

PETROLEUM DEVELOPMENT CORP Weld County CO

Well Name: **Alles 22S-232**

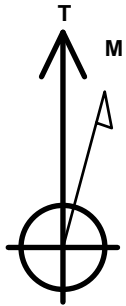
Surface Location: Alles 22S-HZ Pad Sec.22-T5N-R65W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone
Ground Elevation: 4645.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1383658.67	3239036.27	40.383370	-104.641930	

Enisgn 14 RKB - 15' WELL @ 4660.0ft (Enisgn 14 RKB - 15')

WELLBORE TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
LEASE LINE	1.0	-2074.2	-753.9	Polygon
SHL 2138'FSL & 566'FEL, Sec.22	1.0	0.0	0.0	Point
BHL 2326'FSL & 500'FEL, Sec.23	6792.0	171.8	5321.0	Point



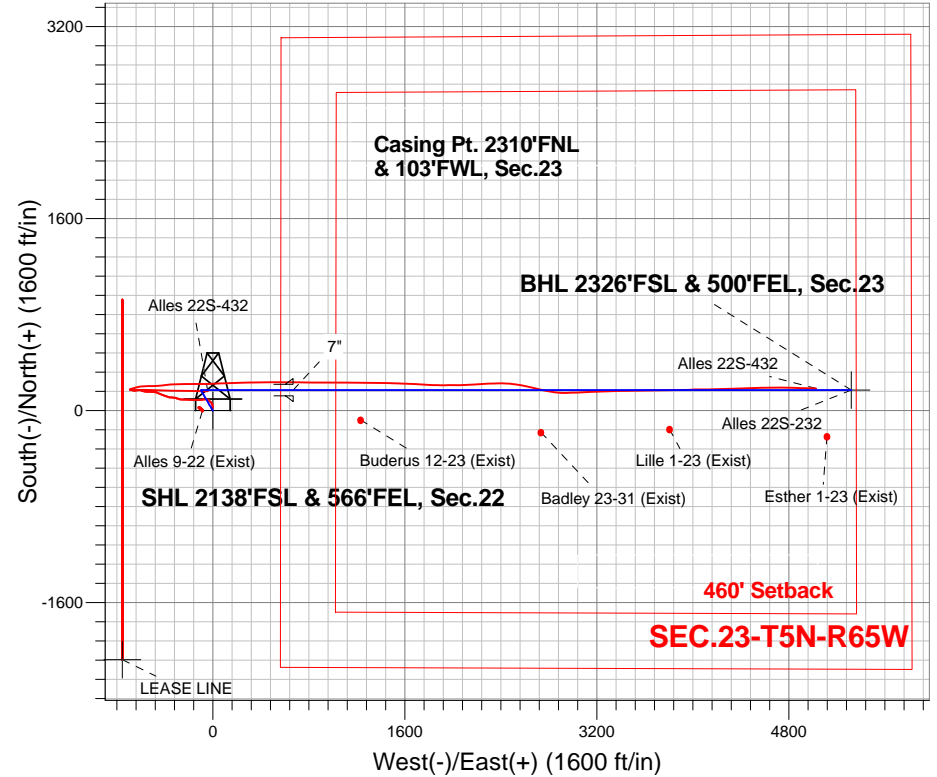
Azimuths to True North
Magnetic North: 8.42°

Magnetic Field
Strength: 52843.6snT
Dip Angle: 66.96°
Date: 3/28/2014
Model: IGRF2010

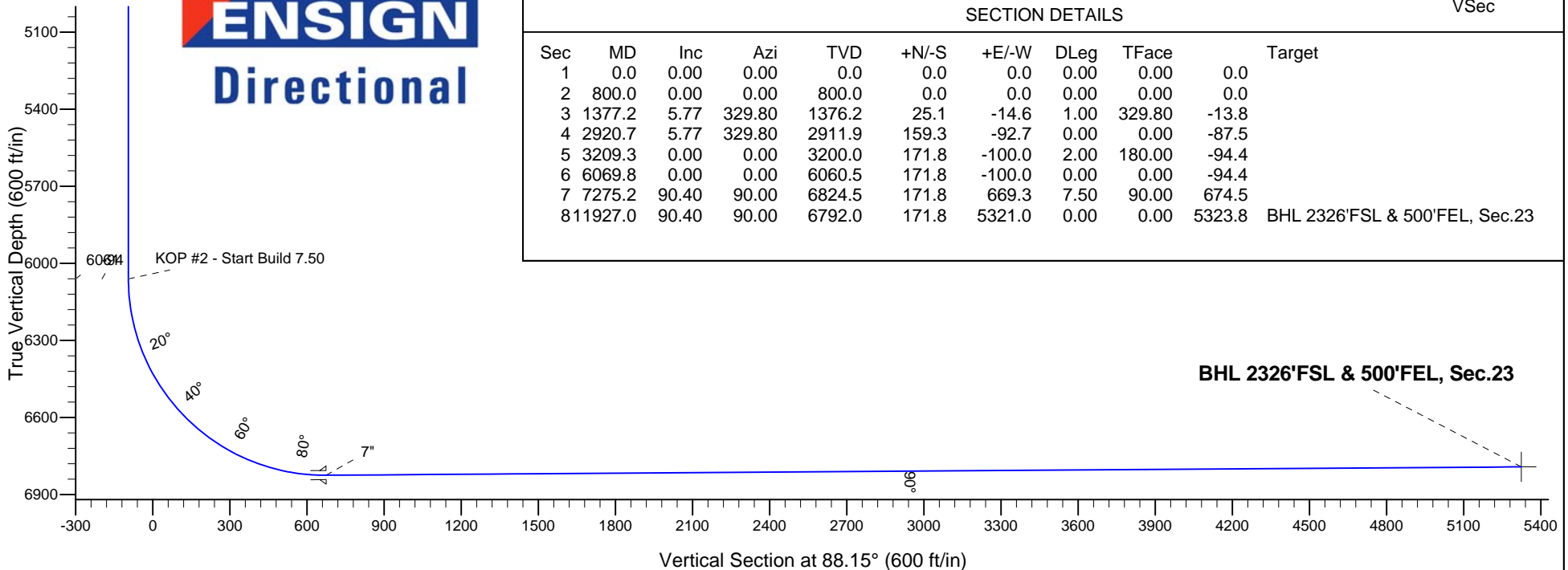
Alles 22S-HZ Pad Sec.22-T5N-R65W
Alles 22S-232
Plan #1 (3-28-14)
16:49, March 28 2014

ANNOTATIONS

TVD	MD	Annotation
800.0	800.0	KOP - Start Build 1.00
2911.9	2920.7	Start Drop -2.00
6060.5	6069.8	KOP #2 - Start Build 7.50
6792.0	11927.0	TD at 11927.0



ENSIGN
Directional



SECTION DETAILS

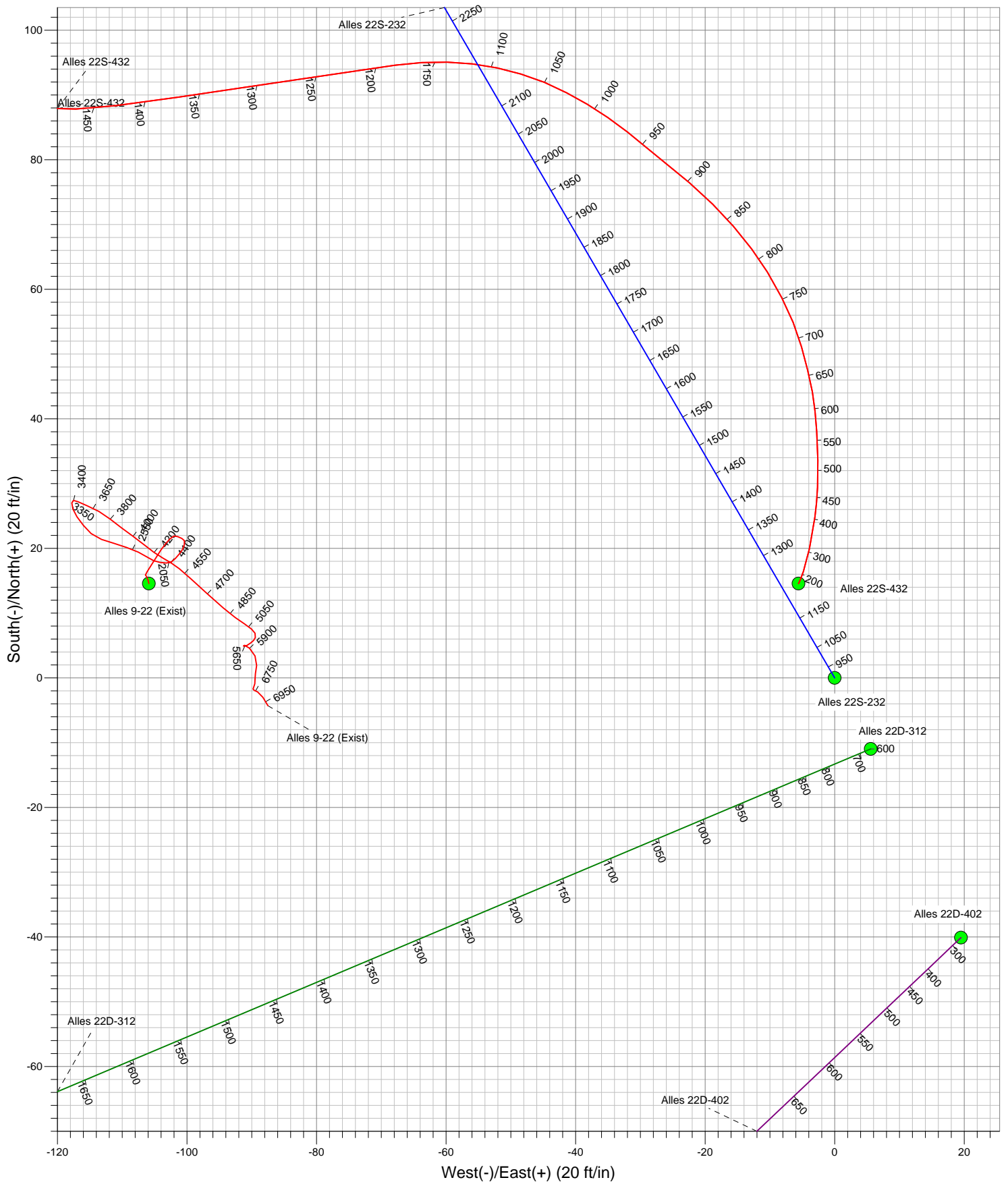
VSec

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	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	1377.2	5.77	329.80	1376.2	25.1	-14.6	1.00	329.80	-13.8
4	2920.7	5.77	329.80	2911.9	159.3	-92.7	0.00	0.00	-87.5
5	3209.3	0.00	0.00	3200.0	171.8	-100.0	2.00	180.00	-94.4
6	6069.8	0.00	0.00	6060.5	171.8	-100.0	0.00	0.00	-94.4
7	7275.2	90.40	90.00	6824.5	171.8	669.3	7.50	90.00	674.5
8	11927.0	90.40	90.00	6792.0	171.8	5321.0	0.00	0.00	5323.8 BHL 2326'FSL & 500'FEL, Sec.23



Well Name: **Alles 22S-232**
Surface Location: Alles 22S-HZ Pad Sec.22-T5N-R65W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1383658.67	3239036.27	40.383370	-104.641930	





PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.22-T5N-R65W

Alles 22S-HZ Pad Sec.22-T5N-R65W

Alles 22S-232

Wellbore #1

Plan: Plan #1 (3-28-14)

Standard Planning Report

28 March, 2014

Database:	Landmark	Local Co-ordinate Reference:	Well Alles 22S-232
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Project:	SEC.22-T5N-R65W	MD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Site:	Alles 22S-HZ Pad Sec.22-T5N-R65W	North Reference:	True
Well:	Alles 22S-232	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (3-28-14)		

Project	SEC.22-T5N-R65W, Weld County, Colorado		
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	Alles 22S-HZ Pad Sec.22-T5N-R65W		
Site Position:		Northing:	1,383,618.80 ft
From:	Lat/Long	Easting:	3,239,056.16 ft
Position Uncertainty:	0.0 ft	Slot Radius:	"
		Latitude:	40.383260
		Longitude:	-104.641860
		Grid Convergence:	0.55 °

Well	Alles 22S-232		
Well Position	+N/-S	40.1 ft	Northing:
	+E/-W	-19.5 ft	Easting:
Position Uncertainty		0.0 ft	Wellhead Elevation:
			Latitude:
			Longitude:
			Ground Level:

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	3/28/2014	8.42	66.96	52,844

Design	Plan #1 (3-28-14)			
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	88.15

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	
1,377.2	5.77	329.80	1,376.2	25.1	-14.6	1.00	1.00	0.00	329.80	
2,920.7	5.77	329.80	2,911.9	159.3	-92.7	0.00	0.00	0.00	0.00	
3,209.3	0.00	0.00	3,200.0	171.8	-100.0	2.00	-2.00	0.00	180.00	
6,069.8	0.00	0.00	6,060.5	171.8	-100.0	0.00	0.00	0.00	0.00	
7,275.2	90.40	90.00	6,824.5	171.8	669.3	7.50	7.50	0.00	90.00	
11,927.0	90.40	90.00	6,792.0	171.8	5,321.0	0.00	0.00	0.00	0.00	BHL 2326'FSL & 5C

Database:	Landmark	Local Co-ordinate Reference:	Well Alles 22S-232
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Project:	SEC.22-T5N-R65W	MD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Site:	Alles 22S-HZ Pad Sec.22-T5N-R65W	North Reference:	True
Well:	Alles 22S-232	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (3-28-14)		

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 2138'FSL & 566'FEL, Sec.22 - LEASE LINE									
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 1.00									
900.0	1.00	329.80	900.0	0.8	-0.4	-0.4	1.00	1.00	0.00
1,000.0	2.00	329.80	1,000.0	3.0	-1.8	-1.7	1.00	1.00	0.00
1,100.0	3.00	329.80	1,099.9	6.8	-3.9	-3.7	1.00	1.00	0.00
1,200.0	4.00	329.80	1,199.7	12.1	-7.0	-6.6	1.00	1.00	0.00
1,300.0	5.00	329.80	1,299.4	18.8	-11.0	-10.4	1.00	1.00	0.00
1,377.2	5.77	329.80	1,376.2	25.1	-14.6	-13.8	1.00	1.00	0.00
1,400.0	5.77	329.80	1,398.9	27.1	-15.8	-14.9	0.00	0.00	0.00
1,500.0	5.77	329.80	1,498.4	35.8	-20.8	-19.7	0.00	0.00	0.00
1,600.0	5.77	329.80	1,597.9	44.5	-25.9	-24.4	0.00	0.00	0.00
1,700.0	5.77	329.80	1,697.4	53.2	-30.9	-29.2	0.00	0.00	0.00
1,800.0	5.77	329.80	1,796.9	61.9	-36.0	-34.0	0.00	0.00	0.00
1,900.0	5.77	329.80	1,896.4	70.5	-41.1	-38.8	0.00	0.00	0.00
2,000.0	5.77	329.80	1,995.9	79.2	-46.1	-43.5	0.00	0.00	0.00
2,100.0	5.77	329.80	2,095.4	87.9	-51.2	-48.3	0.00	0.00	0.00
2,200.0	5.77	329.80	2,194.9	96.6	-56.2	-53.1	0.00	0.00	0.00
2,300.0	5.77	329.80	2,294.3	105.3	-61.3	-57.9	0.00	0.00	0.00
2,400.0	5.77	329.80	2,393.8	114.0	-66.4	-62.6	0.00	0.00	0.00
2,500.0	5.77	329.80	2,493.3	122.7	-71.4	-67.4	0.00	0.00	0.00
2,600.0	5.77	329.80	2,592.8	131.4	-76.5	-72.2	0.00	0.00	0.00
2,700.0	5.77	329.80	2,692.3	140.1	-81.5	-77.0	0.00	0.00	0.00
2,800.0	5.77	329.80	2,791.8	148.8	-86.6	-81.7	0.00	0.00	0.00
2,900.0	5.77	329.80	2,891.3	157.5	-91.6	-86.5	0.00	0.00	0.00
2,920.7	5.77	329.80	2,911.9	159.3	-92.7	-87.5	0.00	0.00	0.00
Start Drop -2.00									
3,000.0	4.19	329.80	2,990.9	165.2	-96.2	-90.8	2.00	-2.00	0.00
3,100.0	2.19	329.80	3,090.7	170.0	-99.0	-93.4	2.00	-2.00	0.00
3,200.0	0.19	329.80	3,190.7	171.8	-100.0	-94.4	2.00	-2.00	0.00
3,209.3	0.00	0.00	3,200.0	171.8	-100.0	-94.4	2.00	-2.00	0.00
3,300.0	0.00	0.00	3,290.7	171.8	-100.0	-94.4	0.00	0.00	0.00
3,400.0	0.00	0.00	3,390.7	171.8	-100.0	-94.4	0.00	0.00	0.00
3,500.0	0.00	0.00	3,490.7	171.8	-100.0	-94.4	0.00	0.00	0.00
3,600.0	0.00	0.00	3,590.7	171.8	-100.0	-94.4	0.00	0.00	0.00
3,700.0	0.00	0.00	3,690.7	171.8	-100.0	-94.4	0.00	0.00	0.00
3,800.0	0.00	0.00	3,790.7	171.8	-100.0	-94.4	0.00	0.00	0.00
3,900.0	0.00	0.00	3,890.7	171.8	-100.0	-94.4	0.00	0.00	0.00
4,000.0	0.00	0.00	3,990.7	171.8	-100.0	-94.4	0.00	0.00	0.00
4,100.0	0.00	0.00	4,090.7	171.8	-100.0	-94.4	0.00	0.00	0.00
4,200.0	0.00	0.00	4,190.7	171.8	-100.0	-94.4	0.00	0.00	0.00
4,300.0	0.00	0.00	4,290.7	171.8	-100.0	-94.4	0.00	0.00	0.00
4,400.0	0.00	0.00	4,390.7	171.8	-100.0	-94.4	0.00	0.00	0.00
4,500.0	0.00	0.00	4,490.7	171.8	-100.0	-94.4	0.00	0.00	0.00

