

PETROLEUM DEVELOPMENT CORP Weld County CO

Well Name: **Alles 22S-432**

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

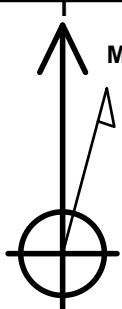
Ground Elevation: 4645.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1383673.18	3239030.56	40.383410	-104.641950	

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

WELLBORE TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
LEASE LINE	1.0	-2088.7	-748.3	Polygon
SHL 2151'FSL, 572'FEL, SEC.22	1.0			Point
BHL 2326'FSL, 500'FEL, SEC.23	6953.0	157.2	5326.6	Point
Target Sidetrack Casing Pt	6985.0	207.0	100.0	Point



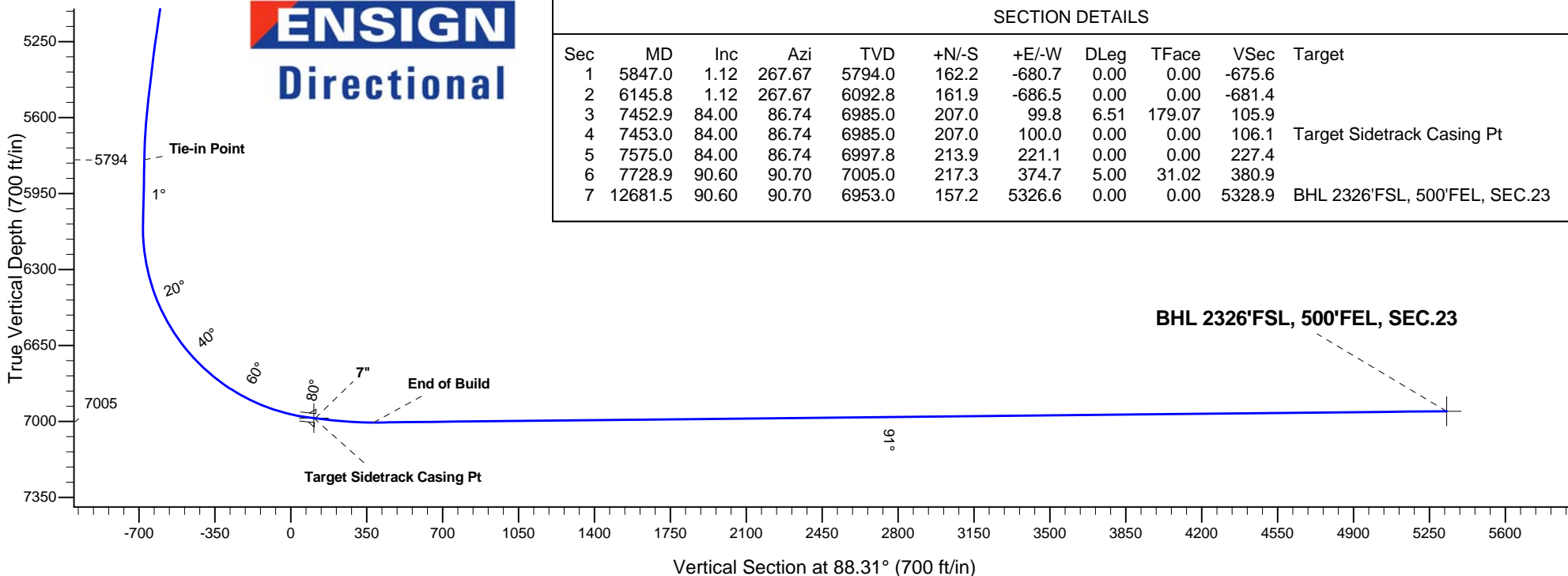
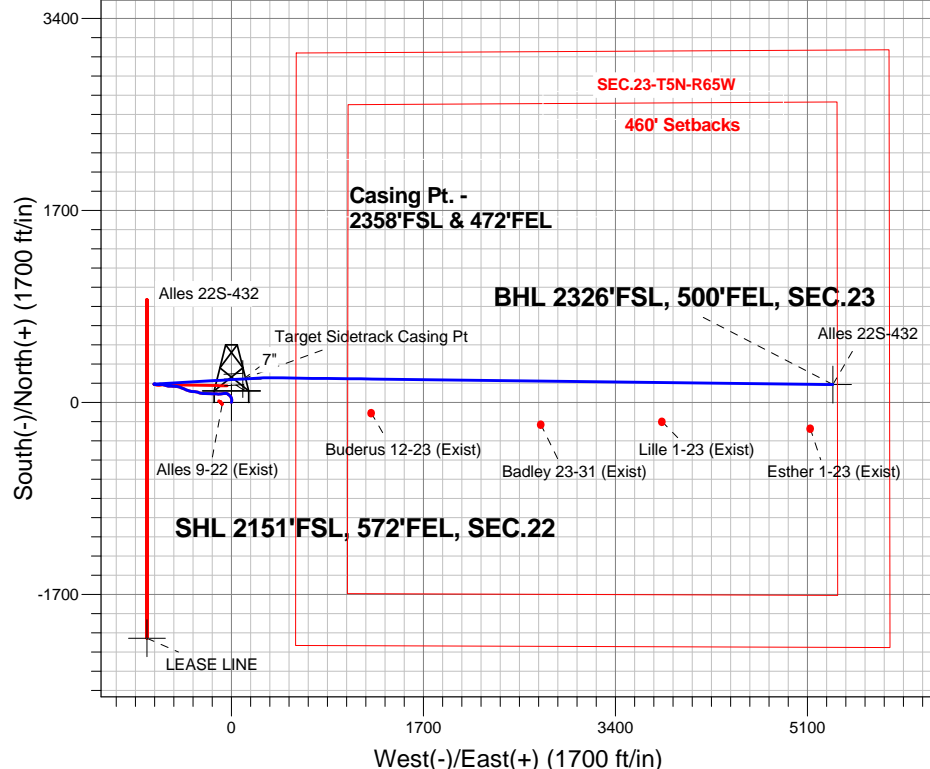
Azimuths to True North
Magnetic North: 8.44°

Magnetic Field
Strength: 52858.7srT
Dip Angle: 66.97°
Date: 2/4/2014
Model: IGRF2010

ANNOTATIONS

TVD	MD	Annotation
5794.0	5847.0	Tie-in Point
7005.0	7728.9	End of Build

Alles 22S-HZ Pad Sec.22-T5N-R65W
Alles 22S-432
Plan #5 (3-10-14) Sidetrack
8:51, March 10 2014



SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	VSoc	Target
1	5847.0	1.12	267.67	5794.0	162.2	-680.7	0.00	0.00	-675.6	
2	6145.8	1.12	267.67	6092.8	161.9	-686.5	0.00	0.00	-681.4	
3	7452.9	84.00	86.74	6985.0	207.0	99.8	6.51	179.07	105.9	
4	7453.0	84.00	86.74	6985.0	207.0	100.0	0.00	0.00	106.1	Target Sidetrack Casing Pt
5	7575.0	84.00	86.74	6997.8	213.9	221.1	0.00	0.00	227.4	
6	7728.9	90.60	90.70	7005.0	217.3	374.7	5.00	31.02	380.9	
7	12681.5	90.60	90.70	6953.0	157.2	5326.6	0.00	0.00	5328.9	BHL 2326'FSL, 500'FEL, SEC.23



Directional

PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.22-T5N-R65W

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

Alles 22S-432

Wellbore #1

Plan: Plan #5 (3-10-14) Sidetrack

Standard Planning Report

10 March, 2014

Database:	Landmark	Local Co-ordinate Reference:	Well Alles 22S-432
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4660.0ft (RKB - 15')
Project:	SEC.22-T5N-R65W	MD Reference:	WELL @ 4660.0ft (RKB - 15')
Site:	Alles 22S-HZ Pad Sec.22-T5N-R65W	North Reference:	True
Well:	Alles 22S-432	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #5 (3-10-14) Sidetrack		

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-432		
Well Position	+N/-S	54.6 ft	Northing:
	+E/-W	-25.1 ft	Easting:
Position Uncertainty		0.0 ft	Wellhead Elevation:
			ft
			Latitude:
			40.383410
			Longitude:
			-104.641950
			Ground Level:
			4,645.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	2/4/2014	8.44	66.97	52,859

Design	Plan #5 (3-10-14) Sidetrack			
Audit Notes:				
Version:	Phase:	PROTOTYPE	Tie On Depth:	5,847.0
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.0	0.0	0.0	88.31

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
5,847.0	1.12	267.67	5,794.0	162.2	-680.7	0.00	0.00	0.00	0.00	
6,145.8	1.12	267.67	6,092.8	161.9	-686.5	0.00	0.00	0.00	0.00	
7,452.9	84.00	86.74	6,985.0	207.0	99.8	6.51	6.34	13.70	179.07	
7,453.0	84.00	86.74	6,985.0	207.0	100.0	0.00	0.00	0.00	0.00	Target Sidetrack C
7,575.0	84.00	86.74	6,997.8	213.9	221.1	0.00	0.00	0.00	0.00	
7,728.9	90.60	90.70	7,005.0	217.3	374.7	5.00	4.29	2.57	31.02	
12,681.5	90.60	90.70	6,953.0	157.2	5,326.6	0.00	0.00	0.00	0.00	BHL 2326'FSL, 500

Database:	Landmark	Local Co-ordinate Reference:	Well Alles 22S-432
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Project:	SEC.22-T5N-R65W	MD Reference:	WELL @ 4660.0ft (RKB - 15')
Site:	Alles 22S-HZ Pad Sec.22-T5N-R65W	North Reference:	True
Well:	Alles 22S-432	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #5 (3-10-14) Sidetrack		

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)
5,847.0	1.12	267.67	5,794.0	162.2	-680.7	-675.6	0.00	0.00	0.00
Tie-in Point									
5,900.0	1.12	267.67	5,847.0	162.1	-681.7	-676.6	0.00	0.00	0.00
6,000.0	1.12	267.67	5,947.0	162.0	-683.7	-678.6	0.00	0.00	0.00
6,100.0	1.12	267.67	6,047.0	162.0	-685.6	-680.5	0.00	0.00	0.00
6,145.8	1.12	267.67	6,092.8	161.9	-686.5	-681.4	0.00	0.00	0.00
6,200.0	2.41	86.31	6,147.0	162.0	-685.9	-680.8	6.51	2.37	329.74
6,300.0	8.92	86.62	6,246.4	162.6	-676.1	-671.0	6.51	6.51	0.32
6,400.0	15.43	86.67	6,344.1	163.8	-655.0	-649.9	6.51	6.51	0.05
6,500.0	21.94	86.70	6,438.8	165.6	-623.1	-617.9	6.51	6.51	0.02
6,600.0	28.46	86.71	6,529.2	168.1	-580.6	-575.4	6.51	6.51	0.01
6,700.0	34.97	86.71	6,614.3	171.1	-528.1	-522.8	6.51	6.51	0.01
6,800.0	41.48	86.72	6,692.8	174.7	-466.4	-461.0	6.51	6.51	0.01
6,900.0	47.99	86.72	6,763.8	178.7	-396.1	-390.7	6.51	6.51	0.00
7,000.0	54.51	86.73	6,826.3	183.1	-318.3	-312.8	6.51	6.51	0.00
7,100.0	61.02	86.73	6,879.6	188.0	-233.9	-228.3	6.51	6.51	0.00
7,200.0	67.53	86.73	6,923.0	193.1	-144.0	-138.3	6.51	6.51	0.00
7,300.0	74.04	86.74	6,955.9	198.5	-49.8	-43.9	6.51	6.51	0.00
7,400.0	80.56	86.74	6,977.9	204.0	47.5	53.5	6.51	6.51	0.00
7,452.9	84.00	86.74	6,985.0	207.0	99.8	105.9	6.51	6.51	0.00
7,453.0	84.00	86.74	6,985.0	207.0	100.0	106.1	0.00	0.00	0.00
7,460.0	84.00	86.74	6,985.7	207.4	106.9	113.0	0.00	0.00	0.00
7"									
7,500.0	84.00	86.74	6,989.9	209.7	146.6	152.8	0.00	0.00	0.00
7,575.0	84.00	86.74	6,997.8	213.9	221.1	227.4	0.00	0.00	0.00
7,600.0	85.07	87.38	7,000.1	215.2	246.0	252.2	5.00	4.29	2.59
7,700.0	89.36	89.95	7,005.0	217.5	345.8	352.0	5.00	4.29	2.57
7,728.9	90.60	90.70	7,005.0	217.3	374.7	380.9	5.00	4.29	2.56
End of Build									
7,800.0	90.60	90.70	7,004.3	216.5	445.8	452.0	0.00	0.00	0.00
7,900.0	90.60	90.70	7,003.2	215.3	545.8	551.9	0.00	0.00	0.00
8,000.0	90.60	90.70	7,002.2	214.0	645.7	651.8	0.00	0.00	0.00
8,100.0	90.60	90.70	7,001.1	212.8	745.7	751.7	0.00	0.00	0.00
8,200.0	90.60	90.70	7,000.1	211.6	845.7	851.6	0.00	0.00	0.00
8,300.0	90.60	90.70	6,999.0	210.4	945.7	951.5	0.00	0.00	0.00
8,400.0	90.60	90.70	6,998.0	209.2	1,045.7	1,051.4	0.00	0.00	0.00
8,500.0	90.60	90.70	6,996.9	208.0	1,145.7	1,151.3	0.00	0.00	0.00
8,600.0	90.60	90.70	6,995.9	206.8	1,245.7	1,251.2	0.00	0.00	0.00
8,700.0	90.60	90.70	6,994.8	205.5	1,345.7	1,351.1	0.00	0.00	0.00
8,800.0	90.60	90.70	6,993.8	204.3	1,445.6	1,451.0	0.00	0.00	0.00
8,900.0	90.60	90.70	6,992.7	203.1	1,545.6	1,550.9	0.00	0.00	0.00
9,000.0	90.60	90.70	6,991.7	201.9	1,645.6	1,650.9	0.00	0.00	0.00
9,100.0	90.60	90.70	6,990.6	200.7	1,745.6	1,750.8	0.00	0.00	0.00
9,200.0	90.60	90.70	6,989.6	199.5	1,845.6	1,850.7	0.00	0.00	0.00
9,300.0	90.60	90.70	6,988.5	198.3	1,945.6	1,950.6	0.00	0.00	0.00
9,400.0	90.60	90.70	6,987.5	197.1	2,045.6	2,050.5	0.00	0.00	0.00
9,500.0	90.60	90.70	6,986.4	195.8	2,145.6	2,150.4	0.00	0.00	0.00
9,600.0	90.60	90.70	6,985.4	194.6	2,245.5	2,250.3	0.00	0.00	0.00
9,700.0	90.60	90.70	6,984.3	193.4	2,345.5	2,350.2	0.00	0.00	0.00
9,800.0	90.60	90.70	6,983.3	192.2	2,445.5	2,450.1	0.00	0.00	0.00
9,900.0	90.60	90.70	6,982.2	191.0	2,545.5	2,550.0	0.00	0.00	0.00
10,000.0	90.60	90.70	6,981.2	189.8	2,645.5	2,649.9	0.00	0.00	0.00
10,100.0	90.60	90.70	6,980.1	188.6	2,745.5	2,749.8	0.00	0.00	0.00

