

PETROLEUM DEVELOPMENT CORP Weld County CO

Well Name: **Thornton 15E-232**

Surface Location: Thornton Pad Sec.15-T7N-R66W

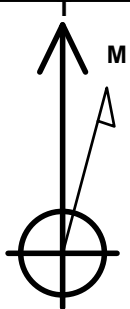
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone

Ground Elevation: 4970.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1455601.68	3202070.80	40.581750	-104.772500	
RKB Ensign 32 - 15' WELL @ 4985.0ft (RKB Ensign 32 - 15')						

WELLBORE TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
HARDLINE BHL 460'FEL (1)	1.0	270.0	4589.9	Polygon
HARDLINE SHL 460'FWL (1)	1.0	270.0	175.0	Polygon
SECTION LINE 270°N & 285°W OF SHL (1)	1.0	270.0	-285.0	Polygon
BHL 200'FNL 500'FEL	7305.0	80.6	4549.9	Point



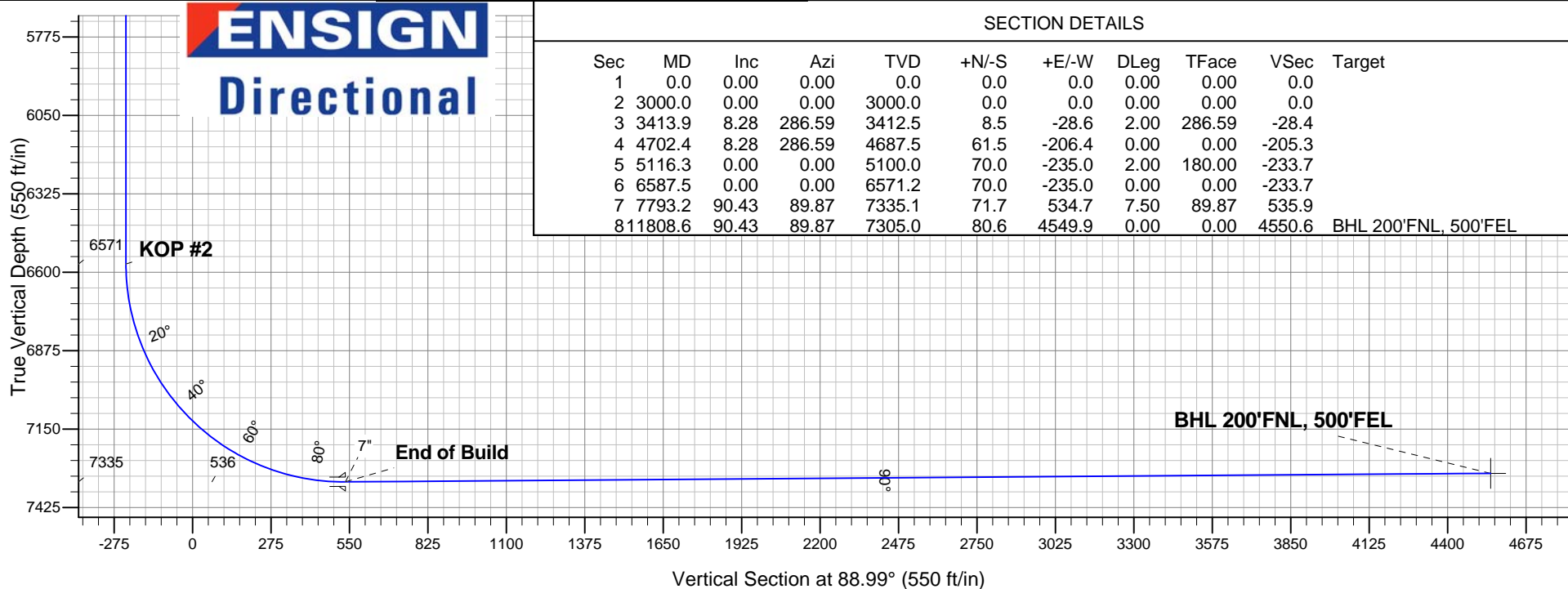
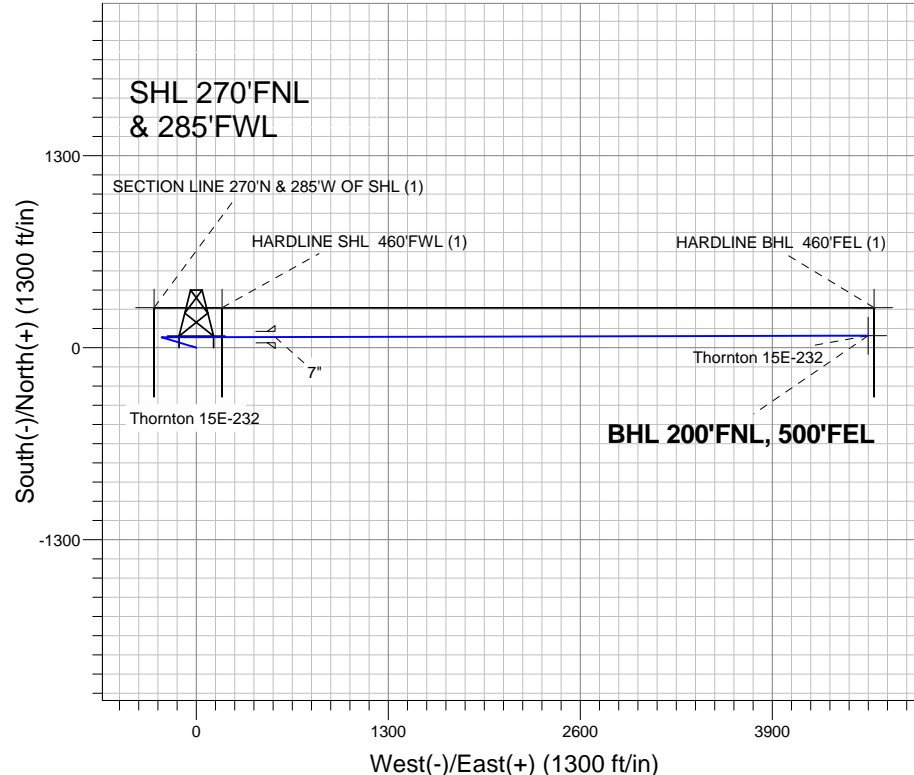
Azimuths to True North
Magnetic North: 8.75°

Magnetic Field
Strength: 53119.7snT
Dip Angle: 67.16°
Date: 6/27/2012
Model: IGRF2010

Thornton Pad Sec.15-T7N-R66W
Thornton 15E-232
Plan #1 (6-12-12)
10:39, June 27 2012

ANNOTATIONS

TVD	MD	Annotation
3000.0	3000.0	KOP #1
6571.2	6587.5	KOP #2
7335.1	7793.2	End of Build





PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.15-T7N-R66W

Thornton Pad Sec.15-T7N-R66W

Thornton 15E-232

Wellbore #1

Plan: Plan #1 (6-12-12)

