

PETROLEUM DEVELOPMENT CORP Weld County CO

Well Name: **Ram Land 30G-303**

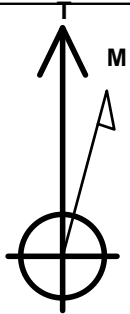
Surface Location: Ram Land 30GK-HZ Pad Sec.30-T4N-R66W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone
Ground Elevation: 4758.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1346351.16	3188138.08	40.282170	-104.825650	

RKB-15' WELL @ 4773.0ft (RKB-15')

WELLBORE TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
SHL 2487'FSL, 1151'FWL, SEC.30	1.0	0.0	0.0	Point
BHL 2158'FNL & 120'FWL, SEC.31	7143.0	-4641.2	-1040.9	Point



Azimuths to True North
Magnetic North: 8.61°

Magnetic Field
Strength: 52845.9nT
Dip Angle: 66.87°
Date: 7/9/2013
Model: IGRF2010

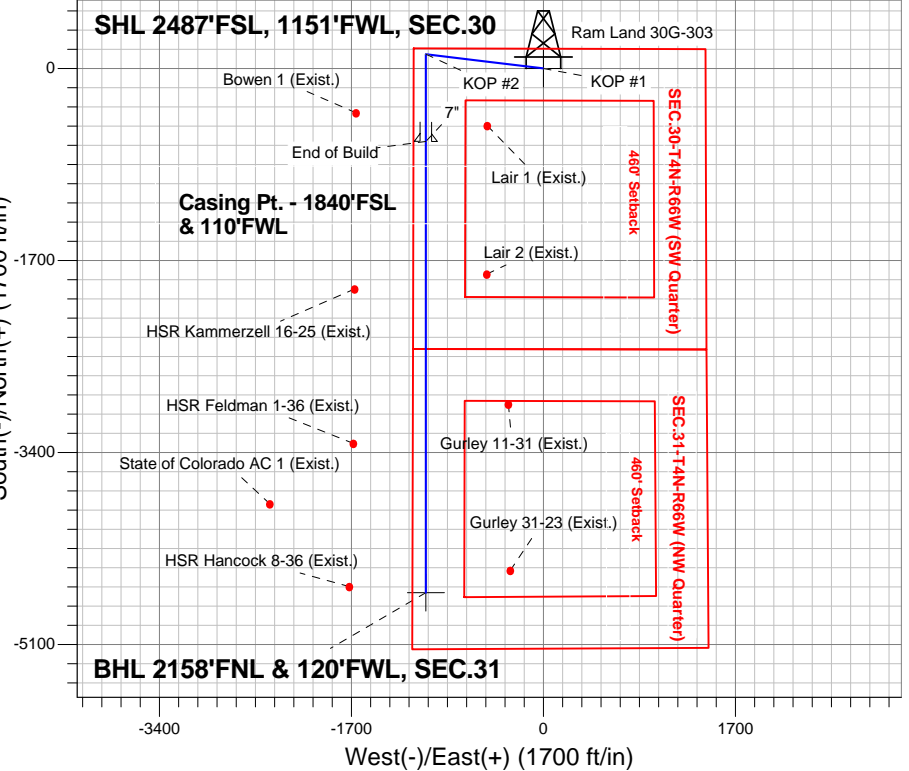
Ram Land 30GK-HZ Pad Sec.30-T4N-R66W
Ram Land 30G-303
Plan #1 (7-02-13)
14:14, July 11 2013

ANNOTATIONS

TVD	MD	Annotation
200.0	200.0	KOP #1
6429.3	6524.1	KOP #2
7193.2	7733.7	End of Build

SHL 2487'FSL, 1151'FWL, SEC.30

South(-)/North(+) (1700 ft/in)

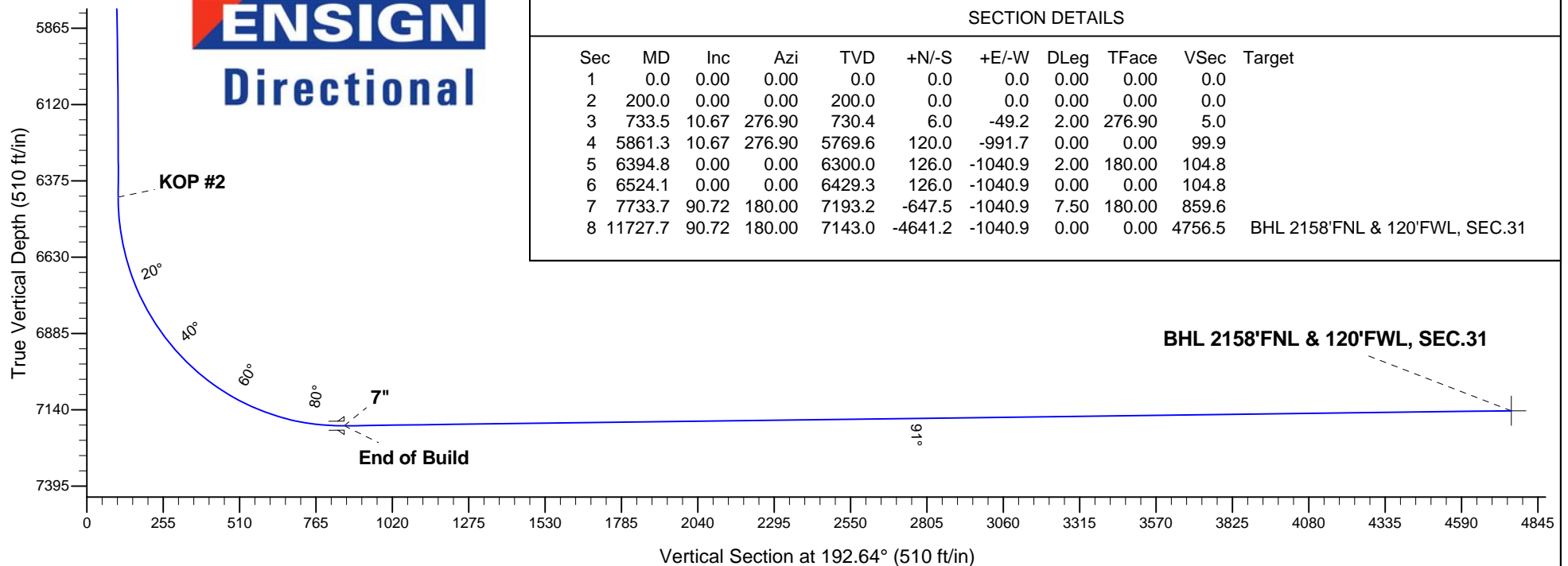


BHL 2158'FNL & 120'FWL, SEC.31

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	VSec	Target
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	200.0	0.00	0.00	200.0	0.0	0.0	0.00	0.00	0.0	
3	733.5	10.67	276.90	730.4	6.0	-49.2	2.00	276.90	5.0	
4	5861.3	10.67	276.90	5769.6	120.0	-991.7	0.00	0.00	99.9	
5	6394.8	0.00	0.00	6300.0	126.0	-1040.9	2.00	180.00	104.8	
6	6524.1	0.00	0.00	6429.3	126.0	-1040.9	0.00	0.00	104.8	
7	7733.7	90.72	180.00	7193.2	-647.5	-1040.9	7.50	180.00	859.6	
8	11727.7	90.72	180.00	7143.0	-4641.2	-1040.9	0.00	0.00	4756.5	BHL 2158'FNL & 120'FWL, SEC.31

BHL 2158'FNL & 120'FWL, SEC.31





PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.30-T4N-R66W

Ram Land 30GK-HZ Pad Sec.30-T4N-R66W

Ram Land 30G-303

Wellbore #1

Plan: Plan #1 (7-02-13)

Standard Planning Report

09 July, 2013

Database:	Landmark	Local Co-ordinate Reference:	Well Ram Land 30G-303
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4773.0ft (RKB-15')
Project:	SEC.30-T4N-R66W	MD Reference:	WELL @ 4773.0ft (RKB-15')
Site:	Ram Land 30GK-HZ Pad Sec.30-T4N-R66W	North Reference:	True
Well:	Ram Land 30G-303	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (7-02-13)		

Project	SEC.30-T4N-R66W, Weld County, CO		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		Using Well Reference Point
Map Zone:	Colorado Northern Zone		Using geodetic scale factor

Site						Ram Land 30GK-HZ Pad Sec.30-T4N-R66W											
Site Position:						Northing:			1,346,533.34 ft			Latitude:			40.282640		
From:			Lat/Long			Easting:			3,189,570.75 ft			Longitude:			-104.820510		
Position Uncertainty:			0.0 ft			Slot Radius:			"			Grid Convergence:			0.44 °		

Well	Ram Land 30G-303					
Well Position	+N-S	-171.3 ft	Northing:	1,346,351.16 ft	Latitude:	40.282170
	+E-W	-1,434.1 ft	Easting:	3,188,138.08 ft	Longitude:	-104.825650
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,758.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	7/9/2013	8.61	66.87	52,846

Design	Plan #1 (7-02-13)			
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	192.64

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	
200.0	0.00	0.00	200.0	0.0	0.0	0.00	0.00	0.00	0.00	
733.5	10.67	276.90	730.4	6.0	-49.2	2.00	2.00	0.00	276.90	
5,861.3	10.67	276.90	5,769.6	120.0	-991.7	0.00	0.00	0.00	0.00	
6,394.8	0.00	0.00	6,300.0	126.0	-1,040.9	2.00	-2.00	0.00	180.00	
6,524.1	0.00	0.00	6,429.3	126.0	-1,040.9	0.00	0.00	0.00	0.00	
7,733.7	90.72	180.00	7,193.2	-647.5	-1,040.9	7.50	7.50	0.00	180.00	
11,727.7	90.72	180.00	7,143.0	-4,641.2	-1,040.9	0.00	0.00	0.00	0.00	BHL 2158'FNL & 12

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Project:	SEC.30-T4N-R66W	MD Reference:	WELL @ 4773.0ft (RKB-15')
Site:	Ram Land 30GK-HZ Pad Sec.30-T4N-R66W	North Reference:	True
Well:	Ram Land 30G-303	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (7-02-13)		

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 2487'FSL, 1151'FWL, SEC.30									
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
KOP #1									
300.0	2.00	276.90	300.0	0.2	-1.7	0.2	2.00	2.00	0.00
400.0	4.00	276.90	399.8	0.8	-6.9	0.7	2.00	2.00	0.00
500.0	6.00	276.90	499.5	1.9	-15.6	1.6	2.00	2.00	0.00
600.0	8.00	276.90	598.7	3.4	-27.7	2.8	2.00	2.00	0.00
700.0	10.00	276.90	697.5	5.2	-43.2	4.4	2.00	2.00	0.00
733.5	10.67	276.90	730.4	6.0	-49.2	5.0	2.00	2.00	0.00
800.0	10.67	276.90	795.8	7.4	-61.4	6.2	0.00	0.00	0.00
900.0	10.67	276.90	894.0	9.7	-79.8	8.0	0.00	0.00	0.00
1,000.0	10.67	276.90	992.3	11.9	-98.2	9.9	0.00	0.00	0.00
1,100.0	10.67	276.90	1,090.6	14.1	-116.5	11.7	0.00	0.00	0.00
1,200.0	10.67	276.90	1,188.9	16.3	-134.9	13.6	0.00	0.00	0.00
1,300.0	10.67	276.90	1,287.1	18.6	-153.3	15.4	0.00	0.00	0.00
1,400.0	10.67	276.90	1,385.4	20.8	-171.7	17.3	0.00	0.00	0.00
1,500.0	10.67	276.90	1,483.7	23.0	-190.1	19.1	0.00	0.00	0.00
1,600.0	10.67	276.90	1,581.9	25.2	-208.4	21.0	0.00	0.00	0.00
1,700.0	10.67	276.90	1,680.2	27.5	-226.8	22.8	0.00	0.00	0.00
1,800.0	10.67	276.90	1,778.5	29.7	-245.2	24.7	0.00	0.00	0.00
1,900.0	10.67	276.90	1,876.8	31.9	-263.6	26.5	0.00	0.00	0.00
2,000.0	10.67	276.90	1,975.0	34.1	-282.0	28.4	0.00	0.00	0.00
2,100.0	10.67	276.90	2,073.3	36.4	-300.3	30.2	0.00	0.00	0.00
2,200.0	10.67	276.90	2,171.6	38.6	-318.7	32.1	0.00	0.00	0.00
2,300.0	10.67	276.90	2,269.8	40.8	-337.1	33.9	0.00	0.00	0.00
2,400.0	10.67	276.90	2,368.1	43.0	-355.5	35.8	0.00	0.00	0.00
2,500.0	10.67	276.90	2,466.4	45.3	-373.9	37.6	0.00	0.00	0.00
2,600.0	10.67	276.90	2,564.6	47.5	-392.3	39.5	0.00	0.00	0.00
2,700.0	10.67	276.90	2,662.9	49.7	-410.6	41.3	0.00	0.00	0.00
2,800.0	10.67	276.90	2,761.2	51.9	-429.0	43.2	0.00	0.00	0.00
2,900.0	10.67	276.90	2,859.5	54.2	-447.4	45.1	0.00	0.00	0.00
3,000.0	10.67	276.90	2,957.7	56.4	-465.8	46.9	0.00	0.00	0.00
3,100.0	10.67	276.90	3,056.0	58.6	-484.2	48.8	0.00	0.00	0.00
3,200.0	10.67	276.90	3,154.3	60.8	-502.5	50.6	0.00	0.00	0.00
3,300.0	10.67	276.90	3,252.5	63.1	-520.9	52.5	0.00	0.00	0.00
3,400.0	10.67	276.90	3,350.8	65.3	-539.3	54.3	0.00	0.00	0.00
3,500.0	10.67	276.90	3,449.1	67.5	-557.7	56.2	0.00	0.00	0.00
3,600.0	10.67	276.90	3,547.4	69.7	-576.1	58.0	0.00	0.00	0.00
3,700.0	10.67	276.90	3,645.6	72.0	-594.4	59.9	0.00	0.00	0.00
3,800.0	10.67	276.90	3,743.9	74.2	-612.8	61.7	0.00	0.00	0.00
3,900.0	10.67	276.90	3,842.2	76.4	-631.2	63.6	0.00	0.00	0.00
4,000.0	10.67	276.90	3,940.4	78.6	-649.6	65.4	0.00	0.00	0.00
4,100.0	10.67	276.90	4,038.7	80.9	-668.0	67.3	0.00	0.00	0.00
4,200.0	10.67	276.90	4,137.0	83.1	-686.4	69.1	0.00	0.00	0.00
4,300.0	10.67	276.90	4,235.3	85.3	-704.7	71.0	0.00	0.00	0.00
4,400.0	10.67	276.90	4,333.5	87.5	-723.1	72.8	0.00	0.00	0.00
4,500.0	10.67	276.90	4,431.8	89.8	-741.5	74.7	0.00	0.00	0.00
4,600.0	10.67	276.90	4,530.1	92.0	-759.9	76.5	0.00	0.00	0.00
4,700.0	10.67	276.90	4,628.3	94.2	-778.3	78.4	0.00	0.00	0.00
4,800.0	10.67	276.90	4,726.6	96.4	-796.6	80.2	0.00	0.00	0.00

