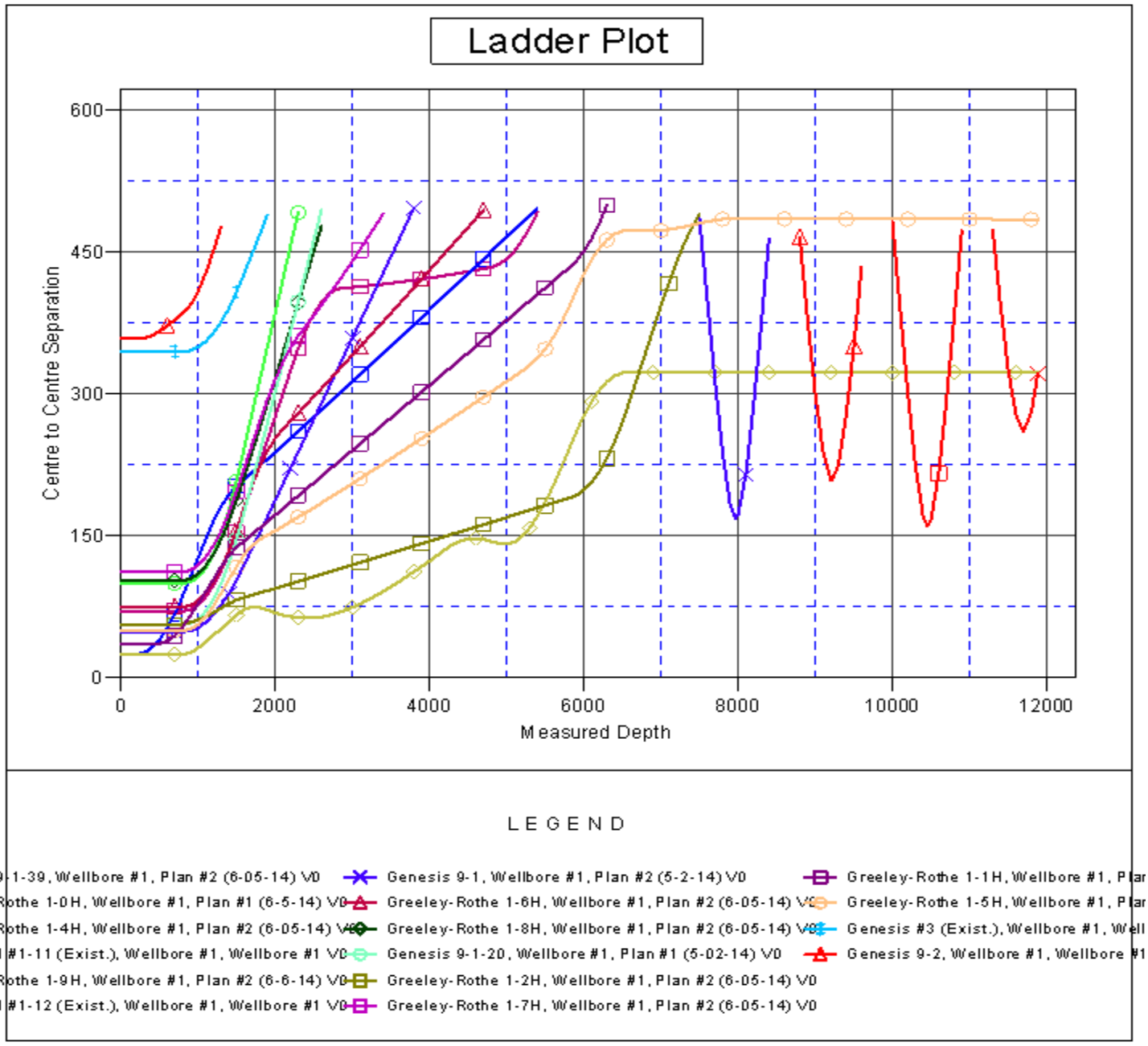
Survey Program: 7329-MWD — **Offset Well Error:** 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
11,300.0	7,282.0	7,310.0	7,310.0	111.0	8.2	90.00	1,223.8	-4,037.0	474.1	355.3	118.81	3.991	
11,400.0	7,282.0	7,310.0	7,310.0	113.7	8.2	90.00	1,223.8	-4,037.0	394.5	272.9	121.57	3.245	
11,500.0	7,282.0	7,310.0	7,310.0	116.5	8.2	90.00	1,223.8	-4,037.0	326.3	202.0	124.33	2.624	
11,600.0	7,282.0	7,310.0	7,310.0	119.3	8.2	90.00	1,223.8	-4,037.0	278.0	150.9	127.09	2.187	
11,695.9	7,282.0	7,310.0	7,310.0	121.9	8.2	90.00	1,223.8	-4,037.0	260.9	131.2	129.73	2.011	CC
11,700.0	7,282.0	7,310.0	7,310.0	122.0	8.2	90.00	1,223.8	-4,037.0	261.0	131.1	129.85	2.010	ES, SF
11,800.0	7,282.0	7,310.0	7,310.0	124.8	8.2	90.00	1,223.8	-4,037.0	280.9	148.3	132.61	2.118	
11,884.2	7,282.0	7,310.0	7,310.0	126.3	8.2	90.00	1,223.8	-4,037.0	321.8	187.7	134.10	2.400	

Company:	KP KAUFFMAN	**Local Co-ordinate Reference:**	Well Greeley-Rothe 1-3H
Project:	SEC.1-T5N-R67W	**TVD Reference:**	WELL @ 4890.0ft (RKB - 15')
Reference Site:	Greeley-Rothe Pad Sec.1-T5N-R67W	**MD Reference:**	WELL @ 4890.0ft (RKB - 15')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Greeley-Rothe 1-3H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Landmark
Reference Design:	Plan #2 (6-05-14)	**Offset TVD Reference:**	Offset Datum

Reference Depths are relative to WELL @ 4890.0ft (RKB - 15')
Offset Depths are relative to Offset Datum
Central Meridian is -105.500000 °

Coordinates are relative to: Greeley-Rothe 1-3H
Coordinate System is US State Plane 1983, Colorado Northern Zone
Grid Convergence at Surface is: 0.43°



Company:	KP KAUFFMAN	**Local Co-ordinate Reference:**	Well Greeley-Rothe 1-3H
Project:	SEC.1-T5N-R67W	**TVD Reference:**	WELL @ 4890.0ft (RKB - 15')
Reference Site:	Greeley-Rothe Pad Sec.1-T5N-R67W	**MD Reference:**	WELL @ 4890.0ft (RKB - 15')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Greeley-Rothe 1-3H	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	Wellbore #1	**Database:**	Landmark
Reference Design:	Plan #2 (6-05-14)	**Offset TVD Reference:**	Offset Datum

Reference Depths are relative to WELL @ 4890.0ft (RKB - 15')	Coordinates are relative to: Greeley-Rothe 1-3H
Offset Depths are relative to Offset Datum	Coordinate System is US State Plane 1983, Colorado Northern Zone
Central Meridian is -105.500000 °	Grid Convergence at Surface is: 0.43°