Standard Planning Report

27 June, 2012

Database:	Landmark	Local Co-ordinate Reference:	Well Thornton 15E-232
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4985.0ft (RKB Ensign 32 - 15')
Project:	SEC.15-T7N-R66W	MD Reference:	WELL @ 4985.0ft (RKB Ensign 32 - 15')
Site:	Thornton Pad Sec.15-T7N-R66W	North Reference:	True
Well:	Thornton 15E-232	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (6-12-12)		

Project	SEC.15-T7N-R66W, 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		Thornton Pad Sec.15-T7N-R66W			
Site Position:		Northing:	1,455,601.69 ft	Latitude:	40.581750
From:	Lat/Long	Easting:	3,202,070.80 ft	Longitude:	-104.772500
Position Uncertainty:	0.0 ft	Slot Radius:	"	Grid Convergence:	0.47 °

Well	Thornton 15E-232					
Well Position	+N/-S	0.0 ft	Northing:	1,455,601.68 ft	Latitude:	40.581750
	+E/-W	0.0 ft	Easting:	3,202,070.80 ft	Longitude:	-104.772500
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,970.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	6/12/2012	8.75	67.16	53,120

Design	Plan #1 (6-12-12)			
Audit Notes:				
Version:	Phase:	PROTOTYPE	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.0	0.0	0.0	88.99

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	
3,000.0	0.00	0.00	3,000.0	0.0	0.0	0.00	0.00	0.00	0.00	
3,413.9	8.28	286.59	3,412.5	8.5	-28.6	2.00	2.00	0.00	286.59	
4,702.4	8.28	286.59	4,687.5	61.5	-206.4	0.00	0.00	0.00	0.00	
5,116.3	0.00	0.00	5,100.0	70.0	-235.0	2.00	-2.00	0.00	180.00	
6,587.5	0.00	0.00	6,571.2	70.0	-235.0	0.00	0.00	0.00	0.00	
7,793.2	90.43	89.87	7,335.1	71.7	534.7	7.50	7.50	0.00	89.87	
11,808.6	90.43	89.87	7,305.0	80.6	4,549.9	0.00	0.00	0.00	0.00	BHL 200'FNL, 500'

Database:	Landmark	Local Co-ordinate Reference:	Well Thornton 15E-232
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4985.0ft (RKB Ensign 32 - 15')
Project:	SEC.15-T7N-R66W	MD Reference:	WELL @ 4985.0ft (RKB Ensign 32 - 15')
Site:	Thornton Pad Sec.15-T7N-R66W	North Reference:	True
Well:	Thornton 15E-232	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (6-12-12)		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N-S (ft)	+E-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
1.0	0.00	0.00	1.0	0.0	0.0	0.0	0.00	0.00	0.00
HARDLINE SHL 460'FWL (1) - SECTION LINE 270°N & 285°W OF SHL (1) - HARDLINE BHL 460'FEL (1)									
40.0	0.00	0.00	40.0	0.0	0.0	0.0	0.00	0.00	0.00
80.0	0.00	0.00	80.0	0.0	0.0	0.0	0.00	0.00	0.00
120.0	0.00	0.00	120.0	0.0	0.0	0.0	0.00	0.00	0.00
160.0	0.00	0.00	160.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
240.0	0.00	0.00	240.0	0.0	0.0	0.0	0.00	0.00	0.00
280.0	0.00	0.00	280.0	0.0	0.0	0.0	0.00	0.00	0.00
320.0	0.00	0.00	320.0	0.0	0.0	0.0	0.00	0.00	0.00
360.0	0.00	0.00	360.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
440.0	0.00	0.00	440.0	0.0	0.0	0.0	0.00	0.00	0.00
480.0	0.00	0.00	480.0	0.0	0.0	0.0	0.00	0.00	0.00
520.0	0.00	0.00	520.0	0.0	0.0	0.0	0.00	0.00	0.00
560.0	0.00	0.00	560.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
640.0	0.00	0.00	640.0	0.0	0.0	0.0	0.00	0.00	0.00
680.0	0.00	0.00	680.0	0.0	0.0	0.0	0.00	0.00	0.00
720.0	0.00	0.00	720.0	0.0	0.0	0.0	0.00	0.00	0.00
760.0	0.00	0.00	760.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
840.0	0.00	0.00	840.0	0.0	0.0	0.0	0.00	0.00	0.00
880.0	0.00	0.00	880.0	0.0	0.0	0.0	0.00	0.00	0.00
920.0	0.00	0.00	920.0	0.0	0.0	0.0	0.00	0.00	0.00
960.0	0.00	0.00	960.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
1,040.0	0.00	0.00	1,040.0	0.0	0.0	0.0	0.00	0.00	0.00
1,080.0	0.00	0.00	1,080.0	0.0	0.0	0.0	0.00	0.00	0.00
1,120.0	0.00	0.00	1,120.0	0.0	0.0	0.0	0.00	0.00	0.00
1,160.0	0.00	0.00	1,160.0	0.0	0.0	0.0	0.00	0.00	0.00
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	0.00
1,240.0	0.00	0.00	1,240.0	0.0	0.0	0.0	0.00	0.00	0.00
1,280.0	0.00	0.00	1,280.0	0.0	0.0	0.0	0.00	0.00	0.00
1,320.0	0.00	0.00	1,320.0	0.0	0.0	0.0	0.00	0.00	0.00
1,360.0	0.00	0.00	1,360.0	0.0	0.0	0.0	0.00	0.00	0.00
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	0.00
1,440.0	0.00	0.00	1,440.0	0.0	0.0	0.0	0.00	0.00	0.00
1,480.0	0.00	0.00	1,480.0	0.0	0.0	0.0	0.00	0.00	0.00
1,520.0	0.00	0.00	1,520.0	0.0	0.0	0.0	0.00	0.00	0.00
1,560.0	0.00	0.00	1,560.0	0.0	0.0	0.0	0.00	0.00	0.00
1,600.0	0.00	0.00	1,600.0	0.0	0.0	0.0	0.00	0.00	0.00
1,640.0	0.00	0.00	1,640.0	0.0	0.0	0.0	0.00	0.00	0.00
1,680.0	0.00	0.00	1,680.0	0.0	0.0	0.0	0.00	0.00	0.00
1,720.0	0.00	0.00	1,720.0	0.0	0.0	0.0	0.00	0.00	0.00
1,760.0	0.00	0.00	1,760.0	0.0	0.0	0.0	0.00	0.00	0.00
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.0	0.00	0.00	0.00
1,840.0	0.00	0.00	1,840.0	0.0	0.0	0.0	0.00	0.00	0.00
1,880.0	0.00	0.00	1,880.0	0.0	0.0	0.0	0.00	0.00	0.00
1,920.0	0.00	0.00	1,920.0	0.0	0.0	0.0	0.00	0.00	0.00
1,960.0	0.00	0.00	1,960.0	0.0	0.0	0.0	0.00	0.00	0.00
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.0	0.00	0.00	0.00