Database:	Landmark	Local Co-ordinate Reference:	Well Ram Land 30G-303
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4773.0ft (RKB-15')
Project:	SEC.30-T4N-R66W	MD Reference:	WELL @ 4773.0ft (RKB-15')
Site:	Ram Land 30GK-HZ Pad Sec.30-T4N-R66W	North Reference:	True
Well:	Ram Land 30G-303	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (7-02-13)		

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)
4,900.0	10.67	276.90	4,824.9	98.7	-815.0	82.1	0.00	0.00	0.00
5,000.0	10.67	276.90	4,923.2	100.9	-833.4	83.9	0.00	0.00	0.00
5,100.0	10.67	276.90	5,021.4	103.1	-851.8	85.8	0.00	0.00	0.00
5,200.0	10.67	276.90	5,119.7	105.3	-870.2	87.6	0.00	0.00	0.00
5,300.0	10.67	276.90	5,218.0	107.6	-888.5	89.5	0.00	0.00	0.00
5,400.0	10.67	276.90	5,316.2	109.8	-906.9	91.3	0.00	0.00	0.00
5,500.0	10.67	276.90	5,414.5	112.0	-925.3	93.2	0.00	0.00	0.00
5,600.0	10.67	276.90	5,512.8	114.2	-943.7	95.0	0.00	0.00	0.00
5,700.0	10.67	276.90	5,611.1	116.5	-962.1	96.9	0.00	0.00	0.00
5,800.0	10.67	276.90	5,709.3	118.7	-980.4	98.7	0.00	0.00	0.00
5,861.3	10.67	276.90	5,769.6	120.0	-991.7	99.9	0.00	0.00	0.00
5,900.0	9.90	276.90	5,807.6	120.9	-998.6	100.6	2.00	-2.00	0.00
6,000.0	7.90	276.90	5,906.4	122.7	-1,013.9	102.1	2.00	-2.00	0.00
6,100.0	5.90	276.90	6,005.7	124.2	-1,025.8	103.3	2.00	-2.00	0.00
6,200.0	3.90	276.90	6,105.3	125.2	-1,034.3	104.2	2.00	-2.00	0.00
6,300.0	1.90	276.90	6,205.2	125.8	-1,039.3	104.7	2.00	-2.00	0.00
6,394.8	0.00	0.00	6,300.0	126.0	-1,040.9	104.8	2.00	-2.00	0.00
6,400.0	0.00	0.00	6,305.2	126.0	-1,040.9	104.8	0.00	0.00	0.00
6,500.0	0.00	0.00	6,405.2	126.0	-1,040.9	104.8	0.00	0.00	0.00
6,524.1	0.00	0.00	6,429.3	126.0	-1,040.9	104.8	0.00	0.00	0.00
KOP #2									
6,600.0	5.69	180.00	6,505.1	122.2	-1,040.9	108.5	7.50	7.50	0.00
6,700.0	13.19	180.00	6,603.6	105.8	-1,040.9	124.5	7.50	7.50	0.00
6,800.0	20.69	180.00	6,699.2	76.7	-1,040.9	152.9	7.50	7.50	0.00
6,900.0	28.19	180.00	6,790.2	35.4	-1,040.9	193.2	7.50	7.50	0.00
7,000.0	35.69	180.00	6,875.0	-17.5	-1,040.9	244.8	7.50	7.50	0.00
7,100.0	43.19	180.00	6,952.2	-81.0	-1,040.9	306.8	7.50	7.50	0.00
7,200.0	50.69	180.00	7,020.4	-154.0	-1,040.9	378.0	7.50	7.50	0.00
7,300.0	58.19	180.00	7,078.5	-235.3	-1,040.9	457.3	7.50	7.50	0.00
7,400.0	65.69	180.00	7,125.5	-323.5	-1,040.9	543.4	7.50	7.50	0.00
7,500.0	73.19	180.00	7,160.6	-417.0	-1,040.9	634.7	7.50	7.50	0.00
7,600.0	80.69	180.00	7,183.2	-514.4	-1,040.9	729.7	7.50	7.50	0.00
7,700.0	88.19	180.00	7,192.9	-613.8	-1,040.9	826.7	7.50	7.50	0.00
7,733.7	90.72	180.00	7,193.2	-647.5	-1,040.9	859.6	7.50	7.50	0.00
End of Build - 7"									
7,800.0	90.72	180.00	7,192.4	-713.8	-1,040.9	924.3	0.00	0.00	0.00
7,900.0	90.72	180.00	7,191.1	-813.8	-1,040.9	1,021.8	0.00	0.00	0.00
8,000.0	90.72	180.00	7,189.8	-913.8	-1,040.9	1,119.4	0.00	0.00	0.00
8,100.0	90.72	180.00	7,188.6	-1,013.8	-1,040.9	1,217.0	0.00	0.00	0.00
8,200.0	90.72	180.00	7,187.3	-1,113.8	-1,040.9	1,314.6	0.00	0.00	0.00
8,300.0	90.72	180.00	7,186.1	-1,213.8	-1,040.9	1,412.1	0.00	0.00	0.00
8,400.0	90.72	180.00	7,184.8	-1,313.8	-1,040.9	1,509.7	0.00	0.00	0.00
8,500.0	90.72	180.00	7,183.6	-1,413.8	-1,040.9	1,607.3	0.00	0.00	0.00
8,600.0	90.72	180.00	7,182.3	-1,513.8	-1,040.9	1,704.8	0.00	0.00	0.00
8,700.0	90.72	180.00	7,181.0	-1,613.7	-1,040.9	1,802.4	0.00	0.00	0.00
8,800.0	90.72	180.00	7,179.8	-1,713.7	-1,040.9	1,900.0	0.00	0.00	0.00
8,900.0	90.72	180.00	7,178.5	-1,813.7	-1,040.9	1,997.5	0.00	0.00	0.00
9,000.0	90.72	180.00	7,177.3	-1,913.7	-1,040.9	2,095.1	0.00	0.00	0.00
9,100.0	90.72	180.00	7,176.0	-2,013.7	-1,040.9	2,192.7	0.00	0.00	0.00
9,200.0	90.72	180.00	7,174.8	-2,113.7	-1,040.9	2,290.2	0.00	0.00	0.00
9,300.0	90.72	180.00	7,173.5	-2,213.7	-1,040.9	2,387.8	0.00	0.00	0.00
9,400.0	90.72	180.00	7,172.2	-2,313.7	-1,040.9	2,485.4	0.00	0.00	0.00
9,500.0	90.72	180.00	7,171.0	-2,413.7	-1,040.9	2,583.0	0.00	0.00	0.00

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Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4773.0ft (RKB-15')
Project:	SEC.30-T4N-R66W	MD Reference:	WELL @ 4773.0ft (RKB-15')
Site:	Ram Land 30GK-HZ Pad Sec.30-T4N-R66W	North Reference:	True
Well:	Ram Land 30G-303	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (7-02-13)		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
9,600.0	90.72	180.00	7,169.7	-2,513.7	-1,040.9	2,680.5	0.00	0.00	0.00
9,700.0	90.72	180.00	7,168.5	-2,613.7	-1,040.9	2,778.1	0.00	0.00	0.00
9,800.0	90.72	180.00	7,167.2	-2,713.7	-1,040.9	2,875.7	0.00	0.00	0.00
9,900.0	90.72	180.00	7,166.0	-2,813.7	-1,040.9	2,973.2	0.00	0.00	0.00
10,000.0	90.72	180.00	7,164.7	-2,913.6	-1,040.9	3,070.8	0.00	0.00	0.00
10,100.0	90.72	180.00	7,163.5	-3,013.6	-1,040.9	3,168.4	0.00	0.00	0.00
10,200.0	90.72	180.00	7,162.2	-3,113.6	-1,040.9	3,265.9	0.00	0.00	0.00
10,300.0	90.72	180.00	7,160.9	-3,213.6	-1,040.9	3,363.5	0.00	0.00	0.00
10,400.0	90.72	180.00	7,159.7	-3,313.6	-1,040.9	3,461.1	0.00	0.00	0.00
10,500.0	90.72	180.00	7,158.4	-3,413.6	-1,040.9	3,558.6	0.00	0.00	0.00
10,600.0	90.72	180.00	7,157.2	-3,513.6	-1,040.9	3,656.2	0.00	0.00	0.00
10,700.0	90.72	180.00	7,155.9	-3,613.6	-1,040.9	3,753.8	0.00	0.00	0.00
10,800.0	90.72	180.00	7,154.7	-3,713.6	-1,040.9	3,851.3	0.00	0.00	0.00
10,900.0	90.72	180.00	7,153.4	-3,813.6	-1,040.9	3,948.9	0.00	0.00	0.00
11,000.0	90.72	180.00	7,152.1	-3,913.6	-1,040.9	4,046.5	0.00	0.00	0.00
11,100.0	90.72	180.00	7,150.9	-4,013.6	-1,040.9	4,144.1	0.00	0.00	0.00
11,200.0	90.72	180.00	7,149.6	-4,113.5	-1,040.9	4,241.6	0.00	0.00	0.00
11,300.0	90.72	180.00	7,148.4	-4,213.5	-1,040.9	4,339.2	0.00	0.00	0.00
11,400.0	90.72	180.00	7,147.1	-4,313.5	-1,040.9	4,436.8	0.00	0.00	0.00
11,500.0	90.72	180.00	7,145.9	-4,413.5	-1,040.9	4,534.3	0.00	0.00	0.00
11,600.0	90.72	180.00	7,144.6	-4,513.5	-1,040.9	4,631.9	0.00	0.00	0.00
11,700.0	90.72	180.00	7,143.3	-4,613.5	-1,040.9	4,729.5	0.00	0.00	0.00
11,727.7	90.72	180.00	7,143.0	-4,641.2	-1,040.9	4,756.5	0.00	0.00	0.00
BHL 2158'FNL & 120'FWL, SEC.31									

Casing Points

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
7,733.7	7,193.2	7"	7	7-1/2

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
200.0	200.0	0.0	0.0	KOP #1
6,524.1	6,429.3	126.0	-1,040.9	KOP #2
7,733.7	7,193.2	-647.5	-1,040.9	End of Build



PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.30-T4N-R66W

Ram Land 30GK-HZ Pad Sec.30-T4N-R66W

Ram Land 30G-303

Wellbore #1

Plan #1 (7-02-13)