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Site:	Alles 22S-HZ Pad Sec.22-T5N-R65W	North Reference:	True
Well:	Alles 22S-232	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (3-28-14)		

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)
4,600.0	0.00	0.00	4,590.7	171.8	-100.0	-94.4	0.00	0.00	0.00
4,700.0	0.00	0.00	4,690.7	171.8	-100.0	-94.4	0.00	0.00	0.00
4,800.0	0.00	0.00	4,790.7	171.8	-100.0	-94.4	0.00	0.00	0.00
4,900.0	0.00	0.00	4,890.7	171.8	-100.0	-94.4	0.00	0.00	0.00
5,000.0	0.00	0.00	4,990.7	171.8	-100.0	-94.4	0.00	0.00	0.00
5,100.0	0.00	0.00	5,090.7	171.8	-100.0	-94.4	0.00	0.00	0.00
5,200.0	0.00	0.00	5,190.7	171.8	-100.0	-94.4	0.00	0.00	0.00
5,300.0	0.00	0.00	5,290.7	171.8	-100.0	-94.4	0.00	0.00	0.00
5,400.0	0.00	0.00	5,390.7	171.8	-100.0	-94.4	0.00	0.00	0.00
5,500.0	0.00	0.00	5,490.7	171.8	-100.0	-94.4	0.00	0.00	0.00
5,600.0	0.00	0.00	5,590.7	171.8	-100.0	-94.4	0.00	0.00	0.00
5,700.0	0.00	0.00	5,690.7	171.8	-100.0	-94.4	0.00	0.00	0.00
5,800.0	0.00	0.00	5,790.7	171.8	-100.0	-94.4	0.00	0.00	0.00
5,900.0	0.00	0.00	5,890.7	171.8	-100.0	-94.4	0.00	0.00	0.00
6,000.0	0.00	0.00	5,990.7	171.8	-100.0	-94.4	0.00	0.00	0.00
6,069.8	0.00	0.00	6,060.5	171.8	-100.0	-94.4	0.00	0.00	0.00
KOP #2 - Start Build 7.50									
6,100.0	2.26	90.00	6,090.7	171.8	-99.4	-93.8	7.49	7.49	0.00
6,200.0	9.76	90.00	6,190.1	171.8	-88.9	-83.3	7.50	7.50	0.00
6,300.0	17.26	90.00	6,287.2	171.8	-65.6	-60.0	7.50	7.50	0.00
6,400.0	24.76	90.00	6,380.5	171.8	-29.8	-24.2	7.50	7.50	0.00
6,500.0	32.26	90.00	6,468.3	171.8	17.9	23.5	7.50	7.50	0.00
6,600.0	39.76	90.00	6,549.2	171.8	76.7	82.2	7.50	7.50	0.00
6,700.0	47.26	90.00	6,621.6	171.8	145.5	151.0	7.50	7.50	0.00
6,800.0	54.76	90.00	6,684.5	171.8	223.2	228.6	7.50	7.50	0.00
6,900.0	62.26	90.00	6,736.7	171.8	308.4	313.8	7.50	7.50	0.00
7,000.0	69.76	90.00	6,777.3	171.8	399.7	405.0	7.50	7.50	0.00
7,100.0	77.26	90.00	6,805.7	171.8	495.5	500.8	7.50	7.50	0.00
7,200.0	84.76	90.00	6,821.3	171.8	594.2	599.4	7.50	7.50	0.00
7,275.2	90.40	90.00	6,824.5	171.8	669.3	674.5	7.50	7.50	0.00
7"									
7,300.0	90.40	90.00	6,824.3	171.8	694.1	699.3	0.00	0.00	0.00
7,400.0	90.40	90.00	6,823.6	171.8	794.1	799.2	0.00	0.00	0.00
7,500.0	90.40	90.00	6,822.9	171.8	894.1	899.2	0.00	0.00	0.00
7,600.0	90.40	90.00	6,822.2	171.8	994.1	999.1	0.00	0.00	0.00
7,700.0	90.40	90.00	6,821.5	171.8	1,094.1	1,099.1	0.00	0.00	0.00
7,800.0	90.40	90.00	6,820.8	171.8	1,194.1	1,199.0	0.00	0.00	0.00
7,900.0	90.40	90.00	6,820.1	171.8	1,294.1	1,299.0	0.00	0.00	0.00
8,000.0	90.40	90.00	6,819.4	171.8	1,394.1	1,398.9	0.00	0.00	0.00
8,100.0	90.40	90.00	6,818.7	171.8	1,494.1	1,498.9	0.00	0.00	0.00
8,200.0	90.40	90.00	6,818.0	171.8	1,594.1	1,598.8	0.00	0.00	0.00
8,300.0	90.40	90.00	6,817.3	171.8	1,694.1	1,698.7	0.00	0.00	0.00
8,400.0	90.40	90.00	6,816.6	171.8	1,794.1	1,798.7	0.00	0.00	0.00
8,500.0	90.40	90.00	6,815.9	171.8	1,894.1	1,898.6	0.00	0.00	0.00
8,600.0	90.40	90.00	6,815.2	171.8	1,994.1	1,998.6	0.00	0.00	0.00
8,700.0	90.40	90.00	6,814.5	171.8	2,094.1	2,098.5	0.00	0.00	0.00
8,800.0	90.40	90.00	6,813.8	171.8	2,194.1	2,198.5	0.00	0.00	0.00
8,900.0	90.40	90.00	6,813.1	171.8	2,294.1	2,298.4	0.00	0.00	0.00
9,000.0	90.40	90.00	6,812.4	171.8	2,394.1	2,398.4	0.00	0.00	0.00
9,100.0	90.40	90.00	6,811.7	171.8	2,494.1	2,498.3	0.00	0.00	0.00
9,200.0	90.40	90.00	6,811.0	171.8	2,594.1	2,598.3	0.00	0.00	0.00
9,300.0	90.40	90.00	6,810.3	171.8	2,694.1	2,698.2	0.00	0.00	0.00
9,400.0	90.40	90.00	6,809.6	171.8	2,794.1	2,798.1	0.00	0.00	0.00

Database:	Landmark	Local Co-ordinate Reference:	Well Alles 22S-232
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Project:	SEC.22-T5N-R65W	MD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Site:	Alles 22S-HZ Pad Sec.22-T5N-R65W	North Reference:	True
Well:	Alles 22S-232	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (3-28-14)		

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)
9,500.0	90.40	90.00	6,808.9	171.8	2,894.1	2,898.1	0.00	0.00	0.00
9,600.0	90.40	90.00	6,808.2	171.8	2,994.0	2,998.0	0.00	0.00	0.00
9,700.0	90.40	90.00	6,807.5	171.8	3,094.0	3,098.0	0.00	0.00	0.00
9,800.0	90.40	90.00	6,806.8	171.8	3,194.0	3,197.9	0.00	0.00	0.00
9,900.0	90.40	90.00	6,806.2	171.8	3,294.0	3,297.9	0.00	0.00	0.00
10,000.0	90.40	90.00	6,805.5	171.8	3,394.0	3,397.8	0.00	0.00	0.00
10,100.0	90.40	90.00	6,804.8	171.8	3,494.0	3,497.8	0.00	0.00	0.00
10,200.0	90.40	90.00	6,804.1	171.8	3,594.0	3,597.7	0.00	0.00	0.00
10,300.0	90.40	90.00	6,803.4	171.8	3,694.0	3,697.7	0.00	0.00	0.00
10,400.0	90.40	90.00	6,802.7	171.8	3,794.0	3,797.6	0.00	0.00	0.00
10,500.0	90.40	90.00	6,802.0	171.8	3,894.0	3,897.5	0.00	0.00	0.00
10,600.0	90.40	90.00	6,801.3	171.8	3,994.0	3,997.5	0.00	0.00	0.00
10,700.0	90.40	90.00	6,800.6	171.8	4,094.0	4,097.4	0.00	0.00	0.00
10,800.0	90.40	90.00	6,799.9	171.8	4,194.0	4,197.4	0.00	0.00	0.00
10,900.0	90.40	90.00	6,799.2	171.8	4,294.0	4,297.3	0.00	0.00	0.00
11,000.0	90.40	90.00	6,798.5	171.8	4,394.0	4,397.3	0.00	0.00	0.00
11,100.0	90.40	90.00	6,797.8	171.8	4,494.0	4,497.2	0.00	0.00	0.00
11,200.0	90.40	90.00	6,797.1	171.8	4,594.0	4,597.2	0.00	0.00	0.00
11,300.0	90.40	90.00	6,796.4	171.8	4,694.0	4,697.1	0.00	0.00	0.00
11,400.0	90.40	90.00	6,795.7	171.8	4,794.0	4,797.1	0.00	0.00	0.00
11,500.0	90.40	90.00	6,795.0	171.8	4,894.0	4,897.0	0.00	0.00	0.00
11,600.0	90.40	90.00	6,794.3	171.8	4,994.0	4,996.9	0.00	0.00	0.00
11,700.0	90.40	90.00	6,793.6	171.8	5,094.0	5,096.9	0.00	0.00	0.00
11,800.0	90.40	90.00	6,792.9	171.8	5,194.0	5,196.8	0.00	0.00	0.00
11,900.0	90.40	90.00	6,792.2	171.8	5,294.0	5,296.8	0.00	0.00	0.00
11,927.0	90.40	90.00	6,792.0	171.8	5,321.0	5,323.8	0.00	0.00	0.00
TD at 11927.0 - BHL 2326'FSL & 500'FEL, Sec.23									

Casing Points

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
7,275.2	6,824.5	7"	7	7-1/2

Plan Annotations

	Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
			+N-S (ft)	+E-W (ft)	
	800.0	800.0	0.0	0.0	KOP - Start Build 1.00
	2,920.7	2,911.9	25.1	-14.6	Start Drop -2.00
	6,069.8	6,060.5	159.3	-92.7	KOP #2 - Start Build 7.50
	11,927.0	6,792.0	171.8	-100.0	TD at 11927.0



PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.22-T5N-R65W

Alles 22S-HZ Pad Sec.22-T5N-R65W

Alles 22S-232

Wellbore #1

Plan #1 (3-28-14)

Anticollision Report

28 March, 2014



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Alles 22S-232
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Reference Site:	Alles 22S-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Alles 22S-232	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 (3-28-14)	Offset TVD Reference:	Offset Datum

Reference	Plan #1 (3-28-14)
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria
Interpolation Method:	MD Interval 100.0ft
Depth Range:	Unlimited
Results Limited by:	Maximum center-center distance of 1,000.0ft
Warning Levels Evaluated at:	2.00 Sigma
Error Model:	ISCWSA
Scan Method:	Closest Approach 3D
Error Surface:	Elliptical Conic

Survey Tool Program		Date	3/28/2014		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
0.0	11,927.4	Plan #1 (3-28-14) (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						
Alles 22S-HZ Pad Sec.22-T5N-R65W						
Alles 22D-312 - Wellbore #1 - Plan #2 (3-20-14)R	671.2	671.2	12.3	9.5	4.407	CC
Alles 22D-312 - Wellbore #1 - Plan #2 (3-20-14)R	700.0	700.0	12.3	9.4	4.228	ES
Alles 22D-312 - Wellbore #1 - Plan #2 (3-20-14)R	11,927.9	12,664.0	498.1	189.9	1.616	SF
Alles 22D-402 - Wellbore #1 - Plan #1 (5-16-13)	200.0	200.0	44.6	43.9	66.105	CC, ES
Alles 22D-402 - Wellbore #1 - Plan #1 (5-16-13)	11,927.9	12,773.4	921.3	615.8	3.016	SF
Alles 22S-432 - Wellbore #1 - Wellbore #1	0.0	0.0	15.6	15.6	10,000.000	CC
Alles 22S-432 - Wellbore #1 - Wellbore #1	100.0	100.0	15.7	15.5	70.000	ES
Alles 22S-432 - Wellbore #1 - Wellbore #1	400.0	398.8	24.6	23.1	15.849	SF
Alles 22S-432 - Wellbore #2 - Wellbore #2	0.0	0.0	15.6	15.6	10,000.000	CC
Alles 22S-432 - Wellbore #2 - Wellbore #2	100.0	100.0	15.7	15.5	70.000	ES
Alles 22S-432 - Wellbore #2 - Wellbore #2	11,626.1	12,379.0	167.9	86.9	2.074	SF
Lofland 22T & Alles 22S-HZ Existing Wells						
Alles 9-22 (Exist) - Wellbore #1 - Wellbore #1	1,711.4	1,709.3	77.3	70.1	10.707	CC, ES
Alles 9-22 (Exist) - Wellbore #1 - Wellbore #1	6,300.0	6,287.6	173.6	148.6	6.943	SF
Badley 23-31 (Exist) - Wellbore #1 - Wellbore #1	9,339.7	6,808.5	350.2	136.6	1.640	CC, ES, SF
Buderus 12-23 (Exist) - Wellbore #1 - Wellbore #1	7,838.1	6,819.3	248.3	74.8	1.431	Level 3, CC, ES, SF
Esther 1-23 (Exist) - Wellbore #1 - Wellbore #1	11,724.6	6,789.5	386.2	106.8	1.382	Level 3, CC, ES, SF
Lille 1-23 (Exist) - Wellbore #1 - Wellbore #1	10,412.4	6,800.8	324.5	81.4	1.335	Level 3, CC, ES, SF

Offset Design	Alles 22S-HZ Pad Sec.22-T5N-R65W - Alles 22D-312 - Wellbore #1 - Plan #2 (3-20-14)R											Offset Site Error:	0.0ft
Survey Program:	0-MWD											Offset Well Error:	0.0ft
Reference	Offset	Semi Major Axis		Distance		Minimum Separation		Warning					
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
0.0	0.0	0.0	0.0	0.0	0.0	153.02	-10.9	5.6	12.3	12.3	0.00	N/A	
100.0	100.0	100.0	100.0	0.1	0.1	153.02	-10.9	5.6	12.3	12.1	0.22	54.645	
200.0	200.0	200.0	200.0	0.3	0.3	153.02	-10.9	5.6	12.3	11.6	0.67	18.215	
300.0	300.0	300.0	300.0	0.6	0.6	153.02	-10.9	5.6	12.3	11.2	1.12	10.929	
400.0	400.0	400.0	400.0	0.8	0.8	153.02	-10.9	5.6	12.3	10.7	1.57	7.806	
500.0	500.0	500.0	500.0	1.0	1.0	153.02	-10.9	5.6	12.3	10.3	2.02	6.072	
600.0	600.0	600.0	600.0	1.2	1.2	153.02	-10.9	5.6	12.3	9.8	2.47	4.968	
671.2	671.2	671.2	671.2	1.4	1.4	157.15	-11.3	4.8	12.3	9.5	2.78	4.407	CC