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Project:	SEC.22-T5N-R65W	MD Reference:	WELL @ 4660.0ft (RKB - 15')
Site:	Alles 22S-HZ Pad Sec.22-T5N-R65W	North Reference:	True
Well:	Alles 22S-432	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #5 (3-10-14) Sidetrack		

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)
10,200.0	90.60	90.70	6,979.1	187.3	2,845.5	2,849.8	0.00	0.00	0.00
10,300.0	90.60	90.70	6,978.0	186.1	2,945.4	2,949.7	0.00	0.00	0.00
10,400.0	90.60	90.70	6,977.0	184.9	3,045.4	3,049.6	0.00	0.00	0.00
10,500.0	90.60	90.70	6,975.9	183.7	3,145.4	3,149.5	0.00	0.00	0.00
10,600.0	90.60	90.70	6,974.9	182.5	3,245.4	3,249.4	0.00	0.00	0.00
10,700.0	90.60	90.70	6,973.8	181.3	3,345.4	3,349.3	0.00	0.00	0.00
10,800.0	90.60	90.70	6,972.8	180.1	3,445.4	3,449.2	0.00	0.00	0.00
10,900.0	90.60	90.70	6,971.7	178.9	3,545.4	3,549.1	0.00	0.00	0.00
11,000.0	90.60	90.70	6,970.7	177.6	3,645.4	3,649.0	0.00	0.00	0.00
11,100.0	90.60	90.70	6,969.6	176.4	3,745.3	3,748.9	0.00	0.00	0.00
11,200.0	90.60	90.70	6,968.6	175.2	3,845.3	3,848.8	0.00	0.00	0.00
11,300.0	90.60	90.70	6,967.5	174.0	3,945.3	3,948.7	0.00	0.00	0.00
11,400.0	90.60	90.70	6,966.5	172.8	4,045.3	4,048.6	0.00	0.00	0.00
11,500.0	90.60	90.70	6,965.4	171.6	4,145.3	4,148.6	0.00	0.00	0.00
11,600.0	90.60	90.70	6,964.4	170.4	4,245.3	4,248.5	0.00	0.00	0.00
11,700.0	90.60	90.70	6,963.3	169.2	4,345.3	4,348.4	0.00	0.00	0.00
11,800.0	90.60	90.70	6,962.3	167.9	4,445.3	4,448.3	0.00	0.00	0.00
11,900.0	90.60	90.70	6,961.2	166.7	4,545.2	4,548.2	0.00	0.00	0.00
12,000.0	90.60	90.70	6,960.2	165.5	4,645.2	4,648.1	0.00	0.00	0.00
12,100.0	90.60	90.70	6,959.1	164.3	4,745.2	4,748.0	0.00	0.00	0.00
12,200.0	90.60	90.70	6,958.1	163.1	4,845.2	4,847.9	0.00	0.00	0.00
12,300.0	90.60	90.70	6,957.0	161.9	4,945.2	4,947.8	0.00	0.00	0.00
12,400.0	90.60	90.70	6,956.0	160.7	5,045.2	5,047.7	0.00	0.00	0.00
12,500.0	90.60	90.70	6,954.9	159.4	5,145.2	5,147.6	0.00	0.00	0.00
12,600.0	90.60	90.70	6,953.9	158.2	5,245.2	5,247.5	0.00	0.00	0.00
12,681.5	90.60	90.70	6,953.0	157.2	5,326.6	5,328.9	0.00	0.00	0.00

Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
- hit/miss target									
- Shape									
Target Sidetrack Casi	0.00	0.00	6,985.0	207.0	100.0	1,383,881.13	3,239,128.55	40.383978	-104.641591
- plan hits target center									
- Point									
SHL 2151'FSL, 572'FI	0.00	0.00	1.0	0.0	0.0	1,383,673.20	3,239,030.56	40.383410	-104.641950
- plan misses target center by 5835.1ft at 5847.0ft MD (5794.0 TVD, 162.2 N, -680.7 E)									
- Point									
BHL 2326'FSL, 500'FI	0.00	0.00	6,953.0	157.2	5,326.6	1,383,881.95	3,244,355.18	40.383840	-104.622830
- plan hits target center									
- Point									
LEASE LINE	0.00	0.00	1.0	-2,088.7	-748.3	1,381,577.39	3,238,302.52	40.377677	-104.644636
- plan misses target center by 6215.3ft at 5847.0ft MD (5794.0 TVD, 162.2 N, -680.7 E)									
- Polygon									
Point 1			1.0	0.0	0.0	1,381,577.39	3,238,302.52		
Point 2			1.0	3,000.0	0.0	1,384,577.12	3,238,273.49		

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Project:	SEC.22-T5N-R65W	MD Reference:	WELL @ 4660.0ft (RKB - 15')
Site:	Alles 22S-HZ Pad Sec.22-T5N-R65W	North Reference:	True
Well:	Alles 22S-432	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #5 (3-10-14) Sidetrack		

Casing Points

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
7,460.0	6,985.7	7"	7	7-1/2

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
5,847.0	5,794.0	162.2	-680.7	Tie-in Point
7,728.9	7,005.0	217.3	374.7	End of Build



Directional

PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.22-T5N-R65W

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

Alles 22S-432

Wellbore #1

Plan #5 (3-10-14) Sidetrack

Anticollision Report

10 March, 2014



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Alles 22S-432
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4660.0ft (RKB - 15')
Reference Site:	Alles 22S-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4660.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Alles 22S-432	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 #5 (3-10-14) Sidetrack	Offset TVD Reference:	Offset Datum

Reference	Plan #5 (3-10-14) Sidetrack		
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 1,000.0ft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma		

Survey Tool Program	Date 3/10/2014			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
125.0	5,847.0	Survey #1 (Wellbore #1)	MWD	MWD - Standard
5,847.0	12,681.0	Plan #5 (3-10-14) Sidetrack (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 (10-22-13)	0.0	0.0	27.8			
Alles 22D-312 - Wellbore #1 - Plan #2 (10-22-13)	125.0	125.0	28.1	27.7	90.711	ES
Alles 22D-312 - Wellbore #1 - Plan #2 (10-22-13)	12,681.5	12,661.7	507.5	194.2	1.620	SF
Alles 22D-402 - Wellbore #1 - Plan #1 (5-16-13)	0.0	0.0	60.1			
Alles 22D-402 - Wellbore #1 - Plan #1 (5-16-13)	125.0	125.0	60.3	60.0	195.091	ES
Alles 22D-402 - Wellbore #1 - Plan #1 (5-16-13)	12,681.5	12,771.8	907.1	586.2	2.827	SF
Alles 22S-432 - Wellbore #1 - Wellbore #1	5,847.0	5,847.0	0.0	0.0	0.000	Level 1, CC, ES, SF
Lofland 22T & Alles 22S-HZ Existing Wells						
Alles 9-22 (Exist) - Wellbore #1 - Wellbore #1	1,422.5	1,411.3	67.6	61.1	10.346	CC, ES
Alles 9-22 (Exist) - Wellbore #1 - Wellbore #1	7,252.0	6,940.3	214.3	183.2	6.881	SF
Badley 23-31 (Exist) - Wellbore #1 - Wellbore #1	10,097.7	6,978.1	381.5	153.1	1.670	CC
Badley 23-31 (Exist) - Wellbore #1 - Wellbore #1	10,100.0	6,978.1	381.5	153.0	1.670	ES, SF
Buderus 12-23 (Exist) - Wellbore #1 - Wellbore #1	8,594.9	6,993.9	297.9	109.8	1.584	CC
Buderus 12-23 (Exist) - Wellbore #1 - Wellbore #1	8,600.0	6,993.9	297.9	109.7	1.583	ES, SF
Esther 1-23 (Exist) - Wellbore #1 - Wellbore #1	12,482.9	6,951.1	388.7	94.5	1.321	Level 3, CC
Esther 1-23 (Exist) - Wellbore #1 - Wellbore #1	12,500.0	6,950.9	389.0	94.4	1.320	Level 3, ES, SF
Lille 1-23 (Exist) - Wellbore #1 - Wellbore #1	11,170.0	6,966.9	342.9	85.0	1.329	Level 3, CC, ES, SF

Offset Design	Alles 22S-HZ Pad Sec.22-T5N-R65W - Alles 22D-312 - Wellbore #1 - Plan #2 (10-22-13)											Offset Site Error:	0.0ft
Survey Program:	0-MWD											Offset Well Error:	0.0ft
Reference Measured Depth (ft)	Vertical Depth (ft)	Offset Measured Depth (ft)	Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	156.40	-25.5	11.1	27.8				
125.0	125.0	125.0	125.0	0.1	0.2	132.30	-25.5	11.1	28.1	27.7	0.31	90.711	ES
218.0	218.0	218.0	218.0	0.4	0.4	139.00	-25.5	11.1	29.3	28.6	0.73	39.972	
313.0	312.9	312.9	312.9	0.6	0.6	151.65	-25.5	11.1	32.3	31.2	1.16	27.765	
407.0	406.8	406.8	406.8	0.8	0.8	157.84	-25.5	11.1	36.9	35.3	1.59	23.160	
470.0	469.6	469.6	469.6	0.9	0.9	165.95	-25.5	11.1	41.2	39.3	1.88	21.877	
565.0	564.2	564.2	564.2	1.2	1.2	174.02	-25.5	11.1	49.8	47.4	2.31	21.513	
596.0	595.1	595.1	595.1	1.3	1.2	176.61	-25.5	11.1	52.8	50.3	2.44	21.596	

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-432
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4660.0ft (RKB - 15')
Reference Site:	Alles 22S-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4660.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Alles 22S-432	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 #5 (3-10-14) Sidetrack	Offset TVD Reference:	Offset Datum