Anticollision Report

09 July, 2013



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ram Land 30G-303
Project:	SEC.30-T4N-R66W	TVD Reference:	WELL @ 4773.0ft (RKB-15')
Reference Site:	Ram Land 30GK-HZ Pad Sec.30-T4N-R66W	MD Reference:	WELL @ 4773.0ft (RKB-15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ram Land 30G-303	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 (7-02-13)	Offset TVD Reference:	Offset Datum

Reference	Plan #1 (7-02-13)		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	MD Interval 100.0ft	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 1,000.0ft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma		

Survey Tool Program	Date 7/9/2013			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.0	11,727.7	Plan #1 (7-02-13) (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						
Existing Wells						
Bowen 1 (Exist.) - Wellbore #1 - Wellbore #1	7,475.1	7,142.0	619.2	457.6	3.831	CC, ES
Bowen 1 (Exist.) - Wellbore #1 - Wellbore #1	7,500.0	7,149.6	619.7	457.7	3.826	SF
HSR Feldman 1-36 (Exist.) - Wellbore #1 - Wellbore #1	10,405.1	7,153.6	641.7	432.4	3.065	CC, ES, SF
HSR Hancock 8-36 (Exist.) - Wellbore #1 - Wellbore #1	11,673.0	7,140.7	678.1	445.3	2.912	CC, ES
HSR Hancock 8-36 (Exist.) - Wellbore #1 - Wellbore #1	11,700.0	7,140.3	678.6	445.3	2.908	SF
HSR Kammerzell 16-25 (Exist.) - Wellbore #1 - Wellbore	9,038.9	7,168.8	630.5	445.6	3.410	CC, ES
HSR Kammerzell 16-25 (Exist.) - Wellbore #1 - Wellbore	9,100.0	7,168.0	633.4	447.5	3.406	SF
Lair 1 (Exist.) - Wellbore #1 - Wellbore #1	7,591.9	7,168.8	544.2	381.0	3.334	CC
Lair 1 (Exist.) - Wellbore #1 - Wellbore #1	7,600.0	7,170.2	544.3	381.0	3.333	ES, SF
Lair 2 (Exist.) - Wellbore #1 - Wellbore #1	8,907.8	7,169.4	538.6	356.0	2.949	CC, ES, SF
State of Colorado AC 1 (Exist.) - Wellbore #1 - Wellbore						Out of range
Ram Land 30GK-HZ Pad Sec.30-T4N-R66W						
Ram Land 30G-423 - Wellbore #1 - Plan #1 (7-02-13)	200.0	200.0	30.7	30.0	45.515	CC, ES
Ram Land 30G-423 - Wellbore #1 - Plan #1 (7-02-13)	11,728.2	11,761.8	352.8	177.9	2.017	SF
Ram Land 30K-243 - Wellbore #1 - Plan #1 (7-02-13)	200.0	200.0	61.4	60.7	91.030	CC, ES
Ram Land 30K-243 - Wellbore #1 - Plan #1 (7-02-13)	11,728.2	11,595.1	666.2	486.2	3.701	SF

Offset Design Existing Wells - Bowen 1 (Exist.) - Wellbore #1 - Wellbore #1											
Survey Program: 7500-UNKNOWN											
Reference											
Offset											
Semi Major Axis											
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)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)
4,800.0	4,726.6	4,715.6	4,715.6	18.8	94.3	-36.95	-393.4	-1,660.1	992.7	884.8	107.91
4,900.0	4,824.9	4,813.9	4,813.9	19.2	96.3	-37.59	-393.4	-1,660.1	977.9	867.6	110.27
5,000.0	4,923.2	4,912.2	4,912.2	19.6	98.2	-38.26	-393.4	-1,660.1	963.2	850.6	112.64
5,100.0	5,021.4	5,010.4	5,010.4	20.1	100.2	-38.95	-393.4	-1,660.1	948.6	833.6	115.02
5,200.0	5,119.7	5,108.7	5,108.7	20.5	102.2	-39.66	-393.4	-1,660.1	934.2	816.8	117.41
5,300.0	5,218.0	5,207.0	5,207.0	20.9	104.1	-40.39	-393.4	-1,660.1	919.9	800.1	119.80
5,400.0	5,316.2	5,305.2	5,305.2	21.3	106.1	-41.14	-393.4	-1,660.1	905.8	783.6	122.21
5,500.0	5,414.5	5,403.5	5,403.5	21.7	108.1	-41.92	-393.4	-1,660.1	891.8	767.2	124.62
5,600.0	5,512.8	5,501.8	5,501.8	22.2	110.0	-42.72	-393.4	-1,660.1	878.0	751.0	127.04
5,700.0	5,611.1	5,600.1	5,600.1	22.6	112.0	-43.54	-393.4	-1,660.1	864.4	734.9	129.48

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 Ram Land 30G-303
Project:	SEC.30-T4N-R66W	TVD Reference:	WELL @ 4773.0ft (RKB-15')
Reference Site:	Ram Land 30GK-HZ Pad Sec.30-T4N-R66W	MD Reference:	WELL @ 4773.0ft (RKB-15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ram Land 30G-303	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 (7-02-13)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells - Bowen 1 (Exist.) - Wellbore #1 - Wellbore #1													Offset Site Error:	0.0 ft
Survey Program: 7500-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)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
5,800.0	5,709.3	5,698.3	5,698.3	23.0	114.0	-44.40	-393.4	-1,660.1	851.0	719.1	131.92	6.451		
5,900.0	5,807.6	5,796.6	5,796.6	23.4	115.9	-45.19	-393.4	-1,660.1	837.9	703.4	134.48	6.231		
6,000.0	5,906.4	5,895.4	5,895.4	23.7	117.9	-45.79	-393.4	-1,660.1	827.0	689.9	137.10	6.032		
6,100.0	6,005.7	5,994.7	5,994.7	23.9	119.9	-46.27	-393.4	-1,660.1	818.6	679.0	139.61	5.864		
6,200.0	6,105.3	6,094.3	6,094.3	24.1	121.9	-46.62	-393.4	-1,660.1	812.7	670.7	142.01	5.723		
6,300.0	6,205.2	6,194.2	6,194.2	24.3	123.9	-46.82	-393.4	-1,660.1	809.3	665.0	144.28	5.609		
6,400.0	6,305.2	6,294.2	6,294.2	24.4	125.9	-129.99	-393.4	-1,660.1	808.2	661.8	146.43	5.519		
6,500.0	6,405.2	6,394.2	6,394.2	24.5	127.9	-129.99	-393.4	-1,660.1	808.2	659.6	148.57	5.440		
6,600.0	6,505.1	6,494.1	6,494.1	24.6	129.9	50.36	-393.4	-1,660.1	805.8	655.4	150.38	5.358		
6,700.0	6,603.6	6,592.6	6,592.6	24.7	131.9	51.87	-393.4	-1,660.1	795.4	644.5	150.95	5.269		
6,800.0	6,699.2	6,688.2	6,688.2	24.8	133.8	54.62	-393.4	-1,660.1	777.5	626.8	150.63	5.161		
6,900.0	6,790.2	6,779.2	6,779.2	24.9	135.6	58.61	-393.4	-1,660.1	753.2	603.0	150.19	5.015		
7,000.0	6,875.0	6,864.0	6,864.0	25.0	137.3	63.76	-393.4	-1,660.1	724.4	573.9	150.53	4.812		
7,100.0	6,952.2	6,941.2	6,941.2	25.1	138.8	69.81	-393.4	-1,660.1	693.6	541.3	152.22	4.556		
7,200.0	7,020.4	7,009.4	7,009.4	25.2	140.2	76.24	-393.4	-1,660.1	663.9	508.8	155.05	4.282		
7,300.0	7,078.5	7,067.5	7,067.5	25.4	141.4	82.34	-393.4	-1,660.1	639.1	481.0	158.07	4.043		
7,400.0	7,125.5	7,114.5	7,114.5	25.7	142.3	87.34	-393.4	-1,660.1	623.2	462.8	160.41	3.885		
7,475.1	7,153.0	7,142.0	7,142.0	26.0	142.8	90.00	-393.4	-1,660.1	619.2	457.6	161.65	3.831 CC, ES		
7,500.0	7,160.6	7,149.6	7,149.6	26.1	143.0	90.63	-393.4	-1,660.1	619.7	457.7	161.97	3.826 SF		
7,600.0	7,183.2	7,172.2	7,172.2	26.6	143.4	91.81	-393.4	-1,660.1	630.9	467.7	163.23	3.865		
7,700.0	7,192.9	7,181.9	7,181.9	27.3	143.6	90.64	-393.4	-1,660.1	657.3	492.7	164.57	3.994		
7,800.0	7,192.4	7,181.4	7,181.4	28.1	143.6	89.63	-393.4	-1,660.1	697.2	531.4	165.79	4.205		
7,900.0	7,191.1	7,180.1	7,180.1	29.0	143.6	89.51	-393.4	-1,660.1	748.5	581.4	167.04	4.481		
8,000.0	7,189.8	7,178.8	7,178.8	30.0	143.6	89.39	-393.4	-1,660.1	808.9	640.5	168.37	4.804		
8,100.0	7,188.6	7,177.6	7,177.6	31.1	143.6	89.28	-393.4	-1,660.1	876.6	706.8	169.77	5.163		
8,200.0	7,187.3	7,176.3	7,176.3	32.3	143.5	89.16	-393.4	-1,660.1	950.0	778.7	171.23	5.548		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ram Land 30G-303
Project:	SEC.30-T4N-R66W	TVD Reference:	WELL @ 4773.0ft (RKB-15')
Reference Site:	Ram Land 30GK-HZ Pad Sec.30-T4N-R66W	MD Reference:	WELL @ 4773.0ft (RKB-15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ram Land 30G-303	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 (7-02-13)	Offset TVD Reference:	Offset Datum

Offset Design		Existing Wells - HSR Feldman 1-36 (Exist.) - Wellbore #1 - Wellbore #1											Offset Site Error:	0.0 ft
Survey Program: 7500-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)			
9,700.0	7,168.5	7,162.5	7,162.5	55.8	143.2	90.79	-3,318.7	-1,682.6	953.4	756.9	196.53	4.851		
9,800.0	7,167.2	7,161.2	7,161.2	57.5	143.2	90.68	-3,318.7	-1,682.6	882.0	683.7	198.34	4.447		
9,900.0	7,166.0	7,160.0	7,160.0	59.3	143.2	90.57	-3,318.7	-1,682.6	816.7	616.5	200.15	4.080		
10,000.0	7,164.7	7,158.7	7,158.7	61.1	143.2	90.45	-3,318.7	-1,682.6	758.9	556.9	201.97	3.757		
10,100.0	7,163.5	7,157.5	7,157.5	62.8	143.1	90.34	-3,318.7	-1,682.6	710.6	506.8	203.80	3.487		
10,200.0	7,162.2	7,156.2	7,156.2	64.6	143.1	90.23	-3,318.7	-1,682.6	673.7	468.1	205.62	3.277		
10,300.0	7,160.9	7,154.9	7,154.9	66.4	143.1	90.12	-3,318.7	-1,682.6	650.3	442.8	207.46	3.135		
10,400.0	7,159.7	7,153.7	7,153.7	68.2	143.1	90.01	-3,318.7	-1,682.6	641.8	432.5	209.29	3.066		
10,405.1	7,159.6	7,153.6	7,153.6	68.3	143.1	90.00	-3,318.7	-1,682.6	641.7	432.4	209.38	3.065	CC, ES, SF	
10,500.0	7,158.4	7,152.4	7,152.4	70.0	143.0	89.89	-3,318.7	-1,682.6	648.7	437.6	211.13	3.073		
10,600.0	7,157.2	7,151.2	7,151.2	71.8	143.0	89.78	-3,318.7	-1,682.6	670.7	457.7	212.97	3.149		
10,700.0	7,155.9	7,149.9	7,149.9	73.6	143.0	89.67	-3,318.7	-1,682.6	706.2	491.4	214.81	3.288		
10,800.0	7,154.7	7,148.7	7,148.7	75.5	143.0	89.56	-3,318.7	-1,682.6	753.5	536.8	216.65	3.478		
10,900.0	7,153.4	7,147.4	7,147.4	77.3	142.9	89.44	-3,318.7	-1,682.6	810.4	591.9	218.50	3.709		
11,000.0	7,152.1	7,146.1	7,146.1	79.1	142.9	89.33	-3,318.7	-1,682.6	875.0	654.7	220.35	3.971		
11,100.0	7,150.9	7,144.9	7,144.9	80.9	142.9	89.22	-3,318.7	-1,682.6	945.8	723.6	222.20	4.257		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ram Land 30G-303
Project:	SEC.30-T4N-R66W	TVD Reference:	WELL @ 4773.0ft (RKB-15')
Reference Site:	Ram Land 30GK-HZ Pad Sec.30-T4N-R66W	MD Reference:	WELL @ 4773.0ft (RKB-15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ram Land 30G-303	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 (7-02-13)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells - HSR Hancock 8-36 (Exist.) - Wellbore #1 - Wellbore #1													Offset Site Error:		0.0 ft
Survey Program: 7500-UNKNOWN													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)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor			
11,000.0	7,152.1	7,149.1	7,149.1	79.1	143.0	90.71	-4,586.5	-1,719.0	955.4	735.0	220.32	4.336			
11,100.0	7,150.9	7,147.9	7,147.9	80.9	143.0	90.61	-4,586.5	-1,719.0	887.8	665.6	222.18	3.996			
11,200.0	7,149.6	7,146.6	7,146.6	82.8	142.9	90.50	-4,586.5	-1,719.0	826.8	602.7	224.04	3.690			
11,300.0	7,148.4	7,145.4	7,145.4	84.6	142.9	90.40	-4,586.5	-1,719.0	773.9	548.0	225.91	3.426			
11,400.0	7,147.1	7,144.1	7,144.1	86.5	142.9	90.29	-4,586.5	-1,719.0	731.0	503.2	227.77	3.209			
11,500.0	7,145.9	7,142.9	7,142.9	88.3	142.9	90.18	-4,586.5	-1,719.0	699.8	470.2	229.63	3.048			
11,600.0	7,144.6	7,141.6	7,141.6	90.2	142.8	90.08	-4,586.5	-1,719.0	682.0	450.5	231.50	2.946			
11,673.0	7,143.7	7,140.7	7,140.7	91.5	142.8	90.00	-4,586.5	-1,719.0	678.1	445.3	232.86	2.912 CC, ES			
11,700.0	7,143.3	7,140.3	7,140.3	92.0	142.8	89.97	-4,586.5	-1,719.0	678.6	445.3	233.36	2.908 SF			
11,728.2	7,143.0	7,140.0	7,140.0	92.6	142.8	89.94	-4,586.5	-1,719.0	680.4	446.5	233.89	2.909			