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

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Alles 22S-232
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Reference Site:	Alles 22S-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Alles 22S-232	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 (3-28-14)	Offset TVD Reference:	Offset Datum

Offset Design Alles 22S-HZ Pad Sec.22-T5N-R65W - Alles 22D-312 - Wellbore #1 - Plan #2 (3-20-14)R													Offset Site Error:	0.0 ft
Survey Program: 0-MWDD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
700.0	700.0	700.0	700.0	1.5	1.4	161.17		-11.6	4.0	12.3	9.4	2.90	4.228 ES	
800.0	800.0	799.7	799.6	1.7	1.6	-176.47		-13.6	-0.8	13.7	10.4	3.33	4.109	
900.0	900.0	899.0	898.5	1.9	1.9	-124.53		-17.0	-8.8	19.7	15.9	3.77	5.222	
1,000.0	1,000.0	997.6	996.3	2.1	2.1	-113.36		-21.6	-19.8	30.8	26.6	4.21	7.304	
1,100.0	1,099.9	1,095.8	1,093.4	2.4	2.4	-108.48		-27.5	-33.6	45.8	41.1	4.67	9.795	
1,200.0	1,199.7	1,194.5	1,190.8	2.6	2.7	-107.26		-33.5	-48.0	61.9	56.8	5.13	12.065	
1,300.0	1,299.4	1,293.1	1,288.2	2.8	3.0	-107.72		-39.6	-62.3	78.6	73.0	5.61	14.013	
1,400.0	1,398.9	1,391.5	1,385.4	3.1	3.4	-108.97		-45.6	-76.7	95.8	89.7	6.10	15.695	
1,500.0	1,498.4	1,490.0	1,482.6	3.3	3.7	-110.18		-51.7	-91.0	113.2	106.6	6.61	17.119	
1,600.0	1,597.9	1,588.4	1,579.8	3.6	4.1	-111.06		-57.7	-105.4	130.7	123.6	7.13	18.320	
1,700.0	1,697.4	1,686.9	1,677.0	3.8	4.4	-111.74		-63.7	-119.7	148.2	140.5	7.66	19.343	
1,800.0	1,796.9	1,785.3	1,774.2	4.1	4.8	-112.28		-69.8	-134.1	165.7	157.5	8.19	20.222	
1,900.0	1,896.4	1,883.8	1,871.4	4.4	5.1	-112.71		-75.8	-148.4	183.2	174.5	8.73	20.984	
2,000.0	1,995.9	1,982.2	1,968.6	4.7	5.5	-113.07		-81.9	-162.7	200.7	191.5	9.27	21.650	
2,100.0	2,095.4	2,080.7	2,065.8	4.9	5.9	-113.36		-87.9	-177.1	218.3	208.5	9.82	22.235	
2,200.0	2,194.9	2,179.1	2,163.1	5.2	6.2	-113.62		-94.0	-191.4	235.8	225.5	10.36	22.754	
2,300.0	2,294.3	2,277.5	2,260.3	5.5	6.6	-113.84		-100.0	-205.8	253.4	242.4	10.91	23.216	
2,400.0	2,393.8	2,376.0	2,357.5	5.8	7.0	-114.03		-106.1	-220.1	270.9	259.4	11.46	23.630	
2,500.0	2,493.3	2,474.4	2,454.7	6.0	7.3	-114.20		-112.1	-234.5	288.5	276.4	12.02	24.003	
2,600.0	2,592.8	2,572.9	2,551.9	6.3	7.7	-114.35		-118.1	-248.8	306.0	293.4	12.57	24.340	
2,700.0	2,692.3	2,671.3	2,649.1	6.6	8.1	-114.48		-124.2	-263.1	323.6	310.4	13.13	24.647	
2,800.0	2,791.8	2,769.8	2,746.3	6.9	8.4	-114.60		-130.2	-277.5	341.1	327.4	13.68	24.927	
2,900.0	2,891.3	2,868.2	2,843.5	7.2	8.8	-114.71		-136.3	-291.8	358.7	344.4	14.24	25.183	
3,000.0	2,990.9	2,966.7	2,940.8	7.4	9.2	-114.90		-142.3	-306.2	375.8	361.0	14.78	25.419	
3,100.0	3,090.7	3,065.4	3,038.2	7.6	9.6	-114.68		-148.4	-320.6	391.5	376.2	15.25	25.662	
3,200.0	3,190.7	3,164.2	3,135.8	7.8	9.9	-114.01		-154.5	-334.9	405.8	390.1	15.69	25.865	
3,300.0	3,290.7	3,262.9	3,233.3	8.0	10.3	-143.12		-160.5	-349.3	419.4	402.4	17.04	24.618	
3,400.0	3,390.7	3,361.7	3,330.8	8.2	10.7	-142.07		-166.6	-363.7	433.2	415.6	17.63	24.569	
3,500.0	3,490.7	3,460.4	3,428.3	8.4	11.0	-141.08		-172.6	-378.1	447.1	428.9	18.23	24.527	
3,600.0	3,590.7	3,559.2	3,525.8	8.6	11.4	-140.16		-178.7	-392.5	461.1	442.3	18.83	24.493	
3,700.0	3,690.7	3,657.9	3,623.3	8.8	11.8	-139.28		-184.8	-406.9	475.3	455.8	19.43	24.465	
3,800.0	3,790.7	3,756.7	3,720.8	9.0	12.2	-138.46		-190.8	-421.3	489.5	469.5	20.03	24.442	
3,900.0	3,890.7	3,855.4	3,818.3	9.2	12.5	-137.69		-196.9	-435.7	503.8	483.2	20.63	24.424	
4,000.0	3,990.7	3,954.1	3,915.8	9.4	12.9	-136.95		-203.0	-450.0	518.3	497.0	21.23	24.410	
4,100.0	4,090.7	4,052.9	4,013.3	9.6	13.3	-136.26		-209.0	-464.4	532.8	510.9	21.83	24.400	
4,200.0	4,190.7	4,151.6	4,110.8	9.8	13.7	-135.60		-215.1	-478.8	547.3	524.9	22.44	24.393	
4,300.0	4,290.7	4,250.4	4,208.3	10.0	14.0	-134.98		-221.1	-493.2	562.0	538.9	23.04	24.389	
4,400.0	4,390.7	4,349.1	4,305.8	10.2	14.4	-134.39		-227.2	-507.6	576.7	553.0	23.65	24.387	
4,500.0	4,490.7	4,447.8	4,403.3	10.4	14.8	-133.83		-233.3	-522.0	591.4	567.2	24.25	24.388	
4,600.0	4,590.7	4,546.6	4,500.8	10.6	15.2	-133.30		-239.3	-536.4	606.2	581.4	24.86	24.390	
4,700.0	4,690.7	4,645.3	4,598.3	10.8	15.5	-132.79		-245.4	-550.7	621.1	595.6	25.46	24.394	
4,800.0	4,790.7	4,744.1	4,695.8	11.0	15.9	-132.30		-251.5	-565.1	636.0	609.9	26.07	24.400	
4,900.0	4,890.7	4,842.8	4,793.3	11.3	16.3	-131.84		-257.5	-579.5	651.0	624.3	26.67	24.407	
5,000.0	4,990.7	4,941.6	4,890.8	11.5	16.7	-131.40		-263.6	-593.9	665.9	638.7	27.28	24.414	
5,100.0	5,090.7	5,040.3	4,988.3	11.7	17.0	-130.97		-269.6	-608.3	681.0	653.1	27.88	24.423	
5,200.0	5,190.7	5,139.0	5,085.8	11.9	17.4	-130.57		-275.7	-622.7	696.0	667.5	28.49	24.433	
5,300.0	5,290.7	5,237.8	5,183.3	12.1	17.8	-130.18		-281.8	-637.1	711.1	682.0	29.09	24.443	
5,400.0	5,390.7	5,336.5	5,280.8	12.3	18.2	-129.81		-287.8	-651.4	726.3	696.6	29.70	24.454	
5,500.0	5,490.7	5,445.7	5,388.6	12.5	18.6	-129.43		-294.4	-667.1	741.2	710.9	30.31	24.450	
5,600.0	5,590.7	5,578.1	5,520.1	12.8	18.9	-129.08		-300.6	-681.8	752.8	721.9	30.88	24.374	
5,700.0	5,690.7	5,711.8	5,653.3	13.0	19.2	-128.87		-304.5	-691.0	759.9	728.6	31.36	24.229	

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

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Alles 22S-232
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Reference Site:	Alles 22S-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Alles 22S-232	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 (3-28-14)	Offset TVD Reference:	Offset Datum

Offset Design												Offset Site Error:	0.0 ft
Survey Program: 0-MWD												Offset Well Error:	0.0 ft
Alles 22S-HZ Pad Sec.22-T5N-R65W - Alles 22D-312 - Wellbore #1 - Plan #2 (3-20-14)R													
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Distance		Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)		Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)					
5,800.0	5,790.7	5,846.0	5,787.5	13.2	19.3	-128.79	-305.9	-694.4	762.6	730.8	31.78	23.994	
5,900.0	5,890.7	5,949.2	5,890.7	13.4	19.5	-128.79	-305.9	-694.4	762.6	730.5	32.14	23.727	
6,000.0	5,990.7	6,049.2	5,990.7	13.6	19.6	-128.79	-305.9	-694.4	762.6	730.1	32.50	23.467	
6,047.3	6,038.0	6,096.5	6,038.0	13.7	19.7	141.23	-305.9	-694.4	763.0	734.8	28.17	27.085	
6,100.0	6,090.7	6,149.2	6,090.7	13.8	19.7	141.22	-305.9	-694.4	763.1	734.7	28.35	26.920	
6,200.0	6,190.1	6,381.5	6,321.6	14.0	19.9	141.49	-306.0	-675.8	768.0	739.6	28.49	26.955	
6,300.0	6,287.3	6,802.4	6,687.0	14.1	19.2	136.93	-306.6	-477.9	747.3	718.7	28.56	26.166	
6,400.0	6,380.6	7,092.1	6,851.8	14.3	19.6	129.09	-307.3	-241.7	704.5	674.7	29.82	23.629	
6,500.0	6,468.5	7,284.1	6,907.3	14.4	21.2	121.87	-307.8	-58.5	654.5	622.2	32.30	20.262	
6,600.0	6,549.4	7,422.8	6,918.0	14.7	23.1	115.87	-308.2	79.7	605.3	570.1	35.15	17.218	
6,700.0	6,621.9	7,490.9	6,917.0	15.3	24.2	114.08	-308.4	147.7	563.7	526.9	36.82	15.311	
6,800.0	6,684.9	7,567.6	6,915.9	16.1	25.6	111.32	-308.7	224.4	533.1	493.9	39.26	13.581	
6,900.0	6,737.1	7,652.0	6,914.7	17.2	27.2	108.04	-308.9	308.8	512.5	470.0	42.43	12.079	
7,000.0	6,777.9	7,742.6	6,913.4	18.6	29.1	104.79	-309.2	399.4	499.7	453.5	46.18	10.821	
7,100.0	6,806.3	7,838.0	6,912.1	20.3	31.1	102.09	-309.4	494.8	492.7	442.4	50.32	9.793	
7,200.0	6,822.0	7,936.4	6,910.7	22.2	33.3	100.39	-309.7	593.2	489.6	435.0	54.68	8.955	
7,282.3	6,826.3	8,018.5	6,909.5	23.9	35.3	99.80	-310.0	675.3	488.9	430.6	58.35	8.379	
7,300.0	6,825.1	8,036.3	6,909.2	24.3	35.7	99.90	-310.0	693.1	489.1	430.0	59.12	8.274	
7,400.0	6,824.4	8,136.3	6,907.8	26.5	38.1	99.81	-310.3	793.1	489.3	425.6	63.67	7.684	
7,500.0	6,823.7	8,236.3	6,906.4	28.8	40.5	99.73	-310.6	893.1	489.5	421.1	68.39	7.157	
7,600.0	6,823.0	8,336.3	6,904.9	31.2	43.0	99.64	-310.9	993.0	489.6	416.4	73.23	6.686	
7,700.0	6,822.3	8,436.3	6,903.5	33.6	45.6	99.55	-311.2	1,093.0	489.8	411.6	78.17	6.266	
7,800.0	6,821.5	8,536.3	6,902.1	36.2	48.1	99.46	-311.5	1,193.0	490.0	406.8	83.20	5.889	
7,900.0	6,820.8	8,636.3	6,900.7	38.7	50.7	99.37	-311.8	1,293.0	490.1	401.9	88.30	5.551	
8,000.0	6,820.1	8,736.3	6,899.2	41.3	53.3	99.29	-312.1	1,393.0	490.3	396.9	93.45	5.247	
8,100.0	6,819.4	8,836.3	6,897.8	43.9	56.0	99.20	-312.4	1,493.0	490.5	391.8	98.65	4.972	
8,200.0	6,818.7	8,936.3	6,896.4	46.5	58.6	99.11	-312.7	1,593.0	490.7	386.8	103.89	4.723	
8,300.0	6,818.0	9,036.3	6,894.9	49.2	61.3	99.02	-313.0	1,692.9	490.9	381.7	109.17	4.496	
8,400.0	6,817.2	9,136.3	6,893.5	51.8	64.0	98.93	-313.3	1,792.9	491.0	376.6	114.48	4.289	
8,500.0	6,816.5	9,236.3	6,892.1	54.5	66.7	98.85	-313.6	1,892.9	491.2	371.4	119.82	4.100	
8,600.0	6,815.8	9,336.2	6,890.6	57.2	69.4	98.76	-313.9	1,992.9	491.4	366.2	125.18	3.926	
8,700.0	6,815.1	9,436.2	6,889.2	59.9	72.1	98.67	-314.2	2,092.9	491.6	361.0	130.56	3.765	
8,800.0	6,814.4	9,536.2	6,887.8	62.6	74.8	98.58	-314.4	2,192.9	491.8	355.8	135.96	3.617	
8,900.0	6,813.7	9,636.2	6,886.3	65.4	77.5	98.49	-314.7	2,292.9	491.9	350.6	141.37	3.480	
9,000.0	6,813.0	9,736.2	6,884.9	68.1	80.2	98.41	-315.0	2,392.8	492.1	345.3	146.80	3.352	
9,100.0	6,812.2	9,836.2	6,883.5	70.8	82.9	98.32	-315.3	2,492.8	492.3	340.1	152.25	3.234	
9,200.0	6,811.5	9,936.2	6,882.0	73.6	85.7	98.23	-315.6	2,592.8	492.5	334.8	157.70	3.123	
9,300.0	6,810.8	10,036.2	6,880.6	76.3	88.4	98.15	-315.9	2,692.8	492.7	329.5	163.17	3.019	
9,400.0	6,810.1	10,136.2	6,879.2	79.1	91.2	98.06	-316.2	2,792.8	492.9	324.2	168.65	2.923	
9,500.0	6,809.4	10,236.2	6,877.8	81.8	93.9	97.97	-316.5	2,892.8	493.1	318.9	174.14	2.832	
9,600.0	6,808.7	10,336.2	6,876.3	84.6	96.7	97.88	-316.8	2,992.8	493.3	313.6	179.63	2.746	
9,700.0	6,807.9	10,436.2	6,874.9	87.3	99.4	97.80	-317.1	3,092.8	493.5	308.3	185.14	2.665	
9,800.0	6,807.2	10,536.2	6,873.5	90.1	102.2	97.71	-317.4	3,192.7	493.7	303.0	190.65	2.589	
9,900.0	6,806.5	10,636.2	6,872.0	92.9	104.9	97.62	-317.7	3,292.7	493.9	297.7	196.17	2.517	
10,000.0	6,805.8	10,736.2	6,870.6	95.6	107.7	97.54	-318.0	3,392.7	494.1	292.4	201.70	2.450	
10,100.0	6,805.1	10,836.2	6,869.2	98.4	110.5	97.45	-318.3	3,492.7	494.3	287.0	207.23	2.385	
10,200.0	6,804.4	10,936.2	6,867.7	101.2	113.2	97.36	-318.6	3,592.7	494.5	281.7	212.76	2.324	
10,300.0	6,803.6	11,036.2	6,866.3	104.0	116.0	97.28	-318.9	3,692.7	494.7	276.3	218.31	2.266	
10,400.0	6,802.9	11,136.2	6,864.9	106.7	118.8	97.19	-319.2	3,792.7	494.9	271.0	223.85	2.211	
10,500.0	6,802.2	11,236.2	6,863.4	109.5	121.5	97.10	-319.5	3,892.6	495.1	265.7	229.41	2.158	
10,600.0	6,801.5	11,336.2	6,862.0	112.3	124.3	97.02	-319.7	3,992.6	495.3	260.3	234.96	2.108	

