

ENSIGN

Directional

Well Name: Sunmarke 19-28-14

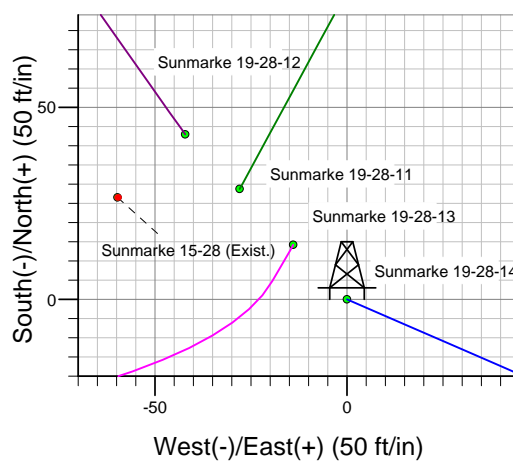
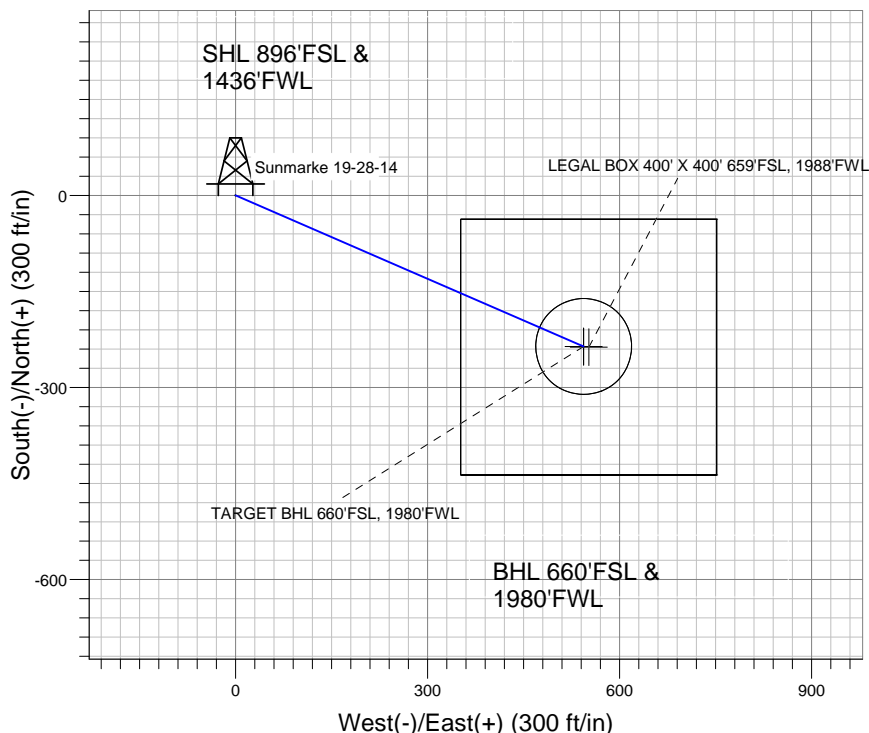
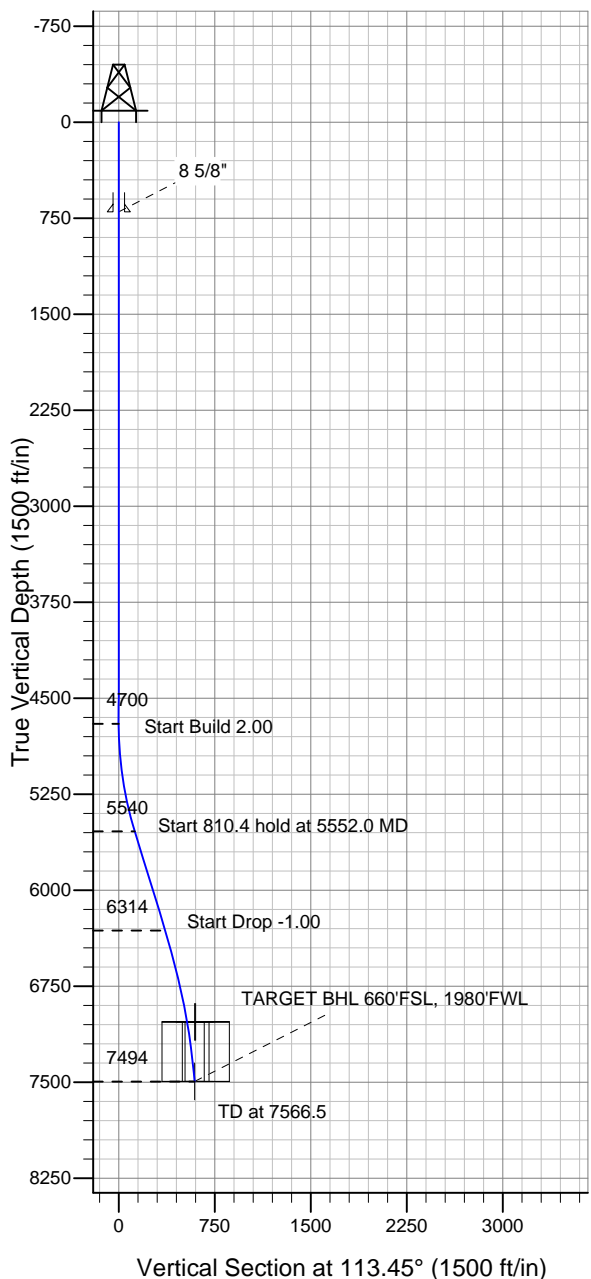
Surface Location: Sunmarke 19-28-11 Pad Sec.28-T4N-R67W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone

Ground Elevation: 4975.0

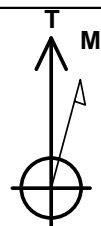
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1345093.63	3167403.99	40.279127	-104.899996	

Original Well Elev WELL @ 4989.0ft (Original Well Elev)

KP KAUFFMAN



Sunmarke 19-28-11 Pad Sec.28-T4N-R67W
Sunmarke 19-28-14
Plan #1 (1-11-12)
11:00, January 12 2012



Azimuths to True North
Magnetic North: 8.85°

Magnetic Field
Strength: 52991.4snT
Dip Angle: 66.91°
Date: 1/11/2012
Model: IGRF2010

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Shape
LEGAL BOX 400' X 400' 659'FSL, 1988'FWL	7029.0	-237.0	552.0	40.278476	-104.898018	Rectangle (Sides: L400.0 W400.0)
TARGET CIRCLE 660'FSL, 1980'FWL	7029.0	-236.0	544.0	40.278479	-104.898046	Circle (Radius: 75.0)
TARGET BHL 660'FSL, 1980'FWL	7494.0	-236.0	544.0	40.278479	-104.898046	Point