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ram Land 30G-303
Project:	SEC.30-T4N-R66W	TVD Reference:	WELL @ 4773.0ft (RKB-15')
Reference Site:	Ram Land 30GK-HZ Pad Sec.30-T4N-R66W	MD Reference:	WELL @ 4773.0ft (RKB-15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ram Land 30G-303	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 (7-02-13)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells - HSR Kammerzell 16-25 (Exist.) - Wellbore #1 - Wellbore #1													Offset Site Error:		0.0 ft
Survey Program: 7500-UNKNOWN													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)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor			
8,300.0	7,186.1	7,178.1	7,178.1	33.6	143.6	90.84	-1,952.6	-1,671.4	971.3	798.6	172.69	5.625			
8,400.0	7,184.8	7,176.8	7,176.8	35.0	143.5	90.73	-1,952.6	-1,671.4	897.6	723.3	174.25	5.151			
8,500.0	7,183.6	7,175.6	7,175.6	36.4	143.5	90.62	-1,952.6	-1,671.4	829.4	653.5	175.85	4.716			
8,600.0	7,182.3	7,174.3	7,174.3	37.8	143.5	90.50	-1,952.6	-1,671.4	768.2	590.7	177.48	4.328			
8,700.0	7,181.0	7,173.0	7,173.0	39.3	143.5	90.39	-1,952.6	-1,671.4	715.8	536.6	179.13	3.996			
8,800.0	7,179.8	7,171.8	7,171.8	40.9	143.4	90.27	-1,952.6	-1,671.4	674.2	493.4	180.81	3.729			
8,900.0	7,178.5	7,170.5	7,170.5	42.4	143.4	90.16	-1,952.6	-1,671.4	645.6	463.1	182.51	3.537			
9,000.0	7,177.3	7,169.3	7,169.3	44.0	143.4	90.04	-1,952.6	-1,671.4	631.7	447.5	184.23	3.429			
9,038.9	7,176.8	7,168.8	7,168.8	44.7	143.4	90.00	-1,952.6	-1,671.4	630.5	445.6	184.91	3.410 CC, ES			
9,100.0	7,176.0	7,168.0	7,168.0	45.7	143.4	89.93	-1,952.6	-1,671.4	633.4	447.5	185.97	3.406 SF			
9,200.0	7,174.8	7,166.8	7,166.8	47.3	143.3	89.82	-1,952.6	-1,671.4	650.7	463.0	187.71	3.467			
9,300.0	7,173.5	7,165.5	7,165.5	49.0	143.3	89.70	-1,952.6	-1,671.4	682.4	492.9	189.47	3.602			
9,400.0	7,172.2	7,164.2	7,164.2	50.7	143.3	89.59	-1,952.6	-1,671.4	726.6	535.3	191.24	3.799			
9,500.0	7,171.0	7,163.0	7,163.0	52.4	143.3	89.47	-1,952.6	-1,671.4	781.1	588.1	193.01	4.047			
9,600.0	7,169.7	7,161.7	7,161.7	54.1	143.2	89.36	-1,952.6	-1,671.4	844.0	649.2	194.80	4.333			
9,700.0	7,168.5	7,160.5	7,160.5	55.8	143.2	89.25	-1,952.6	-1,671.4	913.5	716.9	196.59	4.647			
9,800.0	7,167.2	7,159.2	7,159.2	57.5	143.2	89.13	-1,952.6	-1,671.4	988.3	789.9	198.39	4.982			

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ram Land 30G-303
Project:	SEC.30-T4N-R66W	TVD Reference:	WELL @ 4773.0ft (RKB-15')
Reference Site:	Ram Land 30GK-HZ Pad Sec.30-T4N-R66W	MD Reference:	WELL @ 4773.0ft (RKB-15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ram Land 30G-303	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 (7-02-13)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells - Lair 1 (Exist.) - Wellbore #1 - Wellbore #1													Offset Site Error:	0.0 ft
Survey Program: 7500-UNKNOWN													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	-135.56	-506.4	-496.6	709.4					
100.0	100.0	87.0	87.0	0.1	1.7	-135.56	-506.4	-496.6	709.3	707.4	1.85	382.854		
200.0	200.0	187.0	187.0	0.3	3.7	-135.56	-506.4	-496.6	709.3	705.2	4.08	173.953		
300.0	300.0	287.0	287.0	0.6	5.7	-52.59	-506.4	-496.6	708.2	701.9	6.29	112.557		
400.0	399.8	386.8	386.8	0.8	7.7	-52.97	-506.4	-496.6	705.0	696.5	8.50	82.905		
500.0	499.5	486.5	486.5	1.0	9.7	-53.63	-506.4	-496.6	699.8	689.1	10.72	65.254		
600.0	598.7	585.7	585.7	1.3	11.7	-54.55	-506.4	-496.6	692.6	679.7	12.96	53.457		
700.0	697.5	684.5	684.5	1.7	13.7	-55.76	-506.4	-496.6	683.6	668.4	15.21	44.952		
800.0	795.8	782.8	782.8	2.0	15.7	-57.09	-506.4	-496.6	673.4	655.9	17.50	38.472		
900.0	894.0	881.0	881.0	2.4	17.6	-58.42	-506.4	-496.6	663.4	643.5	19.83	33.458		
1,000.0	992.3	979.3	979.3	2.8	19.6	-59.78	-506.4	-496.6	653.7	631.6	22.17	29.493		
1,100.0	1,090.6	1,077.6	1,077.6	3.2	21.6	-61.19	-506.4	-496.6	644.5	620.0	24.52	26.288		
1,200.0	1,188.9	1,175.9	1,175.9	3.7	23.5	-62.63	-506.4	-496.6	635.7	608.8	26.88	23.649		
1,300.0	1,287.1	1,274.1	1,274.1	4.1	25.5	-64.11	-506.4	-496.6	627.2	598.0	29.25	21.445		
1,400.0	1,385.4	1,372.4	1,372.4	4.5	27.4	-65.63	-506.4	-496.6	619.3	587.6	31.63	19.579		
1,500.0	1,483.7	1,470.7	1,470.7	4.9	29.4	-67.18	-506.4	-496.6	611.7	577.7	34.02	17.984		
1,600.0	1,581.9	1,568.9	1,568.9	5.3	31.4	-68.78	-506.4	-496.6	604.7	568.3	36.41	16.608		
1,700.0	1,680.2	1,667.2	1,667.2	5.7	33.3	-70.41	-506.4	-496.6	598.1	559.3	38.81	15.412		
1,800.0	1,778.5	1,765.5	1,765.5	6.2	35.3	-72.07	-506.4	-496.6	592.1	550.9	41.22	14.366		
1,900.0	1,876.8	1,863.8	1,863.8	6.6	37.3	-73.76	-506.4	-496.6	586.6	542.9	43.63	13.445		
2,000.0	1,975.0	1,962.0	1,962.0	7.0	39.2	-75.48	-506.4	-496.6	581.6	535.5	46.04	12.632		
2,100.0	2,073.3	2,060.3	2,060.3	7.4	41.2	-77.24	-506.4	-496.6	577.1	528.7	48.45	11.911		
2,200.0	2,171.6	2,158.6	2,158.6	7.8	43.2	-79.01	-506.4	-496.6	573.3	522.4	50.87	11.269		
2,300.0	2,269.8	2,256.8	2,256.8	8.3	45.1	-80.81	-506.4	-496.6	570.0	516.7	53.28	10.696		
2,400.0	2,368.1	2,355.1	2,355.1	8.7	47.1	-82.62	-506.4	-496.6	567.2	511.5	55.70	10.184		
2,500.0	2,466.4	2,453.4	2,453.4	9.1	49.1	-84.45	-506.4	-496.6	565.1	507.0	58.11	9.725		
2,600.0	2,564.6	2,551.6	2,551.6	9.5	51.0	-86.29	-506.4	-496.6	563.6	503.1	60.52	9.313		
2,700.0	2,662.9	2,649.9	2,649.9	9.9	53.0	-88.14	-506.4	-496.6	562.7	499.8	62.92	8.943		
2,800.0	2,761.2	2,748.2	2,748.2	10.4	55.0	-90.00	-506.4	-496.6	562.4	497.1	65.32	8.610		
2,800.2	2,761.4	2,748.4	2,748.4	10.4	55.0	-90.00	-506.4	-496.6	562.4	497.1	65.32	8.609		
2,900.0	2,859.5	2,846.5	2,846.5	10.8	56.9	-91.85	-506.4	-496.6	562.7	495.0	67.71	8.311		
3,000.0	2,957.7	2,944.7	2,944.7	11.2	58.9	-93.70	-506.4	-496.6	563.6	493.5	70.09	8.042		
3,100.0	3,056.0	3,043.0	3,043.0	11.6	60.9	-95.54	-506.4	-496.6	565.1	492.7	72.46	7.799		
3,200.0	3,154.3	3,141.3	3,141.3	12.0	62.8	-97.37	-506.4	-496.6	567.2	492.4	74.82	7.582		
3,300.0	3,252.5	3,239.5	3,239.5	12.5	64.8	-99.18	-506.4	-496.6	569.9	492.8	77.17	7.386		
3,400.0	3,350.8	3,337.8	3,337.8	12.9	66.8	-100.98	-506.4	-496.6	573.2	493.7	79.50	7.210		
3,500.0	3,449.1	3,436.1	3,436.1	13.3	68.7	-102.76	-506.4	-496.6	577.1	495.3	81.83	7.053		
3,600.0	3,547.4	3,534.4	3,534.4	13.7	70.7	-104.51	-506.4	-496.6	581.5	497.4	84.14	6.911		
3,700.0	3,645.6	3,632.6	3,632.6	14.1	72.7	-106.23	-506.4	-496.6	586.5	500.1	86.45	6.785		
3,800.0	3,743.9	3,730.9	3,730.9	14.6	74.6	-107.92	-506.4	-496.6	592.1	503.3	88.74	6.672		
3,900.0	3,842.2	3,829.2	3,829.2	15.0	76.6	-109.59	-506.4	-496.6	598.1	507.1	91.01	6.572		
4,000.0	3,940.4	3,927.4	3,927.4	15.4	78.5	-111.21	-506.4	-496.6	604.7	511.4	93.28	6.482		
4,100.0	4,038.7	4,025.7	4,025.7	15.8	80.5	-112.81	-506.4	-496.6	611.7	516.2	95.53	6.403		
4,200.0	4,137.0	4,124.0	4,124.0	16.3	82.5	-114.36	-506.4	-496.6	619.2	521.4	97.78	6.333		
4,300.0	4,235.3	4,222.3	4,222.3	16.7	84.4	-115.88	-506.4	-496.6	627.2	527.2	100.01	6.271		
4,400.0	4,333.5	4,320.5	4,320.5	17.1	86.4	-117.37	-506.4	-496.6	635.6	533.4	102.23	6.217		
4,500.0	4,431.8	4,418.8	4,418.8	17.5	88.4	-118.81	-506.4	-496.6	644.5	540.0	104.45	6.170		
4,600.0	4,530.1	4,517.1	4,517.1	17.9	90.3	-120.21	-506.4	-496.6	653.7	547.0	106.65	6.129		
4,700.0	4,628.3	4,615.3	4,615.3	18.4	92.3	-121.58	-506.4	-496.6	663.3	554.5	108.85	6.094		
4,800.0	4,726.6	4,713.6	4,713.6	18.8	94.3	-122.90	-506.4	-496.6	673.3	562.3	111.04	6.064		
4,900.0	4,824.9	4,811.9	4,811.9	19.2	96.2	-124.19	-506.4	-496.6	683.7	570.5	113.22	6.039		