Offset Design													Offset Site Error:	0.0 ft
Survey Program: 0-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		
627.0	625.9	625.8	625.8	1.3	1.3	-179.48	-25.6	11.0	55.9	53.3	2.57	21.723		
659.0	657.7	657.4	657.4	1.4	1.4	-174.69	-25.7	10.6	59.5	56.8	2.71	21.938		
690.0	688.5	688.0	688.0	1.5	1.4	-172.74	-26.0	9.9	63.3	60.5	2.84	22.261		
786.0	783.7	782.5	782.4	1.8	1.6	-156.07	-27.8	5.8	76.6	73.4	3.25	23.559		
902.0	898.2	896.3	895.7	2.2	1.9	-138.67	-31.5	-3.0	94.4	90.7	3.77	25.042		
971.0	966.1	963.8	962.8	2.4	2.0	-136.17	-34.5	-10.1	105.5	101.4	4.11	25.642		
1,034.0	1,028.1	1,025.5	1,023.9	2.6	2.2	-125.64	-37.8	-17.9	115.0	110.6	4.44	25.917		
1,192.0	1,183.7	1,182.5	1,179.0	3.0	2.7	-91.31	-47.3	-40.7	129.3	124.0	5.33	24.261		
1,319.0	1,308.6	1,309.3	1,304.2	3.4	3.1	-92.00	-55.1	-59.1	134.4	128.3	6.11	21.990		
1,440.0	1,427.8	1,430.2	1,423.6	3.7	3.5	-94.12	-62.6	-76.7	139.4	132.5	6.88	20.259		
1,562.0	1,548.5	1,551.9	1,543.8	4.1	3.9	-110.93	-70.0	-94.5	147.1	139.4	7.67	19.170		
1,714.0	1,698.7	1,703.6	1,693.5	4.5	4.5	-98.55	-79.3	-116.6	157.9	149.2	8.69	18.166		
1,866.0	1,848.9	1,855.3	1,843.3	5.0	5.0	-102.07	-88.6	-138.7	167.2	157.5	9.72	17.194		
2,019.0	2,000.4	2,007.9	1,994.0	5.5	5.6	-101.34	-98.0	-160.9	177.0	166.3	10.76	16.457		
2,171.0	2,150.9	2,159.5	2,143.7	6.0	6.2	-104.65	-107.3	-183.0	187.6	175.8	11.79	15.912		
2,323.0	2,301.5	2,311.2	2,293.4	6.4	6.7	-96.83	-116.6	-205.1	197.5	184.7	12.81	15.419		
2,475.0	2,452.4	2,462.8	2,443.2	6.9	7.3	-99.55	-126.0	-227.2	206.8	193.0	13.82	14.964		
2,634.0	2,610.4	2,621.3	2,599.7	7.3	7.9	-100.50	-135.7	-250.3	217.3	202.4	14.85	14.635		
2,792.0	2,767.0	2,778.5	2,754.9	7.8	8.5	-115.51	-145.3	-273.2	232.3	216.5	15.85	14.660		
2,950.0	2,923.1	2,935.6	2,910.0	8.4	9.1	-104.10	-155.0	-296.1	249.2	232.2	16.96	14.690		
3,108.0	3,079.6	3,093.1	3,065.5	8.9	9.7	-94.51	-164.6	-319.0	261.3	243.3	18.04	14.487		
3,266.0	3,236.4	3,250.7	3,221.1	9.3	10.3	-98.07	-174.3	-342.0	272.2	253.1	19.07	14.269		
3,425.0	3,394.3	3,408.9	3,377.4	9.8	10.9	-110.84	-184.0	-365.0	286.0	266.0	20.07	14.250		
3,583.0	3,551.2	3,566.1	3,532.6	10.3	11.4	-105.23	-193.7	-387.9	301.5	280.4	21.08	14.299		
3,742.0	3,708.5	3,724.1	3,688.6	10.8	12.0	-111.92	-203.4	-411.0	319.0	296.9	22.11	14.430		
3,900.0	3,864.2	3,880.8	3,843.3	11.4	12.6	-112.91	-213.0	-433.8	339.2	316.0	23.22	14.608		
4,059.0	4,021.3	4,038.6	3,999.2	11.9	13.2	-110.76	-222.7	-456.8	358.3	334.0	24.34	14.722		
4,217.0	4,177.7	4,195.9	4,154.5	12.4	13.8	-95.37	-232.4	-479.7	373.2	347.8	25.44	14.669		
4,376.0	4,334.6	4,354.4	4,311.0	13.0	14.4	-93.69	-242.1	-502.8	385.2	358.6	26.58	14.491		
4,535.0	4,491.6	4,513.0	4,467.6	13.5	15.0	-92.01	-251.8	-525.9	396.3	368.6	27.72	14.296		
4,693.0	4,648.0	4,670.7	4,623.3	14.0	15.6	-92.54	-261.5	-548.9	406.8	378.0	28.80	14.127		
4,788.0	4,742.3	4,765.4	4,716.8	14.3	16.0	-97.47	-267.3	-562.7	413.6	384.2	29.41	14.063		
4,883.0	4,836.8	4,859.9	4,810.2	14.6	16.4	-109.74	-273.1	-576.4	422.0	392.0	29.97	14.077		
5,042.0	4,994.5	5,018.1	4,966.4	15.1	17.0	-103.25	-282.8	-599.5	437.7	406.7	31.00	14.121		
5,200.0	5,150.8	5,175.5	5,121.7	15.6	17.6	-97.04	-292.5	-622.4	452.0	419.9	32.09	14.084		
5,359.0	5,308.3	5,334.1	5,278.4	16.1	18.2	-79.53	-302.2	-645.5	462.0	428.8	33.18	13.921		
5,485.0	5,433.4	5,464.0	5,406.7	16.5	18.6	-88.37	-310.0	-663.9	468.3	434.4	33.97	13.786		
5,612.0	5,559.6	5,600.1	5,541.9	16.8	18.9	-99.86	-316.0	-678.1	475.4	440.8	34.66	13.718		
5,707.0	5,654.2	5,701.9	5,643.5	17.1	19.1	-104.48	-318.8	-684.9	480.0	444.9	35.12	13.669		
5,847.0	5,794.0	5,852.1	5,793.6	17.4	19.4	-86.70	-320.5	-688.8	482.7	447.1	35.64	13.543		
5,900.0	5,847.0	5,905.5	5,847.0	17.4	19.4	-86.82	-320.5	-688.9	482.7	446.9	35.81	13.478		
6,000.0	5,947.0	6,005.5	5,947.0	17.6	19.6	-87.05	-320.5	-688.9	482.6	446.4	36.13	13.356		
6,100.0	6,047.0	6,105.5	6,047.0	17.8	19.7	-87.29	-320.5	-688.9	482.5	446.0	36.45	13.236		
6,145.8	6,092.8	6,151.3	6,092.8	17.9	19.8	-87.39	-320.5	-688.9	482.4	445.8	36.60	13.181		
6,150.0	6,097.0	6,155.5	6,097.0	17.9	19.8	-87.70	-320.5	-688.9	482.4	445.8	36.61	13.177		
6,158.5	6,105.5	6,164.0	6,105.5	17.9	19.8	-90.00	-320.5	-688.9	482.4	445.8	36.64	13.168		
6,200.0	6,147.0	6,205.5	6,147.0	17.9	19.8	94.04	-320.5	-688.9	482.5	445.7	36.75	13.130		
6,250.0	6,196.8	6,255.6	6,197.0	18.0	19.9	94.05	-320.5	-687.7	482.7	445.9	36.83	13.109		
6,300.0	6,246.4	6,305.9	6,247.1	18.0	19.9	94.18	-320.5	-683.2	483.1	446.3	36.84	13.115		
6,350.0	6,295.6	6,356.3	6,296.9	17.9	19.9	94.28	-320.5	-675.4	483.7	446.9	36.80	13.145		
6,400.0	6,344.1	6,406.8	6,346.2	17.9	19.9	94.33	-320.6	-664.3	484.5	447.8	36.71	13.197		

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-432
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4660.0ft (RKB - 15')
Reference Site:	Alles 22S-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4660.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Alles 22S-432	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 #5 (3-10-14) Sidetrack	Offset TVD Reference:	Offset Datum

Offset Design Alles 22S-HZ Pad Sec.22-T5N-R65W - Alles 22D-312 - Wellbore #1 - Plan #2 (10-22-13)													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)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
6,450.0	6,391.9	6,457.3	6,394.6	17.8	19.8	94.32	94.32	-320.6	-650.0	485.4	448.8	36.58	13.270	
6,500.0	6,438.8	6,507.9	6,442.1	17.7	19.7	94.24	94.24	-320.7	-632.5	486.4	450.0	36.41	13.360	
6,550.0	6,484.6	6,558.4	6,488.2	17.6	19.6	94.11	94.11	-320.7	-611.9	487.6	451.4	36.22	13.464	
6,600.0	6,529.2	6,608.9	6,532.9	17.5	19.5	93.90	93.90	-320.8	-588.4	489.0	453.0	36.01	13.578	
6,650.0	6,572.5	6,659.3	6,575.8	17.4	19.4	93.64	93.64	-320.9	-562.0	490.5	454.7	35.81	13.698	
6,700.0	6,614.3	6,709.6	6,616.8	17.3	19.4	93.31	93.31	-321.0	-532.9	492.1	456.5	35.62	13.817	
6,750.0	6,654.4	6,759.7	6,655.6	17.2	19.3	92.93	92.93	-321.1	-501.2	493.9	458.4	35.46	13.927	
6,800.0	6,692.8	6,809.6	6,692.2	17.1	19.2	92.49	92.49	-321.2	-467.2	495.8	460.5	35.36	14.023	
6,850.0	6,729.3	6,859.3	6,726.3	17.0	19.2	92.00	92.00	-321.3	-431.1	497.9	462.6	35.33	14.094	
6,900.0	6,763.8	6,908.8	6,757.9	17.0	19.2	91.45	91.45	-321.4	-393.0	500.1	464.7	35.38	14.134	
6,950.0	6,796.2	6,958.0	6,786.7	17.0	19.2	90.86	90.86	-321.5	-353.2	502.5	466.9	35.55	14.134	
7,000.0	6,826.3	7,006.9	6,812.8	17.1	19.3	90.23	90.23	-321.6	-311.9	505.0	469.1	35.84	14.090	
7,050.0	6,854.2	7,055.5	6,836.1	17.3	19.4	89.56	89.56	-321.7	-269.2	507.6	471.4	36.27	13.998	
7,100.0	6,879.6	7,103.7	6,856.5	17.5	19.7	88.85	88.85	-321.9	-225.5	510.4	473.6	36.83	13.857	
7,150.0	6,902.6	7,151.6	6,873.9	17.9	20.0	88.11	88.11	-322.0	-180.9	513.4	475.8	37.55	13.671	
7,200.0	6,923.0	7,200.0	6,888.7	18.3	20.3	87.33	87.33	-322.1	-134.8	516.4	478.0	38.42	13.441	
7,250.0	6,940.8	7,246.4	6,900.1	18.8	20.8	86.55	86.55	-322.3	-89.9	519.7	480.2	39.43	13.181	
7,300.0	6,955.9	7,293.2	6,908.8	19.4	21.3	85.74	85.74	-322.4	-43.9	523.0	482.5	40.57	12.894	
7,350.0	6,968.3	7,339.6	6,914.6	20.1	21.9	84.91	84.91	-322.5	2.2	526.5	484.7	41.82	12.590	
7,400.0	6,977.9	7,385.7	6,917.6	20.8	22.5	84.07	84.07	-322.7	48.1	530.1	486.9	43.18	12.277	
7,452.9	6,985.0	7,434.9	6,917.8	21.7	23.3	83.17	83.17	-322.8	97.3	534.1	489.3	44.72	11.941	
7,453.0	6,985.0	7,435.1	6,917.8	21.7	23.3	83.17	83.17	-322.8	97.5	534.1	489.3	44.73	11.940	
7,500.0	6,989.9	7,481.6	6,917.2	22.5	24.0	82.62	82.62	-323.0	144.0	537.6	491.3	46.26	11.622	
7,575.0	6,997.8	7,556.0	6,916.1	24.0	25.4	81.75	81.75	-323.2	218.4	543.3	494.4	48.86	11.118	
7,600.0	7,000.1	7,580.8	6,915.8	24.4	25.8	81.36	81.36	-323.3	243.2	545.0	495.2	49.76	10.953	
7,700.0	7,005.0	7,680.5	6,914.3	26.5	27.8	80.49	80.49	-323.5	342.9	548.6	495.0	53.59	10.238	
7,728.9	7,005.0	7,709.4	6,913.9	27.1	28.3	80.45	80.45	-323.6	371.8	548.6	493.8	54.74	10.021	
7,800.0	7,004.3	7,780.5	6,912.9	28.7	29.9	80.41	80.41	-323.8	442.9	548.0	490.2	57.76	9.487	
7,900.0	7,003.2	7,880.5	6,911.5	30.9	32.1	80.35	80.35	-324.1	542.9	547.1	485.0	62.17	8.801	
8,000.0	7,002.2	7,980.5	6,910.0	33.3	34.4	80.30	80.30	-324.4	642.8	546.3	479.6	66.74	8.185	
8,100.0	7,001.1	8,080.5	6,908.6	35.7	36.7	80.24	80.24	-324.7	742.8	545.5	474.0	71.45	7.634	
8,200.0	7,000.1	8,180.5	6,907.2	38.2	39.2	80.19	80.19	-325.0	842.8	544.6	468.4	76.27	7.141	
8,300.0	6,999.0	8,280.5	6,905.7	40.7	41.6	80.13	80.13	-325.3	942.8	543.8	462.6	81.17	6.699	
8,400.0	6,998.0	8,380.5	6,904.3	43.2	44.2	80.07	80.07	-325.6	1,042.8	542.9	456.8	86.15	6.302	
8,500.0	6,996.9	8,480.4	6,902.9	45.8	46.7	80.02	80.02	-325.9	1,142.8	542.1	450.9	91.19	5.944	
8,600.0	6,995.9	8,580.4	6,901.5	48.4	49.3	79.96	79.96	-326.2	1,242.7	541.3	445.0	96.29	5.621	
8,700.0	6,994.8	8,680.4	6,900.0	51.1	51.9	79.90	79.90	-326.5	1,342.7	540.4	439.0	101.42	5.328	
8,800.0	6,993.8	8,780.4	6,898.6	53.7	54.5	79.85	79.85	-326.8	1,442.7	539.6	433.0	106.60	5.062	
8,900.0	6,992.7	8,880.4	6,897.2	56.4	57.1	79.79	79.79	-327.1	1,542.7	538.7	426.9	111.80	4.819	
9,000.0	6,991.7	8,980.4	6,895.7	59.0	59.8	79.73	79.73	-327.4	1,642.7	537.9	420.9	117.03	4.596	
9,100.0	6,990.6	9,080.4	6,894.3	61.7	62.5	79.67	79.67	-327.7	1,742.7	537.1	414.8	122.29	4.392	
9,200.0	6,989.6	9,180.4	6,892.9	64.4	65.2	79.62	79.62	-328.0	1,842.7	536.2	408.7	127.56	4.204	
9,300.0	6,988.5	9,280.4	6,891.4	67.1	67.8	79.56	79.56	-328.3	1,942.6	535.4	402.6	132.85	4.030	
9,400.0	6,987.5	9,380.4	6,890.0	69.8	70.5	79.50	79.50	-328.6	2,042.6	534.6	396.4	138.16	3.869	
9,500.0	6,986.4	9,480.4	6,888.6	72.6	73.2	79.44	79.44	-328.8	2,142.6	533.7	390.3	143.48	3.720	
9,600.0	6,985.4	9,580.4	6,887.1	75.3	76.0	79.38	79.38	-329.1	2,242.6	532.9	384.1	148.81	3.581	
9,700.0	6,984.3	9,680.4	6,885.7	78.0	78.7	79.33	79.33	-329.4	2,342.6	532.1	377.9	154.15	3.452	
9,800.0	6,983.3	9,780.4	6,884.3	80.8	81.4	79.27	79.27	-329.7	2,442.6	531.2	371.7	159.50	3.331	
9,900.0	6,982.2	9,880.4	6,882.8	83.5	84.1	79.21	79.21	-330.0	2,542.5	530.4	365.6	164.85	3.217	
10,000.0	6,981.2	9,980.4	6,881.4	86.3	86.9	79.15	79.15	-330.3	2,642.5	529.6	359.4	170.22	3.111	
10,100.0	6,980.1	10,080.4	6,880.0	89.0	89.6	79.09	79.09	-330.6	2,742.5	528.7	353.2	175.59	3.011	