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	4700.0	0.00	0.00	4700.0	0.0	0.0	0.00	0.00	0.0	
3	5552.0	17.04	113.45	5539.5	-50.1	115.4	2.00	113.45	125.8	
4	6362.4	17.04	113.45	6314.3	-144.6	333.2	0.00	0.00	363.3	
5	7566.5	5.00	113.45	7494.0	-236.0	544.0	1.00	180.00	593.0	TARGET BHL 660'FSL, 1980'FWL



Directional

KP KAUFFMAN

SEC.28-T4N-R67W

Sunmarke 19-28-11 Pad Sec.28-T4N-R67W

Sunmarke 19-28-14

Wellbore #1

Plan: Plan #1 (1-11-12)

Standard Planning Report

12 January, 2012

Database:	Landmark	Local Co-ordinate Reference:	Well Sunmarke 19-28-14
Company:	KP KAUFFMAN	TVD Reference:	WELL @ 4989.0ft (Original Well Elev)
Project:	SEC.28-T4N-R67W	MD Reference:	WELL @ 4989.0ft (Original Well Elev)
Site:	Sunmarke 19-28-11 Pad Sec.28-T4N-R67W	North Reference:	True
Well:	Sunmarke 19-28-14	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (1-11-12)		

Project	SEC.28-T4N-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						Sunmarke 19-28-11 Pad Sec.28-T4N-R67W											
Site Position:						Northing:			1,345,122.23ft			Latitude:			40.279206		
From:			Lat/Long			Easting:			3,167,375.90ft			Longitude:			-104.900096		
Position Uncertainty:			0.0 ft			Slot Radius:			"			Grid Convergence:			0.39 °		

Well	Sunmarke 19-28-14					
Well Position	+N/-S	-28.8 ft	Northing:	1,345,093.63 ft	Latitude:	40.279127
	+E/-W	27.9 ft	Easting:	3,167,403.99 ft	Longitude:	-104.899996
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,975.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	1/11/2012	8.85	66.91	52,991

Design	Plan #1 (1-11-12)			
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	113.45

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	
4,700.0	0.00	0.00	4,700.0	0.0	0.0	0.00	0.00	0.00	0.00	
5,552.0	17.04	113.45	5,539.5	-50.1	115.4	2.00	2.00	0.00	113.45	
6,362.4	17.04	113.45	6,314.3	-144.6	333.2	0.00	0.00	0.00	0.00	
7,566.5	5.00	113.45	7,494.0	-236.0	544.0	1.00	-1.00	0.00	180.00	TARGET BHL 660'I

Database:	Landmark	Local Co-ordinate Reference:	Well Sunmarke 19-28-14
Company:	KP KAUFFMAN	TVD Reference:	WELL @ 4989.0ft (Original Well Elev)
Project:	SEC.28-T4N-R67W	MD Reference:	WELL @ 4989.0ft (Original Well Elev)
Site:	Sunmarke 19-28-11 Pad Sec.28-T4N-R67W	North Reference:	True
Well:	Sunmarke 19-28-14	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (1-11-12)		

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
40.0	0.00	0.00	40.0	0.0	0.0	0.0	0.00	0.00	0.00
80.0	0.00	0.00	80.0	0.0	0.0	0.0	0.00	0.00	0.00
120.0	0.00	0.00	120.0	0.0	0.0	0.0	0.00	0.00	0.00
160.0	0.00	0.00	160.0	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
240.0	0.00	0.00	240.0	0.0	0.0	0.0	0.00	0.00	0.00
280.0	0.00	0.00	280.0	0.0	0.0	0.0	0.00	0.00	0.00
320.0	0.00	0.00	320.0	0.0	0.0	0.0	0.00	0.00	0.00
360.0	0.00	0.00	360.0	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
440.0	0.00	0.00	440.0	0.0	0.0	0.0	0.00	0.00	0.00
480.0	0.00	0.00	480.0	0.0	0.0	0.0	0.00	0.00	0.00
520.0	0.00	0.00	520.0	0.0	0.0	0.0	0.00	0.00	0.00
560.0	0.00	0.00	560.0	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
640.0	0.00	0.00	640.0	0.0	0.0	0.0	0.00	0.00	0.00
680.0	0.00	0.00	680.0	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
8 5/8"									
720.0	0.00	0.00	720.0	0.0	0.0	0.0	0.00	0.00	0.00
760.0	0.00	0.00	760.0	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
840.0	0.00	0.00	840.0	0.0	0.0	0.0	0.00	0.00	0.00
880.0	0.00	0.00	880.0	0.0	0.0	0.0	0.00	0.00	0.00
920.0	0.00	0.00	920.0	0.0	0.0	0.0	0.00	0.00	0.00
960.0	0.00	0.00	960.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
1,040.0	0.00	0.00	1,040.0	0.0	0.0	0.0	0.00	0.00	0.00
1,080.0	0.00	0.00	1,080.0	0.0	0.0	0.0	0.00	0.00	0.00
1,120.0	0.00	0.00	1,120.0	0.0	0.0	0.0	0.00	0.00	0.00
1,160.0	0.00	0.00	1,160.0	0.0	0.0	0.0	0.00	0.00	0.00
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	0.00
1,240.0	0.00	0.00	1,240.0	0.0	0.0	0.0	0.00	0.00	0.00
1,280.0	0.00	0.00	1,280.0	0.0	0.0	0.0	0.00	0.00	0.00
1,320.0	0.00	0.00	1,320.0	0.0	0.0	0.0	0.00	0.00	0.00
1,360.0	0.00	0.00	1,360.0	0.0	0.0	0.0	0.00	0.00	0.00
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	0.00
1,440.0	0.00	0.00	1,440.0	0.0	0.0	0.0	0.00	0.00	0.00
1,480.0	0.00	0.00	1,480.0	0.0	0.0	0.0	0.00	0.00	0.00
1,520.0	0.00	0.00	1,520.0	0.0	0.0	0.0	0.00	0.00	0.00
1,560.0	0.00	0.00	1,560.0	0.0	0.0	0.0	0.00	0.00	0.00
1,600.0	0.00	0.00	1,600.0	0.0	0.0	0.0	0.00	0.00	0.00
1,640.0	0.00	0.00	1,640.0	0.0	0.0	0.0	0.00	0.00	0.00
1,680.0	0.00	0.00	1,680.0	0.0	0.0	0.0	0.00	0.00	0.00
1,720.0	0.00	0.00	1,720.0	0.0	0.0	0.0	0.00	0.00	0.00
1,760.0	0.00	0.00	1,760.0	0.0	0.0	0.0	0.00	0.00	0.00
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.0	0.00	0.00	0.00
1,840.0	0.00	0.00	1,840.0	0.0	0.0	0.0	0.00	0.00	0.00
1,880.0	0.00	0.00	1,880.0	0.0	0.0	0.0	0.00	0.00	0.00
1,920.0	0.00	0.00	1,920.0	0.0	0.0	0.0	0.00	0.00	0.00
1,960.0	0.00	0.00	1,960.0	0.0	0.0	0.0	0.00	0.00	0.00
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.0	0.00	0.00	0.00
2,040.0	0.00	0.00	2,040.0	0.0	0.0	0.0	0.00	0.00	0.00