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Site:	Thornton Pad Sec.15-T7N-R66W	North Reference:	True
Well:	Thornton 15E-232	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (6-12-12)		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
2,040.0	0.00	0.00	2,040.0	0.0	0.0	0.0	0.00	0.00	0.00
2,080.0	0.00	0.00	2,080.0	0.0	0.0	0.0	0.00	0.00	0.00
2,120.0	0.00	0.00	2,120.0	0.0	0.0	0.0	0.00	0.00	0.00
2,160.0	0.00	0.00	2,160.0	0.0	0.0	0.0	0.00	0.00	0.00
2,200.0	0.00	0.00	2,200.0	0.0	0.0	0.0	0.00	0.00	0.00
2,240.0	0.00	0.00	2,240.0	0.0	0.0	0.0	0.00	0.00	0.00
2,280.0	0.00	0.00	2,280.0	0.0	0.0	0.0	0.00	0.00	0.00
2,320.0	0.00	0.00	2,320.0	0.0	0.0	0.0	0.00	0.00	0.00
2,360.0	0.00	0.00	2,360.0	0.0	0.0	0.0	0.00	0.00	0.00
2,400.0	0.00	0.00	2,400.0	0.0	0.0	0.0	0.00	0.00	0.00
2,440.0	0.00	0.00	2,440.0	0.0	0.0	0.0	0.00	0.00	0.00
2,480.0	0.00	0.00	2,480.0	0.0	0.0	0.0	0.00	0.00	0.00
2,520.0	0.00	0.00	2,520.0	0.0	0.0	0.0	0.00	0.00	0.00
2,560.0	0.00	0.00	2,560.0	0.0	0.0	0.0	0.00	0.00	0.00
2,600.0	0.00	0.00	2,600.0	0.0	0.0	0.0	0.00	0.00	0.00
2,640.0	0.00	0.00	2,640.0	0.0	0.0	0.0	0.00	0.00	0.00
2,680.0	0.00	0.00	2,680.0	0.0	0.0	0.0	0.00	0.00	0.00
2,720.0	0.00	0.00	2,720.0	0.0	0.0	0.0	0.00	0.00	0.00
2,760.0	0.00	0.00	2,760.0	0.0	0.0	0.0	0.00	0.00	0.00
2,800.0	0.00	0.00	2,800.0	0.0	0.0	0.0	0.00	0.00	0.00
2,840.0	0.00	0.00	2,840.0	0.0	0.0	0.0	0.00	0.00	0.00
2,880.0	0.00	0.00	2,880.0	0.0	0.0	0.0	0.00	0.00	0.00
2,920.0	0.00	0.00	2,920.0	0.0	0.0	0.0	0.00	0.00	0.00
2,960.0	0.00	0.00	2,960.0	0.0	0.0	0.0	0.00	0.00	0.00
3,000.0	0.00	0.00	3,000.0	0.0	0.0	0.0	0.00	0.00	0.00
KOP #1									
3,040.0	0.80	286.59	3,040.0	0.1	-0.3	-0.3	2.00	2.00	0.00
3,080.0	1.60	286.59	3,080.0	0.3	-1.1	-1.1	2.00	2.00	0.00
3,120.0	2.40	286.59	3,120.0	0.7	-2.4	-2.4	2.00	2.00	0.00
3,160.0	3.20	286.59	3,159.9	1.3	-4.3	-4.3	2.00	2.00	0.00
3,200.0	4.00	286.59	3,199.8	2.0	-6.7	-6.7	2.00	2.00	0.00
3,240.0	4.80	286.59	3,239.7	2.9	-9.6	-9.6	2.00	2.00	0.00
3,280.0	5.60	286.59	3,279.6	3.9	-13.1	-13.0	2.00	2.00	0.00
3,320.0	6.40	286.59	3,319.3	5.1	-17.1	-17.0	2.00	2.00	0.00
3,360.0	7.20	286.59	3,359.1	6.4	-21.6	-21.5	2.00	2.00	0.00
3,400.0	8.00	286.59	3,398.7	8.0	-26.7	-26.6	2.00	2.00	0.00
3,413.9	8.28	286.59	3,412.5	8.5	-28.6	-28.4	2.00	2.00	0.00
3,440.0	8.28	286.59	3,438.3	9.6	-32.2	-32.0	0.00	0.00	0.00
3,480.0	8.28	286.59	3,477.9	11.2	-37.7	-37.5	0.00	0.00	0.00
3,520.0	8.28	286.59	3,517.5	12.9	-43.2	-43.0	0.00	0.00	0.00
3,560.0	8.28	286.59	3,557.0	14.5	-48.8	-48.5	0.00	0.00	0.00
3,600.0	8.28	286.59	3,596.6	16.2	-54.3	-54.0	0.00	0.00	0.00
3,640.0	8.28	286.59	3,636.2	17.8	-59.8	-59.5	0.00	0.00	0.00
3,680.0	8.28	286.59	3,675.8	19.5	-65.3	-65.0	0.00	0.00	0.00
3,720.0	8.28	286.59	3,715.4	21.1	-70.8	-70.5	0.00	0.00	0.00
3,760.0	8.28	286.59	3,755.0	22.7	-76.4	-75.9	0.00	0.00	0.00
3,800.0	8.28	286.59	3,794.5	24.4	-81.9	-81.4	0.00	0.00	0.00
3,840.0	8.28	286.59	3,834.1	26.0	-87.4	-86.9	0.00	0.00	0.00
3,880.0	8.28	286.59	3,873.7	27.7	-92.9	-92.4	0.00	0.00	0.00
3,920.0	8.28	286.59	3,913.3	29.3	-98.4	-97.9	0.00	0.00	0.00
3,960.0	8.28	286.59	3,952.9	31.0	-104.0	-103.4	0.00	0.00	0.00
4,000.0	8.28	286.59	3,992.5	32.6	-109.5	-108.9	0.00	0.00	0.00
4,040.0	8.28	286.59	4,032.0	34.3	-115.0	-114.4	0.00	0.00	0.00