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-432
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4660.0ft (RKB - 15')
Reference Site:	Alles 22S-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4660.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Alles 22S-432	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 #5 (3-10-14) Sidetrack	Offset TVD Reference:	Offset Datum

Offset Design													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)						
10,200.0	6,979.1	10,180.4	6,878.6	91.8	92.4	79.03	-330.9	2,842.5	527.9	347.0	180.96	2.917		
10,300.0	6,978.0	10,280.4	6,877.1	94.5	95.1	78.97	-331.2	2,942.5	527.1	340.7	186.34	2.829		
10,400.0	6,977.0	10,380.4	6,875.7	97.3	97.9	78.91	-331.5	3,042.5	526.3	334.5	191.72	2.745		
10,500.0	6,975.9	10,480.3	6,874.3	100.0	100.6	78.85	-331.8	3,142.4	525.4	328.3	197.11	2.666		
10,600.0	6,974.9	10,580.3	6,872.8	102.8	103.4	78.79	-332.1	3,242.4	524.6	322.1	202.50	2.591		
10,700.0	6,973.8	10,680.3	6,871.4	105.6	106.1	78.73	-332.4	3,342.4	523.8	315.9	207.89	2.520		
10,800.0	6,972.8	10,780.3	6,870.0	108.4	108.9	78.67	-332.7	3,442.4	523.0	309.7	213.28	2.452		
10,900.0	6,971.7	10,880.3	6,868.5	111.1	111.7	78.61	-333.0	3,542.4	522.1	303.5	218.68	2.388		
11,000.0	6,970.7	10,980.3	6,867.1	113.9	114.4	78.55	-333.3	3,642.4	521.3	297.2	224.07	2.326		
11,100.0	6,969.6	11,080.3	6,865.7	116.7	117.2	78.49	-333.6	3,742.4	520.5	291.0	229.47	2.268		
11,200.0	6,968.6	11,180.3	6,864.2	119.5	120.0	78.42	-333.9	3,842.3	519.7	284.8	234.87	2.213		
11,300.0	6,967.5	11,280.3	6,862.8	122.2	122.8	78.36	-334.1	3,942.3	518.8	278.6	240.26	2.159		
11,400.0	6,966.5	11,380.3	6,861.4	125.0	125.5	78.30	-334.4	4,042.3	518.0	272.3	245.66	2.109		
11,500.0	6,965.4	11,480.3	6,860.0	127.8	128.3	78.24	-334.7	4,142.3	517.2	266.1	251.06	2.060		
11,600.0	6,964.4	11,580.3	6,858.5	130.6	131.1	78.18	-335.0	4,242.3	516.4	259.9	256.46	2.013		
11,700.0	6,963.3	11,680.3	6,857.1	133.4	133.9	78.11	-335.3	4,342.3	515.5	253.7	261.85	1.969		
11,800.0	6,962.3	11,780.3	6,855.7	136.2	136.6	78.05	-335.6	4,442.2	514.7	247.5	267.25	1.926		
11,900.0	6,961.2	11,880.3	6,854.2	138.9	139.4	77.99	-335.9	4,542.2	513.9	241.3	272.64	1.885		
12,000.0	6,960.2	11,980.3	6,852.8	141.7	142.2	77.93	-336.2	4,642.2	513.1	235.0	278.04	1.845		
12,100.0	6,959.1	12,080.3	6,851.4	144.5	145.0	77.86	-336.5	4,742.2	512.3	228.8	283.43	1.807		
12,200.0	6,958.1	12,180.3	6,849.9	147.3	147.8	77.80	-336.8	4,842.2	511.4	222.6	288.82	1.771		
12,300.0	6,957.0	12,280.3	6,848.5	150.1	150.6	77.74	-337.1	4,942.2	510.6	216.4	294.22	1.736		
12,400.0	6,956.0	12,380.3	6,847.1	152.9	153.4	77.67	-337.4	5,042.2	509.8	210.2	299.60	1.702		
12,500.0	6,954.9	12,480.2	6,845.6	155.7	156.1	77.61	-337.7	5,142.1	509.0	204.0	304.99	1.669		
12,600.0	6,953.9	12,580.2	6,844.2	158.5	158.9	77.54	-338.0	5,242.1	508.2	197.8	310.38	1.637		
12,681.5	6,953.0	12,661.7	6,843.0	159.9	160.6	77.49	-338.2	5,323.6	507.5	194.2	313.34	1.620 SF		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Alles 22S-432
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4660.0ft (RKB - 15')
Reference Site:	Alles 22S-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4660.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Alles 22S-432	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 #5 (3-10-14) Sidetrack	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-MWDD													Offset Well Error:		0.0 ft
Reference		Offset		Semi Major Axis			Distance							Warning	
Measured Depth Vertical Depth (ft)	Vertical Depth (ft)	Measured Depth Vertical 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	155.35	-54.6	25.1	60.1						
125.0	125.0	125.0	125.0	0.1	0.2	130.99	-54.6	25.1	60.3	60.0	0.31	195.091	ES		
218.0	218.0	217.8	217.8	0.4	0.4	136.55	-54.7	25.0	61.6	60.8	0.73	84.418			
313.0	312.9	311.9	311.9	0.6	0.6	149.14	-56.2	23.5	65.3	64.2	1.15	57.038			
407.0	406.8	404.4	404.2	0.8	0.8	157.46	-59.7	19.8	72.1	70.6	1.57	46.019			
470.0	469.6	465.9	465.5	0.9	0.9	167.80	-63.1	16.1	79.2	77.3	1.87	42.275			
565.0	564.2	557.6	556.7	1.2	1.2	179.96	-70.0	8.9	94.0	91.7	2.33	40.302			
596.0	595.1	587.3	586.1	1.3	1.3	-176.01	-72.6	6.1	99.7	97.2	2.47	40.318			
627.0	625.9	616.9	615.4	1.3	1.3	-170.70	-75.5	3.1	105.6	103.0	2.62	40.326			
659.0	657.7	647.2	645.4	1.4	1.5	-164.70	-78.6	-0.2	112.4	109.6	2.78	40.375			
690.0	688.5	676.5	674.3	1.5	1.6	-161.87	-81.9	-3.6	119.4	116.4	2.94	40.656			
786.0	783.7	766.9	763.2	1.8	1.9	-143.07	-93.1	-15.4	143.1	139.7	3.43	41.731			
902.0	898.2	879.1	873.4	2.2	2.3	-124.42	-107.9	-31.0	172.2	168.2	4.06	42.454			
971.0	966.1	946.0	939.0	2.4	2.6	-121.98	-116.7	-40.3	188.9	184.5	4.46	42.321			
1,034.0	1,028.1	1,007.4	999.3	2.6	2.9	-112.05	-124.8	-48.8	203.1	198.3	4.84	41.956			
1,192.0	1,183.7	1,163.3	1,152.2	3.0	3.5	-78.74	-145.4	-70.5	227.8	221.9	5.83	39.079			
1,319.0	1,308.6	1,289.5	1,276.1	3.4	4.1	-79.29	-162.0	-88.0	240.9	234.3	6.67	36.098			
1,440.0	1,427.8	1,409.7	1,394.1	3.7	4.6	-81.65	-177.9	-104.7	253.9	246.5	7.48	33.952			
1,562.0	1,548.5	1,530.6	1,512.8	4.1	5.1	-99.23	-193.8	-121.5	270.3	262.0	8.28	32.640			
1,714.0	1,698.7	1,681.0	1,660.4	4.5	5.8	-87.69	-213.7	-142.4	291.8	282.5	9.31	31.330			
1,866.0	1,848.9	1,831.7	1,808.3	5.0	6.4	-91.82	-233.5	-163.3	311.8	301.5	10.36	30.102			
2,019.0	2,000.4	1,983.3	1,957.1	5.5	7.1	-91.98	-253.5	-184.4	332.7	321.3	11.39	29.216			
2,171.0	2,150.9	2,133.7	2,104.7	6.0	7.7	-96.03	-273.4	-205.3	354.2	341.8	12.40	28.562			
2,323.0	2,301.5	2,284.2	2,252.5	6.4	8.4	-89.23	-293.2	-226.2	375.3	361.8	13.42	27.964			
2,475.0	2,452.4	2,434.8	2,400.3	6.9	9.0	-92.82	-313.1	-247.1	395.7	381.3	14.39	27.498			
2,634.0	2,610.4	2,592.2	2,554.7	7.3	9.7	-95.10	-333.8	-268.9	418.0	402.7	15.39	27.158			
2,792.0	2,767.0	2,747.9	2,707.5	7.8	10.4	-110.76	-354.4	-290.5	444.5	428.2	16.32	27.241			
2,950.0	2,923.1	2,903.4	2,860.2	8.4	11.1	-99.81	-374.9	-312.1	472.4	455.0	17.46	27.059			
3,108.0	3,079.6	3,059.7	3,013.5	8.9	11.7	-90.71	-395.5	-333.8	495.8	477.2	18.55	26.731			
3,266.0	3,236.4	3,216.1	3,167.1	9.3	12.4	-94.97	-416.1	-355.6	518.0	498.4	19.57	26.474			
3,425.0	3,394.3	3,373.0	3,321.1	9.8	13.1	-108.50	-436.8	-377.4	543.2	522.7	20.52	26.470			
3,583.0	3,551.2	3,528.7	3,473.9	10.3	13.8	-103.54	-457.3	-399.0	569.9	548.4	21.52	26.483			
3,742.0	3,708.5	3,685.1	3,627.4	10.8	14.5	-110.37	-477.9	-420.7	598.6	576.1	22.49	26.620			
3,900.0	3,864.2	3,839.9	3,779.4	11.4	15.1	-111.38	-498.4	-442.2	629.7	606.1	23.60	26.683			
4,059.0	4,021.3	3,996.0	3,932.6	11.9	15.8	-109.54	-518.9	-463.9	659.9	635.2	24.75	26.663			
4,217.0	4,177.7	4,151.9	4,085.5	12.4	16.5	-94.25	-539.5	-485.5	685.9	660.0	25.87	26.516			
4,376.0	4,334.6	4,309.1	4,239.9	13.0	17.2	-92.45	-560.2	-507.4	709.0	682.0	27.01	26.252			
4,535.0	4,491.6	4,466.5	4,394.4	13.5	17.9	-90.84	-581.0	-529.2	731.2	703.0	28.17	25.956			
4,693.0	4,648.0	4,623.0	4,548.0	14.0	18.6	-91.58	-601.6	-551.0	752.9	723.6	29.25	25.737			
4,788.0	4,742.3	4,717.0	4,640.2	14.3	19.0	-96.85	-614.0	-564.0	766.4	736.5	29.87	25.659			
4,883.0	4,836.8	4,810.8	4,732.3	14.6	19.4	-109.45	-626.4	-577.0	781.4	751.0	30.39	25.708			
5,042.0	4,994.5	4,967.5	4,886.0	15.1	20.1	-103.14	-647.0	-598.8	808.3	776.9	31.38	25.760			
5,200.0	5,150.8	5,123.4	5,039.1	15.6	20.7	-97.00	-667.6	-620.4	833.7	801.2	32.48	25.665			
5,359.0	5,308.3	5,281.0	5,193.7	16.1	21.4	-79.72	-688.4	-642.3	854.8	821.2	33.63	25.414			
5,485.0	5,433.4	5,424.0	5,334.3	16.5	22.0	-88.84	-706.4	-661.3	869.6	835.1	34.43	25.256			
5,612.0	5,559.6	5,584.7	5,493.5	16.8	22.4	-100.33	-721.3	-677.0	882.8	847.7	35.13	25.129			
5,707.0	5,654.2	5,705.4	5,613.8	17.1	22.6	-104.98	-728.5	-684.5	890.4	854.7	35.67	24.964			
5,847.0	5,794.0	5,884.1	5,792.4	17.4	22.8	-87.14	-732.6	-688.9	894.8	858.6	36.27	24.674			
5,900.0	5,847.0	5,938.8	5,847.0	17.4	22.9	-87.21	-732.6	-688.9	894.8	858.4	36.44	24.559			
6,000.0	5,947.0	6,038.7	5,947.0	17.6	23.0	-87.33	-732.6	-688.9	894.7	858.0	36.75	24.349			
6,100.0	6,047.0	6,138.7	6,047.0	17.8	23.1	-87.46	-732.6	-688.9	894.6	857.6	37.06	24.140			