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

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Alles 22S-232
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Reference Site:	Alles 22S-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Alles 22S-232	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 (3-28-14)	Offset TVD Reference:	Offset Datum

Offset Design Alles 22S-HZ Pad Sec.22-T5N-R65W - Alles 22D-312 - Wellbore #1 - Plan #2 (3-20-14)R												Offset Site Error:	0.0 ft
Survey Program: 0-MWD												Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Distance		Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)		Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)					
10,700.0	6,800.8	11,436.2	6,860.6	115.1	127.1	96.93	-320.0	4,092.6	495.5	254.9	240.52	2.060	
10,800.0	6,800.1	11,536.2	6,859.2	117.9	129.9	96.84	-320.3	4,192.6	495.7	249.6	246.09	2.014	
10,900.0	6,799.4	11,636.2	6,857.7	120.6	132.6	96.76	-320.6	4,292.6	495.9	244.2	251.66	1.970	
11,000.0	6,798.6	11,736.2	6,856.3	123.4	135.4	96.67	-320.9	4,392.6	496.1	238.9	257.23	1.929	
11,100.0	6,797.9	11,836.2	6,854.9	126.2	138.2	96.59	-321.2	4,492.6	496.3	233.5	262.80	1.888	
11,200.0	6,797.2	11,936.2	6,853.4	129.0	141.0	96.50	-321.5	4,592.5	496.5	228.1	268.38	1.850	
11,300.0	6,796.5	12,036.2	6,852.0	131.8	143.8	96.41	-321.8	4,692.5	496.7	222.8	273.96	1.813	
11,400.0	6,795.8	12,136.2	6,850.6	134.6	146.6	96.33	-322.1	4,792.5	496.9	217.4	279.55	1.778	
11,500.0	6,795.1	12,236.2	6,849.1	137.4	149.3	96.24	-322.4	4,892.5	497.2	212.0	285.14	1.744	
11,600.0	6,794.3	12,336.2	6,847.7	140.2	152.1	96.16	-322.7	4,992.5	497.4	206.6	290.73	1.711	
11,700.0	6,793.6	12,436.2	6,846.3	142.9	154.9	96.07	-323.0	5,092.5	497.6	201.3	296.32	1.679	
11,800.0	6,792.9	12,536.2	6,844.8	145.7	157.7	95.99	-323.3	5,192.5	497.8	195.9	301.91	1.649	
11,900.0	6,792.2	12,636.1	6,843.4	148.5	160.1	95.90	-323.6	5,292.4	498.0	190.9	307.15	1.621	
11,927.9	6,792.0	12,664.0	6,843.0	149.0	160.6	95.88	-323.7	5,320.3	498.1	189.9	308.15	1.616 SF	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Alles 22S-232
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Reference Site:	Alles 22S-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Alles 22S-232	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 (3-28-14)	Offset TVD Reference:	Offset Datum

Offset Design Alles 22S-HZ Pad Sec.22-T5N-R65W - Alles 22D-402 - Wellbore #1 - Plan #1 (5-16-13)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	154.06	154.06	-40.1	19.5	44.6				
100.0	100.0	100.0	100.0	0.1	0.1	154.06	154.06	-40.1	19.5	44.6	44.3	0.22	198.316	
200.0	200.0	200.0	200.0	0.3	0.3	154.06	154.06	-40.1	19.5	44.6	43.9	0.67	66.105 CC, ES	
300.0	300.0	299.5	299.5	0.6	0.5	156.15	156.15	-41.3	18.2	45.1	44.0	1.11	40.840	
400.0	400.0	398.7	398.6	0.8	0.8	162.07	162.07	-44.8	14.5	47.1	45.6	1.54	30.562	
500.0	500.0	497.5	497.0	1.0	1.0	170.70	170.70	-50.7	8.3	51.5	49.5	2.00	25.784	
600.0	600.0	595.6	594.3	1.2	1.3	-179.73	-179.73	-58.9	-0.3	59.1	56.7	2.46	24.082	
700.0	700.0	692.7	690.3	1.5	1.6	-170.84	-170.84	-69.2	-11.2	70.7	67.8	2.92	24.264	
800.0	800.0	789.7	785.6	1.7	2.0	-163.49	-163.49	-81.6	-24.2	86.3	82.9	3.38	25.495	
900.0	900.0	887.8	881.9	1.9	2.4	-128.24	-128.24	-94.5	-37.8	103.9	100.0	3.93	26.471	
1,000.0	1,000.0	985.8	978.1	2.1	2.8	-125.28	-125.28	-107.4	-51.4	123.1	118.7	4.39	28.008	
1,100.0	1,099.9	1,083.7	1,074.1	2.4	3.2	-123.65	-123.65	-120.3	-65.0	143.3	138.5	4.87	29.452	
1,200.0	1,199.7	1,181.4	1,170.0	2.6	3.6	-122.90	-122.90	-133.2	-78.6	164.6	159.3	5.35	30.777	
1,300.0	1,299.4	1,278.9	1,265.7	2.8	4.0	-122.73	-122.73	-146.1	-92.1	186.8	181.0	5.84	31.983	
1,400.0	1,398.9	1,376.2	1,361.2	3.1	4.4	-122.99	-122.99	-158.9	-105.6	210.0	203.6	6.35	33.074	
1,500.0	1,498.4	1,473.4	1,456.6	3.3	4.9	-123.44	-123.44	-171.7	-119.1	233.4	226.5	6.87	33.980	
1,600.0	1,597.9	1,570.6	1,552.0	3.6	5.3	-123.80	-123.80	-184.5	-132.6	256.8	249.4	7.39	34.735	
1,700.0	1,697.4	1,667.8	1,647.4	3.8	5.7	-124.10	-124.10	-197.4	-146.1	280.2	272.3	7.92	35.371	
1,800.0	1,796.9	1,765.0	1,742.8	4.1	6.1	-124.36	-124.36	-210.2	-159.6	303.6	295.2	8.45	35.913	
1,900.0	1,896.4	1,862.2	1,838.2	4.4	6.5	-124.58	-124.58	-223.0	-173.1	327.1	318.1	8.99	36.380	
2,000.0	1,995.9	1,959.4	1,933.7	4.7	7.0	-124.77	-124.77	-235.8	-186.6	350.5	341.0	9.53	36.786	
2,100.0	2,095.4	2,056.6	2,029.1	4.9	7.4	-124.94	-124.94	-248.6	-200.1	374.0	363.9	10.07	37.142	
2,200.0	2,194.9	2,153.8	2,124.5	5.2	7.8	-125.08	-125.08	-261.4	-213.6	397.4	386.8	10.61	37.456	
2,300.0	2,294.3	2,251.0	2,219.9	5.5	8.2	-125.21	-125.21	-274.3	-227.1	420.9	409.7	11.15	37.735	
2,400.0	2,393.8	2,348.2	2,315.3	5.8	8.7	-125.33	-125.33	-287.1	-240.6	444.3	432.6	11.70	37.984	
2,500.0	2,493.3	2,445.5	2,410.7	6.0	9.1	-125.43	-125.43	-299.9	-254.1	467.8	455.5	12.24	38.208	
2,600.0	2,592.8	2,542.7	2,506.1	6.3	9.5	-125.53	-125.53	-312.7	-267.6	491.2	478.4	12.79	38.410	
2,700.0	2,692.3	2,639.9	2,601.5	6.6	9.9	-125.62	-125.62	-325.5	-281.1	514.7	501.3	13.34	38.593	
2,800.0	2,791.8	2,737.1	2,696.9	6.9	10.3	-125.69	-125.69	-338.4	-294.6	538.1	524.2	13.88	38.760	
2,900.0	2,891.3	2,834.3	2,792.3	7.2	10.8	-125.77	-125.77	-351.2	-308.1	561.6	547.1	14.43	38.913	
3,000.0	2,990.9	2,931.6	2,887.9	7.4	11.2	-126.04	-126.04	-364.0	-321.6	584.4	569.4	14.98	39.005	
3,100.0	3,090.7	3,029.4	2,983.8	7.6	11.6	-126.10	-126.10	-376.9	-335.2	605.3	589.8	15.47	39.115	
3,200.0	3,190.7	3,127.4	3,080.0	7.8	12.0	-126.88	-126.88	-389.8	-348.8	624.2	608.2	15.93	39.178	
3,300.0	3,290.7	3,225.6	3,176.4	8.0	12.5	-155.45	-155.45	-402.8	-362.5	642.0	622.5	19.43	33.033	
3,400.0	3,390.7	3,323.7	3,272.7	8.2	12.9	-154.83	-154.83	-415.7	-376.1	659.8	639.7	20.07	32.867	
3,500.0	3,490.7	3,421.9	3,369.0	8.4	13.3	-154.24	-154.24	-428.7	-389.7	677.7	657.0	20.72	32.713	
3,600.0	3,590.7	3,520.0	3,465.4	8.6	13.8	-153.69	-153.69	-441.6	-403.3	695.7	674.3	21.36	32.569	
3,700.0	3,690.7	3,618.2	3,561.7	8.8	14.2	-153.16	-153.16	-454.6	-417.0	713.8	691.7	22.01	32.434	
3,800.0	3,790.7	3,716.3	3,658.0	9.0	14.6	-152.65	-152.65	-467.5	-430.6	731.9	709.2	22.65	32.308	
3,900.0	3,890.7	3,814.5	3,754.4	9.2	15.0	-152.18	-152.18	-480.4	-444.2	750.0	726.7	23.30	32.190	
4,000.0	3,990.7	3,912.6	3,850.7	9.4	15.5	-151.72	-151.72	-493.4	-457.9	768.2	744.3	23.95	32.080	
4,100.0	4,090.7	4,010.8	3,947.0	9.6	15.9	-151.29	-151.29	-506.3	-471.5	786.5	761.9	24.60	31.976	
4,200.0	4,190.7	4,108.9	4,043.4	9.8	16.3	-150.87	-150.87	-519.3	-485.1	804.7	779.5	25.24	31.878	
4,300.0	4,290.7	4,207.1	4,139.7	10.0	16.7	-150.47	-150.47	-532.2	-498.8	823.1	797.2	25.89	31.786	
4,400.0	4,390.7	4,305.2	4,236.0	10.2	17.2	-150.09	-150.09	-545.2	-512.4	841.4	814.9	26.54	31.700	
4,500.0	4,490.7	4,403.4	4,332.4	10.4	17.6	-149.73	-149.73	-558.1	-526.0	859.8	832.6	27.19	31.618	
4,600.0	4,590.7	4,501.5	4,428.7	10.6	18.0	-149.38	-149.38	-571.0	-539.6	878.3	850.4	27.85	31.541	
4,700.0	4,690.7	4,599.7	4,525.0	10.8	18.5	-149.05	-149.05	-584.0	-553.3	896.7	868.2	28.50	31.468	
4,800.0	4,790.7	4,697.8	4,621.4	11.0	18.9	-148.73	-148.73	-596.9	-566.9	915.2	886.1	29.15	31.399	
4,900.0	4,890.7	4,796.0	4,717.7	11.3	19.3	-148.42	-148.42	-609.9	-580.5	933.7	903.9	29.80	31.334	
5,000.0	4,990.7	4,894.1	4,814.0	11.5	19.7	-148.12	-148.12	-622.8	-594.2	952.3	921.8	30.45	31.272	

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

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Alles 22S-232
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Reference Site:	Alles 22S-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Alles 22S-232	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 (3-28-14)	Offset TVD Reference:	Offset Datum

Offset Design Alles 22S-HZ Pad Sec.22-T5N-R65W - Alles 22D-402 - Wellbore #1 - Plan #1 (5-16-13)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
5,100.0	5,090.7	4,992.3	4,910.4	11.7	20.2	-147.84	-635.8	-607.8	970.8	939.7	31.10	31.213		
5,200.0	5,190.7	5,090.4	5,006.7	11.9	20.6	-147.56	-648.7	-621.4	989.4	957.7	31.76	31.157		
6,600.0	6,549.4	7,479.6	6,994.0	14.7	22.9	109.85	-720.1	26.9	997.9	962.7	35.15	28.387		
6,700.0	6,621.9	7,575.2	7,002.5	15.3	24.1	108.28	-720.4	122.1	970.3	933.0	37.27	26.033		
6,800.0	6,684.9	7,676.2	7,003.7	16.1	25.7	106.24	-720.7	223.1	947.8	907.8	40.02	23.685		
6,900.0	6,737.1	7,760.8	7,002.9	17.2	27.3	104.75	-721.0	307.8	931.5	888.6	42.87	21.727		
7,000.0	6,777.9	7,851.7	7,002.0	18.6	29.1	103.25	-721.2	398.6	920.7	874.5	46.26	19.904		
7,100.0	6,806.3	7,947.2	7,001.1	20.3	31.1	102.01	-721.5	494.1	914.3	864.1	50.14	18.234		
7,200.0	6,822.0	8,045.7	7,000.1	22.2	33.4	101.23	-721.8	592.6	911.1	856.8	54.33	16.772		
7,279.1	6,826.2	8,124.6	6,999.3	23.9	35.2	100.96	-722.0	671.5	910.4	852.6	57.78	15.757		
7,300.0	6,825.1	8,145.6	6,999.1	24.3	35.7	101.01	-722.1	692.5	910.6	852.0	58.68	15.519		
7,400.0	6,824.4	8,245.6	6,998.1	26.5	38.1	100.99	-722.3	792.5	910.9	847.7	63.19	14.415		
7,500.0	6,823.7	8,345.6	6,997.1	28.8	40.5	100.97	-722.6	892.4	911.1	843.2	67.86	13.426		
7,600.0	6,823.0	8,445.6	6,996.1	31.2	43.0	100.95	-722.9	992.4	911.3	838.7	72.66	12.542		
7,700.0	6,822.3	8,545.6	6,995.1	33.6	45.6	100.93	-723.2	1,092.4	911.5	834.0	77.56	11.753		
7,800.0	6,821.5	8,645.6	6,994.1	36.2	48.1	100.91	-723.5	1,192.4	911.8	829.2	82.54	11.046		
7,900.0	6,820.8	8,745.6	6,993.1	38.7	50.7	100.89	-723.8	1,292.4	912.0	824.4	87.59	10.412		
8,000.0	6,820.1	8,845.6	6,992.1	41.3	53.3	100.87	-724.1	1,392.4	912.2	819.5	92.70	9.841		
8,100.0	6,819.4	8,945.6	6,991.1	43.9	55.9	100.85	-724.3	1,492.4	912.5	814.6	97.85	9.325		
8,200.0	6,818.7	9,045.6	6,990.1	46.5	58.6	100.83	-724.6	1,592.4	912.7	809.6	103.05	8.857		
8,300.0	6,818.0	9,145.6	6,989.1	49.2	61.2	100.81	-724.9	1,692.4	912.9	804.6	108.28	8.431		
8,400.0	6,817.2	9,245.6	6,988.1	51.8	63.9	100.79	-725.2	1,792.4	913.2	799.6	113.54	8.043		
8,500.0	6,816.5	9,345.6	6,987.1	54.5	66.6	100.76	-725.5	1,892.4	913.4	794.6	118.82	7.687		
8,600.0	6,815.8	9,445.6	6,986.1	57.2	69.3	100.74	-725.8	1,992.4	913.6	789.5	124.13	7.360		
8,700.0	6,815.1	9,545.6	6,985.2	59.9	72.0	100.72	-726.1	2,092.4	913.8	784.4	129.46	7.059		
8,800.0	6,814.4	9,645.6	6,984.2	62.6	74.7	100.70	-726.4	2,192.4	914.1	779.3	134.80	6.781		
8,900.0	6,813.7	9,745.6	6,983.2	65.4	77.4	100.68	-726.6	2,292.4	914.3	774.1	140.17	6.523		
9,000.0	6,813.0	9,845.6	6,982.2	68.1	80.1	100.66	-726.9	2,392.4	914.5	769.0	145.54	6.284		
9,100.0	6,812.2	9,945.6	6,981.2	70.8	82.8	100.64	-727.2	2,492.4	914.8	763.8	150.93	6.061		
9,200.0	6,811.5	10,045.6	6,980.2	73.6	85.6	100.62	-727.5	2,592.3	915.0	758.7	156.33	5.853		
9,300.0	6,810.8	10,145.6	6,979.2	76.3	88.3	100.60	-727.8	2,692.3	915.2	753.5	161.73	5.659		
9,400.0	6,810.1	10,245.6	6,978.2	79.1	91.0	100.58	-728.1	2,792.3	915.4	748.3	167.15	5.477		
9,500.0	6,809.4	10,345.6	6,977.2	81.8	93.8	100.56	-728.4	2,892.3	915.7	743.1	172.58	5.306		
9,600.0	6,808.7	10,445.6	6,976.2	84.6	96.5	100.54	-728.6	2,992.3	915.9	737.9	178.01	5.145		
9,700.0	6,807.9	10,545.6	6,975.2	87.3	99.3	100.52	-728.9	3,092.3	916.1	732.7	183.45	4.994		
9,800.0	6,807.2	10,645.6	6,974.2	90.1	102.0	100.50	-729.2	3,192.3	916.4	727.5	188.90	4.851		
9,900.0	6,806.5	10,745.6	6,973.2	92.9	104.8	100.48	-729.5	3,292.3	916.6	722.2	194.35	4.716		
10,000.0	6,805.8	10,845.6	6,972.2	95.6	107.6	100.46	-729.8	3,392.3	916.8	717.0	199.81	4.588		
10,100.0	6,805.1	10,945.6	6,971.2	98.4	110.3	100.44	-730.1	3,492.3	917.1	711.8	205.28	4.467		
10,200.0	6,804.4	11,045.6	6,970.2	101.2	113.1	100.42	-730.4	3,592.3	917.3	706.5	210.75	4.353		
10,300.0	6,803.6	11,145.6	6,969.2	104.0	115.8	100.40	-730.7	3,692.3	917.5	701.3	216.22	4.243		
10,400.0	6,802.9	11,245.6	6,968.2	106.7	118.6	100.38	-730.9	3,792.3	917.8	696.1	221.70	4.140		
10,500.0	6,802.2	11,345.6	6,967.2	109.5	121.4	100.36	-731.2	3,892.3	918.0	690.8	227.18	4.041		
10,600.0	6,801.5	11,445.6	6,966.2	112.3	124.2	100.34	-731.5	3,992.3	918.2	685.6	232.67	3.947		
10,700.0	6,800.8	11,545.6	6,965.3	115.1	126.9	100.31	-731.8	4,092.3	918.5	680.3	238.15	3.857		
10,800.0	6,800.1	11,645.6	6,964.3	117.9	129.7	100.29	-732.1	4,192.2	918.7	675.0	243.65	3.771		
10,900.0	6,799.4	11,745.6	6,963.3	120.6	132.5	100.27	-732.4	4,292.2	918.9	669.8	249.14	3.688		
11,000.0	6,798.6	11,845.6	6,962.3	123.4	135.3	100.25	-732.7	4,392.2	919.2	664.5	254.64	3.610		
11,100.0	6,797.9	11,945.6	6,961.3	126.2	138.0	100.23	-732.9	4,492.2	919.4	659.2	260.14	3.534		
11,200.0	6,797.2	12,045.6	6,960.3	129.0	140.8	100.21	-733.2	4,592.2	919.6	654.0	265.65	3.462		
11,300.0	6,796.5	12,145.6	6,959.3	131.8	143.6	100.19	-733.5	4,692.2	919.8	648.7	271.15	3.392		