Database:	Landmark	Local Co-ordinate Reference:	Well Thornton 15E-232
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4985.0ft (RKB Ensign 32 - 15')
Project:	SEC.15-T7N-R66W	MD Reference:	WELL @ 4985.0ft (RKB Ensign 32 - 15')
Site:	Thornton Pad Sec.15-T7N-R66W	North Reference:	True
Well:	Thornton 15E-232	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (6-12-12)		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
4,080.0	8.28	286.59	4,071.6	35.9	-120.5	-119.9	0.00	0.00	0.00
4,120.0	8.28	286.59	4,111.2	37.5	-126.0	-125.3	0.00	0.00	0.00
4,160.0	8.28	286.59	4,150.8	39.2	-131.6	-130.8	0.00	0.00	0.00
4,200.0	8.28	286.59	4,190.4	40.8	-137.1	-136.3	0.00	0.00	0.00
4,240.0	8.28	286.59	4,230.0	42.5	-142.6	-141.8	0.00	0.00	0.00
4,280.0	8.28	286.59	4,269.5	44.1	-148.1	-147.3	0.00	0.00	0.00
4,320.0	8.28	286.59	4,309.1	45.8	-153.6	-152.8	0.00	0.00	0.00
4,360.0	8.28	286.59	4,348.7	47.4	-159.1	-158.3	0.00	0.00	0.00
4,400.0	8.28	286.59	4,388.3	49.1	-164.7	-163.8	0.00	0.00	0.00
4,440.0	8.28	286.59	4,427.9	50.7	-170.2	-169.3	0.00	0.00	0.00
4,480.0	8.28	286.59	4,467.5	52.3	-175.7	-174.8	0.00	0.00	0.00
4,520.0	8.28	286.59	4,507.0	54.0	-181.2	-180.2	0.00	0.00	0.00
4,560.0	8.28	286.59	4,546.6	55.6	-186.7	-185.7	0.00	0.00	0.00
4,600.0	8.28	286.59	4,586.2	57.3	-192.3	-191.2	0.00	0.00	0.00
4,640.0	8.28	286.59	4,625.8	58.9	-197.8	-196.7	0.00	0.00	0.00
4,680.0	8.28	286.59	4,665.4	60.6	-203.3	-202.2	0.00	0.00	0.00
4,702.4	8.28	286.59	4,687.5	61.5	-206.4	-205.3	0.00	0.00	0.00
4,720.0	7.93	286.59	4,705.0	62.2	-208.8	-207.6	2.00	-2.00	0.00
4,760.0	7.13	286.59	4,744.6	63.7	-213.8	-212.6	2.00	-2.00	0.00
4,800.0	6.33	286.59	4,784.3	65.0	-218.3	-217.1	2.00	-2.00	0.00
4,840.0	5.53	286.59	4,824.1	66.2	-222.2	-221.0	2.00	-2.00	0.00
4,880.0	4.73	286.59	4,864.0	67.2	-225.7	-224.4	2.00	-2.00	0.00
4,920.0	3.93	286.59	4,903.9	68.1	-228.6	-227.3	2.00	-2.00	0.00
4,960.0	3.13	286.59	4,943.8	68.8	-230.9	-229.7	2.00	-2.00	0.00
5,000.0	2.33	286.59	4,983.7	69.3	-232.7	-231.5	2.00	-2.00	0.00
5,040.0	1.53	286.59	5,023.7	69.7	-234.0	-232.8	2.00	-2.00	0.00
5,080.0	0.73	286.59	5,063.7	69.9	-234.8	-233.5	2.00	-2.00	0.00
5,116.3	0.00	0.00	5,100.0	70.0	-235.0	-233.7	2.00	-2.00	0.00
5,120.0	0.00	0.00	5,103.7	70.0	-235.0	-233.7	0.00	0.00	0.00
5,160.0	0.00	0.00	5,143.7	70.0	-235.0	-233.7	0.00	0.00	0.00
5,200.0	0.00	0.00	5,183.7	70.0	-235.0	-233.7	0.00	0.00	0.00
5,240.0	0.00	0.00	5,223.7	70.0	-235.0	-233.7	0.00	0.00	0.00
5,280.0	0.00	0.00	5,263.7	70.0	-235.0	-233.7	0.00	0.00	0.00
5,320.0	0.00	0.00	5,303.7	70.0	-235.0	-233.7	0.00	0.00	0.00
5,360.0	0.00	0.00	5,343.7	70.0	-235.0	-233.7	0.00	0.00	0.00
5,400.0	0.00	0.00	5,383.7	70.0	-235.0	-233.7	0.00	0.00	0.00
5,440.0	0.00	0.00	5,423.7	70.0	-235.0	-233.7	0.00	0.00	0.00
5,480.0	0.00	0.00	5,463.7	70.0	-235.0	-233.7	0.00	0.00	0.00
5,520.0	0.00	0.00	5,503.7	70.0	-235.0	-233.7	0.00	0.00	0.00
5,560.0	0.00	0.00	5,543.7	70.0	-235.0	-233.7	0.00	0.00	0.00
5,600.0	0.00	0.00	5,583.7	70.0	-235.0	-233.7	0.00	0.00	0.00
5,640.0	0.00	0.00	5,623.7	70.0	-235.0	-233.7	0.00	0.00	0.00
5,680.0	0.00	0.00	5,663.7	70.0	-235.0	-233.7	0.00	0.00	0.00
5,720.0	0.00	0.00	5,703.7	70.0	-235.0	-233.7	0.00	0.00	0.00
5,760.0	0.00	0.00	5,743.7	70.0	-235.0	-233.7	0.00	0.00	0.00
5,800.0	0.00	0.00	5,783.7	70.0	-235.0	-233.7	0.00	0.00	0.00
5,840.0	0.00	0.00	5,823.7	70.0	-235.0	-233.7	0.00	0.00	0.00
5,880.0	0.00	0.00	5,863.7	70.0	-235.0	-233.7	0.00	0.00	0.00
5,920.0	0.00	0.00	5,903.7	70.0	-235.0	-233.7	0.00	0.00	0.00
5,960.0	0.00	0.00	5,943.7	70.0	-235.0	-233.7	0.00	0.00	0.00
6,000.0	0.00	0.00	5,983.7	70.0	-235.0	-233.7	0.00	0.00	0.00
6,040.0	0.00	0.00	6,023.7	70.0	-235.0	-233.7	0.00	0.00	0.00
6,080.0	0.00	0.00	6,063.7	70.0	-235.0	-233.7	0.00	0.00	0.00