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Site:	Sunmarke 19-28-11 Pad Sec.28-T4N-R67W	North Reference:	True
Well:	Sunmarke 19-28-14	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (1-11-12)		

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)
2,080.0	0.00	0.00	2,080.0	0.0	0.0	0.0	0.00	0.00	0.00
2,120.0	0.00	0.00	2,120.0	0.0	0.0	0.0	0.00	0.00	0.00
2,160.0	0.00	0.00	2,160.0	0.0	0.0	0.0	0.00	0.00	0.00
2,200.0	0.00	0.00	2,200.0	0.0	0.0	0.0	0.00	0.00	0.00
2,240.0	0.00	0.00	2,240.0	0.0	0.0	0.0	0.00	0.00	0.00
2,280.0	0.00	0.00	2,280.0	0.0	0.0	0.0	0.00	0.00	0.00
2,320.0	0.00	0.00	2,320.0	0.0	0.0	0.0	0.00	0.00	0.00
2,360.0	0.00	0.00	2,360.0	0.0	0.0	0.0	0.00	0.00	0.00
2,400.0	0.00	0.00	2,400.0	0.0	0.0	0.0	0.00	0.00	0.00
2,440.0	0.00	0.00	2,440.0	0.0	0.0	0.0	0.00	0.00	0.00
2,480.0	0.00	0.00	2,480.0	0.0	0.0	0.0	0.00	0.00	0.00
2,520.0	0.00	0.00	2,520.0	0.0	0.0	0.0	0.00	0.00	0.00
2,540.0	0.00	0.00	2,540.0	0.0	0.0	0.0	0.00	0.00	0.00
GREELEY									
2,560.0	0.00	0.00	2,560.0	0.0	0.0	0.0	0.00	0.00	0.00
2,600.0	0.00	0.00	2,600.0	0.0	0.0	0.0	0.00	0.00	0.00
2,640.0	0.00	0.00	2,640.0	0.0	0.0	0.0	0.00	0.00	0.00
2,680.0	0.00	0.00	2,680.0	0.0	0.0	0.0	0.00	0.00	0.00
2,720.0	0.00	0.00	2,720.0	0.0	0.0	0.0	0.00	0.00	0.00
2,760.0	0.00	0.00	2,760.0	0.0	0.0	0.0	0.00	0.00	0.00
2,800.0	0.00	0.00	2,800.0	0.0	0.0	0.0	0.00	0.00	0.00
2,840.0	0.00	0.00	2,840.0	0.0	0.0	0.0	0.00	0.00	0.00
2,880.0	0.00	0.00	2,880.0	0.0	0.0	0.0	0.00	0.00	0.00
2,920.0	0.00	0.00	2,920.0	0.0	0.0	0.0	0.00	0.00	0.00
2,960.0	0.00	0.00	2,960.0	0.0	0.0	0.0	0.00	0.00	0.00
3,000.0	0.00	0.00	3,000.0	0.0	0.0	0.0	0.00	0.00	0.00
3,040.0	0.00	0.00	3,040.0	0.0	0.0	0.0	0.00	0.00	0.00
3,080.0	0.00	0.00	3,080.0	0.0	0.0	0.0	0.00	0.00	0.00
3,120.0	0.00	0.00	3,120.0	0.0	0.0	0.0	0.00	0.00	0.00
3,160.0	0.00	0.00	3,160.0	0.0	0.0	0.0	0.00	0.00	0.00
3,200.0	0.00	0.00	3,200.0	0.0	0.0	0.0	0.00	0.00	0.00
3,240.0	0.00	0.00	3,240.0	0.0	0.0	0.0	0.00	0.00	0.00
3,280.0	0.00	0.00	3,280.0	0.0	0.0	0.0	0.00	0.00	0.00
3,320.0	0.00	0.00	3,320.0	0.0	0.0	0.0	0.00	0.00	0.00
3,360.0	0.00	0.00	3,360.0	0.0	0.0	0.0	0.00	0.00	0.00
3,400.0	0.00	0.00	3,400.0	0.0	0.0	0.0	0.00	0.00	0.00
3,440.0	0.00	0.00	3,440.0	0.0	0.0	0.0	0.00	0.00	0.00
3,480.0	0.00	0.00	3,480.0	0.0	0.0	0.0	0.00	0.00	0.00
3,520.0	0.00	0.00	3,520.0	0.0	0.0	0.0	0.00	0.00	0.00
3,560.0	0.00	0.00	3,560.0	0.0	0.0	0.0	0.00	0.00	0.00
3,600.0	0.00	0.00	3,600.0	0.0	0.0	0.0	0.00	0.00	0.00
3,640.0	0.00	0.00	3,640.0	0.0	0.0	0.0	0.00	0.00	0.00
3,680.0	0.00	0.00	3,680.0	0.0	0.0	0.0	0.00	0.00	0.00
3,720.0	0.00	0.00	3,720.0	0.0	0.0	0.0	0.00	0.00	0.00
3,725.0	0.00	0.00	3,725.0	0.0	0.0	0.0	0.00	0.00	0.00
PARKMAN									
3,760.0	0.00	0.00	3,760.0	0.0	0.0	0.0	0.00	0.00	0.00
3,800.0	0.00	0.00	3,800.0	0.0	0.0	0.0	0.00	0.00	0.00
3,840.0	0.00	0.00	3,840.0	0.0	0.0	0.0	0.00	0.00	0.00
3,880.0	0.00	0.00	3,880.0	0.0	0.0	0.0	0.00	0.00	0.00
3,920.0	0.00	0.00	3,920.0	0.0	0.0	0.0	0.00	0.00	0.00
3,960.0	0.00	0.00	3,960.0	0.0	0.0	0.0	0.00	0.00	0.00
4,000.0	0.00	0.00	4,000.0	0.0	0.0	0.0	0.00	0.00	0.00
4,040.0	0.00	0.00	4,040.0	0.0	0.0	0.0	0.00	0.00	0.00