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 Ram Land 30G-303
Project:	SEC.30-T4N-R66W	TVD Reference:	WELL @ 4773.0ft (RKB-15')
Reference Site:	Ram Land 30GK-HZ Pad Sec.30-T4N-R66W	MD Reference:	WELL @ 4773.0ft (RKB-15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ram Land 30G-303	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 (7-02-13)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells - Lair 1 (Exist.) - Wellbore #1 - Wellbore #1													Offset Site Error:	0.0 ft
Survey Program: 7500-UNKNOWN													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
5,000.0	4,923.2	4,910.2	4,910.2	19.6	98.2	-125.44		-506.4	-496.6	694.4	579.0	115.39	6.017	
5,100.0	5,021.4	5,008.4	5,008.4	20.1	100.2	-126.65		-506.4	-496.6	705.4	587.8	117.56	6.000	
5,200.0	5,119.7	5,106.7	5,106.7	20.5	102.1	-127.83		-506.4	-496.6	716.7	597.0	119.73	5.986	
5,300.0	5,218.0	5,205.0	5,205.0	20.9	104.1	-128.96		-506.4	-496.6	728.3	606.5	121.89	5.976	
5,400.0	5,316.2	5,303.2	5,303.2	21.3	106.1	-130.07		-506.4	-496.6	740.2	616.2	124.04	5.968	
5,500.0	5,414.5	5,401.5	5,401.5	21.7	108.0	-131.14		-506.4	-496.6	752.4	626.2	126.19	5.963	
5,600.0	5,512.8	5,499.8	5,499.8	22.2	110.0	-132.17		-506.4	-496.6	764.8	636.5	128.34	5.960	
5,700.0	5,611.1	5,598.1	5,598.1	22.6	112.0	-133.17		-506.4	-496.6	777.5	647.0	130.48	5.959	
5,800.0	5,709.3	5,696.3	5,696.3	23.0	113.9	-134.14		-506.4	-496.6	790.4	657.8	132.62	5.960	
5,900.0	5,807.6	5,794.6	5,794.6	23.4	115.9	-135.14		-506.4	-496.6	803.3	668.5	134.87	5.956	
6,000.0	5,906.4	5,893.4	5,893.4	23.7	117.9	-136.06		-506.4	-496.6	814.5	677.2	137.23	5.935	
6,100.0	6,005.7	5,992.7	5,992.7	23.9	119.9	-136.76		-506.4	-496.6	823.2	683.6	139.55	5.899	
6,200.0	6,105.3	6,092.3	6,092.3	24.1	121.8	-137.24		-506.4	-496.6	829.4	687.6	141.81	5.849	
6,300.0	6,205.2	6,192.2	6,192.2	24.3	123.8	-137.53		-506.4	-496.6	833.2	689.2	144.01	5.786	
6,400.0	6,305.2	6,292.2	6,292.2	24.4	125.8	-139.28		-506.4	-496.6	834.3	688.2	146.13	5.709	
6,500.0	6,405.2	6,392.2	6,392.2	24.5	127.8	-139.28		-506.4	-496.6	834.3	686.0	148.27	5.627	
6,600.0	6,505.1	6,492.1	6,492.1	24.6	129.8	-41.03		-506.4	-496.6	831.5	681.6	149.84	5.549	
6,700.0	6,603.6	6,590.6	6,590.6	24.7	131.8	-42.40		-506.4	-496.6	819.2	669.3	149.87	5.466	
6,800.0	6,699.2	6,686.2	6,686.2	24.8	133.7	-44.94		-506.4	-496.6	797.6	648.9	148.72	5.363	
6,900.0	6,790.2	6,777.2	6,777.2	24.9	135.5	-48.74		-506.4	-496.6	767.9	620.7	147.19	5.217	
7,000.0	6,875.0	6,862.0	6,862.0	25.0	137.2	-53.89		-506.4	-496.6	731.6	585.1	146.44	4.996	
7,100.0	6,952.2	6,939.2	6,939.2	25.1	138.8	-60.32		-506.4	-496.6	690.8	543.2	147.59	4.680	
7,200.0	7,020.4	7,007.4	7,007.4	25.2	140.1	-67.70		-506.4	-496.6	648.4	497.5	150.91	4.296	
7,300.0	7,078.5	7,065.5	7,065.5	25.4	141.3	-75.29		-506.4	-496.6	608.0	452.7	155.31	3.915	
7,400.0	7,125.5	7,112.5	7,112.5	25.7	142.3	-82.12		-506.4	-496.6	574.2	415.0	159.18	3.607	
7,500.0	7,160.6	7,147.6	7,147.6	26.1	143.0	-87.28		-506.4	-496.6	551.5	389.8	161.73	3.410	
7,591.9	7,181.8	7,168.8	7,168.8	26.6	143.4	-90.00		-506.4	-496.6	544.2	381.0	163.23	3.334 CC	
7,600.0	7,183.2	7,170.2	7,170.2	26.6	143.4	-90.14		-506.4	-496.6	544.3	381.0	163.33	3.333 ES, SF	
7,700.0	7,192.9	7,179.9	7,179.9	27.3	143.6	-90.36		-506.4	-496.6	554.8	390.2	164.59	3.370	
7,800.0	7,192.4	7,179.4	7,179.4	28.1	143.6	-89.73		-506.4	-496.6	582.4	416.7	165.72	3.515	
7,900.0	7,191.1	7,178.1	7,178.1	29.0	143.6	-89.59		-506.4	-496.6	625.1	458.1	166.94	3.744	
8,000.0	7,189.8	7,176.8	7,176.8	30.0	143.5	-89.46		-506.4	-496.6	679.9	511.6	168.26	4.041	
8,100.0	7,188.6	7,175.6	7,175.6	31.1	143.5	-89.33		-506.4	-496.6	744.1	574.5	169.64	4.386	
8,200.0	7,187.3	7,174.3	7,174.3	32.3	143.5	-89.20		-506.4	-496.6	815.6	644.5	171.08	4.767	
8,300.0	7,186.1	7,173.1	7,173.1	33.6	143.5	-89.06		-506.4	-496.6	892.5	720.0	172.58	5.172	
8,400.0	7,184.8	7,171.8	7,171.8	35.0	143.4	-88.93		-506.4	-496.6	973.7	799.6	174.11	5.592	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ram Land 30G-303
Project:	SEC.30-T4N-R66W	TVD Reference:	WELL @ 4773.0ft (RKB-15')
Reference Site:	Ram Land 30GK-HZ Pad Sec.30-T4N-R66W	MD Reference:	WELL @ 4773.0ft (RKB-15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ram Land 30G-303	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 (7-02-13)	Offset TVD Reference:	Offset Datum

Offset Design		Existing Wells - Lair 2 (Exist.) - Wellbore #1 - Wellbore #1											Offset Site Error:	0.0 ft
Survey Program: 7500-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)			
8,100.0	7,188.6	7,179.6	7,179.6	31.1	143.6	-91.08	-1,821.5	-502.2	970.8	801.0	169.81	5.717	2.949 CC, ES, SF	
8,200.0	7,187.3	7,178.3	7,178.3	32.3	143.6	-90.95	-1,821.5	-502.2	889.4	718.1	171.27	5.193		
8,300.0	7,186.1	7,177.1	7,177.1	33.6	143.5	-90.81	-1,821.5	-502.2	812.1	639.3	172.77	4.700		
8,400.0	7,184.8	7,175.8	7,175.8	35.0	143.5	-90.68	-1,821.5	-502.2	740.2	565.9	174.32	4.246		
8,500.0	7,183.6	7,174.6	7,174.6	36.4	143.5	-90.54	-1,821.5	-502.2	675.6	499.7	175.90	3.841		
8,600.0	7,182.3	7,173.3	7,173.3	37.8	143.5	-90.41	-1,821.5	-502.2	620.4	442.8	177.52	3.495		
8,700.0	7,181.0	7,172.0	7,172.0	39.3	143.4	-90.28	-1,821.5	-502.2	577.3	398.2	179.16	3.222		
8,800.0	7,179.8	7,170.8	7,170.8	40.9	143.4	-90.14	-1,821.5	-502.2	549.3	368.5	180.82	3.038		
8,900.0	7,178.5	7,169.5	7,169.5	42.4	143.4	-90.01	-1,821.5	-502.2	538.7	356.2	182.51	2.952		
8,907.8	7,178.4	7,169.4	7,169.4	42.6	143.4	-90.00	-1,821.5	-502.2	538.6	356.0	182.64	2.949		
9,000.0	7,177.3	7,168.3	7,168.3	44.0	143.4	-89.88	-1,821.5	-502.2	546.5	362.3	184.21	2.967		
9,100.0	7,176.0	7,167.0	7,167.0	45.7	143.3	-89.74	-1,821.5	-502.2	571.9	386.0	185.92	3.076		
9,200.0	7,174.8	7,165.8	7,165.8	47.3	143.3	-89.61	-1,821.5	-502.2	612.8	425.1	187.65	3.266		
9,300.0	7,173.5	7,164.5	7,164.5	49.0	143.3	-89.48	-1,821.5	-502.2	666.3	476.9	189.39	3.518		
9,400.0	7,172.2	7,163.2	7,163.2	50.7	143.3	-89.34	-1,821.5	-502.2	729.6	538.5	191.14	3.817		
9,500.0	7,171.0	7,162.0	7,162.0	52.4	143.2	-89.21	-1,821.5	-502.2	800.5	607.6	192.90	4.150		
9,600.0	7,169.7	7,160.7	7,160.7	54.1	143.2	-89.07	-1,821.5	-502.2	877.1	682.4	194.67	4.505		
9,700.0	7,168.5	7,159.5	7,159.5	55.8	143.2	-88.94	-1,821.5	-502.2	957.9	761.5	196.44	4.876		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ram Land 30G-303
Project:	SEC.30-T4N-R66W	TVD Reference:	WELL @ 4773.0ft (RKB-15')
Reference Site:	Ram Land 30GK-HZ Pad Sec.30-T4N-R66W	MD Reference:	WELL @ 4773.0ft (RKB-15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ram Land 30G-303	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 (7-02-13)	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		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)	Offset Wellbore Centre +E/-W (ft)				Between Centres (ft)	Between Ellipses (ft)	
0.0	0.0	0.0	0.0	0.0	0.0	89.98	0.0	30.7	30.7					
100.0	100.0	100.0	100.0	0.1	0.1	89.98	0.0	30.7	30.7	30.5	0.22	136.545		
200.0	200.0	200.0	200.0	0.3	0.3	89.98	0.0	30.7	30.7	30.0	0.67	45.515 CC, ES		
300.0	300.0	300.0	300.0	0.6	0.6	173.44	0.0	30.7	32.4	31.3	1.12	28.917		
400.0	399.8	399.8	399.8	0.8	0.8	174.34	0.0	30.7	37.6	36.1	1.57	23.952		
500.0	499.5	501.0	501.0	1.0	1.0	175.12	0.3	28.9	44.6	42.6	2.01	22.164		
600.0	598.7	602.5	602.3	1.3	1.2	175.49	1.2	23.6	51.5	49.0	2.45	21.053		
700.0	697.5	704.2	703.6	1.7	1.5	175.61	2.7	14.8	58.4	55.5	2.89	20.177		
800.0	795.8	806.2	804.8	2.0	1.7	175.50	4.8	2.3	64.4	61.1	3.35	19.212		
900.0	894.0	906.2	903.8	2.4	2.1	175.22	7.2	-11.8	68.8	64.9	3.83	17.949		
1,000.0	992.3	1,006.1	1,002.7	2.8	2.4	174.98	9.6	-25.9	73.1	68.8	4.32	16.933		
1,100.0	1,090.6	1,106.0	1,101.6	3.2	2.7	174.76	12.0	-39.9	77.4	72.6	4.81	16.105		
1,200.0	1,188.9	1,205.9	1,200.4	3.7	3.0	174.56	14.3	-54.0	81.7	76.4	5.30	15.419		
1,300.0	1,287.1	1,305.8	1,299.3	4.1	3.4	174.39	16.7	-68.1	86.1	80.3	5.80	14.841		
1,400.0	1,385.4	1,405.7	1,398.2	4.5	3.7	174.23	19.1	-82.2	90.4	84.1	6.30	14.354		
1,500.0	1,483.7	1,505.6	1,497.1	4.9	4.0	174.08	21.5	-96.3	94.7	87.9	6.80	13.932		
1,600.0	1,581.9	1,605.5	1,595.9	5.3	4.4	173.95	23.9	-110.4	99.0	91.7	7.30	13.565		
1,700.0	1,680.2	1,705.4	1,694.8	5.7	4.7	173.83	26.2	-124.5	103.4	95.6	7.80	13.244		
1,800.0	1,778.5	1,805.3	1,793.7	6.2	5.1	173.72	28.6	-138.6	107.7	99.4	8.31	12.960		
1,900.0	1,876.8	1,905.2	1,892.6	6.6	5.4	173.62	31.0	-152.7	112.0	103.2	8.81	12.708		
2,000.0	1,975.0	2,005.2	1,991.5	7.0	5.8	173.53	33.4	-166.8	116.3	107.0	9.32	12.482		
2,100.0	2,073.3	2,105.1	2,090.3	7.4	6.1	173.44	35.8	-180.9	120.7	110.8	9.83	12.278		
2,200.0	2,171.6	2,205.0	2,189.2	7.8	6.5	173.36	38.2	-195.0	125.0	114.7	10.34	12.094		
2,300.0	2,269.8	2,304.9	2,288.1	8.3	6.8	173.28	40.5	-209.1	129.3	118.5	10.84	11.927		
2,400.0	2,368.1	2,404.8	2,387.0	8.7	7.2	173.21	42.9	-223.2	133.7	122.3	11.35	11.774		
2,500.0	2,466.4	2,504.7	2,485.8	9.1	7.5	173.14	45.3	-237.3	138.0	126.1	11.86	11.634		
2,600.0	2,564.6	2,604.6	2,584.7	9.5	7.9	173.08	47.7	-251.4	142.3	129.9	12.37	11.505		
2,700.0	2,662.9	2,704.5	2,683.6	9.9	8.2	173.02	50.1	-265.5	146.6	133.8	12.88	11.386		
2,800.0	2,761.2	2,804.4	2,782.5	10.4	8.6	172.96	52.5	-279.5	151.0	137.6	13.39	11.276		
2,900.0	2,859.5	2,904.3	2,881.4	10.8	8.9	172.91	54.8	-293.6	155.3	141.4	13.90	11.174		
3,000.0	2,957.7	3,004.2	2,980.2	11.2	9.3	172.86	57.2	-307.7	159.6	145.2	14.41	11.079		
3,100.0	3,056.0	3,104.1	3,079.1	11.6	9.6	172.81	59.6	-321.8	164.0	149.0	14.92	10.990		
3,200.0	3,154.3	3,204.0	3,178.0	12.0	10.0	172.77	62.0	-335.9	168.3	152.9	15.43	10.907		
3,300.0	3,252.5	3,303.9	3,276.9	12.5	10.3	172.73	64.4	-350.0	172.6	156.7	15.94	10.829		
3,400.0	3,350.8	3,403.8	3,375.8	12.9	10.7	172.69	66.7	-364.1	177.0	160.5	16.45	10.756		
3,500.0	3,449.1	3,503.7	3,474.6	13.3	11.0	172.65	69.1	-378.2	181.3	164.3	16.96	10.687		
3,600.0	3,547.4	3,603.7	3,573.5	13.7	11.4	172.61	71.5	-392.3	185.6	168.1	17.47	10.623		
3,700.0	3,645.6	3,703.6	3,672.4	14.1	11.7	172.58	73.9	-406.4	190.0	172.0	17.99	10.562		
3,800.0	3,743.9	3,803.5	3,771.3	14.6	12.1	172.54	76.3	-420.5	194.3	175.8	18.50	10.504		
3,900.0	3,842.2	3,903.4	3,870.1	15.0	12.5	172.51	78.7	-434.6	198.6	179.6	19.01	10.449		
4,000.0	3,940.4	4,003.3	3,969.0	15.4	12.8	172.48	81.0	-448.7	202.9	183.4	19.52	10.397		
4,100.0	4,038.7	4,103.2	4,067.9	15.8	13.2	172.45	83.4	-462.8	207.3	187.2	20.03	10.348		
4,200.0	4,137.0	4,203.1	4,166.8	16.3	13.5	172.42	85.8	-476.9	211.6	191.1	20.54	10.301		
4,300.0	4,235.3	4,303.0	4,265.7	16.7	13.9	172.40	88.2	-491.0	215.9	194.9	21.05	10.256		
4,400.0	4,333.5	4,402.9	4,364.5	17.1	14.2	172.37	90.6	-505.1	220.3	198.7	21.57	10.213		
4,500.0	4,431.8	4,502.8	4,463.4	17.5	14.6	172.34	93.0	-519.2	224.6	202.5	22.08	10.173		
4,600.0	4,530.1	4,602.7	4,562.3	17.9	14.9	172.32	95.3	-533.2	228.9	206.3	22.59	10.134		
4,700.0	4,628.3	4,702.6	4,661.2	18.4	15.3	172.30	97.7	-547.3	233.3	210.2	23.10	10.097		
4,800.0	4,726.6	4,802.5	4,760.0	18.8	15.6	172.28	100.1	-561.4	237.6	214.0	23.61	10.061		
4,900.0	4,824.9	4,902.4	4,858.9	19.2	16.0	172.25	102.5	-575.5	241.9	217.8	24.13	10.027		
5,000.0	4,923.2	5,002.3	4,957.8	19.6	16.3	172.23	104.9	-589.6	246.3	221.6	24.64	9.995		