Database:	Landmark	Local Co-ordinate Reference:	Well Thornton 15E-232
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4985.0ft (RKB Ensign 32 - 15')
Project:	SEC.15-T7N-R66W	MD Reference:	WELL @ 4985.0ft (RKB Ensign 32 - 15')
Site:	Thornton Pad Sec.15-T7N-R66W	North Reference:	True
Well:	Thornton 15E-232	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (6-12-12)		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
6,120.0	0.00	0.00	6,103.7	70.0	-235.0	-233.7	0.00	0.00	0.00
6,160.0	0.00	0.00	6,143.7	70.0	-235.0	-233.7	0.00	0.00	0.00
6,200.0	0.00	0.00	6,183.7	70.0	-235.0	-233.7	0.00	0.00	0.00
6,240.0	0.00	0.00	6,223.7	70.0	-235.0	-233.7	0.00	0.00	0.00
6,280.0	0.00	0.00	6,263.7	70.0	-235.0	-233.7	0.00	0.00	0.00
6,320.0	0.00	0.00	6,303.7	70.0	-235.0	-233.7	0.00	0.00	0.00
6,360.0	0.00	0.00	6,343.7	70.0	-235.0	-233.7	0.00	0.00	0.00
6,400.0	0.00	0.00	6,383.7	70.0	-235.0	-233.7	0.00	0.00	0.00
6,440.0	0.00	0.00	6,423.7	70.0	-235.0	-233.7	0.00	0.00	0.00
6,480.0	0.00	0.00	6,463.7	70.0	-235.0	-233.7	0.00	0.00	0.00
6,520.0	0.00	0.00	6,503.7	70.0	-235.0	-233.7	0.00	0.00	0.00
6,560.0	0.00	0.00	6,543.7	70.0	-235.0	-233.7	0.00	0.00	0.00
6,587.5	0.00	0.00	6,571.2	70.0	-235.0	-233.7	0.00	0.00	0.00
KOP #2									
6,600.0	0.94	89.87	6,583.7	70.0	-234.9	-233.6	7.49	7.49	0.00
6,640.0	3.94	89.87	6,623.7	70.0	-233.2	-231.9	7.50	7.50	0.00
6,680.0	6.94	89.87	6,663.5	70.0	-229.4	-228.1	7.50	7.50	0.00
6,720.0	9.94	89.87	6,703.0	70.0	-223.5	-222.3	7.50	7.50	0.00
6,760.0	12.94	89.87	6,742.2	70.0	-215.6	-214.3	7.50	7.50	0.00
6,800.0	15.94	89.87	6,781.0	70.1	-205.6	-204.4	7.50	7.50	0.00
6,840.0	18.94	89.87	6,819.1	70.1	-193.7	-192.4	7.50	7.50	0.00
6,880.0	21.94	89.87	6,856.6	70.1	-179.7	-178.4	7.50	7.50	0.00
6,920.0	24.94	89.87	6,893.3	70.2	-163.8	-162.5	7.50	7.50	0.00
6,960.0	27.94	89.87	6,929.1	70.2	-146.0	-144.7	7.50	7.50	0.00
7,000.0	30.94	89.87	6,963.9	70.2	-126.3	-125.1	7.50	7.50	0.00
7,040.0	33.94	89.87	6,997.7	70.3	-104.9	-103.6	7.50	7.50	0.00
7,080.0	36.94	89.87	7,030.3	70.3	-81.7	-80.4	7.50	7.50	0.00
7,120.0	39.94	89.87	7,061.6	70.4	-56.8	-55.6	7.50	7.50	0.00
7,160.0	42.94	89.87	7,091.6	70.5	-30.3	-29.1	7.50	7.50	0.00
7,200.0	45.94	89.87	7,120.2	70.5	-2.3	-1.1	7.50	7.50	0.00
7,240.0	48.94	89.87	7,147.2	70.6	27.1	28.4	7.50	7.50	0.00
7,280.0	51.94	89.87	7,172.7	70.6	57.9	59.2	7.50	7.50	0.00
7,320.0	54.94	89.87	7,196.5	70.7	90.1	91.3	7.50	7.50	0.00
7,360.0	57.94	89.87	7,218.6	70.8	123.4	124.6	7.50	7.50	0.00
7,400.0	60.94	89.87	7,239.0	70.9	157.8	159.1	7.50	7.50	0.00
7,440.0	63.94	89.87	7,257.5	70.9	193.3	194.5	7.50	7.50	0.00
7,480.0	66.94	89.87	7,274.1	71.0	229.7	230.9	7.50	7.50	0.00
7,520.0	69.94	89.87	7,288.8	71.1	266.9	268.1	7.50	7.50	0.00
7,560.0	72.94	89.87	7,301.5	71.2	304.8	306.0	7.50	7.50	0.00
7,600.0	75.94	89.87	7,312.3	71.3	343.3	344.5	7.50	7.50	0.00
7,640.0	78.94	89.87	7,321.0	71.4	382.3	383.5	7.50	7.50	0.00
7,680.0	81.94	89.87	7,327.6	71.5	421.8	423.0	7.50	7.50	0.00
7,720.0	84.94	89.87	7,332.2	71.5	461.5	462.7	7.50	7.50	0.00
7,760.0	87.94	89.87	7,334.7	71.6	501.4	502.6	7.50	7.50	0.00
7,793.2	90.43	89.87	7,335.1	71.7	534.6	535.8	7.50	7.50	0.00
End of Build - 7"									
7,800.0	90.43	89.87	7,335.1	71.7	541.4	542.6	0.05	0.05	0.00
7,840.0	90.43	89.87	7,334.8	71.8	581.4	582.6	0.00	0.00	0.00
7,880.0	90.43	89.87	7,334.5	71.9	621.4	622.6	0.00	0.00	0.00
7,920.0	90.43	89.87	7,334.2	72.0	661.4	662.6	0.00	0.00	0.00
7,960.0	90.43	89.87	7,333.9	72.1	701.4	702.6	0.00	0.00	0.00
8,000.0	90.43	89.87	7,333.6	72.2	741.4	742.6	0.00	0.00	0.00
8,040.0	90.43	89.87	7,333.3	72.2	781.4	782.6	0.00	0.00	0.00