Database:	Landmark	Local Co-ordinate Reference:	Well Sunmarke 19-28-14
Company:	KP KAUFFMAN	TVD Reference:	WELL @ 4989.0ft (Original Well Elev)
Project:	SEC.28-T4N-R67W	MD Reference:	WELL @ 4989.0ft (Original Well Elev)
Site:	Sunmarke 19-28-11 Pad Sec.28-T4N-R67W	North Reference:	True
Well:	Sunmarke 19-28-14	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (1-11-12)		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
4,080.0	0.00	0.00	4,080.0	0.0	0.0	0.0	0.00	0.00	0.00
4,120.0	0.00	0.00	4,120.0	0.0	0.0	0.0	0.00	0.00	0.00
4,160.0	0.00	0.00	4,160.0	0.0	0.0	0.0	0.00	0.00	0.00
4,200.0	0.00	0.00	4,200.0	0.0	0.0	0.0	0.00	0.00	0.00
4,240.0	0.00	0.00	4,240.0	0.0	0.0	0.0	0.00	0.00	0.00
4,268.0	0.00	0.00	4,268.0	0.0	0.0	0.0	0.00	0.00	0.00
SUSSEX									
4,280.0	0.00	0.00	4,280.0	0.0	0.0	0.0	0.00	0.00	0.00
4,320.0	0.00	0.00	4,320.0	0.0	0.0	0.0	0.00	0.00	0.00
4,360.0	0.00	0.00	4,360.0	0.0	0.0	0.0	0.00	0.00	0.00
4,400.0	0.00	0.00	4,400.0	0.0	0.0	0.0	0.00	0.00	0.00
4,440.0	0.00	0.00	4,440.0	0.0	0.0	0.0	0.00	0.00	0.00
4,480.0	0.00	0.00	4,480.0	0.0	0.0	0.0	0.00	0.00	0.00
4,520.0	0.00	0.00	4,520.0	0.0	0.0	0.0	0.00	0.00	0.00
4,560.0	0.00	0.00	4,560.0	0.0	0.0	0.0	0.00	0.00	0.00
4,600.0	0.00	0.00	4,600.0	0.0	0.0	0.0	0.00	0.00	0.00
4,640.0	0.00	0.00	4,640.0	0.0	0.0	0.0	0.00	0.00	0.00
4,680.0	0.00	0.00	4,680.0	0.0	0.0	0.0	0.00	0.00	0.00
4,700.0	0.00	0.00	4,700.0	0.0	0.0	0.0	0.00	0.00	0.00
4,720.0	0.40	113.45	4,720.0	0.0	0.1	0.1	2.00	2.00	0.00
4,727.0	0.54	113.45	4,727.0	-0.1	0.1	0.1	2.00	2.00	0.00
SHANNON									
4,760.0	1.20	113.45	4,760.0	-0.3	0.6	0.6	2.00	2.00	0.00
4,800.0	2.00	113.45	4,800.0	-0.7	1.6	1.7	2.00	2.00	0.00
4,840.0	2.80	113.45	4,839.9	-1.4	3.1	3.4	2.00	2.00	0.00
4,880.0	3.60	113.45	4,879.9	-2.2	5.2	5.7	2.00	2.00	0.00
4,920.0	4.40	113.45	4,919.8	-3.4	7.7	8.4	2.00	2.00	0.00
4,960.0	5.20	113.45	4,959.6	-4.7	10.8	11.8	2.00	2.00	0.00
5,000.0	6.00	113.45	4,999.5	-6.2	14.4	15.7	2.00	2.00	0.00
5,040.0	6.80	113.45	5,039.2	-8.0	18.5	20.2	2.00	2.00	0.00
5,080.0	7.60	113.45	5,078.9	-10.0	23.1	25.2	2.00	2.00	0.00
5,120.0	8.40	113.45	5,118.5	-12.2	28.2	30.7	2.00	2.00	0.00
5,160.0	9.20	113.45	5,158.0	-14.7	33.8	36.9	2.00	2.00	0.00
5,200.0	10.00	113.45	5,197.5	-17.3	39.9	43.5	2.00	2.00	0.00
5,240.0	10.80	113.45	5,236.8	-20.2	46.6	50.7	2.00	2.00	0.00
5,280.0	11.60	113.45	5,276.0	-23.3	53.7	58.5	2.00	2.00	0.00
5,320.0	12.40	113.45	5,315.2	-26.6	61.3	66.8	2.00	2.00	0.00
5,360.0	13.20	113.45	5,354.2	-30.1	69.4	75.7	2.00	2.00	0.00
5,400.0	14.00	113.45	5,393.1	-33.9	78.1	85.1	2.00	2.00	0.00
5,440.0	14.80	113.45	5,431.8	-37.8	87.2	95.0	2.00	2.00	0.00
5,480.0	15.60	113.45	5,470.4	-42.0	96.8	105.5	2.00	2.00	0.00
5,520.0	16.40	113.45	5,508.8	-46.4	106.9	116.6	2.00	2.00	0.00
5,552.0	17.04	113.45	5,539.5	-50.1	115.4	125.8	2.00	2.00	0.00
5,560.0	17.04	113.45	5,547.1	-51.0	117.5	128.1	0.00	0.00	0.00
5,600.0	17.04	113.45	5,585.4	-55.6	128.3	139.8	0.00	0.00	0.00
5,640.0	17.04	113.45	5,623.6	-60.3	139.0	151.6	0.00	0.00	0.00
5,680.0	17.04	113.45	5,661.9	-65.0	149.8	163.3	0.00	0.00	0.00
5,720.0	17.04	113.45	5,700.1	-69.6	160.5	175.0	0.00	0.00	0.00
5,760.0	17.04	113.45	5,738.4	-74.3	171.3	186.7	0.00	0.00	0.00
5,800.0	17.04	113.45	5,776.6	-79.0	182.0	198.4	0.00	0.00	0.00
5,840.0	17.04	113.45	5,814.9	-83.6	192.8	210.2	0.00	0.00	0.00
5,880.0	17.04	113.45	5,853.1	-88.3	203.6	221.9	0.00	0.00	0.00
5,920.0	17.04	113.45	5,891.3	-93.0	214.3	233.6	0.00	0.00	0.00

Database:	Landmark	Local Co-ordinate Reference:	Well Sunmarke 19-28-14
Company:	KP KAUFFMAN	TVD Reference:	WELL @ 4989.0ft (Original Well Elev)
Project:	SEC.28-T4N-R67W	MD Reference:	WELL @ 4989.0ft (Original Well Elev)
Site:	Sunmarke 19-28-11 Pad Sec.28-T4N-R67W	North Reference:	True
Well:	Sunmarke 19-28-14	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (1-11-12)		