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-432
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4660.0ft (RKB - 15')
Reference Site:	Alles 22S-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4660.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Alles 22S-432	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 #5 (3-10-14) Sidetrack	Offset TVD Reference:	Offset Datum

Offset Design													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)						
6,145.8	6,092.8	6,184.5	6,092.8	17.9	23.1	-87.52	-732.6	-688.9	894.6	857.4	37.20	24.046		
6,150.0	6,097.0	6,188.7	6,097.0	17.9	23.1	-87.82	-732.6	-688.9	894.6	857.4	37.22	24.037		
6,158.3	6,105.3	6,197.0	6,105.3	17.9	23.2	-89.97	-732.6	-688.9	894.6	857.3	37.24	24.023		
6,200.0	6,147.0	6,238.7	6,147.0	17.9	23.2	93.88	-732.6	-688.9	894.6	857.3	37.34	23.959		
6,250.0	6,196.8	6,288.6	6,196.8	18.0	23.3	93.84	-732.6	-688.9	894.9	857.4	37.41	23.918		
6,300.0	6,246.4	6,338.4	6,246.6	18.0	23.3	94.14	-732.6	-688.8	895.3	857.9	37.44	23.915		
6,350.0	6,295.6	6,388.8	6,297.0	17.9	23.3	94.48	-732.7	-686.0	896.0	858.6	37.40	23.956		
6,400.0	6,344.1	6,439.8	6,347.6	17.9	23.3	94.80	-732.7	-679.9	896.8	859.5	37.31	24.034		
6,450.0	6,391.9	6,491.2	6,398.1	17.8	23.3	95.07	-732.7	-670.3	897.9	860.7	37.18	24.149		
6,500.0	6,438.8	6,543.0	6,448.2	17.7	23.3	95.31	-732.7	-657.2	899.1	862.1	37.01	24.296		
6,550.0	6,484.6	6,595.2	6,497.7	17.6	23.2	95.50	-732.8	-640.6	900.5	863.7	36.80	24.470		
6,600.0	6,529.2	6,647.7	6,546.2	17.5	23.1	95.65	-732.8	-620.6	902.0	865.4	36.57	24.664		
6,650.0	6,572.5	6,700.6	6,593.5	17.4	23.0	95.74	-732.9	-597.1	903.6	867.3	36.33	24.872		
6,700.0	6,614.3	6,753.6	6,639.3	17.3	22.9	95.79	-733.0	-570.2	905.4	869.3	36.10	25.081		
6,750.0	6,654.4	6,806.9	6,683.3	17.2	22.8	95.79	-733.1	-540.2	907.3	871.4	35.89	25.279		
6,800.0	6,692.8	6,860.3	6,725.1	17.1	22.7	95.73	-733.2	-507.0	909.3	873.6	35.73	25.451		
6,850.0	6,729.3	6,913.8	6,764.6	17.0	22.5	95.63	-733.3	-471.0	911.4	875.8	35.63	25.580		
6,900.0	6,763.8	6,967.3	6,801.5	17.0	22.4	95.47	-733.4	-432.3	913.6	877.9	35.62	25.649		
6,950.0	6,796.2	7,020.7	6,835.6	17.0	22.3	95.27	-733.5	-391.1	915.8	880.1	35.72	25.641		
7,000.0	6,826.3	7,074.1	6,866.6	17.1	22.2	95.02	-733.6	-347.7	918.1	882.2	35.95	25.542		
7,050.0	6,854.2	7,127.3	6,894.5	17.3	22.1	94.72	-733.8	-302.4	920.5	884.2	36.32	25.342		
7,100.0	6,879.6	7,180.3	6,919.1	17.5	22.1	94.38	-733.9	-255.5	922.9	886.1	36.86	25.038		
7,150.0	6,902.6	7,233.0	6,940.2	17.9	22.0	94.00	-734.0	-207.2	925.4	887.9	37.57	24.633		
7,200.0	6,923.0	7,285.4	6,957.9	18.3	22.1	93.57	-734.2	-157.9	928.0	889.6	38.45	24.137		
7,250.0	6,940.8	7,337.5	6,972.1	18.8	22.2	93.11	-734.3	-107.8	930.6	891.2	39.49	23.566		
7,300.0	6,955.9	7,389.2	6,982.7	19.4	22.3	92.61	-734.5	-57.2	933.3	892.6	40.69	22.937		
7,350.0	6,968.3	7,440.4	6,989.9	20.1	22.6	92.08	-734.6	-6.4	936.1	894.1	42.03	22.272		
7,400.0	6,977.9	7,490.2	6,995.1	20.8	23.0	91.62	-734.7	43.0	938.9	895.4	43.49	21.591		
7,452.9	6,985.0	7,543.3	7,000.3	21.7	23.7	91.30	-734.9	95.9	942.0	896.9	45.16	20.858		
7,453.0	6,985.0	7,543.5	7,000.4	21.7	23.7	91.30	-734.9	96.1	942.0	896.9	45.17	20.856		
7,500.0	6,989.9	7,590.9	7,003.2	22.5	24.3	91.16	-735.0	143.4	944.8	898.1	46.74	20.215		
7,575.0	6,997.8	7,666.0	7,003.8	24.0	25.5	90.72	-735.2	218.5	949.2	899.7	49.43	19.204		
7,600.0	7,000.1	7,690.8	7,003.6	24.4	25.9	90.45	-735.3	243.3	950.5	900.1	50.36	18.875		
7,700.0	7,005.0	7,790.5	7,002.6	26.5	27.8	89.86	-735.6	343.0	953.1	898.8	54.29	17.557		
7,728.9	7,005.0	7,819.4	7,002.3	27.1	28.4	89.84	-735.7	371.9	953.0	897.6	55.47	17.182		
7,800.0	7,004.3	7,890.5	7,001.6	28.7	29.9	89.85	-735.9	443.0	952.4	893.9	58.50	16.279		
7,900.0	7,003.2	7,990.5	7,000.6	30.9	32.1	89.85	-736.2	543.0	951.4	888.5	62.95	15.113		
8,000.0	7,002.2	8,090.5	6,999.6	33.3	34.4	89.85	-736.5	643.0	950.5	882.9	67.58	14.066		
8,100.0	7,001.1	8,190.5	6,998.6	35.7	36.8	89.86	-736.8	743.0	949.6	877.2	72.34	13.126		
8,200.0	7,000.1	8,290.5	6,997.6	38.2	39.2	89.86	-737.0	843.0	948.7	871.4	77.22	12.285		
8,300.0	6,999.0	8,390.5	6,996.6	40.7	41.6	89.86	-737.3	943.0	947.7	865.5	82.20	11.530		
8,400.0	6,998.0	8,490.5	6,995.6	43.2	44.2	89.87	-737.6	1,043.0	946.8	859.6	87.25	10.852		
8,500.0	6,996.9	8,590.5	6,994.7	45.8	46.7	89.87	-737.9	1,142.9	945.9	853.5	92.37	10.240		
8,600.0	6,995.9	8,690.5	6,993.7	48.4	49.3	89.87	-738.2	1,242.9	944.9	847.4	97.54	9.688		
8,700.0	6,994.8	8,790.5	6,992.7	51.1	51.9	89.88	-738.5	1,342.9	944.0	841.3	102.76	9.186		
8,800.0	6,993.8	8,890.5	6,991.7	53.7	54.5	89.88	-738.8	1,442.9	943.1	835.1	108.02	8.731		
8,900.0	6,992.7	8,990.5	6,990.7	56.4	57.1	89.88	-739.0	1,542.9	942.2	828.9	113.32	8.314		
9,000.0	6,991.7	9,090.5	6,989.7	59.0	59.8	89.89	-739.3	1,642.9	941.2	822.6	118.64	7.933		
9,100.0	6,990.6	9,190.5	6,988.7	61.7	62.4	89.89	-739.6	1,742.9	940.3	816.3	123.99	7.584		
9,200.0	6,989.6	9,290.5	6,987.7	64.4	65.1	89.89	-739.9	1,842.9	939.4	810.0	129.37	7.262		
9,300.0	6,988.5	9,390.5	6,986.7	67.1	67.8	89.90	-740.2	1,942.9	938.5	803.7	134.76	6.964		