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

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Alles 22S-232
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Reference Site:	Alles 22S-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Alles 22S-232	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 (3-28-14)	Offset TVD Reference:	Offset Datum

Offset Design Alles 22S-HZ Pad Sec.22-T5N-R65W - Alles 22D-402 - Wellbore #1 - Plan #1 (5-16-13)												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)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
11,400.0	6,795.8	12,245.5	6,958.3	134.6	146.4	100.17	-733.8	4,792.2	920.1	643.4	276.66	3.326	
11,500.0	6,795.1	12,345.5	6,957.3	137.4	149.2	100.15	-734.1	4,892.2	920.3	638.1	282.17	3.262	
11,600.0	6,794.3	12,445.5	6,956.3	140.2	151.9	100.13	-734.4	4,992.2	920.5	632.9	287.69	3.200	
11,700.0	6,793.6	12,545.5	6,955.3	142.9	154.7	100.11	-734.7	5,092.2	920.8	627.6	293.20	3.140	
11,800.0	6,792.9	12,645.5	6,954.3	145.7	157.5	100.09	-735.0	5,192.2	921.0	622.3	298.72	3.083	
11,900.0	6,792.2	12,745.5	6,953.3	148.5	160.3	100.07	-735.2	5,292.2	921.2	617.0	304.24	3.028	
11,927.9	6,792.0	12,773.4	6,953.0	149.0	161.1	100.07	-735.3	5,320.0	921.3	615.8	305.51	3.016 SF	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Alles 22S-232
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Reference Site:	Alles 22S-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Alles 22S-232	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 (3-28-14)	Offset TVD Reference:	Offset Datum

Offset Design													Offset Site Error:	0.0 ft
Survey Program: 125-MWD													Offset Well Error:	0.0 ft
Reference	Offset	Semi Major Axis		Distance		Warning								
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	-20.94	14.6	-5.6	15.6	15.6	0.00	N/A CC		
100.0	100.0	100.0	100.0	0.1	0.1	-20.39	14.8	-5.5	15.7	15.5	0.22	70.000 ES		
200.0	200.0	199.7	199.7	0.3	0.3	-17.44	16.0	-5.0	16.7	16.1	0.65	25.776		
300.0	300.0	299.3	299.2	0.6	0.5	-11.71	19.4	-4.0	19.8	18.7	1.10	17.953		
400.0	400.0	398.8	398.6	0.8	0.8	-7.29	24.4	-3.1	24.6	23.1	1.55	15.849 SF		
500.0	500.0	497.7	497.2	1.0	1.0	-4.64	31.8	-2.6	32.0	30.0	2.01	15.921		
600.0	600.0	597.0	596.0	1.2	1.3	-4.22	41.2	-3.0	41.5	39.1	2.46	16.853		
700.0	700.0	695.3	693.8	1.5	1.5	-5.87	51.8	-5.3	52.4	49.5	2.92	17.956		
800.0	800.0	793.6	791.2	1.7	1.8	-9.79	63.6	-11.0	65.2	61.8	3.38	19.249		
900.0	900.0	892.3	888.7	1.9	2.1	14.62	75.4	-21.2	78.3	74.5	3.80	20.624		
1,000.0	1,000.0	991.6	986.3	2.1	2.5	8.45	86.5	-35.0	90.9	86.7	4.24	21.430		
1,100.0	1,099.9	1,095.4	1,088.6	2.4	2.8	1.79	94.0	-51.1	99.8	95.1	4.69	21.283		
1,200.0	1,199.7	1,198.7	1,190.3	2.6	3.1	-6.76	94.4	-69.1	103.6	98.4	5.12	20.237		
1,300.0	1,299.4	1,297.6	1,287.6	2.8	3.3	-15.84	91.8	-86.9	106.0	100.5	5.55	19.107		
1,400.0	1,398.9	1,397.3	1,385.7	3.1	3.6	-24.48	89.3	-104.1	108.9	102.9	5.99	18.184		
1,500.0	1,498.4	1,496.3	1,483.5	3.3	3.9	-31.71	87.8	-119.5	112.5	106.1	6.44	17.467		
1,600.0	1,597.9	1,595.0	1,581.2	3.6	4.2	-36.85	89.4	-133.8	118.1	111.2	6.91	17.082		
1,700.0	1,697.4	1,693.9	1,678.8	3.8	4.5	-41.89	90.2	-148.7	124.9	117.5	7.40	16.868		
1,800.0	1,796.9	1,793.2	1,777.0	4.1	4.8	-46.94	90.0	-164.2	132.8	124.9	7.91	16.786		
1,900.0	1,896.4	1,893.2	1,875.8	4.4	5.1	-51.16	90.3	-179.3	141.1	132.7	8.43	16.746		
2,000.0	1,995.9	1,993.9	1,975.5	4.7	5.4	-54.84	90.7	-193.5	149.3	140.3	8.96	16.663		
2,100.0	2,095.4	2,092.6	2,073.3	4.9	5.7	-57.99	91.3	-207.0	157.4	147.9	9.49	16.586		
2,200.0	2,194.9	2,191.4	2,171.1	5.2	6.0	-60.59	92.6	-221.2	166.8	156.7	10.03	16.627		
2,300.0	2,294.3	2,294.2	2,273.0	5.5	6.4	-63.22	93.3	-234.9	175.3	164.7	10.58	16.564		
2,400.0	2,393.8	2,393.5	2,371.5	5.8	6.7	-65.79	93.4	-246.8	183.0	171.8	11.14	16.428		
2,500.0	2,493.3	2,492.5	2,469.7	6.0	6.9	-67.95	93.9	-259.3	191.6	179.9	11.69	16.393		
2,600.0	2,592.8	2,596.9	2,573.4	6.3	7.2	-70.02	94.7	-271.2	199.1	186.8	12.25	16.245		
2,700.0	2,692.3	2,694.6	2,670.6	6.6	7.5	-71.69	96.3	-281.0	205.4	192.6	12.82	16.025		
2,800.0	2,791.8	2,792.0	2,767.0	6.9	7.8	-72.28	100.8	-293.9	214.3	200.9	13.36	16.044		
2,900.0	2,891.3	2,887.6	2,861.4	7.2	8.2	-72.58	105.7	-308.2	224.6	210.7	13.90	16.162		
3,000.0	2,990.9	2,987.2	2,960.0	7.4	8.5	-73.29	108.9	-322.5	235.3	220.9	14.42	16.315		
3,100.0	3,090.7	3,087.4	3,059.2	7.6	8.8	-73.65	110.3	-336.2	246.7	231.8	14.86	16.600		
3,200.0	3,190.7	3,189.4	3,160.3	7.8	9.1	-73.49	111.0	-349.3	258.5	243.2	15.25	16.943		
3,300.0	3,290.7	3,291.6	3,261.8	8.0	9.4	-102.86	112.1	-361.4	269.6	253.3	16.32	16.526		
3,400.0	3,390.7	3,392.5	3,362.0	8.2	9.7	-101.81	114.8	-372.7	280.1	263.2	16.86	16.617		
3,500.0	3,490.7	3,491.5	3,460.4	8.4	10.0	-100.62	118.6	-383.8	290.3	272.9	17.40	16.689		
3,600.0	3,590.7	3,589.4	3,557.5	8.6	10.3	-99.58	122.0	-395.0	301.0	283.1	17.93	16.788		
3,700.0	3,690.7	3,682.3	3,649.6	8.8	10.6	-98.48	126.0	-407.0	313.1	294.6	18.48	16.946		
3,800.0	3,790.7	3,776.7	3,742.8	9.0	10.9	-97.09	131.9	-421.2	327.2	308.2	19.05	17.179		
3,900.0	3,890.7	3,875.2	3,839.8	9.2	11.3	-95.66	138.4	-436.5	342.0	322.3	19.65	17.402		
4,000.0	3,990.7	3,978.4	3,941.6	9.4	11.6	-94.33	145.1	-452.1	356.5	336.2	20.26	17.597		
4,100.0	4,090.7	4,081.0	4,043.1	9.6	12.0	-93.32	150.6	-465.8	369.5	348.7	20.85	17.726		
4,200.0	4,190.7	4,174.2	4,135.4	9.8	12.3	-92.71	153.9	-478.8	383.2	361.8	21.39	17.918		
4,300.0	4,290.7	4,268.1	4,228.1	10.0	12.6	-92.37	155.5	-493.0	398.3	376.4	21.93	18.161		
4,400.0	4,390.7	4,362.4	4,321.2	10.2	12.9	-92.11	156.8	-508.4	414.6	392.1	22.49	18.433		
4,500.0	4,490.7	4,465.7	4,423.0	10.4	13.3	-91.88	157.8	-525.4	431.0	407.9	23.08	18.675		
4,600.0	4,590.7	4,570.1	4,526.3	10.6	13.6	-91.73	158.5	-541.1	446.0	422.3	23.66	18.853		
4,700.0	4,690.7	4,673.3	4,628.4	10.8	14.0	-91.61	159.0	-555.6	460.0	435.8	24.21	18.997		
4,800.0	4,790.7	4,787.6	4,741.9	11.0	14.3	-91.43	160.1	-569.4	472.1	447.3	24.78	19.051		
4,900.0	4,890.7	4,883.0	4,836.8	11.3	14.6	-91.11	162.5	-579.2	482.3	457.0	25.28	19.081		
5,000.0	4,990.7	4,977.1	4,930.2	11.5	14.9	-90.67	166.1	-589.8	493.5	467.7	25.79	19.132		

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

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Alles 22S-232
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Reference Site:	Alles 22S-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Alles 22S-232	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 (3-28-14)	Offset TVD Reference:	Offset Datum

Offset Design Alles 22S-HZ Pad Sec.22-T5N-R65W - Alles 22S-432 - Wellbore #1 - Wellbore #1												Offset Site Error:	0.0 ft
Survey Program: 125-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
5,100.0	5,090.7	5,067.9	5,020.2	11.7	15.2	-90.28	169.4	-601.8	506.7	480.4	26.31	19.263	
5,200.0	5,190.7	5,164.3	5,115.5	11.9	15.5	-89.95	172.2	-615.5	520.9	494.1	26.85	19.398	
5,300.0	5,290.7	5,266.5	5,216.7	12.1	15.8	-89.77	174.0	-630.1	535.3	507.9	27.41	19.528	
5,400.0	5,390.7	5,372.7	5,321.9	12.3	16.1	-89.88	173.0	-644.1	548.5	520.5	27.96	19.614	
5,500.0	5,490.7	5,479.4	5,427.9	12.5	16.4	-89.98	172.0	-656.8	560.3	531.8	28.49	19.665	
5,600.0	5,590.7	5,577.3	5,525.1	12.8	16.7	-89.90	172.8	-667.9	571.6	542.6	29.00	19.711	
5,700.0	5,690.7	5,706.1	5,653.3	13.0	17.1	-89.64	175.5	-680.4	581.6	552.0	29.58	19.663	
5,800.0	5,790.7	5,828.8	5,775.9	13.2	17.3	-89.52	176.7	-685.8	586.0	556.0	30.04	19.508	
5,900.0	5,890.7	5,935.9	5,882.9	13.4	17.5	-89.55	176.4	-687.5	587.6	557.1	30.45	19.298	
6,000.0	5,990.7	6,036.1	5,983.1	13.6	17.7	-89.60	176.0	-688.8	588.9	558.0	30.83	19.101	
6,100.0	6,090.7	6,140.3	6,087.3	13.8	17.8	-179.65	175.4	-689.8	590.4	563.0	27.42	21.529	
6,200.0	6,190.1	6,445.1	6,387.2	14.0	17.8	179.40	165.6	-649.3	594.0	566.3	27.61	21.512	
6,300.0	6,287.3	6,696.2	6,611.4	14.1	17.3	-179.83	173.4	-538.4	573.1	545.9	27.12	21.131	
6,400.0	6,380.6	6,908.1	6,772.4	14.3	17.0	179.60	168.3	-401.4	539.8	513.6	26.20	20.601	
6,500.0	6,468.5	7,200.8	6,932.5	14.4	18.2	178.86	163.9	-158.6	496.4	471.4	25.07	19.801	
6,600.0	6,549.4	7,321.0	6,965.4	14.7	19.6	178.36	161.6	-43.1	433.0	409.3	23.67	18.289	
6,700.0	6,621.9	7,321.0	6,965.4	15.3	19.6	178.46	161.6	-43.1	391.8	369.7	22.06	17.756	
6,763.6	6,663.1	7,321.0	6,965.4	15.8	19.6	178.47	161.6	-43.1	384.0	362.9	21.02	18.267	
6,800.0	6,684.9	7,321.0	6,965.4	16.1	19.6	178.47	161.6	-43.1	386.5	366.1	20.43	18.922	
6,900.0	6,737.1	7,321.0	6,965.4	17.2	19.6	178.40	161.6	-43.1	418.7	399.8	18.90	22.147	
7,000.0	6,777.9	7,321.0	6,965.4	18.6	19.6	178.22	161.6	-43.1	480.3	462.7	17.66	27.194	
7,100.0	6,806.3	7,321.0	6,965.4	20.3	19.6	177.86	161.6	-43.1	561.0	544.1	16.89	33.219	
7,200.0	6,822.0	7,321.0	6,965.4	22.2	19.6	177.09	161.6	-43.1	652.6	635.8	16.76	38.940	
7,300.0	6,825.1	7,321.0	6,965.4	24.3	19.6	175.67	161.6	-43.1	749.8	732.4	17.35	43.217	
7,400.0	6,824.4	7,321.0	6,965.4	26.5	19.6	175.67	161.6	-43.1	848.3	830.5	17.81	47.635	
7,500.0	6,823.7	7,321.0	6,965.4	28.8	19.6	175.67	161.6	-43.1	947.2	928.9	18.31	51.738	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Alles 22S-232
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Reference Site:	Alles 22S-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Alles 22S-232	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 (3-28-14)	Offset TVD Reference:	Offset Datum