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)
5,960.0	17.04	113.45	5,929.6	-97.6	225.1	245.3	0.00	0.00	0.00
6,000.0	17.04	113.45	5,967.8	-102.3	235.8	257.0	0.00	0.00	0.00
6,040.0	17.04	113.45	6,006.1	-107.0	246.6	268.8	0.00	0.00	0.00
6,080.0	17.04	113.45	6,044.3	-111.6	257.3	280.5	0.00	0.00	0.00
6,120.0	17.04	113.45	6,082.6	-116.3	268.1	292.2	0.00	0.00	0.00
6,160.0	17.04	113.45	6,120.8	-121.0	278.8	303.9	0.00	0.00	0.00
6,200.0	17.04	113.45	6,159.0	-125.6	289.6	315.7	0.00	0.00	0.00
6,240.0	17.04	113.45	6,197.3	-130.3	300.3	327.4	0.00	0.00	0.00
6,280.0	17.04	113.45	6,235.5	-135.0	311.1	339.1	0.00	0.00	0.00
6,320.0	17.04	113.45	6,273.8	-139.6	321.8	350.8	0.00	0.00	0.00
6,360.0	17.04	113.45	6,312.0	-144.3	332.6	362.5	0.00	0.00	0.00
6,362.4	17.04	113.45	6,314.3	-144.6	333.2	363.3	0.00	0.00	0.00
6,400.0	16.66	113.45	6,350.3	-148.9	343.2	374.1	1.00	-1.00	0.00
6,440.0	16.26	113.45	6,388.7	-153.4	353.6	385.5	1.00	-1.00	0.00
6,480.0	15.86	113.45	6,427.1	-157.8	363.8	396.6	1.00	-1.00	0.00
6,520.0	15.46	113.45	6,465.6	-162.1	373.7	407.4	1.00	-1.00	0.00
6,560.0	15.06	113.45	6,504.2	-166.3	383.4	417.9	1.00	-1.00	0.00
6,600.0	14.66	113.45	6,542.9	-170.4	392.8	428.1	1.00	-1.00	0.00
6,640.0	14.26	113.45	6,581.6	-174.4	401.9	438.1	1.00	-1.00	0.00
6,680.0	13.86	113.45	6,620.4	-178.2	410.9	447.9	1.00	-1.00	0.00
6,720.0	13.46	113.45	6,659.3	-182.0	419.5	457.3	1.00	-1.00	0.00
6,760.0	13.06	113.45	6,698.2	-185.7	427.9	466.5	1.00	-1.00	0.00
6,800.0	12.66	113.45	6,737.2	-189.2	436.1	475.4	1.00	-1.00	0.00
6,840.0	12.26	113.45	6,776.3	-192.6	444.0	484.0	1.00	-1.00	0.00
6,880.0	11.86	113.45	6,815.4	-196.0	451.7	492.4	1.00	-1.00	0.00
6,920.0	11.46	113.45	6,854.5	-199.2	459.1	500.5	1.00	-1.00	0.00
6,960.0	11.06	113.45	6,893.8	-202.3	466.3	508.3	1.00	-1.00	0.00
7,000.0	10.66	113.45	6,933.1	-205.3	473.2	515.8	1.00	-1.00	0.00
7,040.0	10.26	113.45	6,972.4	-208.2	479.9	523.1	1.00	-1.00	0.00
7,080.0	9.86	113.45	7,011.8	-211.0	486.3	530.1	1.00	-1.00	0.00
7,097.5	9.69	113.45	7,029.0	-212.1	489.0	533.0	1.00	-1.00	0.00
NIOBRARA									
7,107.5	9.59	113.45	7,038.9	-212.8	490.6	534.7	1.00	-1.00	0.00
TARGET CIRCLE 660'FSL, 1980'FWL									
7,108.7	9.58	113.45	7,040.1	-212.9	490.7	534.9	1.00	-1.00	0.00
LEGAL BOX 400' X 400' 659'FSL, 1988'FWL									
7,120.0	9.46	113.45	7,051.2	-213.6	492.5	536.8	1.00	-1.00	0.00
7,160.0	9.06	113.45	7,090.7	-216.2	498.4	543.2	1.00	-1.00	0.00
7,200.0	8.66	113.45	7,130.2	-218.7	504.0	549.4	1.00	-1.00	0.00
7,240.0	8.26	113.45	7,169.8	-221.0	509.4	555.3	1.00	-1.00	0.00
7,280.0	7.86	113.45	7,209.4	-223.2	514.6	560.9	1.00	-1.00	0.00
7,320.0	7.46	113.45	7,249.0	-225.4	519.5	566.2	1.00	-1.00	0.00
7,360.0	7.06	113.45	7,288.7	-227.4	524.1	571.3	1.00	-1.00	0.00
7,392.5	6.74	113.45	7,321.0	-228.9	527.7	575.2	1.00	-1.00	0.00
FT HAYS									
7,400.0	6.66	113.45	7,328.4	-229.3	528.5	576.1	1.00	-1.00	0.00
7,415.7	6.51	113.45	7,344.0	-230.0	530.1	577.9	1.00	-1.00	0.00
CODELL									
7,440.0	6.26	113.45	7,368.2	-231.1	532.6	580.6	1.00	-1.00	0.00
7,480.0	5.86	113.45	7,407.9	-232.7	536.5	584.8	1.00	-1.00	0.00
7,520.0	5.46	113.45	7,447.7	-234.3	540.1	588.7	1.00	-1.00	0.00
7,560.0	5.06	113.45	7,487.6	-235.8	543.5	592.4	1.00	-1.00	0.00
7,566.5	5.00	113.45	7,494.0	-236.0	544.0	593.0	1.00	-1.00	0.00

Database:	Landmark	Local Co-ordinate Reference:	Well Sunmarke 19-28-14
Company:	KP KAUFFMAN	TVD Reference:	WELL @ 4989.0ft (Original Well Elev)
Project:	SEC.28-T4N-R67W	MD Reference:	WELL @ 4989.0ft (Original Well Elev)
Site:	Sunmarke 19-28-11 Pad Sec.28-T4N-R67W	North Reference:	True
Well:	Sunmarke 19-28-14	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (1-11-12)		

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)
TARGET BHL 660'FSL, 1980'FWL									

Targets									
Target Name	- hit/miss target	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	
- Shape									Latitude Longitude
LEGAL BOX 400' X 400'	- plan misses target center by 66.8ft at 7108.7ft MD (7040.1 TVD, -212.9 N, 490.7 E)	0.00	0.00	7,029.0	-237.0	552.0	1,344,860.38	3,167,957.56	40.278476 -104.898018
- Rectangle (sides W400.0 H400.0 D465.0)									
TARGET BHL 660'FS	- plan hits target center	0.00	0.00	7,494.0	-236.0	544.0	1,344,861.33	3,167,949.55	40.278479 -104.898046
- Point									
TARGET CIRCLE 660'	- plan misses target center by 59.1ft at 7107.5ft MD (7038.9 TVD, -212.8 N, 490.6 E)	0.00	0.00	7,029.0	-236.0	544.0	1,344,861.33	3,167,949.55	40.278479 -104.898046
- Circle (radius 75.0)									

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")	
700.0	700.0	8 5/8"	8-5/8	12-1/4	

Formations					
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
2,540.0	2,540.0	GREELEY		0.00	
3,725.0	3,725.0	PARKMAN		0.00	
4,268.0	4,268.0	SUSSEX		0.00	
4,727.0	4,727.0	SHANNON		0.00	
7,097.5	7,029.0	NIOBRARA		0.00	
7,392.5	7,321.0	FT HAYS		0.00	
7,415.7	7,344.0	CODELL		0.00	