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-432
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4660.0ft (RKB - 15')
Reference Site:	Alles 22S-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4660.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Alles 22S-432	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 #5 (3-10-14) Sidetrack	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-402 - Wellbore #1 - Plan #1 (5-16-13)													
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)					
9,400.0	6,987.5	9,490.5	6,985.7	69.8	70.5	89.90	-740.5	2,042.9	937.5	797.4	140.17	6.689	
9,500.0	6,986.4	9,590.5	6,984.7	72.6	73.2	89.90	-740.8	2,142.8	936.6	791.0	145.60	6.433	
9,600.0	6,985.4	9,690.5	6,983.7	75.3	75.9	89.90	-741.0	2,242.8	935.7	784.6	151.04	6.195	
9,700.0	6,984.3	9,790.5	6,982.7	78.0	78.6	89.91	-741.3	2,342.8	934.8	778.3	156.49	5.973	
9,800.0	6,983.3	9,890.5	6,981.7	80.8	81.3	89.91	-741.6	2,442.8	933.8	771.9	161.96	5.766	
9,900.0	6,982.2	9,990.5	6,980.7	83.5	84.1	89.91	-741.9	2,542.8	932.9	765.5	167.43	5.572	
10,000.0	6,981.2	10,090.4	6,979.7	86.3	86.8	89.92	-742.2	2,642.8	932.0	759.1	172.92	5.390	
10,100.0	6,980.1	10,190.4	6,978.7	89.0	89.5	89.92	-742.5	2,742.8	931.0	752.6	178.41	5.219	
10,200.0	6,979.1	10,290.4	6,977.7	91.8	92.3	89.92	-742.8	2,842.8	930.1	746.2	183.91	5.058	
10,300.0	6,978.0	10,390.4	6,976.7	94.5	95.0	89.93	-743.1	2,942.8	929.2	739.8	189.42	4.906	
10,400.0	6,977.0	10,490.4	6,975.8	97.3	97.8	89.93	-743.3	3,042.8	928.3	733.3	194.93	4.762	
10,500.0	6,975.9	10,590.4	6,974.8	100.0	100.5	89.93	-743.6	3,142.8	927.3	726.9	200.45	4.626	
10,600.0	6,974.9	10,690.4	6,973.8	102.8	103.3	89.94	-743.9	3,242.7	926.4	720.4	205.97	4.498	
10,700.0	6,973.8	10,790.4	6,972.8	105.6	106.0	89.94	-744.2	3,342.7	925.5	714.0	211.50	4.376	
10,800.0	6,972.8	10,890.4	6,971.8	108.4	108.8	89.94	-744.5	3,442.7	924.6	707.5	217.04	4.260	
10,900.0	6,971.7	10,990.4	6,970.8	111.1	111.6	89.95	-744.8	3,542.7	923.6	701.1	222.58	4.150	
11,000.0	6,970.7	11,090.4	6,969.8	113.9	114.3	89.95	-745.1	3,642.7	922.7	694.6	228.12	4.045	
11,100.0	6,969.6	11,190.4	6,968.8	116.7	117.1	89.95	-745.3	3,742.7	921.8	688.1	233.67	3.945	
11,200.0	6,968.6	11,290.4	6,967.8	119.5	119.9	89.96	-745.6	3,842.7	920.9	681.6	239.22	3.849	
11,300.0	6,967.5	11,390.4	6,966.8	122.2	122.6	89.96	-745.9	3,942.7	919.9	675.2	244.77	3.758	
11,400.0	6,966.5	11,490.4	6,965.8	125.0	125.4	89.96	-746.2	4,042.7	919.0	668.7	250.33	3.671	
11,500.0	6,965.4	11,590.4	6,964.8	127.8	128.2	89.97	-746.5	4,142.7	918.1	662.2	255.89	3.588	
11,600.0	6,964.4	11,690.4	6,963.8	130.6	130.9	89.97	-746.8	4,242.6	917.1	655.7	261.45	3.508	
11,700.0	6,963.3	11,790.4	6,962.8	133.4	133.7	89.98	-747.1	4,342.6	916.2	649.2	267.01	3.431	
11,800.0	6,962.3	11,890.4	6,961.8	136.2	136.5	89.98	-747.4	4,442.6	915.3	642.7	272.58	3.358	
11,900.0	6,961.2	11,990.4	6,960.8	138.9	139.3	89.98	-747.6	4,542.6	914.4	636.2	278.14	3.287	
12,000.0	6,960.2	12,090.4	6,959.8	141.7	142.1	89.99	-747.9	4,642.6	913.4	629.7	283.71	3.220	
12,100.0	6,959.1	12,190.4	6,958.8	144.5	144.8	89.99	-748.2	4,742.6	912.5	623.2	289.29	3.154	
12,200.0	6,958.1	12,290.4	6,957.8	147.3	147.6	89.99	-748.5	4,842.6	911.6	616.7	294.86	3.092	
12,300.0	6,957.0	12,390.4	6,956.9	150.1	150.4	90.00	-748.8	4,942.6	910.7	610.2	300.44	3.031	
12,400.0	6,956.0	12,490.3	6,955.9	152.9	153.2	90.00	-749.1	5,042.6	909.7	603.7	306.01	2.973	
12,500.0	6,954.9	12,590.3	6,954.9	155.7	156.0	90.00	-749.4	5,142.6	908.8	597.2	311.59	2.917	
12,600.0	6,953.9	12,690.3	6,953.9	158.5	158.8	90.01	-749.6	5,242.6	907.9	590.7	317.17	2.862	
12,681.5	6,953.0	12,771.8	6,953.1	159.9	161.0	90.01	-749.9	5,324.0	907.1	586.2	320.89	2.827 SF	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Alles 22S-432
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4660.0ft (RKB - 15')
Reference Site:	Alles 22S-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4660.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Alles 22S-432	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 #5 (3-10-14) Sidetrack	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		
5,847.0	5,794.0	5,847.0	5,794.0	0.0	0.0	0.00	162.2	-680.7	0.0	0.0	0.00	0.000	Level 1, CC, ES, SF	
5,876.5	5,823.6	5,876.5	5,823.6	0.1	0.1	-154.39	162.1	-681.1	0.1	0.0	0.11	1.153	Level 2	
5,900.0	5,847.0	5,900.0	5,847.0	0.1	0.1	-153.57	162.0	-681.4	0.3	0.1	0.20	1.428	Level 3	
6,000.0	5,947.0	6,000.0	5,947.0	0.3	0.3	-150.04	161.6	-682.8	1.0	0.4	0.57	1.761		
6,100.0	6,047.0	6,100.0	6,047.0	0.5	0.5	-148.58	161.0	-684.0	1.9	0.9	0.95	1.993		
6,145.8	6,092.8	6,145.8	6,092.8	0.6	0.6	-150.97	160.8	-684.3	2.5	1.4	1.12	2.210		
6,150.0	6,097.0	6,150.0	6,097.0	0.6	0.6	-151.41	160.8	-684.3	2.5	1.4	1.14	2.226		
6,200.0	6,147.0	6,199.9	6,146.9	0.7	0.7	48.18	160.5	-684.4	2.2	0.9	1.26	1.719		
6,219.2	6,166.1	6,219.1	6,166.1	0.7	0.7	68.81	160.2	-684.1	2.0	0.7	1.24	1.595		
6,250.0	6,196.8	6,249.8	6,196.8	0.8	0.8	101.07	159.5	-682.8	2.7	1.4	1.26	2.143		
6,300.0	6,246.4	6,299.8	6,246.5	0.8	0.8	114.22	157.7	-678.0	5.3	3.9	1.33	3.962		
6,350.0	6,295.6	6,349.8	6,295.8	0.9	0.9	113.79	155.5	-669.8	8.2	6.9	1.31	6.248		
6,400.0	6,344.1	6,399.8	6,344.2	1.0	1.0	106.30	152.5	-657.7	11.6	10.5	1.16	10.005		
6,450.0	6,391.9	6,450.9	6,392.7	1.1	1.0	99.91	151.1	-641.8	13.6	12.6	0.97	14.034		
6,500.0	6,438.8	6,501.6	6,440.0	1.1	1.1	97.53	153.8	-623.6	11.9	11.1	0.77	15.471		
6,550.0	6,484.6	6,551.3	6,485.5	1.2	1.1	99.73	156.7	-604.0	10.2	9.6	0.57	17.986		
6,584.8	6,515.8	6,586.1	6,516.9	1.2	1.2	104.18	158.0	-589.3	9.9	9.4	0.48	20.593		
6,600.0	6,529.2	6,601.2	6,530.4	1.2	1.2	105.34	158.4	-582.4	10.0	9.5	0.45	22.096		
6,650.0	6,572.5	6,651.2	6,573.8	1.2	1.2	105.21	159.0	-557.5	10.8	10.6	0.21	51.502		
6,700.0	6,614.3	6,701.1	6,615.4	1.3	1.3	103.22	158.8	-530.1	12.5	12.2	0.29	42.665		
6,750.0	6,654.4	6,750.7	6,655.7	1.3	1.3	103.23	157.6	-501.0	15.5	15.2	0.32	49.109		
6,800.0	6,692.8	6,801.0	6,694.8	1.4	1.4	103.85	155.9	-469.6	19.1	18.8	0.34	56.886		
6,850.0	6,729.3	6,851.2	6,732.3	1.4	1.4	104.80	154.8	-436.1	22.4	22.0	0.32	68.869		
6,900.0	6,763.8	6,901.5	6,767.9	1.5	1.5	105.87	153.8	-400.6	25.6	25.2	0.39	65.487		
6,950.0	6,796.2	6,951.8	6,801.9	1.6	1.6	107.87	153.2	-363.5	28.8	28.3	0.47	61.650		
7,000.0	6,826.3	7,002.0	6,833.6	1.8	1.7	109.30	152.5	-324.7	32.1	31.6	0.51	62.592		
7,050.0	6,854.2	7,052.7	6,863.1	2.0	1.8	109.72	151.5	-283.4	35.8	35.3	0.49	72.369		
7,100.0	6,879.6	7,103.7	6,890.2	2.3	1.9	110.13	151.1	-240.3	38.8	38.4	0.43	89.306		
7,150.0	6,902.6	7,154.0	6,914.0	2.7	2.1	109.55	150.6	-196.0	42.0	40.8	1.19	35.271		
7,200.0	6,923.0	7,204.7	6,933.9	3.3	2.3	106.71	149.2	-149.4	45.5	43.4	2.16	21.029		
7,250.0	6,940.8	7,255.8	6,949.7	4.1	2.6	102.46	148.0	-100.9	48.7	45.3	3.37	14.453		
7,300.0	6,955.9	7,306.3	6,962.3	6.7	3.0	98.38	147.2	-52.0	51.7	46.8	4.92	10.501		
7,350.0	6,968.3	7,321.0	6,965.4	8.0	3.1	96.41	147.0	-37.6	65.2	59.1	6.07	10.752		
7,400.0	6,977.9	7,321.0	6,965.4	8.9	3.1	92.43	147.0	-37.6	103.2	96.1	7.07	14.591		
7,452.9	6,985.0	7,321.0	6,965.4	9.7	3.1	84.81	147.0	-37.6	151.2	143.2	8.06	18.765		
7,453.0	6,985.0	7,321.0	6,965.4	9.7	3.1	84.81	147.0	-37.6	151.4	143.3	8.06	18.777		
7,500.0	6,989.9	7,321.0	6,965.4	10.5	3.1	84.81	147.0	-37.6	196.1	187.3	8.84	22.175		
7,575.0	6,997.8	7,321.0	6,965.4	11.6	3.1	84.81	147.0	-37.6	269.2	259.0	10.18	26.440		
7,600.0	7,000.1	7,321.0	6,965.4	12.0	3.1	79.78	147.0	-37.6	293.7	283.3	10.41	28.201		
7,700.0	7,005.0	7,321.0	6,965.4	13.5	3.1	63.32	147.0	-37.6	391.8	381.2	10.61	36.916		
7,728.9	7,005.0	7,321.0	6,965.4	14.0	3.1	59.78	147.0	-37.6	420.1	409.5	10.55	39.821		
7,800.0	7,004.3	7,321.0	6,965.4	15.1	3.1	59.78	147.0	-37.6	489.9	477.9	11.92	41.090		
7,900.0	7,003.2	7,321.0	6,965.4	16.7	3.1	59.78	147.0	-37.6	588.5	574.6	13.92	42.283		
8,000.0	7,002.2	7,321.0	6,965.4	18.5	3.1	59.78	147.0	-37.6	687.6	671.6	15.98	43.017		
8,100.0	7,001.1	7,321.0	6,965.4	20.5	3.1	59.78	147.0	-37.6	786.9	768.8	18.10	43.463		
8,200.0	7,000.1	7,321.0	6,965.4	22.6	3.1	59.78	147.0	-37.6	886.3	866.1	20.27	43.726		
8,300.0	6,999.0	7,321.0	6,965.4	24.9	3.1	59.78	147.0	-37.6	985.9	963.4	22.47	43.872		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Alles 22S-432
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4660.0ft (RKB - 15')
Reference Site:	Alles 22S-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4660.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Alles 22S-432	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 #5 (3-10-14) Sidetrack	Offset TVD Reference:	Offset Datum

Offset Design													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 (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	1.0	1.0	0.0	0.0	-89.99	0.0	-100.3	100.3	100.3	0.00	N/A		
125.0	125.0	125.8	125.8	0.1	0.2	-114.37	0.7	-100.5	100.6	100.3	0.34	295.453		
218.0	218.0	218.8	218.8	0.4	0.4	-110.61	1.1	-100.7	101.4	100.7	0.79	127.761		
313.0	312.9	313.9	313.9	0.6	0.7	-103.55	1.4	-100.8	102.6	101.4	1.26	81.748		
407.0	406.8	408.5	408.5	0.8	0.9	-103.27	1.9	-100.5	103.4	101.7	1.69	61.231		
470.0	469.6	471.3	471.2	0.9	1.0	-99.36	2.5	-100.2	103.8	101.9	1.98	52.429		
565.0	564.2	565.8	565.8	1.2	1.3	-97.51	3.2	-99.7	104.5	102.1	2.44	42.776		
596.0	595.1	596.6	596.6	1.3	1.3	-96.76	3.4	-99.6	104.7	102.1	2.59	40.413		
627.0	625.9	627.6	627.5	1.3	1.4	-94.67	3.6	-99.5	104.9	102.1	2.74	38.242		
659.0	657.7	659.5	659.5	1.4	1.5	-92.01	3.8	-99.3	104.9	102.0	2.91	36.076		
690.0	688.5	690.4	690.4	1.5	1.6	-92.32	4.1	-99.2	104.8	101.7	3.07	34.149		
786.0	783.7	785.4	785.4	1.8	1.8	-83.27	4.9	-98.6	103.3	99.7	3.58	28.859		
902.0	898.2	900.0	899.9	2.2	2.1	-75.78	5.7	-98.1	98.8	94.6	4.22	23.436		
971.0	966.1	967.9	967.9	2.4	2.3	-79.98	6.1	-97.8	95.6	91.0	4.61	20.751		
1,034.0	1,028.1	1,029.9	1,029.9	2.6	2.4	-76.03	6.5	-97.4	92.7	87.8	4.95	18.747		
1,192.0	1,183.7	1,185.0	1,185.0	3.0	2.8	-57.37	7.3	-96.5	80.4	74.7	5.69	14.135		
1,319.0	1,308.6	1,309.5	1,309.5	3.4	3.0	-72.73	7.2	-95.8	70.3	64.1	6.20	11.328		
1,422.5	1,410.5	1,411.3	1,411.3	3.7	3.1	-88.67	7.0	-95.2	67.6	61.1	6.54	10.346 CC, ES		
1,440.0	1,427.8	1,428.6	1,428.6	3.7	3.2	-91.29	6.9	-95.1	67.7	61.1	6.58	10.282		
1,562.0	1,548.5	1,549.1	1,549.0	4.1	3.3	-122.65	6.4	-94.8	73.6	66.7	6.88	10.694		
1,714.0	1,698.7	1,699.5	1,699.4	4.5	3.3	-123.75	5.2	-95.1	87.0	79.8	7.22	12.057		
1,866.0	1,848.9	1,849.9	1,849.9	5.0	3.4	-137.44	4.2	-95.9	102.6	95.0	7.59	13.514		
2,019.0	2,000.4	2,001.8	2,001.8	5.5	3.6	-143.90	3.3	-96.9	119.3	111.3	8.04	14.841		
2,171.0	2,150.9	2,153.1	2,153.0	6.0	3.8	-152.74	3.2	-98.1	136.7	128.1	8.55	15.984		
2,323.0	2,301.5	2,304.1	2,304.0	6.4	4.0	-149.50	3.6	-99.6	152.9	143.8	9.13	16.748		
2,475.0	2,452.4	2,456.2	2,456.1	6.9	4.3	-156.64	4.5	-101.2	167.8	158.1	9.74	17.238		
2,634.0	2,610.4	2,615.0	2,614.9	7.3	4.6	-161.38	5.7	-104.0	181.4	171.0	10.40	17.435		
2,792.0	2,767.0	2,772.2	2,772.0	7.8	4.9	-178.80	6.7	-107.1	198.0	187.0	11.03	17.948		
2,950.0	2,923.1	2,927.9	2,927.7	8.4	5.3	-168.12	8.1	-109.6	219.4	207.6	11.75	18.665		
3,108.0	3,079.6	3,084.0	3,083.8	8.9	5.6	-160.55	10.1	-111.2	238.2	225.7	12.48	19.090		
3,266.0	3,236.4	3,239.0	3,238.8	9.3	6.0	-166.62	11.9	-112.2	255.4	242.2	13.19	19.357		
3,425.0	3,394.3	3,394.5	3,394.3	9.8	6.3	178.69	12.8	-112.0	273.6	259.7	13.85	19.756		
3,583.0	3,551.2	3,548.0	3,547.8	10.3	6.5	-176.74	12.4	-110.7	293.8	279.4	14.38	20.426		
3,742.0	3,708.5	3,703.1	3,702.9	10.8	6.7	176.00	11.1	-108.0	319.7	304.8	14.88	21.485		
3,900.0	3,864.2	3,858.2	3,857.9	11.4	6.9	175.78	9.2	-105.3	349.5	334.1	15.45	22.622		
4,059.0	4,021.3	4,015.1	4,014.8	11.9	7.1	178.49	7.2	-102.5	377.3	361.2	16.08	23.466		
4,217.0	4,177.7	4,171.4	4,171.1	12.4	7.3	-166.22	5.2	-100.0	402.9	386.3	16.66	24.189		
4,376.0	4,334.6	4,330.1	4,329.7	13.0	7.6	-164.96	3.7	-97.7	430.4	413.1	17.26	24.936		
4,535.0	4,491.6	4,485.4	4,485.0	13.5	7.8	-163.68	2.5	-95.8	457.0	439.1	17.92	25.501		
4,693.0	4,648.0	4,635.2	4,634.8	14.0	8.1	-164.85	0.0	-93.0	482.1	463.5	18.56	25.977		
4,788.0	4,742.3	4,728.2	4,727.7	14.3	8.3	-170.29	-2.2	-90.6	496.1	477.1	18.96	26.168		
4,883.0	4,836.8	4,825.7	4,825.2	14.6	8.4	176.78	-4.2	-88.3	508.8	489.5	19.34	26.303		
5,042.0	4,994.5	4,987.6	4,987.0	15.1	8.7	-177.25	-6.1	-85.7	531.7	511.7	19.98	26.613		
5,200.0	5,150.8	5,148.5	5,147.9	15.6	9.1	-171.15	-7.3	-84.1	556.3	535.6	20.65	26.943		
5,359.0	5,308.3	5,310.1	5,309.5	16.1	9.3	-154.00	-8.4	-83.9	577.6	556.3	21.33	27.075		
5,485.0	5,433.4	5,436.8	5,436.2	16.5	9.5	-163.78	-8.9	-84.3	591.5	569.6	21.82	27.109		
5,612.0	5,559.6	5,564.2	5,563.6	16.8	9.7	-175.41	-9.5	-85.0	605.2	582.9	22.29	27.156		
5,707.0	5,654.2	5,658.4	5,657.8	17.1	9.9	-179.65	-9.7	-85.6	613.5	590.8	22.66	27.071		
5,847.0	5,794.0	5,792.3	5,791.7	17.4	10.1	-161.57	-9.5	-85.6	619.4	596.2	23.15	26.752		
5,900.0	5,847.0	5,843.5	5,842.9	17.4	10.2	-161.60	-9.6	-85.2	620.7	597.4	23.36	26.576		
6,000.0	5,947.0	5,941.4	5,940.8	17.6	10.4	-161.61	-10.4	-84.4	623.6	599.9	23.75	26.261		