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 Ram Land 30G-303
Project:	SEC.30-T4N-R66W	TVD Reference:	WELL @ 4773.0ft (RKB-15')
Reference Site:	Ram Land 30GK-HZ Pad Sec.30-T4N-R66W	MD Reference:	WELL @ 4773.0ft (RKB-15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ram Land 30G-303	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 (7-02-13)	Offset TVD Reference:	Offset Datum

Offset Design													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	5,021.4	5,102.2	5,056.7	20.1	16.7	172.21	172.21	107.2	-603.7	250.6	225.4	25.15	9.963	
5,200.0	5,119.7	5,202.1	5,155.6	20.5	17.0	172.19	172.19	109.6	-617.8	254.9	229.3	25.66	9.933	
5,300.0	5,218.0	5,302.1	5,254.4	20.9	17.4	172.18	172.18	112.0	-631.9	259.3	233.1	26.18	9.904	
5,400.0	5,316.2	5,402.0	5,353.3	21.3	17.7	172.16	172.16	114.4	-646.0	263.6	236.9	26.69	9.876	
5,500.0	5,414.5	5,501.9	5,452.2	21.7	18.1	172.14	172.14	116.8	-660.1	267.9	240.7	27.20	9.850	
5,600.0	5,512.8	5,601.8	5,551.1	22.2	18.4	172.12	172.12	119.2	-674.2	272.2	244.5	27.71	9.824	
5,700.0	5,611.1	5,696.4	5,644.8	22.6	18.7	172.13	172.13	121.3	-687.0	277.2	249.0	28.20	9.829	
5,800.0	5,709.3	5,787.4	5,735.2	23.0	19.0	172.23	172.23	123.0	-696.7	284.9	256.3	28.63	9.953	
5,900.0	5,807.6	5,877.8	5,825.4	23.4	19.1	172.43	172.43	124.1	-703.6	295.6	266.5	29.04	10.178	
6,000.0	5,906.4	5,967.9	5,915.4	23.7	19.3	172.67	172.67	124.8	-707.6	306.5	277.1	29.39	10.429	
6,100.0	6,005.7	6,058.2	6,005.7	23.9	19.4	172.91	172.91	125.0	-708.8	317.0	287.3	29.69	10.676	
6,200.0	6,105.3	6,157.8	6,105.3	24.1	19.5	173.12	173.12	125.0	-708.8	325.5	295.5	29.99	10.854	
6,300.0	6,205.2	6,257.7	6,205.2	24.3	19.7	173.23	173.23	125.0	-708.8	330.5	300.3	30.25	10.925	
6,400.0	6,305.2	6,357.7	6,305.2	24.4	19.8	90.17	90.17	125.0	-708.8	332.1	301.6	30.50	10.888	
6,500.0	6,405.2	6,457.7	6,405.2	24.5	20.0	90.17	90.17	125.0	-708.8	332.1	301.2	30.87	10.758	
6,550.3	6,455.5	6,508.0	6,455.5	24.6	20.1	-90.05	-90.05	125.0	-708.8	332.1	301.0	31.06	10.692	
6,600.0	6,505.1	6,557.6	6,505.1	24.6	20.1	-90.48	-90.48	125.0	-708.8	332.1	300.8	31.27	10.621	
6,700.0	6,603.6	6,658.1	6,603.6	24.7	20.3	-92.21	-92.21	118.6	-708.8	332.3	300.6	31.70	10.482	
6,800.0	6,699.2	6,760.0	6,705.2	24.8	20.4	-93.91	-93.91	98.7	-708.8	332.9	300.8	32.08	10.375	
6,900.0	6,790.2	6,863.3	6,802.8	24.9	20.5	-95.55	-95.55	65.2	-708.8	333.7	301.2	32.41	10.296	
7,000.0	6,875.0	6,967.9	6,896.2	25.0	20.6	-97.09	-97.09	18.2	-708.8	334.7	302.0	32.69	10.236	
7,100.0	6,952.2	7,073.9	6,983.3	25.1	20.7	-98.51	-98.51	-42.0	-708.8	335.8	302.8	33.03	10.165	
7,200.0	7,020.4	7,181.2	7,062.1	25.2	20.9	-99.78	-99.78	-114.6	-708.8	337.0	303.5	33.51	10.056	
7,300.0	7,078.5	7,289.6	7,130.7	25.4	21.1	-100.87	-100.87	-198.4	-708.8	338.2	303.9	34.26	9.871	
7,400.0	7,125.5	7,399.0	7,187.2	25.7	21.5	-101.76	-101.76	-292.0	-708.8	339.2	303.8	35.39	9.585	
7,500.0	7,160.6	7,509.2	7,230.0	26.1	22.0	-102.43	-102.43	-393.5	-708.8	340.1	303.1	37.00	9.190	
7,600.0	7,183.2	7,620.0	7,257.9	26.6	22.7	-102.88	-102.88	-500.6	-708.8	340.6	301.5	39.11	8.710	
7,700.0	7,192.9	7,725.8	7,271.2	27.3	23.6	-103.31	-103.31	-605.6	-708.8	341.3	299.7	41.60	8.204	
7,800.0	7,192.4	7,831.2	7,279.5	28.1	24.6	-104.70	-104.70	-710.6	-708.8	343.3	299.3	44.07	7.790	
7,900.0	7,191.1	7,934.8	7,280.0	29.0	25.7	-104.99	-104.99	-814.2	-708.8	343.8	297.2	46.61	7.375	
8,000.0	7,189.8	8,034.8	7,279.6	30.0	26.9	-105.12	-105.12	-914.2	-708.8	344.0	294.7	49.26	6.983	
8,100.0	7,188.6	8,134.8	7,279.1	31.1	28.2	-105.25	-105.25	-1,014.2	-708.8	344.2	292.2	52.04	6.614	
8,200.0	7,187.3	8,234.8	7,278.6	32.3	29.6	-105.37	-105.37	-1,114.2	-708.8	344.4	289.5	54.92	6.270	
8,300.0	7,186.1	8,334.8	7,278.1	33.6	31.0	-105.50	-105.50	-1,214.2	-708.8	344.6	286.7	57.90	5.952	
8,400.0	7,184.8	8,434.8	7,277.7	35.0	32.5	-105.62	-105.62	-1,314.2	-708.8	344.8	283.9	60.95	5.657	
8,500.0	7,183.6	8,534.8	7,277.2	36.4	34.0	-105.75	-105.75	-1,414.2	-708.8	345.0	281.0	64.07	5.385	
8,600.0	7,182.3	8,634.8	7,276.7	37.8	35.6	-105.87	-105.87	-1,514.2	-708.8	345.2	278.0	67.25	5.134	
8,700.0	7,181.0	8,734.8	7,276.3	39.3	37.2	-106.00	-106.00	-1,614.2	-708.8	345.5	275.0	70.47	4.902	
8,800.0	7,179.8	8,834.8	7,275.8	40.9	38.8	-106.12	-106.12	-1,714.2	-708.8	345.7	271.9	73.73	4.688	
8,900.0	7,178.5	8,934.8	7,275.3	42.4	40.5	-106.25	-106.25	-1,814.2	-708.8	345.9	268.9	77.03	4.490	
9,000.0	7,177.3	9,034.8	7,274.9	44.0	42.2	-106.37	-106.37	-1,914.2	-708.8	346.1	265.8	80.36	4.307	
9,100.0	7,176.0	9,134.8	7,274.4	45.7	43.9	-106.50	-106.50	-2,014.2	-708.8	346.3	262.6	83.71	4.137	
9,200.0	7,174.8	9,234.8	7,273.9	47.3	45.6	-106.62	-106.62	-2,114.2	-708.8	346.6	259.5	87.09	3.979	
9,300.0	7,173.5	9,334.8	7,273.4	49.0	47.3	-106.75	-106.75	-2,214.2	-708.8	346.8	256.3	90.48	3.833	
9,400.0	7,172.2	9,434.8	7,273.0	50.7	49.0	-106.87	-106.87	-2,314.2	-708.8	347.0	253.1	93.89	3.696	
9,500.0	7,171.0	9,534.8	7,272.5	52.4	50.8	-107.00	-107.00	-2,414.2	-708.8	347.2	249.9	97.32	3.568	
9,600.0	7,169.7	9,634.8	7,272.0	54.1	52.6	-107.12	-107.12	-2,514.2	-708.8	347.5	246.7	100.75	3.449	
9,700.0	7,168.5	9,734.8	7,271.6	55.8	54.3	-107.24	-107.24	-2,614.2	-708.8	347.7	243.5	104.20	3.337	
9,800.0	7,167.2	9,834.8	7,271.1	57.5	56.1	-107.37	-107.37	-2,714.1	-708.8	347.9	240.3	107.66	3.232	
9,900.0	7,166.0	9,934.8	7,270.6	59.3	57.9	-107.49	-107.49	-2,814.1	-708.8	348.2	237.1	111.12	3.133	
10,000.0	7,164.7	10,034.8	7,270.1	61.1	59.7	-107.61	-107.61	-2,914.1	-708.8	348.4	233.8	114.59	3.040	