KP KAUFFMAN

SEC.28-T4N-R67W

Sunmarke 19-28-11 Pad Sec.28-T4N-R67W

Sunmarke 19-28-14

Wellbore #1

Plan #1 (1-11-12)

Anticollision Report

12 January, 2012

Company:	KP KAUFFMAN	Local Co-ordinate Reference:	Well Sunmarke 19-28-14
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4989.0ft (Original Well Elev)
Reference Site:	Sunmarke 19-28-11 Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4989.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 19-28-14	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 #1 (1-11-12)	Offset TVD Reference:	Offset Datum

Reference	Plan #1 (1-11-12)		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	Stations	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 10,000.0ft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma		

Survey Tool Program	Date 1/12/2012			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.0	7,566.5	Plan #1 (1-11-12) (Wellbore #1)	MWD	MWD - Standard

Summary						
Site Name	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Sunmarke 19-28-11 Pad Sec.28-T4N-R67W						
Sunmarke 19-28-13 - Wellbore #1 - Plan #1 (1-11-12)	974.7	974.8	19.2	15.1	4.677 CC	
Sunmarke 19-28-13 - Wellbore #1 - Plan #1 (1-11-12)	1,000.0	1,000.0	19.3	15.1	4.579 ES, SF	

Offset Design Sunmarke 19-28-11 Pad Sec.28-T4N-R67W - Sunmarke 19-28-13 - Wellbore #1 - Plan #1 (1-11-12)											
Survey Program: 0-MWD											
Reference		Offset		Semi Major Axis		Distance					
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)
											Separation Factor
0.0	0.0	0.0	0.0	0.0	0.0	-44.48	14.2	-14.0	19.9	19.9	0.00
100.0	100.0	100.0	100.0	0.1	0.1	-44.48	14.2	-14.0	19.9	19.7	0.22
200.0	200.0	200.0	200.0	0.3	0.3	-44.48	14.2	-14.0	19.9	19.2	0.67
300.0	300.0	300.0	300.0	0.6	0.6	-44.48	14.2	-14.0	19.9	18.8	1.12
400.0	400.0	400.0	400.0	0.8	0.8	-44.48	14.2	-14.0	19.9	18.3	1.57
500.0	500.0	500.0	500.0	1.0	1.0	-44.48	14.2	-14.0	19.9	17.9	2.02
600.0	600.0	600.0	600.0	1.2	1.2	-44.48	14.2	-14.0	19.9	17.4	2.47
700.0	700.0	700.0	700.0	1.5	1.5	-44.48	14.2	-14.0	19.9	17.0	2.92
800.0	800.0	800.0	800.0	1.7	1.7	-44.48	14.2	-14.0	19.9	16.5	3.37
900.0	900.0	900.1	900.1	1.9	1.9	-49.43	12.7	-14.8	19.5	15.7	3.80
974.7	974.7	974.8	974.7	2.1	2.0	-60.00	9.6	-16.6	19.2	15.1	4.10
1,000.0	1,000.0	1,000.0	999.9	2.1	2.1	-64.92	8.2	-17.4	19.3	15.1	4.21
1,100.0	1,100.0	1,099.3	1,098.7	2.4	2.3	-87.12	1.1	-22.0	22.0	17.4	4.63
1,200.0	1,200.0	1,197.8	1,196.8	2.6	2.5	-101.23	-5.9	-29.6	30.4	25.3	5.10
1,300.0	1,300.0	1,295.8	1,293.9	2.8	2.8	-106.96	-12.4	-40.5	42.8	37.2	5.58
1,400.0	1,400.0	1,393.1	1,389.9	3.0	3.1	-108.55	-18.3	-54.6	58.5	52.4	6.09
1,500.0	1,500.0	1,489.9	1,485.1	3.3	3.4	-108.38	-23.8	-71.8	77.1	70.4	6.63
1,600.0	1,600.0	1,588.0	1,581.4	3.5	3.7	-108.06	-29.3	-89.9	96.4	89.2	7.19
1,700.0	1,700.0	1,686.2	1,677.7	3.7	4.1	-107.84	-34.8	-108.1	115.7	107.9	7.76
1,800.0	1,800.0	1,784.3	1,773.9	3.9	4.4	-107.68	-40.2	-126.2	135.0	126.7	8.34
1,900.0	1,900.0	1,882.4	1,870.2	4.2	4.8	-107.57	-45.7	-144.3	154.3	145.4	8.93
2,000.0	2,000.0	1,980.5	1,966.5	4.4	5.2	-107.48	-51.2	-162.5	173.6	164.1	9.52
2,100.0	2,100.0	2,078.6	2,062.7	4.6	5.6	-107.40	-56.6	-180.6	192.9	182.8	10.13
2,200.0	2,200.0	2,176.7	2,159.0	4.8	6.0	-107.34	-62.1	-198.8	212.3	201.5	10.73
2,300.0	2,300.0	2,274.9	2,255.3	5.1	6.4	-107.29	-67.5	-216.9	231.6	220.2	11.34

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

Company:	KP KAUFFMAN	Local Co-ordinate Reference:	Well Sunmarke 19-28-14
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4989.0ft (Original Well Elev)
Reference Site:	Sunmarke 19-28-11 Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4989.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 19-28-14	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 #1 (1-11-12)	Offset TVD Reference:	Offset Datum