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-432
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4660.0ft (RKB - 15')
Reference Site:	Alles 22S-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4660.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Alles 22S-432	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 #5 (3-10-14) Sidetrack	Offset TVD Reference:	Offset Datum

Offset Design													Offset Site Error:	0.0 ft
Survey Program: 100-NS-GYRO-MS													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	
6,100.0	6,047.0	6,044.2	6,043.5	17.8	10.6	-161.56	-11.9	-83.7	626.6	602.4	24.14	25.952		
6,145.8	6,092.8	6,093.8	6,093.1	17.9	10.7	-161.52	-12.6	-83.7	627.6	603.3	24.33	25.798		
6,150.0	6,097.0	6,098.3	6,097.6	17.9	10.7	-161.82	-12.6	-83.7	627.7	603.3	24.34	25.788		
6,200.0	6,147.0	6,147.6	6,147.0	17.9	10.8	19.93	-13.3	-83.8	627.1	602.6	24.44	25.654		
6,250.0	6,196.8	6,196.7	6,196.1	18.0	10.9	19.92	-13.9	-83.9	623.9	599.4	24.48	25.484		
6,300.0	6,246.4	6,246.6	6,246.0	18.0	11.0	20.23	-14.4	-83.9	618.1	593.6	24.46	25.269		
6,350.0	6,295.6	6,296.2	6,295.6	17.9	11.1	20.73	-14.8	-83.9	609.6	585.2	24.37	25.008		
6,400.0	6,344.1	6,344.9	6,344.2	17.9	11.2	21.42	-15.1	-83.9	598.5	574.2	24.23	24.696		
6,450.0	6,391.9	6,392.7	6,392.1	17.8	11.3	22.30	-15.4	-84.0	584.8	560.8	24.04	24.325		
6,500.0	6,438.8	6,440.3	6,439.6	17.7	11.4	23.42	-15.7	-84.0	568.7	544.9	23.81	23.887		
6,550.0	6,484.6	6,486.8	6,486.1	17.6	11.4	24.81	-15.9	-84.1	550.2	526.7	23.55	23.361		
6,600.0	6,529.2	6,531.1	6,530.5	17.5	11.5	26.48	-16.0	-84.2	529.4	506.2	23.29	22.732		
6,650.0	6,572.5	6,573.8	6,573.1	17.4	11.6	28.49	-16.2	-84.2	506.6	483.5	23.05	21.977		
6,700.0	6,614.3	6,615.1	6,614.4	17.3	11.7	30.92	-16.3	-84.2	481.8	459.0	22.87	21.066		
6,750.0	6,654.4	6,654.9	6,654.2	17.2	11.8	33.85	-16.4	-84.2	455.4	432.6	22.81	19.968		
6,800.0	6,692.8	6,693.0	6,692.4	17.1	11.8	37.35	-16.5	-84.1	427.4	404.5	22.90	18.663		
6,850.0	6,729.3	6,729.0	6,728.4	17.0	11.9	41.49	-16.5	-83.9	398.3	375.1	23.22	17.152		
6,900.0	6,763.8	6,763.1	6,762.4	17.0	12.0	46.35	-16.6	-83.8	368.4	344.6	23.81	15.472		
6,950.0	6,796.2	6,795.1	6,794.5	17.0	12.1	51.95	-16.7	-83.6	338.3	313.6	24.69	13.700		
7,000.0	6,826.3	6,824.9	6,824.3	17.1	12.1	58.21	-16.8	-83.3	308.6	282.8	25.81	11.954		
7,050.0	6,854.2	6,852.5	6,851.8	17.3	12.2	64.91	-17.1	-83.1	280.3	253.2	27.07	10.354		
7,100.0	6,879.6	6,877.7	6,877.1	17.5	12.2	71.73	-17.3	-82.9	254.8	226.5	28.32	8.998		
7,150.0	6,902.6	6,900.7	6,900.0	17.9	12.3	78.26	-17.6	-82.7	233.9	204.5	29.44	7.947		
7,200.0	6,923.0	6,921.5	6,920.8	18.3	12.3	84.17	-17.8	-82.5	219.7	189.4	30.37	7.236		
7,250.0	6,940.8	6,939.6	6,939.0	18.8	12.4	89.03	-18.1	-82.4	214.4	183.2	31.12	6.888		
7,252.0	6,941.4	6,940.3	6,939.6	18.8	12.4	89.20	-18.1	-82.3	214.3	183.2	31.15	6.881 SF		
7,300.0	6,955.9	6,955.0	6,954.4	19.4	12.4	92.63	-18.3	-82.2	219.1	187.4	31.79	6.894		
7,350.0	6,968.3	6,967.7	6,967.0	20.1	12.4	94.86	-18.4	-82.1	234.0	201.5	32.46	7.210		
7,400.0	6,977.9	6,977.5	6,976.9	20.8	12.4	95.67	-18.6	-82.1	257.6	224.3	33.21	7.756		
7,452.9	6,985.0	6,984.9	6,984.2	21.7	12.5	94.94	-18.6	-82.0	289.8	255.7	34.11	8.495		
7,453.0	6,985.0	6,984.9	6,984.3	21.7	12.5	94.95	-18.6	-82.0	289.9	255.8	34.12	8.498		
7,500.0	6,989.9	6,990.1	6,989.4	22.5	12.5	96.29	-18.7	-82.0	323.1	288.2	34.89	9.261		
7,575.0	6,997.8	6,998.2	6,997.6	24.0	12.5	98.42	-18.8	-81.9	382.1	345.9	36.18	10.561		
7,600.0	7,000.1	7,000.0	6,999.3	24.4	12.5	97.10	-18.8	-81.9	402.8	366.1	36.75	10.961		
7,700.0	7,005.0	7,000.0	6,999.3	26.5	12.5	89.54	-18.8	-81.9	488.7	449.8	38.93	12.552		
7,728.9	7,005.0	7,000.0	6,999.3	27.1	12.5	87.29	-18.8	-81.9	514.1	474.6	39.47	13.025		
7,800.0	7,004.3	7,000.0	6,999.3	28.7	12.5	87.29	-18.8	-81.9	577.8	536.8	41.02	14.086		
7,900.0	7,003.2	7,000.0	6,999.3	30.9	12.5	87.29	-18.8	-81.9	669.9	626.6	43.28	15.478		
8,000.0	7,002.2	7,000.0	6,999.3	33.3	12.5	87.29	-18.8	-81.9	764.0	718.4	45.63	16.744		
8,100.0	7,001.1	7,000.0	6,999.3	35.7	12.5	87.29	-18.8	-81.9	859.5	811.4	48.04	17.889		
8,200.0	7,000.1	7,000.0	6,999.3	38.2	12.5	87.29	-18.8	-81.9	955.8	905.3	50.51	18.923		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Alles 22S-432
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4660.0ft (RKB - 15')
Reference Site:	Alles 22S-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4660.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Alles 22S-432	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 #5 (3-10-14) Sidetrack	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							
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
9,200.0	6,989.6	6,987.6	6,987.6	64.4	139.8	91.41	-192.9	2,738.6	975.4	771.3	204.06	4.780	
9,300.0	6,988.5	6,986.5	6,986.5	67.1	139.7	91.26	-192.9	2,738.6	884.2	677.5	206.76	4.277	
9,400.0	6,987.5	6,985.5	6,985.5	69.8	139.7	91.10	-192.9	2,738.6	795.2	585.7	209.46	3.796	
9,500.0	6,986.4	6,984.4	6,984.4	72.6	139.7	90.94	-192.9	2,738.6	709.1	496.9	212.17	3.342	
9,600.0	6,985.4	6,983.4	6,983.4	75.3	139.7	90.78	-192.9	2,738.6	627.1	412.2	214.89	2.918	
9,700.0	6,984.3	6,982.3	6,982.3	78.0	139.6	90.63	-192.9	2,738.6	551.1	333.5	217.61	2.533	
9,800.0	6,983.3	6,981.3	6,981.3	80.8	139.6	90.47	-192.9	2,738.6	483.9	263.6	220.33	2.196	
9,900.0	6,982.2	6,980.2	6,980.2	83.5	139.6	90.31	-192.9	2,738.6	429.7	206.7	223.06	1.926	
10,000.0	6,981.2	6,979.2	6,979.2	86.3	139.6	90.15	-192.9	2,738.6	393.9	168.1	225.79	1.744	
10,097.7	6,980.1	6,978.1	6,978.1	88.9	139.6	90.00	-192.9	2,738.6	381.5	153.1	228.46	1.670 CC	
10,100.0	6,980.1	6,978.1	6,978.1	89.0	139.6	90.00	-192.9	2,738.6	381.5	153.0	228.52	1.670 ES, SF	
10,200.0	6,979.1	6,977.1	6,977.1	91.8	139.5	89.84	-192.9	2,738.6	395.0	163.8	231.25	1.708	
10,300.0	6,978.0	6,976.0	6,976.0	94.5	139.5	89.68	-192.9	2,738.6	431.8	197.9	233.99	1.846	
10,400.0	6,977.0	6,975.0	6,975.0	97.3	139.5	89.52	-192.9	2,738.6	486.8	250.0	236.72	2.056	
10,500.0	6,975.9	6,973.9	6,973.9	100.0	139.5	89.37	-192.9	2,738.6	554.4	315.0	239.46	2.315	
10,600.0	6,974.9	6,972.9	6,972.9	102.8	139.5	89.21	-192.9	2,738.6	630.7	388.5	242.20	2.604	
10,700.0	6,973.8	6,971.8	6,971.8	105.6	139.4	89.05	-192.9	2,738.6	712.9	468.0	244.94	2.911	
10,800.0	6,972.8	6,970.8	6,970.8	108.4	139.4	88.89	-192.9	2,738.6	799.2	551.5	247.67	3.227	
10,900.0	6,971.7	6,969.7	6,969.7	111.1	139.4	88.74	-192.9	2,738.6	888.3	637.9	250.41	3.548	
11,000.0	6,970.7	6,968.7	6,968.7	113.9	139.4	88.58	-192.9	2,738.6	979.6	726.4	253.15	3.870	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Alles 22S-432
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4660.0ft (RKB - 15')
Reference Site:	Alles 22S-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4660.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Alles 22S-432	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 #5 (3-10-14) Sidetrack	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
7,700.0	7,005.0	7,003.0	7,003.0	26.5	140.1	88.16	-91.0	1,236.9	943.1	776.7	166.41	5.667	
7,728.9	7,005.0	7,003.0	7,003.0	27.1	140.1	91.75	-91.0	1,236.9	915.8	748.7	167.05	5.482	
7,800.0	7,004.3	7,002.3	7,002.3	28.7	140.0	91.60	-91.0	1,236.9	848.8	680.2	168.60	5.035	
7,900.0	7,003.2	7,001.2	7,001.2	30.9	140.0	91.40	-91.0	1,236.9	756.0	585.2	170.85	4.425	
8,000.0	7,002.2	7,000.2	7,000.2	33.3	140.0	91.20	-91.0	1,236.9	665.3	492.1	173.19	3.841	
8,100.0	7,001.1	6,999.1	6,999.1	35.7	140.0	91.00	-91.0	1,236.9	577.6	402.0	175.60	3.289	
8,200.0	7,000.1	6,998.1	6,998.1	38.2	140.0	90.80	-91.0	1,236.9	494.6	316.6	178.05	2.778	
8,300.0	6,999.0	6,997.0	6,997.0	40.7	139.9	90.60	-91.0	1,236.9	419.1	238.6	180.55	2.322	
8,400.0	6,998.0	6,996.0	6,996.0	43.2	139.9	90.39	-91.0	1,236.9	356.0	172.9	183.08	1.944	
8,500.0	6,996.9	6,994.9	6,994.9	45.8	139.9	90.19	-91.0	1,236.9	312.6	127.0	185.64	1.684	
8,594.9	6,995.9	6,993.9	6,993.9	48.3	139.9	90.00	-91.0	1,236.9	297.9	109.8	188.10	1.584 CC	
8,600.0	6,995.9	6,993.9	6,993.9	48.4	139.9	89.99	-91.0	1,236.9	297.9	109.7	188.23	1.583 ES, SF	
8,700.0	6,994.8	6,992.8	6,992.8	51.1	139.9	89.79	-91.0	1,236.9	315.9	125.0	190.83	1.655	
8,800.0	6,993.8	6,991.8	6,991.8	53.7	139.8	89.59	-91.0	1,236.9	361.7	168.2	193.45	1.869	
8,900.0	6,992.7	6,990.7	6,990.7	56.4	139.8	89.38	-91.0	1,236.9	426.4	230.3	196.09	2.175	
9,000.0	6,991.7	6,989.7	6,989.7	59.0	139.8	89.18	-91.0	1,236.9	502.8	304.1	198.73	2.530	
9,100.0	6,990.6	6,988.6	6,988.6	61.7	139.8	88.98	-91.0	1,236.9	586.4	385.0	201.39	2.912	
9,200.0	6,989.6	6,987.6	6,987.6	64.4	139.8	88.78	-91.0	1,236.9	674.4	470.4	204.05	3.305	
9,300.0	6,988.5	6,986.5	6,986.5	67.1	139.7	88.58	-91.0	1,236.9	765.4	558.7	206.72	3.703	
9,400.0	6,987.5	6,985.5	6,985.5	69.8	139.7	88.37	-91.0	1,236.9	858.4	649.0	209.39	4.100	
9,500.0	6,986.4	6,984.4	6,984.4	72.6	139.7	88.17	-91.0	1,236.9	952.8	740.8	212.07	4.493	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Alles 22S-432
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4660.0ft (RKB - 15')
Reference Site:	Alles 22S-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4660.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Alles 22S-432	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 #5 (3-10-14) Sidetrack	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	Offset Wellbore Centre	Between Centres	Between Ellipses	Minimum Separation	Separation Factor		
Depth (ft)	Depth (ft)	Depth (ft)	Depth (ft)	(ft)	(ft)	(°)	+N/-S (ft)	+E/-W (ft)	(ft)	(ft)	(ft)			
11,600.0	6,964.4	6,960.4	6,960.4	130.6	139.2	91.37	-229.0	5,123.3	964.6	694.9	269.71	3.576		
11,700.0	6,963.3	6,959.3	6,959.3	133.4	139.2	91.21	-229.0	5,123.3	874.0	601.5	272.48	3.208		
11,800.0	6,962.3	6,958.3	6,958.3	136.2	139.2	91.06	-229.0	5,123.3	785.7	510.4	275.26	2.854		
11,900.0	6,961.2	6,957.2	6,957.2	138.9	139.1	90.90	-229.0	5,123.3	700.5	422.5	278.04	2.520		
12,000.0	6,960.2	6,956.2	6,956.2	141.7	139.1	90.75	-229.0	5,123.3	619.8	339.0	280.81	2.207		
12,100.0	6,959.1	6,955.1	6,955.1	144.5	139.1	90.59	-229.0	5,123.3	545.6	262.0	283.59	1.924		
12,200.0	6,958.1	6,954.1	6,954.1	147.3	139.1	90.44	-229.0	5,123.3	480.7	194.3	286.36	1.679		
12,300.0	6,957.0	6,953.0	6,953.0	150.1	139.1	90.28	-229.0	5,123.3	429.5	140.4	289.13	1.486	Level 3	
12,400.0	6,956.0	6,952.0	6,952.0	152.9	139.0	90.13	-229.0	5,123.3	397.4	105.5	291.91	1.361	Level 3	
12,482.9	6,955.1	6,951.1	6,951.1	155.2	139.0	90.00	-229.0	5,123.3	388.7	94.5	294.20	1.321	Level 3, CC	
12,500.0	6,954.9	6,950.9	6,950.9	155.7	139.0	89.97	-229.0	5,123.3	389.0	94.4	294.68	1.320	Level 3, ES, SF	
12,600.0	6,953.9	6,949.9	6,949.9	158.5	139.0	89.82	-229.0	5,123.3	405.9	108.5	297.44	1.365	Level 3	
12,681.5	6,953.0	6,949.0	6,949.0	159.9	139.0	89.69	-229.0	5,123.3	436.5	137.6	298.87	1.460	Level 3	