Database:	Landmark	Local Co-ordinate Reference:	Well Thornton 15E-232
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4985.0ft (RKB Ensign 32 - 15')
Project:	SEC.15-T7N-R66W	MD Reference:	WELL @ 4985.0ft (RKB Ensign 32 - 15')
Site:	Thornton Pad Sec.15-T7N-R66W	North Reference:	True
Well:	Thornton 15E-232	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (6-12-12)		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
8,080.0	90.43	89.87	7,333.0	72.3	821.4	822.6	0.00	0.00	0.00
8,120.0	90.43	89.87	7,332.7	72.4	861.4	862.6	0.00	0.00	0.00
8,160.0	90.43	89.87	7,332.4	72.5	901.4	902.6	0.00	0.00	0.00
8,200.0	90.43	89.87	7,332.1	72.6	941.4	942.6	0.00	0.00	0.00
8,240.0	90.43	89.87	7,331.8	72.7	981.4	982.5	0.00	0.00	0.00
8,280.0	90.43	89.87	7,331.5	72.8	1,021.4	1,022.5	0.00	0.00	0.00
8,320.0	90.43	89.87	7,331.2	72.9	1,061.4	1,062.5	0.00	0.00	0.00
8,360.0	90.43	89.87	7,330.9	73.0	1,101.4	1,102.5	0.00	0.00	0.00
8,400.0	90.43	89.87	7,330.6	73.0	1,141.4	1,142.5	0.00	0.00	0.00
8,440.0	90.43	89.87	7,330.3	73.1	1,181.4	1,182.5	0.00	0.00	0.00
8,480.0	90.43	89.87	7,330.0	73.2	1,221.4	1,222.5	0.00	0.00	0.00
8,520.0	90.43	89.87	7,329.7	73.3	1,261.4	1,262.5	0.00	0.00	0.00
8,560.0	90.43	89.87	7,329.4	73.4	1,301.4	1,302.5	0.00	0.00	0.00
8,600.0	90.43	89.87	7,329.1	73.5	1,341.4	1,342.5	0.00	0.00	0.00
8,640.0	90.43	89.87	7,328.8	73.6	1,381.4	1,382.5	0.00	0.00	0.00
8,680.0	90.43	89.87	7,328.5	73.7	1,421.4	1,422.5	0.00	0.00	0.00
8,720.0	90.43	89.87	7,328.2	73.8	1,461.4	1,462.5	0.00	0.00	0.00
8,760.0	90.43	89.87	7,327.9	73.8	1,501.4	1,502.5	0.00	0.00	0.00
8,800.0	90.43	89.87	7,327.6	73.9	1,541.4	1,542.5	0.00	0.00	0.00
8,840.0	90.43	89.87	7,327.3	74.0	1,581.4	1,582.5	0.00	0.00	0.00
8,880.0	90.43	89.87	7,327.0	74.1	1,621.4	1,622.5	0.00	0.00	0.00
8,920.0	90.43	89.87	7,326.7	74.2	1,661.4	1,662.4	0.00	0.00	0.00
8,960.0	90.43	89.87	7,326.4	74.3	1,701.4	1,702.4	0.00	0.00	0.00
9,000.0	90.43	89.87	7,326.1	74.4	1,741.4	1,742.4	0.00	0.00	0.00
9,040.0	90.43	89.87	7,325.8	74.5	1,781.4	1,782.4	0.00	0.00	0.00
9,080.0	90.43	89.87	7,325.5	74.5	1,821.4	1,822.4	0.00	0.00	0.00
9,120.0	90.43	89.87	7,325.2	74.6	1,861.4	1,862.4	0.00	0.00	0.00
9,160.0	90.43	89.87	7,324.9	74.7	1,901.4	1,902.4	0.00	0.00	0.00
9,200.0	90.43	89.87	7,324.6	74.8	1,941.4	1,942.4	0.00	0.00	0.00
9,240.0	90.43	89.87	7,324.3	74.9	1,981.4	1,982.4	0.00	0.00	0.00
9,280.0	90.43	89.87	7,324.0	75.0	2,021.4	2,022.4	0.00	0.00	0.00
9,320.0	90.43	89.87	7,323.7	75.1	2,061.4	2,062.4	0.00	0.00	0.00
9,360.0	90.43	89.87	7,323.4	75.2	2,101.4	2,102.4	0.00	0.00	0.00
9,400.0	90.43	89.87	7,323.1	75.3	2,141.4	2,142.4	0.00	0.00	0.00
9,440.0	90.43	89.87	7,322.8	75.3	2,181.4	2,182.4	0.00	0.00	0.00
9,480.0	90.43	89.87	7,322.5	75.4	2,221.4	2,222.4	0.00	0.00	0.00
9,520.0	90.43	89.87	7,322.2	75.5	2,261.4	2,262.4	0.00	0.00	0.00
9,560.0	90.43	89.87	7,321.9	75.6	2,301.4	2,302.4	0.00	0.00	0.00
9,600.0	90.43	89.87	7,321.6	75.7	2,341.4	2,342.3	0.00	0.00	0.00
9,640.0	90.43	89.87	7,321.3	75.8	2,381.4	2,382.3	0.00	0.00	0.00
9,680.0	90.43	89.87	7,321.0	75.9	2,421.4	2,422.3	0.00	0.00	0.00
9,720.0	90.43	89.87	7,320.7	76.0	2,461.4	2,462.3	0.00	0.00	0.00
9,760.0	90.43	89.87	7,320.4	76.1	2,501.4	2,502.3	0.00	0.00	0.00
9,800.0	90.43	89.87	7,320.1	76.1	2,541.4	2,542.3	0.00	0.00	0.00
9,840.0	90.43	89.87	7,319.8	76.2	2,581.4	2,582.3	0.00	0.00	0.00
9,880.0	90.43	89.87	7,319.5	76.3	2,621.4	2,622.3	0.00	0.00	0.00
9,920.0	90.43	89.87	7,319.2	76.4	2,661.4	2,662.3	0.00	0.00	0.00
9,960.0	90.43	89.87	7,318.9	76.5	2,701.4	2,702.3	0.00	0.00	0.00
10,000.0	90.43	89.87	7,318.6	76.6	2,741.4	2,742.3	0.00	0.00	0.00
10,040.0	90.43	89.87	7,318.3	76.7	2,781.4	2,782.3	0.00	0.00	0.00
10,080.0	90.43	89.87	7,318.0	76.8	2,821.4	2,822.3	0.00	0.00	0.00
10,120.0	90.43	89.87	7,317.7	76.8	2,861.4	2,862.3	0.00	0.00	0.00
10,160.0	90.43	89.87	7,317.4	76.9	2,901.4	2,902.3	0.00	0.00	0.00