Offset Design												Offset Site Error:	0.0ft
Survey Program: 0-MWD												Offset Well Error:	0.0ft
Reference		Offset		Semi Major Axis			Distance						
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
2,400.0	2,400.0	2,373.0	2,351.5	5.3	6.8	-107.25	-73.0	-235.1	250.9	238.9	11.96	20.985	
2,500.0	2,500.0	2,471.1	2,447.8	5.5	7.2	-107.22	-78.5	-253.2	270.2	257.6	12.57	21.493	
2,600.0	2,600.0	2,569.2	2,544.1	5.7	7.6	-107.19	-83.9	-271.4	289.5	276.3	13.19	21.950	
2,700.0	2,700.0	2,667.3	2,640.3	6.0	8.1	-107.16	-89.4	-289.5	308.8	295.0	13.81	22.363	
2,800.0	2,800.0	2,765.4	2,736.6	6.2	8.5	-107.13	-94.9	-307.7	328.1	313.7	14.43	22.739	
2,900.0	2,900.0	2,863.6	2,832.9	6.4	8.9	-107.11	-100.3	-325.8	347.5	332.4	15.05	23.081	
3,000.0	3,000.0	2,961.7	2,929.2	6.6	9.3	-107.09	-105.8	-344.0	366.8	351.1	15.68	23.395	
3,100.0	3,100.0	3,059.8	3,025.4	6.9	9.7	-107.08	-111.2	-362.1	386.1	369.8	16.30	23.682	
3,200.0	3,200.0	3,157.9	3,121.7	7.1	10.1	-107.06	-116.7	-380.3	405.4	388.5	16.93	23.948	
3,300.0	3,300.0	3,256.0	3,218.0	7.3	10.6	-107.05	-122.2	-398.4	424.7	407.2	17.56	24.193	
3,400.0	3,400.0	3,354.1	3,314.2	7.5	11.0	-107.03	-127.6	-416.6	444.0	425.9	18.18	24.421	
3,500.0	3,500.0	3,452.3	3,410.5	7.8	11.4	-107.02	-133.1	-434.7	463.4	444.5	18.81	24.632	
3,600.0	3,600.0	3,550.4	3,506.8	8.0	11.8	-107.01	-138.5	-452.9	482.7	463.2	19.44	24.830	
3,700.0	3,700.0	3,648.5	3,603.0	8.2	12.3	-107.00	-144.0	-471.0	502.0	481.9	20.07	25.014	
3,800.0	3,800.0	3,746.6	3,699.3	8.4	12.7	-106.99	-149.5	-489.2	521.3	500.6	20.70	25.186	
3,900.0	3,900.0	3,844.7	3,795.6	8.7	13.1	-106.98	-154.9	-507.3	540.6	519.3	21.33	25.348	
4,000.0	4,000.0	3,942.8	3,891.8	8.9	13.5	-106.98	-160.4	-525.4	559.9	538.0	21.96	25.500	
4,100.0	4,100.0	4,041.0	3,988.1	9.1	14.0	-106.97	-165.9	-543.6	579.2	556.7	22.59	25.643	
4,200.0	4,200.0	4,139.1	4,084.4	9.3	14.4	-106.96	-171.3	-561.7	598.6	575.3	23.22	25.778	
4,300.0	4,300.0	4,237.2	4,180.7	9.6	14.8	-106.95	-176.8	-579.9	617.9	594.0	23.85	25.906	
4,400.0	4,400.0	4,335.3	4,276.9	9.8	15.2	-106.95	-182.2	-598.0	637.2	612.7	24.48	26.027	
4,500.0	4,500.0	4,433.4	4,373.2	10.0	15.7	-106.94	-187.7	-616.2	656.5	631.4	25.11	26.141	
4,600.0	4,600.0	4,531.5	4,469.5	10.2	16.1	-106.94	-193.2	-634.3	675.8	650.1	25.75	26.250	
4,700.0	4,700.0	4,629.7	4,565.7	10.5	16.5	-106.93	-198.6	-652.5	695.1	668.8	26.38	26.353	
4,800.0	4,800.0	4,727.5	4,661.7	10.7	17.0	139.44	-204.1	-670.6	715.8	693.9	21.81	32.822	
4,900.0	4,899.8	4,824.7	4,757.1	10.8	17.4	139.40	-209.5	-688.6	739.0	716.8	22.18	33.318	
5,000.0	4,999.5	4,921.2	4,851.7	11.0	17.8	139.48	-214.9	-706.4	764.8	742.2	22.54	33.934	
5,100.0	5,098.7	5,016.7	4,945.5	11.2	18.2	139.67	-220.2	-724.1	793.2	770.3	22.88	34.667	
5,200.0	5,197.5	5,149.0	5,075.8	11.5	18.7	140.24	-226.7	-745.7	822.1	798.9	23.26	35.346	
5,300.0	5,295.6	5,283.9	5,209.6	11.7	19.0	141.01	-231.5	-761.8	849.3	825.7	23.60	35.985	
5,400.0	5,393.1	5,420.8	5,346.2	11.9	19.2	141.96	-234.6	-772.0	874.7	850.8	23.92	36.568	
5,500.0	5,489.6	5,559.7	5,484.9	12.2	19.4	143.10	-235.8	-775.9	898.4	874.2	24.22	37.091	
5,552.0	5,539.5	5,614.3	5,539.5	12.4	19.5	143.56	-235.8	-776.0	910.5	886.1	24.35	37.396	
5,600.0	5,585.4	5,660.1	5,585.4	12.5	19.6	144.07	-235.8	-776.0	922.0	897.5	24.54	37.564	
5,700.0	5,681.0	5,755.7	5,681.0	12.9	19.7	145.09	-235.8	-776.0	946.2	921.3	24.97	37.898	
5,800.0	5,776.6	5,851.4	5,776.6	13.2	19.8	146.07	-235.8	-776.0	970.7	945.3	25.40	38.215	
5,900.0	5,872.2	5,947.0	5,872.2	13.6	19.9	147.00	-235.8	-776.0	995.5	969.7	25.85	38.517	
6,000.0	5,967.8	6,042.6	5,967.8	14.0	20.1	147.88	-235.8	-776.0	1,020.5	994.2	26.30	38.806	
6,100.0	6,063.4	6,138.2	6,063.4	14.4	20.2	148.73	-235.8	-776.0	1,045.8	1,019.0	26.76	39.083	
6,200.0	6,159.0	6,233.8	6,159.0	14.8	20.3	149.53	-235.8	-776.0	1,071.2	1,044.0	27.22	39.350	
6,300.0	6,254.7	6,329.4	6,254.7	15.3	20.5	150.30	-235.8	-776.0	1,096.8	1,069.2	27.69	39.609	
6,362.4	6,314.3	6,389.1	6,314.3	15.5	20.5	150.76	-235.8	-776.0	1,112.9	1,085.0	27.99	39.767	
6,400.0	6,350.3	6,425.1	6,350.3	15.7	20.6	151.08	-235.8	-776.0	1,122.6	1,094.4	28.20	39.804	
6,500.0	6,446.3	6,521.1	6,446.3	16.1	20.7	151.87	-235.8	-776.0	1,147.2	1,118.5	28.76	39.885	
6,600.0	6,542.9	6,617.6	6,542.9	16.4	20.9	152.58	-235.8	-776.0	1,170.6	1,141.2	29.32	39.920	
6,700.0	6,639.8	6,714.6	6,639.8	16.8	21.0	153.22	-235.8	-776.0	1,192.5	1,162.6	29.88	39.913	
6,800.0	6,737.2	6,811.9	6,737.2	17.2	21.1	153.79	-235.8	-776.0	1,213.0	1,182.5	30.43	39.867	
6,900.0	6,834.9	6,909.7	6,834.9	17.5	21.3	154.31	-235.8	-776.0	1,232.0	1,201.0	30.97	39.785	
7,000.0	6,933.1	7,007.8	6,933.1	17.8	21.4	154.77	-235.8	-776.0	1,249.5	1,218.0	31.50	39.670	
7,100.0	7,031.5	7,106.2	7,031.5	18.2	21.6	155.17	-235.8	-776.0	1,265.6	1,233.6	32.02	39.524	
7,200.0	7,130.2	7,205.0	7,130.2	18.5	21.7	155.53	-235.8	-776.0	1,280.1	1,247.5	32.53	39.348	
7,300.0	7,229.2	7,303.9	7,229.2	18.8	21.9	155.85	-235.8	-776.0	1,293.0	1,260.0	33.03	39.144	