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 Ram Land 30G-303
Project:	SEC.30-T4N-R66W	TVD Reference:	WELL @ 4773.0ft (RKB-15')
Reference Site:	Ram Land 30GK-HZ Pad Sec.30-T4N-R66W	MD Reference:	WELL @ 4773.0ft (RKB-15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ram Land 30G-303	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 (7-02-13)	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	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Highside Toolface	Offset Wellbore Centre	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)				
10,100.0	7,163.5	10,134.8	7,269.7	62.8	61.5	-107.74	-3,014.1	-708.8	348.6	230.6	118.07	2.953			
10,200.0	7,162.2	10,234.8	7,269.2	64.6	63.4	-107.86	-3,114.1	-708.8	348.9	227.3	121.55	2.870			
10,300.0	7,160.9	10,334.8	7,268.7	66.4	65.2	-107.98	-3,214.1	-708.8	349.1	224.1	125.04	2.792			
10,400.0	7,159.7	10,434.8	7,268.3	68.2	67.0	-108.10	-3,314.1	-708.8	349.4	220.8	128.52	2.718			
10,500.0	7,158.4	10,534.8	7,267.8	70.0	68.8	-108.23	-3,414.1	-708.8	349.6	217.6	132.02	2.648			
10,600.0	7,157.2	10,634.7	7,267.3	71.8	70.7	-108.35	-3,514.1	-708.8	349.9	214.4	135.51	2.582			
10,700.0	7,155.9	10,734.7	7,266.8	73.6	72.5	-108.47	-3,614.1	-708.8	350.1	211.1	139.00	2.519			
10,800.0	7,154.7	10,834.7	7,266.4	75.5	74.4	-108.59	-3,714.1	-708.8	350.4	207.9	142.50	2.459			
10,900.0	7,153.4	10,934.7	7,265.9	77.3	76.2	-108.71	-3,814.1	-708.8	350.6	204.6	145.99	2.402			
11,000.0	7,152.1	11,034.7	7,265.4	79.1	78.1	-108.84	-3,914.1	-708.8	350.9	201.4	149.49	2.347			
11,100.0	7,150.9	11,134.7	7,265.0	80.9	79.9	-108.96	-4,014.1	-708.8	351.1	198.1	152.98	2.295			
11,200.0	7,149.6	11,234.7	7,264.5	82.8	81.8	-109.08	-4,114.1	-708.8	351.4	194.9	156.47	2.246			
11,300.0	7,148.4	11,334.7	7,264.0	84.6	83.7	-109.20	-4,214.1	-708.8	351.6	191.7	159.97	2.198			
11,400.0	7,147.1	11,434.7	7,263.5	86.5	85.5	-109.32	-4,314.1	-708.8	351.9	188.4	163.46	2.153			
11,500.0	7,145.9	11,534.7	7,263.1	88.3	87.4	-109.44	-4,414.1	-708.8	352.2	185.2	166.95	2.109			
11,600.0	7,144.6	11,634.7	7,262.6	90.2	89.3	-109.56	-4,514.1	-708.8	352.4	182.0	170.44	2.068			
11,700.0	7,143.3	11,734.7	7,262.1	92.0	91.1	-109.68	-4,614.1	-708.8	352.7	178.8	173.92	2.028			
11,728.2	7,143.0	11,761.8	7,262.0	92.6	91.6	-109.71	-4,641.2	-708.8	352.8	177.9	174.88	2.017 SF			

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ram Land 30G-303
Project:	SEC.30-T4N-R66W	TVD Reference:	WELL @ 4773.0ft (RKB-15')
Reference Site:	Ram Land 30GK-HZ Pad Sec.30-T4N-R66W	MD Reference:	WELL @ 4773.0ft (RKB-15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ram Land 30G-303	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 (7-02-13)	Offset TVD Reference:	Offset Datum

Offset Design												Offset Site Error:	0.0 ft
Survey Program: 0-MWD												Offset Well Error:	0.0 ft
Reference													
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
0.0	0.0	0.0	0.0	0.0	0.0	89.99	0.0	61.4	61.4				
100.0	100.0	100.0	100.0	0.1	0.1	89.99	0.0	61.4	61.4	61.2	0.22	273.091	
200.0	200.0	200.0	200.0	0.3	0.3	89.99	0.0	61.4	61.4	60.7	0.67	91.030 CC, ES	
300.0	300.0	300.0	300.0	0.6	0.6	173.27	0.0	61.4	63.1	62.0	1.12	56.289	
400.0	399.8	399.8	399.8	0.8	0.8	173.78	0.0	61.4	68.3	66.7	1.57	43.487	
500.0	499.5	499.5	499.5	1.0	1.0	174.46	0.0	61.4	77.0	75.0	2.03	38.003	
600.0	598.7	598.7	598.7	1.3	1.2	175.20	0.0	61.4	89.1	86.6	2.48	35.886	
700.0	697.5	697.5	697.5	1.7	1.5	175.89	0.0	61.4	104.7	101.8	2.94	35.576	
800.0	795.8	795.8	795.8	2.0	1.7	176.50	0.0	61.4	123.0	119.6	3.40	36.170	
900.0	894.0	894.0	894.0	2.4	1.9	176.95	0.0	61.4	141.5	137.6	3.86	36.650	
1,000.0	992.3	992.3	992.3	2.8	2.1	177.31	0.0	61.4	160.0	155.7	4.32	36.996	
1,100.0	1,090.6	1,090.6	1,090.6	3.2	2.3	177.59	0.0	61.4	178.5	173.7	4.79	37.254	
1,200.0	1,188.9	1,188.9	1,188.9	3.7	2.6	177.81	0.0	61.4	197.0	191.7	5.26	37.452	
1,300.0	1,287.1	1,287.1	1,287.1	4.1	2.8	178.00	0.0	61.4	215.5	209.8	5.73	37.609	
1,400.0	1,385.4	1,385.4	1,385.4	4.5	3.0	178.16	0.0	61.4	234.0	227.8	6.20	37.734	
1,500.0	1,483.7	1,483.7	1,483.7	4.9	3.2	178.29	0.0	61.4	252.5	245.8	6.67	37.837	
1,600.0	1,581.9	1,590.3	1,590.3	5.3	3.5	178.36	0.4	60.0	269.7	262.6	7.15	37.713	
1,700.0	1,680.2	1,699.8	1,699.8	5.7	3.7	178.28	1.9	54.7	283.3	275.7	7.63	37.157	
1,800.0	1,778.5	1,810.2	1,809.6	6.2	3.9	178.04	4.6	45.2	293.2	285.1	8.11	36.167	
1,900.0	1,876.8	1,914.9	1,913.5	6.6	4.2	177.71	8.0	33.1	299.9	291.3	8.58	34.935	
2,000.0	1,975.0	2,014.7	2,012.5	7.0	4.4	177.39	11.4	21.1	306.2	297.1	9.06	33.808	
2,100.0	2,073.3	2,114.4	2,111.5	7.4	4.7	177.09	14.8	9.1	312.5	303.0	9.53	32.781	
2,200.0	2,171.6	2,214.2	2,210.5	7.8	5.0	176.80	18.2	-2.9	318.9	308.8	10.01	31.843	
2,300.0	2,269.8	2,314.0	2,309.5	8.3	5.2	176.52	21.6	-14.9	325.2	314.7	10.50	30.985	
2,400.0	2,368.1	2,413.8	2,408.5	8.7	5.5	176.25	25.0	-26.9	331.6	320.6	10.98	30.195	
2,500.0	2,466.4	2,513.6	2,507.5	9.1	5.8	175.99	28.4	-38.9	337.9	326.5	11.47	29.467	
2,600.0	2,564.6	2,613.4	2,606.5	9.5	6.1	175.75	31.8	-50.9	344.3	332.3	11.96	28.794	
2,700.0	2,662.9	2,713.2	2,705.5	9.9	6.4	175.51	35.2	-62.9	350.7	338.2	12.45	28.171	
2,800.0	2,761.2	2,812.9	2,804.5	10.4	6.7	175.27	38.6	-74.9	357.1	344.1	12.94	27.591	
2,900.0	2,859.5	2,912.7	2,903.5	10.8	7.0	175.05	42.0	-86.8	363.4	350.0	13.44	27.051	
3,000.0	2,957.7	3,012.5	3,002.5	11.2	7.3	174.83	45.4	-98.8	369.8	355.9	13.93	26.548	
3,100.0	3,056.0	3,112.3	3,101.6	11.6	7.6	174.63	48.8	-110.8	376.2	361.8	14.43	26.076	
3,200.0	3,154.3	3,212.1	3,200.6	12.0	7.9	174.43	52.2	-122.8	382.6	367.7	14.93	25.635	
3,300.0	3,252.5	3,311.9	3,299.6	12.5	8.2	174.23	55.6	-134.8	389.0	373.6	15.43	25.220	
3,400.0	3,350.8	3,411.7	3,398.6	12.9	8.5	174.04	59.0	-146.8	395.5	379.5	15.93	24.830	
3,500.0	3,449.1	3,511.4	3,497.6	13.3	8.8	173.86	62.4	-158.8	401.9	385.4	16.43	24.462	
3,600.0	3,547.4	3,611.2	3,596.6	13.7	9.1	173.68	65.8	-170.8	408.3	391.4	16.93	24.115	
3,700.0	3,645.6	3,711.0	3,695.6	14.1	9.4	173.51	69.2	-182.8	414.7	397.3	17.43	23.787	
3,800.0	3,743.9	3,810.8	3,794.6	14.6	9.7	173.35	72.6	-194.8	421.1	403.2	17.94	23.476	
3,900.0	3,842.2	3,910.6	3,893.6	15.0	10.0	173.19	76.0	-206.7	427.6	409.1	18.44	23.181	
4,000.0	3,940.4	4,010.4	3,992.6	15.4	10.3	173.03	79.4	-218.7	434.0	415.1	18.95	22.902	
4,100.0	4,038.7	4,110.2	4,091.6	15.8	10.7	172.88	82.8	-230.7	440.4	421.0	19.46	22.636	
4,200.0	4,137.0	4,209.9	4,190.6	16.3	11.0	172.73	86.2	-242.7	446.9	426.9	19.97	22.383	
4,300.0	4,235.3	4,309.7	4,289.6	16.7	11.3	172.59	89.6	-254.7	453.3	432.8	20.47	22.142	
4,400.0	4,333.5	4,409.5	4,388.6	17.1	11.6	172.45	93.0	-266.7	459.8	438.8	20.98	21.912	
4,500.0	4,431.8	4,509.3	4,487.6	17.5	11.9	172.31	96.4	-278.7	466.2	444.7	21.49	21.693	
4,600.0	4,530.1	4,609.1	4,586.6	17.9	12.2	172.18	99.8	-290.7	472.7	450.7	22.00	21.483	
4,700.0	4,628.3	4,708.9	4,685.6	18.4	12.6	172.05	103.2	-302.7	479.1	456.6	22.51	21.282	
4,800.0	4,726.6	4,808.7	4,784.6	18.8	12.9	171.93	106.6	-314.6	485.6	462.6	23.02	21.090	
4,900.0	4,824.9	4,908.5	4,883.6	19.2	13.2	171.81	110.0	-326.6	492.0	468.5	23.54	20.906	
5,000.0	4,923.2	5,008.2	4,982.6	19.6	13.5	171.69	113.4	-338.6	498.5	474.4	24.05	20.729	