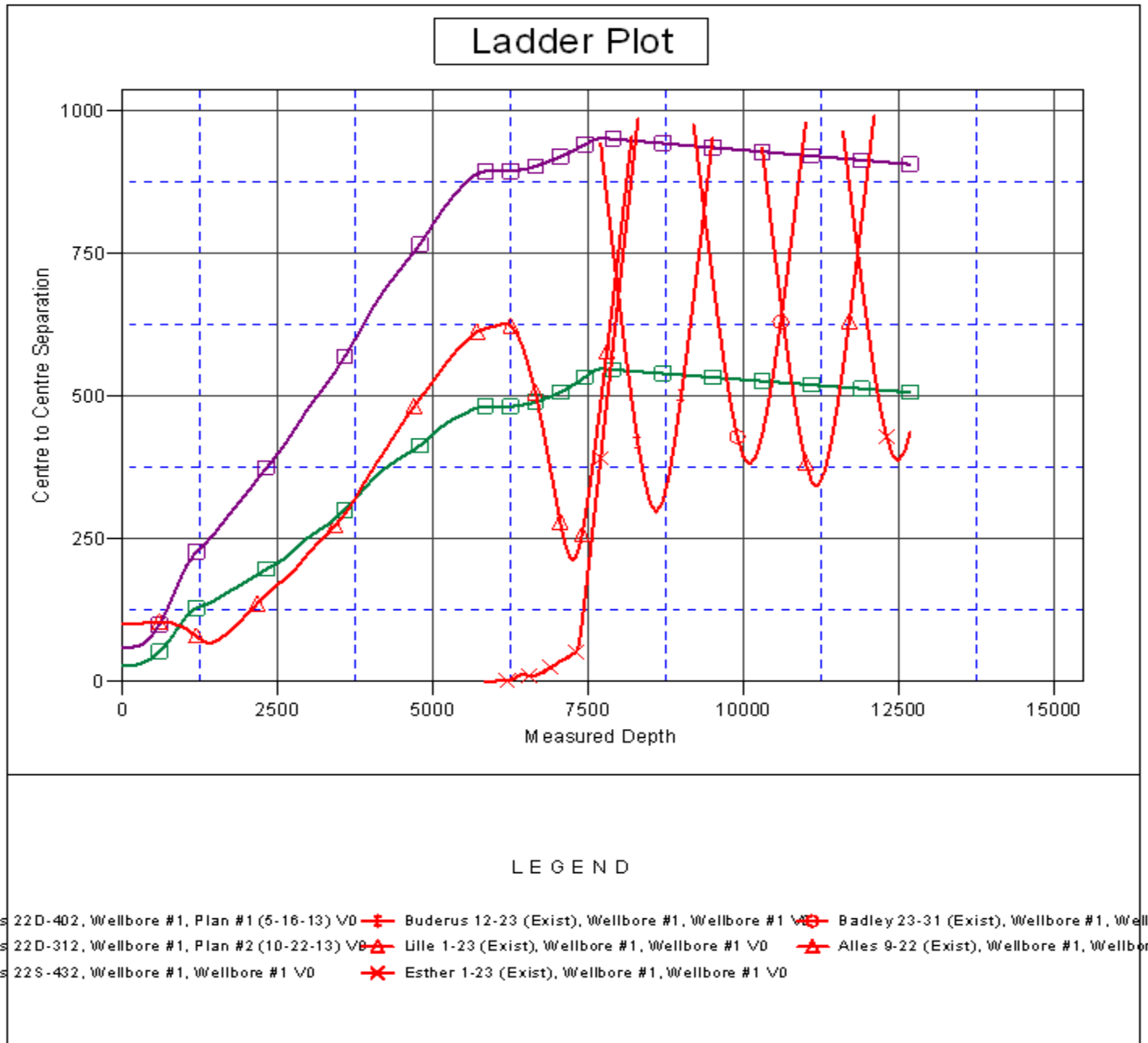
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Alles 22S-432
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4660.0ft (RKB - 15')
Reference Site:	Alles 22S-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4660.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Alles 22S-432	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 #5 (3-10-14) Sidetrack	Offset TVD Reference:	Offset Datum

Offset Design Lofland 22T & Alles 22S-HZ Existing Wells - Lille 1-23 (Exist) - Wellbore #1 - Wellbore #1												Offset Site Error:	0.0 ft
Survey Program: 7300-UNKNOWN												Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	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
10,300.0	6,978.0	6,976.0	6,976.0	94.5	139.5	91.53	-167.3	3,811.1	935.1	701.1	233.93	3.997	
10,400.0	6,977.0	6,975.0	6,975.0	97.3	139.5	91.35	-167.3	3,811.1	842.8	606.1	236.69	3.561	
10,500.0	6,975.9	6,973.9	6,973.9	100.0	139.5	91.18	-167.3	3,811.1	752.6	513.1	239.45	3.143	
10,600.0	6,974.9	6,972.9	6,972.9	102.8	139.5	91.00	-167.3	3,811.1	665.1	422.9	242.21	2.746	
10,700.0	6,973.8	6,971.8	6,971.8	105.6	139.4	90.82	-167.3	3,811.1	581.7	336.8	244.96	2.375	
10,800.0	6,972.8	6,970.8	6,970.8	108.4	139.4	90.65	-167.3	3,811.1	504.4	256.7	247.72	2.036	
10,900.0	6,971.7	6,969.7	6,969.7	111.1	139.4	90.47	-167.3	3,811.1	436.4	185.9	250.48	1.742	
11,000.0	6,970.7	6,968.7	6,968.7	113.9	139.4	90.30	-167.3	3,811.1	382.7	129.5	253.24	1.511	
11,100.0	6,969.6	6,967.6	6,967.6	116.7	139.4	90.12	-167.3	3,811.1	350.0	94.0	256.00	1.367 Level 3	
11,170.0	6,968.9	6,966.9	6,966.9	118.6	139.3	90.00	-167.3	3,811.1	342.9	85.0	257.93	1.329 Level 3, CC, ES, SF	
11,200.0	6,968.6	6,966.6	6,966.6	119.5	139.3	89.95	-167.3	3,811.1	344.2	85.4	258.75	1.330 Level 3	
11,300.0	6,967.5	6,965.5	6,965.5	122.2	139.3	89.77	-167.3	3,811.1	366.7	105.2	261.51	1.402 Level 3	
11,400.0	6,966.5	6,964.5	6,964.5	125.0	139.3	89.60	-167.3	3,811.1	412.9	148.6	264.26	1.562	
11,500.0	6,965.4	6,963.4	6,963.4	127.8	139.3	89.42	-167.3	3,811.1	475.9	208.9	267.02	1.782	
11,600.0	6,964.4	6,962.4	6,962.4	130.6	139.2	89.25	-167.3	3,811.1	550.0	280.2	269.77	2.039	
11,700.0	6,963.3	6,961.3	6,961.3	133.4	139.2	89.07	-167.3	3,811.1	631.3	358.7	272.52	2.316	
11,800.0	6,962.3	6,960.3	6,960.3	136.2	139.2	88.89	-167.3	3,811.1	717.3	442.0	275.27	2.606	
11,900.0	6,961.2	6,959.2	6,959.2	138.9	139.2	88.72	-167.3	3,811.1	806.5	528.5	278.02	2.901	
12,000.0	6,960.2	6,958.2	6,958.2	141.7	139.2	88.54	-167.3	3,811.1	898.0	617.3	280.76	3.199	
12,100.0	6,959.1	6,957.1	6,957.1	144.5	139.1	88.37	-167.3	3,811.1	991.2	707.7	283.50	3.496	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Alles 22S-432
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4660.0ft (RKB - 15')
Reference Site:	Alles 22S-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4660.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Alles 22S-432	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 #5 (3-10-14) Sidetrack	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 4660.0ft (RKB - 15')
Offset Depths are relative to Offset Datum
Central Meridian is -105.500000 °

Coordinates are relative to: Alles 22S-432
Coordinate System is US State Plane 1983, Colorado Northern Zone
Grid Convergence at Surface is: 0.55°



Coordinates are relative to: Alles 22S-432
Coordinate System is US State Plane 1983, Colorado Northern Zone
Grid Convergence at Surface is: 0.55°