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

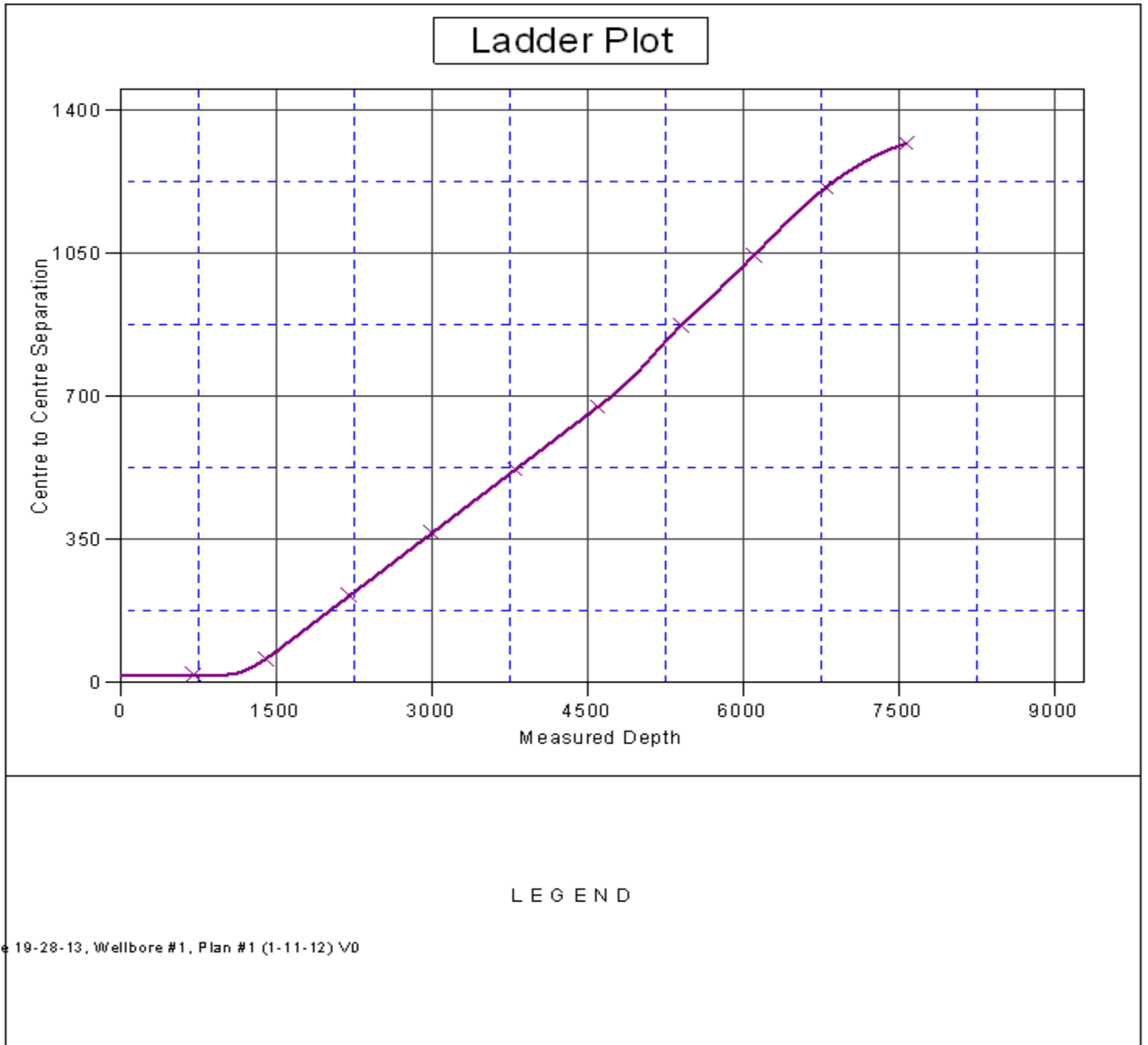
Company:	KP KAUFFMAN	Local Co-ordinate Reference:	Well Sunmarke 19-28-14
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4989.0ft (Original Well Elev)
Reference Site:	Sunmarke 19-28-11 Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4989.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 19-28-14	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 #1 (1-11-12)	Offset TVD Reference:	Offset Datum

Offset Design Sunmarke 19-28-11 Pad Sec.28-T4N-R67W - Sunmarke 19-28-13 - Wellbore #1 - Plan #1 (1-11-12)												Offset Site Error:	0.0 ft
Survey Program: 0-MWD												Offset Well Error:	0.0 ft
Reference	Offset	Semi Major Axis		Distance									
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
7,400.0	7,328.4	7,403.2	7,328.4	19.1	22.0	156.12	-235.8	-776.0	1,304.5	1,270.9	33.52	38.912	
7,500.0	7,427.8	7,502.6	7,427.8	19.3	22.2	156.35	-235.8	-776.0	1,314.3	1,280.3	34.00	38.654	
7,566.5	7,494.0	7,568.7	7,494.0	19.5	22.3	156.48	-235.8	-776.0	1,320.0	1,285.6	34.31	38.468	

Company: KP KAUFFMAN
Project: SEC.28-T4N-R67W
Reference Site: Sunmarke 19-28-11 Pad Sec.28-T4N-R67W
Site Error: 0.0ft
Reference Well: Sunmarke 19-28-14
Well Error: 0.0ft
Reference Wellbore: Wellbore #1
Reference Design: Plan #1 (1-11-12)

Local Co-ordinate Reference: Well Sunmarke 19-28-14
TVD Reference: WELL @ 4989.0ft (Original Well Elev)
MD Reference: WELL @ 4989.0ft (Original Well Elev)
North Reference: True
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Landmark
Offset TVD Reference: Offset Datum

Reference Depths are relative to WELL @ 4989.0ft (Original Well Elev) Coordinates are relative to: Sunmarke 19-28-14
 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: 0.39°



Company: KP KAUFFMAN
Project: SEC.28-T4N-R67W
Reference Site: Sunmarke 19-28-11 Pad Sec.28-T4N-R67W
Site Error: 0.0ft
Reference Well: Sunmarke 19-28-14
Well Error: 0.0ft
Reference Wellbore: Wellbore #1
Reference Design: Plan #1 (1-11-12)

Local Co-ordinate Reference: Well Sunmarke 19-28-14
TVD Reference: WELL @ 4989.0ft (Original Well Elev)
MD Reference: WELL @ 4989.0ft (Original Well Elev)
North Reference: True
Survey Calculation Method: Minimum Curvature
Output errors are at 2.00 sigma
Database: Landmark
Offset TVD Reference: Offset Datum

Reference Depths are relative to WELL @ 4989.0ft (Original Well Elev) Coordinates are relative to: Sunmarke 19-28-14
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: 0.39°