Offset Design Alles 22S-HZ Pad Sec.22-T5N-R65W - Alles 22S-432 - Wellbore #2 - Wellbore #2													Offset Site Error:	0.0 ft
Survey Program: 125-MWD, 6034-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	-20.94		14.6	-5.6	15.6	15.6	0.00	N/A CC	
100.0	100.0	100.0	100.0	0.1	0.1	-20.39		14.8	-5.5	15.7	15.5	0.22	70.000 ES	
200.0	200.0	199.7	199.7	0.3	0.3	-17.44		16.0	-5.0	16.7	16.1	0.65	25.776	
300.0	300.0	299.3	299.2	0.6	0.5	-11.71		19.4	-4.0	19.8	18.7	1.10	17.953	
400.0	400.0	398.8	398.6	0.8	0.8	-7.29		24.4	-3.1	24.6	23.1	1.55	15.849	
500.0	500.0	497.7	497.2	1.0	1.0	-4.64		31.8	-2.6	32.0	30.0	2.01	15.921	
600.0	600.0	597.0	596.0	1.2	1.3	-4.22		41.2	-3.0	41.5	39.1	2.46	16.853	
700.0	700.0	695.3	693.8	1.5	1.5	-5.87		51.8	-5.3	52.4	49.5	2.92	17.956	
800.0	800.0	793.6	791.2	1.7	1.8	-9.79		63.6	-11.0	65.2	61.8	3.38	19.249	
900.0	900.0	892.3	888.7	1.9	2.1	14.62		75.4	-21.2	78.3	74.5	3.80	20.624	
1,000.0	1,000.0	991.6	986.3	2.1	2.5	8.45		86.5	-35.0	90.9	86.7	4.24	21.430	
1,100.0	1,099.9	1,095.4	1,088.6	2.4	2.8	1.79		94.0	-51.1	99.8	95.1	4.69	21.283	
1,200.0	1,199.7	1,198.7	1,190.3	2.6	3.1	-6.76		94.4	-69.1	103.6	98.4	5.12	20.237	
1,300.0	1,299.4	1,297.6	1,287.6	2.8	3.3	-15.84		91.8	-86.9	106.0	100.5	5.55	19.107	
1,400.0	1,398.9	1,397.3	1,385.7	3.1	3.6	-24.48		89.3	-104.1	108.9	102.9	5.99	18.184	
1,500.0	1,498.4	1,496.3	1,483.5	3.3	3.9	-31.71		87.8	-119.5	112.5	106.1	6.44	17.467	
1,600.0	1,597.9	1,595.0	1,581.2	3.6	4.2	-36.85		89.4	-133.8	118.1	111.2	6.91	17.082	
1,700.0	1,697.4	1,693.9	1,678.8	3.8	4.5	-41.89		90.2	-148.7	124.9	117.5	7.40	16.868	
1,800.0	1,796.9	1,793.2	1,777.0	4.1	4.8	-46.94		90.0	-164.2	132.8	124.9	7.91	16.786	
1,900.0	1,896.4	1,893.2	1,875.8	4.4	5.1	-51.16		90.3	-179.3	141.1	132.7	8.43	16.746	
2,000.0	1,995.9	1,993.9	1,975.5	4.7	5.4	-54.84		90.7	-193.5	149.3	140.3	8.96	16.663	
2,100.0	2,095.4	2,092.6	2,073.3	4.9	5.7	-57.99		91.3	-207.0	157.4	147.9	9.49	16.586	
2,200.0	2,194.9	2,191.4	2,171.1	5.2	6.0	-60.59		92.6	-221.2	166.8	156.7	10.03	16.627	
2,300.0	2,294.3	2,294.2	2,273.0	5.5	6.4	-63.22		93.3	-234.9	175.3	164.7	10.58	16.564	
2,400.0	2,393.8	2,393.5	2,371.5	5.8	6.7	-65.79		93.4	-246.8	183.0	171.8	11.14	16.428	
2,500.0	2,493.3	2,492.5	2,469.7	6.0	6.9	-67.95		93.9	-259.3	191.6	179.9	11.69	16.393	
2,600.0	2,592.8	2,596.9	2,573.4	6.3	7.2	-70.02		94.7	-271.2	199.1	186.8	12.25	16.245	
2,700.0	2,692.3	2,694.6	2,670.6	6.6	7.5	-71.69		96.3	-281.0	205.4	192.6	12.82	16.025	
2,800.0	2,791.8	2,792.0	2,767.0	6.9	7.8	-72.28		100.8	-293.9	214.3	200.9	13.36	16.044	
2,900.0	2,891.3	2,887.6	2,861.4	7.2	8.2	-72.58		105.7	-308.2	224.6	210.7	13.90	16.162	
3,000.0	2,990.9	2,987.2	2,960.0	7.4	8.5	-73.29		108.9	-322.5	235.3	220.9	14.42	16.315	
3,100.0	3,090.7	3,087.4	3,059.2	7.6	8.8	-73.65		110.3	-336.2	246.7	231.8	14.86	16.600	
3,200.0	3,190.7	3,189.4	3,160.3	7.8	9.1	-73.49		111.0	-349.3	258.5	243.2	15.25	16.943	
3,300.0	3,290.7	3,291.6	3,261.8	8.0	9.4	-102.86		112.1	-361.4	269.6	253.3	16.32	16.526	
3,400.0	3,390.7	3,392.5	3,362.0	8.2	9.7	-101.81		114.8	-372.7	280.1	263.2	16.86	16.617	
3,500.0	3,490.7	3,491.5	3,460.4	8.4	10.0	-100.62		118.6	-383.8	290.3	272.9	17.40	16.689	
3,600.0	3,590.7	3,589.4	3,557.5	8.6	10.3	-99.58		122.0	-395.0	301.0	283.1	17.93	16.788	
3,700.0	3,690.7	3,682.3	3,649.6	8.8	10.6	-98.48		126.0	-407.0	313.1	294.6	18.48	16.946	
3,800.0	3,790.7	3,776.7	3,742.8	9.0	10.9	-97.09		131.9	-421.2	327.2	308.2	19.05	17.179	
3,900.0	3,890.7	3,875.2	3,839.8	9.2	11.3	-95.66		138.4	-436.5	342.0	322.3	19.65	17.402	
4,000.0	3,990.7	3,978.4	3,941.6	9.4	11.6	-94.33		145.1	-452.1	356.5	336.2	20.26	17.597	
4,100.0	4,090.7	4,081.0	4,043.1	9.6	12.0	-93.32		150.6	-465.8	369.5	348.7	20.85	17.726	
4,200.0	4,190.7	4,174.2	4,135.4	9.8	12.3	-92.71		153.9	-478.8	383.2	361.8	21.39	17.918	
4,300.0	4,290.7	4,268.1	4,228.1	10.0	12.6	-92.37		155.5	-493.0	398.3	376.4	21.93	18.161	
4,400.0	4,390.7	4,362.4	4,321.2	10.2	12.9	-92.11		156.8	-508.4	414.6	392.1	22.49	18.432	
4,500.0	4,490.7	4,465.7	4,423.0	10.4	13.3	-91.88		157.8	-525.4	431.0	407.9	23.08	18.675	
4,600.0	4,590.7	4,570.1	4,526.3	10.6	13.6	-91.73		158.5	-541.1	446.0	422.3	23.66	18.853	
4,700.0	4,690.7	4,673.3	4,628.4	10.8	14.0	-91.61		159.0	-555.6	460.0	435.8	24.21	18.997	
4,800.0	4,790.7	4,787.6	4,741.9	11.0	14.3	-91.43		160.1	-569.4	472.1	447.3	24.78	19.050	
4,900.0	4,890.7	4,883.0	4,836.8	11.3	14.6	-91.11		162.5	-579.2	482.3	457.0	25.28	19.081	
5,000.0	4,990.7	4,977.1	4,930.2	11.5	14.9	-90.67		166.1	-589.8	493.5	467.7	25.79	19.132	

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

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Alles 22S-232
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Reference Site:	Alles 22S-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Alles 22S-232	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 (3-28-14)	Offset TVD Reference:	Offset Datum

Offset Design Alles 22S-HZ Pad Sec.22-T5N-R65W - Alles 22S-432 - Wellbore #2 - Wellbore #2												Offset Site Error:	0.0 ft
Survey Program: 125-MWD, 6034-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
5,100.0	5,090.7	5,067.9	5,020.2	11.7	15.2	-90.28	169.4	-601.8	506.7	480.4	26.31	19.263	
5,200.0	5,190.7	5,164.3	5,115.5	11.9	15.5	-89.95	172.2	-615.5	520.9	494.1	26.85	19.398	
5,300.0	5,290.7	5,266.5	5,216.7	12.1	15.8	-89.77	174.0	-630.1	535.3	507.9	27.41	19.528	
5,400.0	5,390.7	5,372.7	5,321.9	12.3	16.1	-89.88	173.0	-644.1	548.5	520.5	27.96	19.614	
5,500.0	5,490.7	5,479.4	5,427.9	12.5	16.4	-89.98	172.0	-656.8	560.3	531.8	28.49	19.665	
5,600.0	5,590.7	5,577.3	5,525.1	12.8	16.7	-89.90	172.8	-667.9	571.6	542.6	29.00	19.711	
5,700.0	5,690.7	5,706.1	5,653.3	13.0	17.1	-89.64	175.5	-680.4	581.6	552.0	29.58	19.663	
5,800.0	5,790.7	5,828.8	5,775.9	13.2	17.3	-89.52	176.7	-685.8	586.0	556.0	30.04	19.508	
5,900.0	5,890.7	5,935.7	5,882.7	13.4	17.4	-89.55	176.4	-687.5	587.6	557.2	30.39	19.332	
6,000.0	5,990.7	6,035.7	5,982.7	13.6	17.5	-89.61	175.8	-688.9	589.0	558.2	30.70	19.183	
6,100.0	6,090.7	6,149.2	6,096.2	13.8	17.5	-179.67	175.3	-689.6	590.2	563.1	27.05	21.817	
6,200.0	6,190.1	6,485.1	6,420.2	14.0	17.0	-177.20	199.1	-615.3	575.0	548.2	26.75	21.498	
6,300.0	6,287.3	6,682.3	6,591.2	14.1	16.4	-176.30	205.6	-517.9	545.8	519.6	26.14	20.879	
6,400.0	6,380.6	6,884.1	6,747.5	14.3	16.1	-175.00	214.0	-391.3	516.6	491.3	25.31	20.407	
6,500.0	6,468.5	7,062.4	6,860.3	14.4	16.4	-173.55	221.4	-253.8	479.2	454.9	24.35	19.677	
6,600.0	6,549.4	7,317.2	6,963.6	14.7	18.8	-171.27	224.1	-22.5	429.1	405.3	23.71	18.093	
6,700.0	6,621.9	7,456.0	6,981.5	15.3	21.1	-168.67	228.8	114.9	365.3	342.3	23.06	15.845	
6,800.0	6,684.9	7,541.5	6,987.8	16.1	22.7	-167.11	231.4	200.2	309.5	287.2	22.34	13.853	
6,900.0	6,737.1	7,626.7	6,994.0	17.2	24.5	-165.40	233.7	285.1	265.2	243.1	22.04	12.031	
7,000.0	6,777.9	7,723.9	7,001.4	18.6	26.6	-163.22	236.8	381.9	233.4	210.9	22.55	10.352	
7,100.0	6,806.3	7,828.3	7,007.6	20.3	29.0	-161.45	238.3	486.1	212.1	188.4	23.68	8.958	
7,200.0	6,822.0	7,941.1	7,008.7	22.2	31.7	-160.55	237.3	598.9	197.9	172.8	25.11	7.880	
7,300.0	6,825.1	8,040.2	7,006.2	24.3	34.1	-160.59	235.6	698.0	192.1	165.6	26.43	7.267	
7,400.0	6,824.4	8,139.9	7,003.9	26.5	36.5	-160.74	234.5	797.6	190.1	162.0	28.09	6.768	
7,500.0	6,823.7	8,237.4	7,002.2	28.8	39.0	-160.88	233.7	895.1	189.0	159.1	29.81	6.339	
7,531.8	6,823.5	8,268.6	7,002.0	29.6	39.8	-160.96	233.4	926.3	188.9	158.6	30.34	6.226	
7,600.0	6,823.0	8,336.8	7,001.7	31.2	41.6	-161.08	233.1	994.5	188.9	157.4	31.54	5.991	
7,700.0	6,822.3	8,439.3	7,000.2	33.6	44.2	-161.15	232.6	1,097.0	188.1	154.6	33.44	5.624	
7,745.4	6,821.9	8,482.3	6,999.6	34.8	45.3	-161.12	232.6	1,140.0	187.8	153.5	34.33	5.471	
7,800.0	6,821.5	8,534.7	6,999.4	36.2	46.7	-160.97	233.1	1,192.4	188.1	152.6	35.52	5.296	
7,900.0	6,820.8	8,635.0	6,999.9	38.7	49.4	-160.98	233.5	1,292.7	189.4	151.9	37.53	5.047	
8,000.0	6,820.1	8,738.8	6,999.8	41.3	52.1	-161.47	232.0	1,396.4	189.5	150.4	39.11	4.846	
8,100.0	6,819.4	8,841.2	6,998.3	43.9	54.9	-162.48	228.3	1,498.8	187.7	147.6	40.08	4.683	
8,200.0	6,818.7	8,941.4	6,996.6	46.5	57.5	-163.51	224.5	1,598.9	185.6	144.7	40.91	4.537	
8,300.0	6,818.0	9,044.2	6,993.9	49.2	60.3	-164.74	219.8	1,701.5	182.5	141.1	41.45	4.403	
8,400.0	6,817.2	9,142.7	6,990.7	51.8	63.0	-166.09	214.8	1,799.8	178.8	137.0	41.73	4.284	
8,500.0	6,816.5	9,238.7	6,988.2	54.5	65.6	-166.67	212.5	1,895.8	176.5	133.7	42.82	4.121	
8,526.5	6,816.3	9,263.9	6,988.0	55.2	66.3	-166.68	212.4	1,921.0	176.4	133.1	43.27	4.076	
8,600.0	6,815.8	9,337.0	6,987.5	57.2	68.3	-166.49	213.0	1,994.1	176.5	131.7	44.82	3.939	
8,700.0	6,815.1	9,441.6	6,985.2	59.9	71.1	-165.97	214.3	2,098.6	175.4	128.0	47.36	3.703	
8,800.0	6,814.4	9,538.2	6,982.3	62.6	73.7	-164.40	218.7	2,195.1	174.3	122.9	51.42	3.391	
8,811.6	6,814.3	9,549.2	6,982.0	63.0	74.0	-164.18	219.3	2,206.0	174.3	122.3	51.97	3.354	
8,900.0	6,813.7	9,635.1	6,980.8	65.4	76.4	-162.15	225.6	2,291.7	175.6	118.7	56.90	3.086	
8,993.5	6,813.0	9,731.3	6,979.5	67.9	79.0	-161.57	227.3	2,387.8	175.5	115.6	59.89	2.931	
9,000.0	6,813.0	9,737.8	6,979.5	68.1	79.2	-161.55	227.4	2,394.4	175.5	115.5	60.07	2.922	
9,100.0	6,812.2	9,843.3	6,978.6	70.8	82.1	-163.24	221.9	2,499.7	173.9	114.5	59.34	2.930	
9,200.0	6,811.5	9,944.3	6,978.4	73.6	84.8	-168.53	205.7	2,599.3	170.4	117.6	52.74	3.230	
9,300.0	6,810.8	10,045.5	6,977.6	76.3	87.6	-175.82	184.0	2,698.2	167.3	120.9	46.43	3.604	
9,352.7	6,810.4	10,095.7	6,977.1	77.8	88.9	-179.70	172.7	2,747.1	166.7	120.7	45.93	3.629	
9,400.0	6,810.1	10,141.5	6,976.8	79.1	90.1	176.83	162.6	2,791.8	167.0	119.4	47.63	3.506	
9,500.0	6,809.4	10,234.7	6,978.4	81.8	92.7	172.51	149.6	2,883.9	170.7	117.6	53.08	3.216	