Database:	Landmark	Local Co-ordinate Reference:	Well Thornton 15E-232
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4985.0ft (RKB Ensign 32 - 15')
Project:	SEC.15-T7N-R66W	MD Reference:	WELL @ 4985.0ft (RKB Ensign 32 - 15')
Site:	Thornton Pad Sec.15-T7N-R66W	North Reference:	True
Well:	Thornton 15E-232	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (6-12-12)		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
10,200.0	90.43	89.87	7,317.1	77.0	2,941.4	2,942.3	0.00	0.00	0.00
10,240.0	90.43	89.87	7,316.8	77.1	2,981.4	2,982.3	0.00	0.00	0.00
10,280.0	90.43	89.87	7,316.5	77.2	3,021.4	3,022.2	0.00	0.00	0.00
10,320.0	90.43	89.87	7,316.2	77.3	3,061.4	3,062.2	0.00	0.00	0.00
10,360.0	90.43	89.87	7,315.9	77.4	3,101.4	3,102.2	0.00	0.00	0.00
10,400.0	90.43	89.87	7,315.6	77.5	3,141.3	3,142.2	0.00	0.00	0.00
10,440.0	90.43	89.87	7,315.3	77.6	3,181.3	3,182.2	0.00	0.00	0.00
10,480.0	90.43	89.87	7,315.0	77.6	3,221.3	3,222.2	0.00	0.00	0.00
10,520.0	90.43	89.87	7,314.7	77.7	3,261.3	3,262.2	0.00	0.00	0.00
10,560.0	90.43	89.87	7,314.4	77.8	3,301.3	3,302.2	0.00	0.00	0.00
10,600.0	90.43	89.87	7,314.1	77.9	3,341.3	3,342.2	0.00	0.00	0.00
10,640.0	90.43	89.87	7,313.8	78.0	3,381.3	3,382.2	0.00	0.00	0.00
10,680.0	90.43	89.87	7,313.5	78.1	3,421.3	3,422.2	0.00	0.00	0.00
10,720.0	90.43	89.87	7,313.2	78.2	3,461.3	3,462.2	0.00	0.00	0.00
10,760.0	90.43	89.87	7,312.9	78.3	3,501.3	3,502.2	0.00	0.00	0.00
10,800.0	90.43	89.87	7,312.6	78.4	3,541.3	3,542.2	0.00	0.00	0.00
10,840.0	90.43	89.87	7,312.3	78.4	3,581.3	3,582.2	0.00	0.00	0.00
10,880.0	90.43	89.87	7,312.0	78.5	3,621.3	3,622.2	0.00	0.00	0.00
10,920.0	90.43	89.87	7,311.7	78.6	3,661.3	3,662.2	0.00	0.00	0.00
10,960.0	90.43	89.87	7,311.4	78.7	3,701.3	3,702.1	0.00	0.00	0.00
11,000.0	90.43	89.87	7,311.1	78.8	3,741.3	3,742.1	0.00	0.00	0.00
11,040.0	90.43	89.87	7,310.8	78.9	3,781.3	3,782.1	0.00	0.00	0.00
11,080.0	90.43	89.87	7,310.5	79.0	3,821.3	3,822.1	0.00	0.00	0.00
11,120.0	90.43	89.87	7,310.2	79.1	3,861.3	3,862.1	0.00	0.00	0.00
11,160.0	90.43	89.87	7,309.9	79.1	3,901.3	3,902.1	0.00	0.00	0.00
11,200.0	90.43	89.87	7,309.6	79.2	3,941.3	3,942.1	0.00	0.00	0.00
11,240.0	90.43	89.87	7,309.3	79.3	3,981.3	3,982.1	0.00	0.00	0.00
11,280.0	90.43	89.87	7,309.0	79.4	4,021.3	4,022.1	0.00	0.00	0.00
11,320.0	90.43	89.87	7,308.7	79.5	4,061.3	4,062.1	0.00	0.00	0.00
11,360.0	90.43	89.87	7,308.4	79.6	4,101.3	4,102.1	0.00	0.00	0.00
11,400.0	90.43	89.87	7,308.1	79.7	4,141.3	4,142.1	0.00	0.00	0.00
11,440.0	90.43	89.87	7,307.8	79.8	4,181.3	4,182.1	0.00	0.00	0.00
11,480.0	90.43	89.87	7,307.5	79.9	4,221.3	4,222.1	0.00	0.00	0.00
11,520.0	90.43	89.87	7,307.2	79.9	4,261.3	4,262.1	0.00	0.00	0.00
11,560.0	90.43	89.87	7,306.9	80.0	4,301.3	4,302.1	0.00	0.00	0.00
11,600.0	90.43	89.87	7,306.6	80.1	4,341.3	4,342.1	0.00	0.00	0.00
11,640.0	90.43	89.87	7,306.3	80.2	4,381.3	4,382.0	0.00	0.00	0.00
11,680.0	90.43	89.87	7,306.0	80.3	4,421.3	4,422.0	0.00	0.00	0.00
11,720.0	90.43	89.87	7,305.7	80.4	4,461.3	4,462.0	0.00	0.00	0.00
11,760.0	90.43	89.87	7,305.4	80.5	4,501.3	4,502.0	0.00	0.00	0.00
11,800.0	90.43	89.87	7,305.1	80.6	4,541.3	4,542.0	0.00	0.00	0.00
11,808.6	90.43	89.87	7,305.0	80.6	4,549.9	4,550.6	0.00	0.00	0.00
BHL 200'FNL, 500'FEL									

Database:	Landmark	Local Co-ordinate Reference:	Well Thornton 15E-232
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4985.0ft (RKB Ensign 32 - 15')
Project:	SEC.15-T7N-R66W	MD Reference:	WELL @ 4985.0ft (RKB Ensign 32 - 15')
Site:	Thornton Pad Sec.15-T7N-R66W	North Reference:	True
Well:	Thornton 15E-232	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (6-12-12)		

Targets

Target Name

- hit/miss target	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- Shape	(°)	(°)	(ft)	(ft)	(ft)	(ft)	(ft)		
HARDLINE SHL 460'	0.00	0.00	1.0	270.0	175.0	1,455,873.10	3,202,243.58	40.582491	-104.771870
- plan misses target center by 321.8ft at 1.0ft MD (1.0 TVD, 0.0 N, 0.0 E)									
- Polygon									
Point 1			1.0	0.0	0.0	1,455,873.10	3,202,243.58		
Point 2			1.0	-600.0	0.0	1,455,273.14	3,202,248.50		
SECTION LINE 270°N	0.00	0.00	1.0	270.0	-285.0	1,455,869.32	3,201,783.61	40.582491	-104.773526
- plan misses target center by 392.6ft at 1.0ft MD (1.0 TVD, 0.0 N, 0.0 E)									
- Polygon									
Point 1			1.0	0.0	0.0	1,455,869.32	3,201,783.61		
Point 2			1.0	-600.0	0.0	1,455,269.36	3,201,788.53		
Point 3			1.0	0.0	0.0	1,455,869.32	3,201,783.61		
Point 4			1.0	0.0	4,878.0	1,455,909.34	3,206,661.30		
BHL 200'FNL, 500'FE	0.00	0.00	7,305.0	80.6	4,549.9	1,455,719.58	3,206,619.74	40.581970	-104.756120
- plan hits target center									
- Point									
HARDLINE BHL 460'	0.00	0.00	1.0	270.0	4,589.9	1,455,909.32	3,206,658.20	40.582490	-104.755976
- plan misses target center by 4597.8ft at 1.0ft MD (1.0 TVD, 0.0 N, 0.0 E)									
- Polygon									
Point 1			1.0	0.0	0.0	1,455,909.32	3,206,658.20		
Point 2			1.0	-600.0	0.0	1,455,309.35	3,206,663.12		

Casing Points

Measured Depth	Vertical Depth	Name	Casing Diameter	Hole Diameter
(ft)	(ft)		(")	(")
7,793.2	7,335.1	7"	7	7-1/2

Plan Annotations

Measured Depth	Vertical Depth	Local Coordinates	Comment
(ft)	(ft)	+N/-S (ft) +E/-W (ft)	
3,000.0	3,000.0	0.0 0.0	KOP #1
6,587.5	6,571.2	70.0 -235.0	KOP #2
7,793.2	7,335.1	71.7 534.6	End of Build



PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.15-T7N-R66W

Thornton Pad Sec.15-T7N-R66W

Thornton 15E-232

Wellbore #1

Plan #1 (6-12-12)

Anticollision Report

27 June, 2012



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Thornton 15E-232
Project:	SEC.15-T7N-R66W	TVD Reference:	WELL @ 4985.0ft (RKB Ensign 32 - 15')
Reference Site:	Thornton Pad Sec.15-T7N-R66W	MD Reference:	WELL @ 4985.0ft (RKB Ensign 32 - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Thornton 15E-232	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (6-12-12)	Offset TVD Reference:	Offset Datum

Reference	Plan #1 (6-12-12)		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	Stations	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 1,000.0ft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma		

Survey Tool Program	Date 6/27/2012			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.0	11,807.6	Plan #1 (6-12-12) (Wellbore #1)	MWD	MWD - Standard

Summary						
Site Name	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Separation Factor	Warning	
Offset Well - Wellbore - Design						
Thornton Pad Sec.15-T7N-R66W						
Thornton 15E-432 - Wellbore #1 - Plan #1 (6-12-12)	1,500.0	1,500.0	32.8	26.3	5.031	CC, ES
Thornton 15E-432 - Wellbore #1 - Plan #1 (6-12-12)	11,808.6	11,986.8	480.1	239.7	1.998	SF