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 Ram Land 30G-303
Project:	SEC.30-T4N-R66W	TVD Reference:	WELL @ 4773.0ft (RKB-15')
Reference Site:	Ram Land 30GK-HZ Pad Sec.30-T4N-R66W	MD Reference:	WELL @ 4773.0ft (RKB-15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ram Land 30G-303	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 (7-02-13)	Offset TVD Reference:	Offset Datum

Offset Design												Offset Site Error:	0.0 ft
Survey Program: 0-MWD												Offset Well Error:	0.0 ft
Reference													
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	5,021.4	5,108.0	5,081.6	20.1	13.8	171.57	116.8	-350.6	505.0	480.4	24.56	20.559	
5,200.0	5,119.7	5,200.0	5,172.9	20.5	14.1	171.48	119.9	-361.5	511.6	486.6	25.05	20.427	
5,300.0	5,218.0	5,287.2	5,259.6	20.9	14.3	171.46	122.3	-369.8	520.6	495.1	25.48	20.430	
5,400.0	5,316.2	5,371.6	5,343.9	21.3	14.5	171.52	123.9	-375.4	532.4	506.5	25.90	20.554	
5,500.0	5,414.5	5,455.5	5,427.7	21.7	14.6	171.66	124.8	-378.7	547.0	520.6	26.31	20.789	
5,600.0	5,512.8	5,540.6	5,512.8	22.2	14.8	171.86	125.0	-379.5	564.3	537.5	26.71	21.122	
5,700.0	5,611.1	5,638.8	5,611.1	22.6	14.9	172.12	125.0	-379.5	582.6	555.4	27.15	21.457	
5,800.0	5,709.3	5,737.1	5,709.3	23.0	15.1	172.36	125.0	-379.5	600.9	573.3	27.60	21.775	
5,900.0	5,807.6	5,835.4	5,807.6	23.4	15.3	172.61	125.0	-379.5	619.1	591.0	28.05	22.069	
6,000.0	5,906.4	5,934.2	5,906.4	23.7	15.5	172.82	125.0	-379.5	634.4	605.9	28.46	22.287	
6,100.0	6,005.7	6,033.5	6,005.7	23.9	15.6	172.99	125.0	-379.5	646.3	617.5	28.85	22.406	
6,200.0	6,105.3	6,133.1	6,105.3	24.1	15.8	173.10	125.0	-379.5	654.8	625.6	29.19	22.432	
6,300.0	6,205.2	6,233.0	6,205.2	24.3	16.0	173.16	125.0	-379.5	659.8	630.3	29.50	22.366	
6,400.0	6,305.2	6,333.0	6,305.2	24.4	16.2	90.09	125.0	-379.5	661.4	631.6	29.79	22.203	
6,452.6	6,357.8	6,385.6	6,357.8	24.5	16.3	90.09	125.0	-379.5	661.4	631.4	29.99	22.053	
6,500.0	6,405.2	6,432.9	6,405.1	24.5	16.4	90.18	124.0	-379.5	661.4	631.2	30.15	21.935	
6,600.0	6,505.1	6,531.8	6,503.3	24.6	16.5	-89.14	112.5	-379.5	661.4	631.0	30.42	21.741	
6,700.0	6,603.6	6,629.7	6,598.1	24.7	16.6	-88.44	88.7	-379.5	661.6	631.0	30.64	21.590	
6,800.0	6,699.2	6,726.6	6,688.3	24.8	16.7	-87.77	53.4	-379.5	661.9	631.0	30.86	21.449	
6,900.0	6,790.2	6,822.6	6,772.6	24.9	16.8	-87.15	7.4	-379.5	662.2	631.1	31.12	21.280	
7,000.0	6,875.0	6,917.9	6,849.8	25.0	16.9	-86.57	-48.2	-379.5	662.6	631.1	31.48	21.050	
7,100.0	6,952.2	7,012.4	6,919.0	25.1	17.1	-86.04	-112.5	-379.5	662.9	631.0	31.99	20.723	
7,200.0	7,020.4	7,106.3	6,979.3	25.2	17.3	-85.59	-184.4	-379.5	663.3	630.6	32.71	20.280	
7,300.0	7,078.5	7,200.0	7,030.3	25.4	17.7	-85.20	-262.9	-379.5	663.7	630.0	33.66	19.715	
7,400.0	7,125.5	7,292.6	7,070.9	25.7	18.2	-84.89	-346.1	-379.5	664.0	629.1	34.88	19.037	
7,500.0	7,160.6	7,385.2	7,101.2	26.1	18.9	-84.67	-433.6	-379.5	664.2	627.9	36.35	18.273	
7,600.0	7,183.2	7,477.6	7,120.6	26.6	19.7	-84.53	-523.9	-379.5	664.4	626.3	38.07	17.453	
7,700.0	7,192.9	7,569.9	7,128.9	27.3	20.7	-84.47	-615.8	-379.5	664.4	624.5	39.99	16.614	
7,800.0	7,192.4	7,666.9	7,128.1	28.1	21.8	-84.45	-712.8	-379.5	664.5	622.2	42.29	15.714	
7,900.0	7,191.1	7,766.9	7,126.5	29.0	23.1	-84.42	-812.7	-379.5	664.5	619.7	44.85	14.815	
8,000.0	7,189.8	7,866.9	7,124.8	30.0	24.4	-84.38	-912.7	-379.5	664.5	617.0	47.59	13.964	
8,100.0	7,188.6	7,966.9	7,123.2	31.1	25.9	-84.35	-1,012.7	-379.5	664.6	614.1	50.47	13.169	
8,200.0	7,187.3	8,066.9	7,121.5	32.3	27.4	-84.32	-1,112.7	-379.5	664.6	611.2	53.46	12.432	
8,300.0	7,186.1	8,166.9	7,119.9	33.6	28.9	-84.28	-1,212.7	-379.5	664.7	608.1	56.56	11.753	
8,400.0	7,184.8	8,266.9	7,118.2	35.0	30.5	-84.25	-1,312.7	-379.5	664.7	605.0	59.73	11.128	
8,500.0	7,183.6	8,366.9	7,116.5	36.4	32.1	-84.21	-1,412.7	-379.5	664.7	601.8	62.98	10.555	
8,600.0	7,182.3	8,466.9	7,114.9	37.8	33.8	-84.18	-1,512.6	-379.5	664.8	598.5	66.29	10.029	
8,700.0	7,181.0	8,566.9	7,113.2	39.3	35.4	-84.14	-1,612.6	-379.5	664.8	595.2	69.65	9.545	
8,800.0	7,179.8	8,666.9	7,111.6	40.9	37.1	-84.11	-1,712.6	-379.5	664.9	591.8	73.05	9.101	
8,900.0	7,178.5	8,766.9	7,109.9	42.4	38.9	-84.07	-1,812.6	-379.5	664.9	588.4	76.50	8.692	
9,000.0	7,177.3	8,866.9	7,108.2	44.0	40.6	-84.04	-1,912.6	-379.5	665.0	585.0	79.97	8.315	
9,100.0	7,176.0	8,966.9	7,106.6	45.7	42.4	-84.01	-2,012.6	-379.5	665.0	581.5	83.48	7.966	
9,200.0	7,174.8	9,066.9	7,104.9	47.3	44.1	-83.97	-2,112.5	-379.5	665.0	578.0	87.01	7.643	
9,300.0	7,173.5	9,166.9	7,103.3	49.0	45.9	-83.94	-2,212.5	-379.5	665.1	574.5	90.56	7.344	
9,400.0	7,172.2	9,266.9	7,101.6	50.7	47.7	-83.90	-2,312.5	-379.5	665.1	571.0	94.14	7.065	
9,500.0	7,171.0	9,366.9	7,100.0	52.4	49.5	-83.87	-2,412.5	-379.5	665.2	567.4	97.73	6.806	
9,600.0	7,169.7	9,466.9	7,098.3	54.1	51.3	-83.83	-2,512.5	-379.5	665.2	563.9	101.34	6.564	
9,700.0	7,168.5	9,566.9	7,096.6	55.8	53.1	-83.80	-2,612.5	-379.5	665.3	560.3	104.96	6.338	
9,800.0	7,167.2	9,666.9	7,095.0	57.5	54.9	-83.77	-2,712.5	-379.5	665.3	556.7	108.59	6.127	
9,900.0	7,166.0	9,766.9	7,093.3	59.3	56.8	-83.73	-2,812.4	-379.5	665.3	553.1	112.24	5.928	
10,000.0	7,164.7	9,866.9	7,091.7	61.1	58.6	-83.70	-2,912.4	-379.5	665.4	549.5	115.89	5.741	

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 Ram Land 30G-303
Project:	SEC.30-T4N-R66W	TVD Reference:	WELL @ 4773.0ft (RKB-15')
Reference Site:	Ram Land 30GK-HZ Pad Sec.30-T4N-R66W	MD Reference:	WELL @ 4773.0ft (RKB-15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ram Land 30G-303	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 (7-02-13)	Offset TVD Reference:	Offset Datum

Offset Design Ram Land 30GK-HZ Pad Sec.30-T4N-R66W - Ram Land 30K-243 - Wellbore #1 - Plan #1 (7-02-13)												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)					
10,100.0	7,163.5	9,966.9	7,090.0	62.8	60.4	-83.66	-3,012.4	-379.5	665.4	545.9	119.56	5.566	
10,200.0	7,162.2	10,066.9	7,088.4	64.6	62.3	-83.63	-3,112.4	-379.5	665.5	542.2	123.23	5.400	
10,300.0	7,160.9	10,166.9	7,086.7	66.4	64.1	-83.59	-3,212.4	-379.5	665.5	538.6	126.91	5.244	
10,400.0	7,159.7	10,266.9	7,085.0	68.2	66.0	-83.56	-3,312.4	-379.5	665.6	535.0	130.60	5.096	
10,500.0	7,158.4	10,366.9	7,083.4	70.0	67.9	-83.53	-3,412.4	-379.5	665.6	531.3	134.29	4.956	
10,600.0	7,157.2	10,466.9	7,081.7	71.8	69.7	-83.49	-3,512.3	-379.5	665.7	527.7	137.99	4.824	
10,700.0	7,155.9	10,566.9	7,080.1	73.6	71.6	-83.46	-3,612.3	-379.5	665.7	524.0	141.70	4.698	
10,800.0	7,154.7	10,666.9	7,078.4	75.5	73.4	-83.42	-3,712.3	-379.5	665.7	520.3	145.41	4.578	
10,900.0	7,153.4	10,766.9	7,076.7	77.3	75.3	-83.39	-3,812.3	-379.5	665.8	516.7	149.12	4.465	
11,000.0	7,152.1	10,866.9	7,075.1	79.1	77.2	-83.35	-3,912.3	-379.5	665.8	513.0	152.84	4.356	
11,100.0	7,150.9	10,966.9	7,073.4	80.9	79.1	-83.32	-4,012.3	-379.5	665.9	509.3	156.56	4.253	
11,200.0	7,149.6	11,066.9	7,071.8	82.8	80.9	-83.28	-4,112.3	-379.5	665.9	505.6	160.29	4.155	
11,300.0	7,148.4	11,166.9	7,070.1	84.6	82.8	-83.25	-4,212.2	-379.5	666.0	502.0	164.02	4.060	
11,400.0	7,147.1	11,266.9	7,068.5	86.5	84.7	-83.22	-4,312.2	-379.5	666.0	498.3	167.75	3.970	
11,500.0	7,145.9	11,366.9	7,066.8	88.3	86.6	-83.18	-4,412.2	-379.5	666.1	494.6	171.48	3.884	
11,600.0	7,144.6	11,466.9	7,065.1	90.2	88.5	-83.15	-4,512.2	-379.5	666.1	490.9	175.22	3.802	
11,700.0	7,143.3	11,566.9	7,063.5	92.0	90.3	-83.11	-4,612.2	-379.5	666.2	487.2	178.96	3.722	
11,728.2	7,143.0	11,595.1	7,063.0	92.6	90.9	-83.10	-4,640.4	-379.5	666.2	486.2	180.01	3.701 SF	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ram Land 30G-303
Project:	SEC.30-T4N-R66W	TVD Reference:	WELL @ 4773.0ft (RKB-15')
Reference Site:	Ram Land 30GK-HZ Pad Sec.30-T4N-R66W	MD Reference:	WELL @ 4773.0ft (RKB-15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ram Land 30G-303	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 (7-02-13)	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 4773.0ft (RKB-15')

Offset Depths are relative to Offset Datum

Central Meridian is -105.500000 °

Coordinates are relative to: Ram Land 30G-303

Coordinate System is US State Plane 1983, Colorado Northern Zone

Grid Convergence at Surface is: 0.44°



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ram Land 30G-303
Project:	SEC.30-T4N-R66W	TVD Reference:	WELL @ 4773.0ft (RKB-15')
Reference Site:	Ram Land 30GK-HZ Pad Sec.30-T4N-R66W	MD Reference:	WELL @ 4773.0ft (RKB-15')
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