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

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Alles 22S-232
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Reference Site:	Alles 22S-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Alles 22S-232	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 (3-28-14)	Offset TVD Reference:	Offset Datum

Offset Design Alles 22S-HZ Pad Sec.22-T5N-R65W - Alles 22S-432 - Wellbore #2 - Wellbore #2												Offset Site Error:	0.0 ft
Survey Program: 125-MWD, 6034-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
9,600.0	6,808.7	10,332.6	6,984.5	84.6	95.4	172.75	149.4	2,981.6	177.6	123.3	54.33	3.269	
9,700.0	6,807.9	10,433.7	6,991.3	87.3	98.2	174.42	153.9	3,082.3	184.6	130.7	53.92	3.423	
9,800.0	6,807.2	10,540.1	6,996.6	90.1	101.1	175.82	158.0	3,188.6	190.0	135.9	54.11	3.511	
9,900.0	6,806.5	10,653.5	6,995.3	92.9	104.2	176.87	161.5	3,301.9	189.2	134.4	54.86	3.449	
10,000.0	6,805.8	10,756.7	6,989.8	95.6	107.1	177.90	165.1	3,404.8	184.5	128.8	55.70	3.312	
10,100.0	6,805.1	10,850.3	6,985.5	98.4	109.7	178.62	167.5	3,498.3	180.6	123.8	56.77	3.181	
10,200.0	6,804.4	10,949.1	6,983.2	101.2	112.4	178.94	168.5	3,597.0	178.9	120.8	58.08	3.080	
10,300.0	6,803.6	11,049.0	6,981.1	104.0	115.2	179.11	169.1	3,697.0	177.5	118.0	59.45	2.985	
10,400.0	6,802.9	11,149.6	6,978.9	106.7	118.0	179.31	169.7	3,797.5	176.0	115.2	60.83	2.893	
10,500.0	6,802.2	11,247.0	6,977.2	109.5	120.7	179.98	171.7	3,894.9	175.0	112.8	62.14	2.816	
10,526.9	6,802.0	11,273.4	6,977.0	110.3	121.4	-179.73	172.6	3,921.3	174.9	112.4	62.51	2.799	
10,600.0	6,801.5	11,344.7	6,976.7	112.3	123.4	-178.78	175.5	3,992.5	175.3	111.6	63.66	2.753	
10,700.0	6,800.8	11,446.2	6,977.0	115.1	126.2	-178.07	177.8	4,094.0	176.3	111.0	65.34	2.699	
10,800.0	6,800.1	11,545.5	6,976.5	117.9	128.9	-177.69	178.9	4,193.3	176.6	109.6	66.95	2.637	
10,900.0	6,799.4	11,647.8	6,976.1	120.6	131.8	-176.87	181.5	4,295.6	177.0	108.1	68.95	2.568	
11,000.0	6,798.6	11,749.8	6,974.4	123.4	134.6	-175.78	184.8	4,397.4	176.3	104.9	71.40	2.469	
11,085.7	6,798.0	11,832.6	6,972.4	125.8	136.9	-174.82	187.6	4,480.1	175.1	101.3	73.79	2.373	
11,100.0	6,797.9	11,845.8	6,972.3	126.2	137.3	-174.69	188.0	4,493.3	175.1	101.0	74.18	2.361	
11,200.0	6,797.2	11,942.7	6,972.9	129.0	140.0	-173.78	191.0	4,590.2	176.8	99.8	77.01	2.296	
11,300.0	6,796.5	12,046.6	6,973.6	131.8	142.9	-173.34	192.5	4,694.1	178.4	99.1	79.31	2.249	
11,400.0	6,795.8	12,150.7	6,971.4	134.6	145.8	-173.39	192.2	4,798.2	176.9	96.1	80.82	2.189	
11,500.0	6,795.1	12,254.6	6,967.3	137.4	148.7	-174.46	188.5	4,901.9	173.3	92.6	80.65	2.149	
11,600.0	6,794.3	12,354.3	6,962.4	140.2	151.4	-175.38	185.4	5,001.5	168.8	87.9	80.87	2.087	
11,626.1	6,794.2	12,379.0	6,961.4	140.9	152.1	-175.61	184.7	5,026.1	167.9	86.9	80.96	2.074 SF	
11,700.0	6,793.6	12,379.0	6,961.4	142.9	152.1	-175.61	184.7	5,026.1	181.1	99.6	81.51	2.222	
11,800.0	6,792.9	12,379.0	6,961.4	145.7	152.1	-175.61	184.7	5,026.1	237.6	155.4	82.26	2.889	
11,900.0	6,792.2	12,379.0	6,961.4	148.5	152.1	-175.61	184.7	5,026.1	316.4	233.4	83.01	3.812	
11,927.9	6,792.0	12,379.0	6,961.4	149.0	152.1	-175.61	184.7	5,026.1	340.4	257.2	83.12	4.095	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Alles 22S-232
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Reference Site:	Alles 22S-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Alles 22S-232	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 (3-28-14)	Offset TVD Reference:	Offset Datum

Offset Design Lofland 22T & Alles 22S-HZ Existing Wells - Alles 9-22 (Exist) - Wellbore #1 - Wellbore #1													Offset Site Error:	0.0 ft
Survey Program: 100-NS-GYRO-MS													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	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	-82.16		14.6	-105.9	106.9	106.9	0.00	N/A	
100.0	100.0	100.6	100.6	0.1	0.1	-81.92		15.0	-106.0	107.1	106.8	0.25	433.763	
200.0	200.0	200.7	200.7	0.3	0.4	-81.62		15.7	-106.2	107.4	106.6	0.73	146.470	
300.0	300.0	300.9	300.8	0.6	0.7	-81.51		15.9	-106.4	107.6	106.4	1.22	88.171	
400.0	400.0	401.6	401.5	0.8	0.9	-81.21		16.4	-106.1	107.4	105.7	1.67	64.264	
500.0	500.0	501.3	501.3	1.0	1.1	-80.70		17.3	-105.6	107.0	104.9	2.11	50.608	
600.0	600.0	601.3	601.3	1.2	1.3	-80.29		18.0	-105.2	106.7	104.1	2.58	41.427	
700.0	700.0	701.5	701.5	1.5	1.6	-79.85		18.7	-104.7	106.3	103.3	3.04	34.941	
800.0	800.0	801.3	801.3	1.7	1.8	-79.37		19.5	-104.2	106.0	102.5	3.52	30.115	
900.0	900.0	901.4	901.4	1.9	2.1	-49.13		20.2	-103.7	105.1	101.1	3.99	26.305	
1,000.0	1,000.0	1,001.5	1,001.4	2.1	2.3	-49.83		20.9	-103.2	103.0	98.5	4.47	23.054	
1,100.0	1,099.9	1,101.5	1,101.4	2.4	2.6	-51.34		21.5	-102.5	99.7	94.8	4.94	20.191	
1,200.0	1,199.7	1,201.1	1,201.1	2.6	2.8	-53.96		21.9	-102.0	95.5	90.1	5.39	17.727	
1,300.0	1,299.4	1,301.0	1,301.0	2.8	3.0	-58.04		21.8	-101.4	90.5	84.7	5.79	15.637	
1,400.0	1,398.9	1,400.5	1,400.4	3.1	3.1	-63.67		21.5	-100.8	85.2	79.0	6.18	13.795	
1,500.0	1,498.4	1,499.5	1,499.5	3.3	3.2	-70.29		21.2	-100.4	80.9	74.4	6.54	12.364	
1,600.0	1,597.9	1,598.6	1,598.5	3.6	3.3	-77.62		20.6	-100.4	78.3	71.4	6.87	11.401	
1,700.0	1,697.4	1,697.9	1,697.9	3.8	3.3	-85.34		19.8	-100.7	77.3	70.1	7.18	10.764	
1,711.4	1,708.7	1,709.3	1,709.2	3.9	3.3	-86.22		19.7	-100.7	77.3	70.1	7.22	10.707 CC, ES	
1,800.0	1,796.9	1,797.3	1,797.3	4.1	3.4	-92.97		19.2	-101.2	77.9	70.4	7.52	10.365	
1,900.0	1,896.4	1,896.6	1,896.6	4.4	3.5	-100.31		18.5	-101.8	80.0	72.1	7.86	10.173	
2,000.0	1,995.9	1,996.4	1,996.3	4.7	3.6	-107.12		17.9	-102.4	83.3	75.0	8.22	10.126	
2,100.0	2,095.4	2,096.0	2,095.9	4.9	3.7	-113.13		17.8	-103.2	87.3	78.7	8.60	10.153	
2,200.0	2,194.9	2,195.5	2,195.4	5.2	3.8	-118.36		17.8	-104.1	92.2	83.2	9.00	10.246	
2,300.0	2,294.3	2,295.4	2,295.3	5.5	4.0	-123.00		18.1	-105.1	97.6	88.2	9.41	10.375	
2,400.0	2,393.8	2,395.1	2,395.1	5.8	4.2	-127.07		18.6	-106.1	103.3	93.5	9.83	10.508	
2,500.0	2,493.3	2,494.7	2,494.6	6.0	4.4	-130.45		19.4	-107.4	109.4	99.1	10.26	10.658	
2,600.0	2,592.8	2,594.0	2,593.9	6.3	4.6	-133.26		20.1	-109.2	116.0	105.3	10.70	10.842	
2,700.0	2,692.3	2,693.7	2,693.5	6.6	4.8	-135.73		20.7	-111.1	123.0	111.8	11.13	11.045	
2,800.0	2,791.8	2,793.2	2,793.0	6.9	5.0	-137.92		21.3	-113.1	130.1	118.6	11.57	11.244	
2,900.0	2,891.3	2,893.8	2,893.6	7.2	5.2	-140.02		22.2	-114.7	137.2	125.2	12.03	11.409	
3,000.0	2,990.9	2,993.7	2,993.5	7.4	5.4	-141.82		23.5	-115.9	143.1	130.6	12.47	11.480	
3,100.0	3,090.7	3,093.7	3,093.5	7.6	5.7	-142.75		24.8	-116.9	146.3	133.5	12.87	11.372	
3,200.0	3,190.7	3,193.5	3,193.3	7.8	5.9	-142.92		26.0	-117.6	146.8	133.6	13.26	11.070	
3,300.0	3,290.7	3,293.1	3,292.8	8.0	6.1	-173.00		27.0	-117.8	145.9	132.1	13.81	10.569	
3,400.0	3,390.7	3,392.1	3,391.9	8.2	6.3	-173.07		27.4	-117.6	145.5	131.3	14.19	10.254	
3,423.7	3,414.4	3,415.6	3,415.4	8.2	6.3	-173.11		27.4	-117.4	145.5	131.2	14.27	10.195	
3,500.0	3,490.7	3,491.6	3,491.4	8.4	6.4	-173.33		27.2	-116.9	145.5	131.0	14.52	10.027	
3,600.0	3,590.7	3,591.0	3,590.8	8.6	6.5	-173.87		26.7	-115.6	146.0	131.1	14.84	9.835	
3,700.0	3,690.7	3,690.8	3,690.6	8.8	6.7	-174.62		25.8	-113.8	146.7	131.5	15.18	9.663	
3,800.0	3,790.7	3,790.2	3,790.0	9.0	6.8	-175.33		24.7	-112.0	147.6	132.1	15.52	9.514	
3,900.0	3,890.7	3,890.2	3,889.9	9.2	6.9	-176.02		23.3	-110.3	148.8	133.0	15.86	9.384	
4,000.0	3,990.7	3,990.3	3,990.0	9.4	7.1	-176.74		22.0	-108.5	150.0	133.8	16.22	9.253	
4,100.0	4,090.7	4,090.2	4,089.8	9.6	7.2	-177.40		20.8	-106.9	151.2	134.6	16.57	9.124	
4,200.0	4,190.7	4,190.4	4,190.0	9.8	7.3	-178.03		19.5	-105.2	152.4	135.5	16.94	8.996	
4,300.0	4,290.7	4,291.1	4,290.7	10.0	7.5	-178.58		18.6	-103.8	153.3	136.0	17.32	8.852	
4,400.0	4,390.7	4,391.0	4,390.6	10.2	7.7	-179.03		17.9	-102.6	154.0	136.3	17.70	8.699	
4,500.0	4,490.7	4,490.5	4,490.1	10.4	7.8	-179.51		17.0	-101.3	154.9	136.8	18.09	8.563	
4,600.0	4,590.7	4,589.1	4,588.6	10.6	8.0	-179.85		15.5	-99.6	156.3	137.9	18.47	8.463	
4,700.0	4,690.7	4,688.3	4,687.8	10.8	8.2	-178.99		13.3	-97.2	158.6	139.7	18.87	8.404	
4,800.0	4,790.7	4,788.9	4,788.3	11.0	8.4	-178.10		11.1	-94.7	160.9	141.6	19.27	8.349	

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

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Alles 22S-232
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Reference Site:	Alles 22S-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Alles 22S-232	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 (3-28-14)	Offset TVD Reference:	Offset Datum

Offset Design											Lofland 22T & Alles 22S-HZ Existing Wells - Alles 9-22 (Exist) - Wellbore #1 - Wellbore #1		Offset Site Error:		0.0 ft
Survey Program: 100-NS-GYRO-MS													Offset Well Error:		0.0 ft
Reference		Offset		Semi Major Axis			Distance						Warning		
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Highside Toolface	Offset Wellbore Centre		Between Centres	Between Ellipses	Minimum Separation	Separation Factor			
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	+N/-S (ft)	+E/-W (ft)	(ft)	(ft)	(ft)				
4,900.0	4,890.7	4,890.4	4,889.8	11.3	8.6	177.42	9.4	-92.7	162.5	142.9	19.68	8.260			
5,000.0	4,990.7	4,990.6	4,990.0	11.5	8.8	176.93	8.4	-91.2	163.6	143.5	20.09	8.144			
5,100.0	5,090.7	5,091.1	5,090.5	11.7	9.0	176.55	7.6	-90.1	164.5	144.0	20.50	8.023			
5,200.0	5,190.7	5,191.2	5,190.6	11.9	9.1	176.36	7.0	-89.5	165.2	144.3	20.91	7.900			
5,300.0	5,290.7	5,291.2	5,290.6	12.1	9.3	176.35	6.3	-89.4	165.8	144.5	21.30	7.786			
5,400.0	5,390.7	5,391.8	5,391.2	12.3	9.5	176.44	5.8	-89.7	166.3	144.7	21.67	7.674			
5,500.0	5,490.7	5,491.6	5,491.0	12.5	9.6	176.60	5.4	-90.1	166.7	144.6	22.04	7.563			
5,600.0	5,590.7	5,591.7	5,591.1	12.8	9.8	176.83	5.0	-90.8	167.1	144.7	22.41	7.457			
5,700.0	5,690.7	5,692.8	5,692.2	13.0	9.9	177.00	4.9	-91.3	167.1	144.3	22.77	7.338			
5,781.3	5,772.0	5,773.7	5,773.0	13.1	10.1	176.99	5.1	-91.2	167.0	143.9	23.09	7.232			
5,800.0	5,790.7	5,792.2	5,791.6	13.2	10.1	176.96	5.1	-91.2	167.0	143.8	23.16	7.209			
5,900.0	5,890.7	5,890.9	5,890.3	13.4	10.3	176.72	4.7	-90.4	167.4	143.9	23.57	7.102			
6,000.0	5,990.7	5,989.7	5,989.1	13.6	10.5	176.46	3.5	-89.6	168.6	144.6	23.99	7.029			
6,100.0	6,090.7	6,090.0	6,089.4	13.8	10.7	86.53	2.1	-89.2	170.1	145.8	24.23	7.020			
6,200.0	6,190.1	6,189.7	6,189.1	14.0	10.9	90.01	0.8	-89.4	171.0	146.4	24.61	6.948			
6,300.0	6,287.3	6,287.6	6,286.9	14.1	11.1	97.35	-0.2	-89.5	173.6	148.6	25.00	6.943 SF			
6,400.0	6,380.6	6,381.2	6,380.5	14.3	11.2	107.23	-0.8	-89.5	182.5	157.3	25.26	7.225			
6,500.0	6,468.5	6,469.2	6,468.6	14.4	11.4	117.52	-1.2	-89.6	203.5	178.3	25.17	8.084			
6,600.0	6,549.4	6,550.2	6,549.5	14.7	11.6	126.26	-1.5	-89.8	240.0	215.3	24.67	9.728			
6,700.0	6,621.9	6,623.2	6,622.6	15.3	11.7	132.53	-1.8	-89.8	291.9	268.0	23.92	12.204			
6,800.0	6,684.9	6,687.4	6,686.7	16.1	11.8	136.19	-1.9	-89.7	357.2	334.0	23.25	15.366			
6,900.0	6,737.1	6,740.4	6,739.8	17.2	11.9	137.05	-2.0	-89.4	433.5	410.4	23.11	18.759			
7,000.0	6,777.9	6,781.9	6,781.3	18.6	12.0	134.62	-2.1	-89.2	518.2	494.1	24.10	21.504			
7,100.0	6,806.3	6,811.2	6,810.6	20.3	12.1	127.28	-2.2	-89.0	609.1	582.1	27.06	22.513			
7,200.0	6,822.0	6,827.7	6,827.1	22.2	12.1	111.05	-2.3	-88.9	704.2	671.7	32.44	21.710			
7,300.0	6,825.1	6,831.6	6,830.9	24.3	12.1	89.74	-2.3	-88.9	801.3	765.0	36.37	22.035			
7,400.0	6,824.4	6,831.6	6,831.0	26.5	12.1	89.76	-2.3	-88.9	899.2	860.6	38.57	23.311			
7,500.0	6,823.7	6,831.7	6,831.0	28.8	12.1	89.78	-2.3	-88.9	997.5	956.6	40.89	24.397			

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Alles 22S-232
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Reference Site:	Alles 22S-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Alles 22S-232	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 (3-28-14)	Offset TVD Reference:	Offset Datum

Offset Design											Lofland 22T & Alles 22S-HZ Existing Wells - Badley 23-31 (Exist) - Wellbore #1 - Wellbore #1		Offset Site Error:	0.0 ft
Survey Program: 7300-UNKNOWN													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance						Warning	
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Highside Toolface	Offset Wellbore Centre		Between Centres	Between Ellipses	Minimum Separation	Separation Factor		
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	+N/-S (ft)	+E/-W (ft)	(ft)	(ft)	(ft)			
8,500.0	6,816.5	6,814.5	6,814.5	54.5	136.3	90.98	-178.4	2,733.0	909.8	719.0	190.78	4.769		
8,600.0	6,815.8	6,813.8	6,813.8	57.2	136.3	90.87	-178.4	2,733.0	818.4	625.0	193.46	4.230		
8,700.0	6,815.1	6,813.1	6,813.1	59.9	136.3	90.75	-178.4	2,733.0	729.3	533.1	196.16	3.718		
8,800.0	6,814.4	6,812.4	6,812.4	62.6	136.2	90.63	-178.4	2,733.0	643.4	444.5	198.86	3.235		
8,900.0	6,813.7	6,811.7	6,811.7	65.4	136.2	90.51	-178.4	2,733.0	562.1	360.6	201.58	2.789		
9,000.0	6,813.0	6,811.0	6,811.0	68.1	136.2	90.40	-178.4	2,733.0	487.9	283.6	204.29	2.388		
9,100.0	6,812.2	6,810.2	6,810.2	70.8	136.2	90.28	-178.4	2,733.0	424.4	217.4	207.02	2.050		
9,200.0	6,811.5	6,809.5	6,809.5	73.6	136.2	90.16	-178.4	2,733.0	377.0	167.3	209.74	1.798		
9,300.0	6,810.8	6,808.8	6,808.8	76.3	136.2	90.05	-178.4	2,733.0	352.4	139.9	212.48	1.659		
9,339.7	6,810.5	6,808.5	6,808.5	77.4	136.2	90.00	-178.4	2,733.0	350.2	136.6	213.56	1.640	CC, ES, SF	
9,400.0	6,810.1	6,808.1	6,808.1	79.1	136.2	89.93	-178.4	2,733.0	355.3	140.1	215.21	1.651		
9,500.0	6,809.4	6,807.4	6,807.4	81.8	136.1	89.81	-178.4	2,733.0	385.1	167.1	217.95	1.767		
9,600.0	6,808.7	6,806.7	6,806.7	84.6	136.1	89.70	-178.4	2,733.0	436.3	215.6	220.69	1.977		
9,700.0	6,807.9	6,805.9	6,805.9	87.3	136.1	89.58	-178.4	2,733.0	502.4	279.0	223.43	2.248		
9,800.0	6,807.2	6,805.2	6,805.2	90.1	136.1	89.46	-178.4	2,733.0	578.3	352.1	226.18	2.557		
9,900.0	6,806.5	6,804.5	6,804.5	92.9	136.1	89.34	-178.4	2,733.0	660.7	431.7	228.92	2.886		
10,000.0	6,805.8	6,803.8	6,803.8	95.6	136.1	89.23	-178.4	2,733.0	747.3	515.7	231.67	3.226		
10,100.0	6,805.1	6,803.1	6,803.1	98.4	136.1	89.11	-178.4	2,733.0	837.0	602.6	234.42	3.570		
10,200.0	6,804.4	6,802.4	6,802.4	101.2	136.0	88.99	-178.4	2,733.0	928.8	691.6	237.17	3.916		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Alles 22S-232
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Reference Site:	Alles 22S-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Alles 22S-232	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 (3-28-14)	Offset TVD Reference:	Offset Datum

Offset Design Lofland 22T & Alles 22S-HZ Existing Wells - Buderus 12-23 (Exist) - Wellbore #1 - Wellbore #1												Offset Site Error:	0.0 ft
Survey Program: 7300-UNKNOWN												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
6,900.0	6,737.1	6,735.1	6,735.1	17.2	134.7	29.96	-76.5	1,231.4	956.5	858.1	98.34	9.726	
7,000.0	6,777.9	6,775.9	6,775.9	18.6	135.5	40.69	-76.5	1,231.4	868.7	759.7	108.96	7.972	
7,100.0	6,806.3	6,804.3	6,804.3	20.3	136.1	56.68	-76.5	1,231.4	777.4	645.1	132.28	5.877	
7,200.0	6,822.0	6,820.0	6,820.0	22.2	136.4	76.65	-76.5	1,231.4	684.6	530.3	154.29	4.437	
7,300.0	6,825.1	6,823.1	6,823.1	24.3	136.5	90.89	-76.5	1,231.4	592.6	431.9	160.69	3.688	
7,400.0	6,824.4	6,822.4	6,822.4	26.5	136.4	90.72	-76.5	1,231.4	503.5	340.7	162.89	3.091	
7,500.0	6,823.7	6,821.7	6,821.7	28.8	136.4	90.56	-76.5	1,231.4	419.5	254.3	165.19	2.539	
7,600.0	6,823.0	6,821.0	6,821.0	31.2	136.4	90.39	-76.5	1,231.4	344.0	176.4	167.57	2.053	
7,700.0	6,822.3	6,820.3	6,820.3	33.6	136.4	90.23	-76.5	1,231.4	284.1	114.1	170.02	1.671	
7,800.0	6,821.5	6,819.5	6,819.5	36.2	136.4	90.06	-76.5	1,231.4	251.2	78.7	172.51	1.456 Level 3	
7,838.1	6,821.3	6,819.3	6,819.3	37.1	136.4	90.00	-76.5	1,231.4	248.3	74.8	173.48	1.431 Level 3, CC, ES, SF	
7,900.0	6,820.8	6,818.8	6,818.8	38.7	136.4	89.90	-76.5	1,231.4	255.9	80.8	175.04	1.462 Level 3	
8,000.0	6,820.1	6,818.1	6,818.1	41.3	136.4	89.73	-76.5	1,231.4	296.4	118.8	177.61	1.669	
8,100.0	6,819.4	6,817.4	6,817.4	43.9	136.3	89.57	-76.5	1,231.4	360.9	180.7	180.20	2.003	
8,200.0	6,818.7	6,816.7	6,816.7	46.5	136.3	89.40	-76.5	1,231.4	438.9	256.1	182.82	2.401	
8,300.0	6,818.0	6,816.0	6,816.0	49.2	136.3	89.24	-76.5	1,231.4	524.4	338.9	185.45	2.828	
8,400.0	6,817.2	6,815.2	6,815.2	51.8	136.3	89.07	-76.5	1,231.4	614.3	426.2	188.09	3.266	
8,500.0	6,816.5	6,814.5	6,814.5	54.5	136.3	88.91	-76.5	1,231.4	706.9	516.2	190.75	3.706	
8,600.0	6,815.8	6,813.8	6,813.8	57.2	136.3	88.74	-76.5	1,231.4	801.3	607.9	193.42	4.143	
8,700.0	6,815.1	6,813.1	6,813.1	59.9	136.3	88.58	-76.5	1,231.4	896.9	700.8	196.10	4.574	
8,800.0	6,814.4	6,812.4	6,812.4	62.6	136.2	88.41	-76.5	1,231.4	993.4	794.6	198.78	4.998	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Alles 22S-232
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Reference Site:	Alles 22S-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Alles 22S-232	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 (3-28-14)	Offset TVD Reference:	Offset Datum

Offset Design Lofland 22T & Alles 22S-HZ Existing Wells - Esther 1-23 (Exist) - Wellbore #1 - Wellbore #1												Offset Site Error: 0.0 ft	
Survey Program: 7300-UNKNOWN												Offset Well Error: 0.0 ft	
Reference		Offset		Semi Major Axis			Distance						Warning
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Highside Toolface	Offset Wellbore Centre		Between Centres	Between Ellipses	Minimum Separation	Separation Factor	
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	+N/-S (ft)	+E/-W (ft)	(ft)	(ft)	(ft)		
10,900.0	6,799.4	6,795.4	6,795.4	120.6	135.9	90.88	-214.4	5,117.8	910.5	654.0	256.52	3.550	
11,000.0	6,798.6	6,794.6	6,794.6	123.4	135.9	90.77	-214.4	5,117.8	821.1	561.8	259.29	3.167	
11,100.0	6,797.9	6,793.9	6,793.9	126.2	135.9	90.66	-214.4	5,117.8	734.3	472.3	262.07	2.802	
11,200.0	6,797.2	6,793.2	6,793.2	129.0	135.9	90.56	-214.4	5,117.8	651.4	386.6	264.85	2.460	
11,300.0	6,796.5	6,792.5	6,792.5	131.8	135.8	90.45	-214.4	5,117.8	574.0	306.3	267.62	2.145	
11,400.0	6,795.8	6,791.8	6,791.8	134.6	135.8	90.34	-214.4	5,117.8	504.5	234.1	270.40	1.866	
11,500.0	6,795.1	6,791.1	6,791.1	137.4	135.8	90.24	-214.4	5,117.8	446.8	173.6	273.18	1.635	
11,600.0	6,794.3	6,790.3	6,790.3	140.2	135.8	90.13	-214.4	5,117.8	405.8	129.9	275.95	1.471	Level 3
11,700.0	6,793.6	6,789.6	6,789.6	142.9	135.8	90.03	-214.4	5,117.8	387.0	108.3	278.73	1.388	Level 3
11,724.6	6,793.5	6,789.5	6,789.5	143.6	135.8	90.00	-214.4	5,117.8	386.2	106.8	279.41	1.382	Level 3, CC, ES, SF
11,800.0	6,792.9	6,788.9	6,788.9	145.7	135.8	89.92	-214.4	5,117.8	393.5	112.0	281.51	1.398	Level 3
11,900.0	6,792.2	6,788.2	6,788.2	148.5	135.8	89.81	-214.4	5,117.8	424.2	139.9	284.28	1.492	Level 3
11,927.9	6,792.0	6,788.0	6,788.0	149.0	135.8	89.78	-214.4	5,117.8	436.5	151.7	284.78	1.533	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Alles 22S-232
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Reference Site:	Alles 22S-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Alles 22S-232	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 (3-28-14)	Offset TVD Reference:	Offset Datum

Offset Design												Offset Site Error:	0.0 ft
Survey Program: 7300-UNKNOWN												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
9,500.0	6,809.4	6,807.4	6,807.4	81.8	136.1	91.15	-152.7	3,805.6	968.3	750.4	217.92	4.444	
9,600.0	6,808.7	6,806.7	6,806.7	84.6	136.1	91.03	-152.7	3,805.6	874.8	654.1	220.67	3.964	
9,700.0	6,807.9	6,805.9	6,805.9	87.3	136.1	90.90	-152.7	3,805.6	782.8	559.4	223.43	3.504	
9,800.0	6,807.2	6,805.2	6,805.2	90.1	136.1	90.77	-152.7	3,805.6	693.0	466.8	226.18	3.064	
9,900.0	6,806.5	6,804.5	6,804.5	92.9	136.1	90.65	-152.7	3,805.6	606.5	377.5	228.94	2.649	
10,000.0	6,805.8	6,803.8	6,803.8	95.6	136.1	90.52	-152.7	3,805.6	524.7	293.0	231.70	2.265	
10,100.0	6,805.1	6,803.1	6,803.1	98.4	136.1	90.39	-152.7	3,805.6	450.4	216.0	234.46	1.921	
10,200.0	6,804.4	6,802.4	6,802.4	101.2	136.0	90.27	-152.7	3,805.6	387.8	150.6	237.22	1.635	
10,300.0	6,803.6	6,801.6	6,801.6	104.0	136.0	90.14	-152.7	3,805.6	343.4	103.4	239.98	1.431	Level 3
10,400.0	6,802.9	6,800.9	6,800.9	106.7	136.0	90.02	-152.7	3,805.6	324.8	82.0	242.74	1.338	Level 3
10,412.4	6,802.8	6,800.8	6,800.8	107.1	136.0	90.00	-152.7	3,805.6	324.5	81.4	243.08	1.335	Level 3, CC, ES, SF
10,500.0	6,802.2	6,800.2	6,800.2	109.5	136.0	89.89	-152.7	3,805.6	336.2	90.6	245.50	1.369	Level 3
10,600.0	6,801.5	6,799.5	6,799.5	112.3	136.0	89.76	-152.7	3,805.6	374.9	126.6	248.27	1.510	
10,700.0	6,800.8	6,798.8	6,798.8	115.1	136.0	89.64	-152.7	3,805.6	433.6	182.6	251.03	1.727	
10,800.0	6,800.1	6,798.1	6,798.1	117.9	136.0	89.51	-152.7	3,805.6	505.5	251.8	253.79	1.992	
10,900.0	6,799.4	6,797.4	6,797.4	120.6	135.9	89.38	-152.7	3,805.6	585.7	329.2	256.56	2.283	
11,000.0	6,798.6	6,796.6	6,796.6	123.4	135.9	89.26	-152.7	3,805.6	671.3	412.0	259.32	2.589	
11,100.0	6,797.9	6,795.9	6,795.9	126.2	135.9	89.13	-152.7	3,805.6	760.4	498.3	262.08	2.901	
11,200.0	6,797.2	6,795.2	6,795.2	129.0	135.9	89.01	-152.7	3,805.6	851.9	587.0	264.84	3.216	
11,300.0	6,796.5	6,794.5	6,794.5	131.8	135.9	88.88	-152.7	3,805.6	945.1	677.5	267.61	3.532	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Alles 22S-232
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Reference Site:	Alles 22S-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Alles 22S-232	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 (3-28-14)	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 4660.0ft (Enisgn 14 RKB - 1 Coordinates are relative to: Alles 22S-232
Offset Depths are relative to Offset Datum
Central Meridian is -105.500000 °
Coordinate System is US State Plane 1983, Colorado Northern Zone
Grid Convergence at Surface is: 0.55°



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Alles 22S-232
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Reference Site:	Alles 22S-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4660.0ft (Enisgn 14 RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Alles 22S-232	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 (3-28-14)	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 4660.0ft (Enisgn 14 RKB - 1 Coordinates are relative to: Alles 22S-232

Offset Depths are relative to Offset Datum

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