Offset Design		Thornton Pad Sec.15-T7N-R66W - Thornton 15E-432 - Wellbore #1 - Plan #1 (6-12-12)											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		Between Centres	Between Ellipses	Minimum Separation	Separation Factor			
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	+N/-S (ft)	+E/-W (ft)	(ft)	(ft)	(ft)				
0.0	0.0	0.0	0.0	0.0	0.0	-180.00	-32.8	0.0	32.8						
100.0	100.0	100.0	100.0	0.1	0.1	-180.00	-32.8	0.0	32.8	32.6	0.22	145.899			
200.0	200.0	200.0	200.0	0.3	0.3	-180.00	-32.8	0.0	32.8	32.1	0.67	48.633			
300.0	300.0	300.0	300.0	0.6	0.6	-180.00	-32.8	0.0	32.8	31.7	1.12	29.180			
400.0	400.0	400.0	400.0	0.8	0.8	-180.00	-32.8	0.0	32.8	31.2	1.57	20.843			
500.0	500.0	500.0	500.0	1.0	1.0	-180.00	-32.8	0.0	32.8	30.8	2.02	16.211			
600.0	600.0	600.0	600.0	1.2	1.2	-180.00	-32.8	0.0	32.8	30.3	2.47	13.264			
700.0	700.0	700.0	700.0	1.5	1.5	-180.00	-32.8	0.0	32.8	29.9	2.92	11.223			
800.0	800.0	800.0	800.0	1.7	1.7	-180.00	-32.8	0.0	32.8	29.4	3.37	9.727			
900.0	900.0	900.0	900.0	1.9	1.9	-180.00	-32.8	0.0	32.8	29.0	3.82	8.582			
1,000.0	1,000.0	1,000.0	1,000.0	2.1	2.1	-180.00	-32.8	0.0	32.8	28.5	4.27	7.679			
1,100.0	1,100.0	1,100.0	1,100.0	2.4	2.4	-180.00	-32.8	0.0	32.8	28.1	4.72	6.948			
1,200.0	1,200.0	1,200.0	1,200.0	2.6	2.6	-180.00	-32.8	0.0	32.8	27.6	5.17	6.343			
1,300.0	1,300.0	1,300.0	1,300.0	2.8	2.8	-180.00	-32.8	0.0	32.8	27.2	5.62	5.836			
1,400.0	1,400.0	1,400.0	1,400.0	3.0	3.0	-180.00	-32.8	0.0	32.8	26.7	6.07	5.404			
1,500.0	1,500.0	1,500.0	1,500.0	3.3	3.3	-180.00	-32.8	0.0	32.8	26.3	6.52	5.031	CC, ES		
1,600.0	1,600.0	1,599.0	1,599.0	3.5	3.5	-178.37	-34.2	-1.0	34.2	27.3	6.94	4.933			
1,700.0	1,700.0	1,697.8	1,697.7	3.7	3.6	-174.23	-38.4	-3.9	38.7	31.3	7.34	5.270			
1,800.0	1,800.0	1,796.1	1,795.6	3.9	3.8	-169.15	-45.4	-8.7	46.4	38.7	7.75	5.991			
1,900.0	1,900.0	1,894.1	1,892.9	4.2	4.0	-164.40	-55.0	-15.4	57.6	49.4	8.17	7.050			
2,000.0	2,000.0	1,993.2	1,991.1	4.4	4.2	-160.90	-65.7	-22.8	70.1	61.5	8.60	8.150			
2,100.0	2,100.0	2,092.4	2,089.4	4.6	4.5	-158.47	-76.4	-30.2	82.8	73.8	9.05	9.148			
2,200.0	2,200.0	2,191.5	2,187.7	4.8	4.7	-156.68	-87.1	-37.5	95.7	86.1	9.52	10.050			
2,300.0	2,300.0	2,290.6	2,286.0	5.1	5.0	-155.32	-97.8	-44.9	108.6	98.6	9.99	10.863			

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 Thornton 15E-232
Project:	SEC.15-T7N-R66W	TVD Reference:	WELL @ 4985.0ft (RKB Ensign 32 - 15')
Reference Site:	Thornton Pad Sec.15-T7N-R66W	MD Reference:	WELL @ 4985.0ft (RKB Ensign 32 - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Thornton 15E-232	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (6-12-12)	Offset TVD Reference:	Offset Datum

Offset Design Thornton Pad Sec.15-T7N-R66W - Thornton 15E-432 - Wellbore #1 - Plan #1 (6-12-12)													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	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	
2,400.0	2,400.0	2,389.8	2,384.2	5.3	5.3	-154.25	-108.5	-52.3	121.5	111.0	10.48	11.596		
2,500.0	2,500.0	2,488.9	2,482.5	5.5	5.5	-153.39	-119.2	-59.7	134.5	123.5	10.97	12.259		
2,600.0	2,600.0	2,588.0	2,580.8	5.7	5.8	-152.67	-129.9	-67.1	147.5	136.0	11.47	12.860		
2,700.0	2,700.0	2,687.2	2,679.1	6.0	6.1	-152.08	-140.6	-74.5	160.5	148.6	11.97	13.405		
2,800.0	2,800.0	2,786.3	2,777.4	6.2	6.4	-151.57	-151.3	-81.9	173.6	161.1	12.49	13.902		
2,900.0	2,900.0	2,885.4	2,875.6	6.4	6.7	-151.13	-162.0	-89.3	186.6	173.6	13.00	14.356		
3,000.0	3,000.0	2,984.6	2,973.9	6.6	7.0	-150.75	-172.7	-96.7	199.7	186.2	13.52	14.771		
3,100.0	3,100.0	3,083.8	3,072.2	6.8	7.3	-77.22	-183.4	-104.1	212.4	199.0	13.36	15.897		
3,200.0	3,199.8	3,183.0	3,170.6	7.1	7.6	-77.98	-194.1	-111.5	224.3	210.5	13.79	16.262		
3,300.0	3,299.5	3,282.1	3,268.8	7.3	7.9	-79.48	-204.8	-118.9	235.7	221.4	14.24	16.550		
3,400.0	3,398.7	3,381.0	3,366.9	7.5	8.2	-81.62	-215.5	-126.3	246.7	232.0	14.70	16.780		
3,413.9	3,412.5	3,394.7	3,380.5	7.5	8.3	-81.96	-217.0	-127.3	248.2	233.5	14.77	16.808		
3,500.0	3,497.7	3,479.7	3,464.7	7.7	8.5	-84.22	-226.2	-133.7	257.9	242.7	15.19	16.982		
3,600.0	3,596.6	3,578.3	3,562.5	8.0	8.9	-86.64	-236.8	-141.0	269.6	253.9	15.69	17.186		
3,700.0	3,695.6	3,677.0	3,660.4	8.2	9.2	-88.86	-247.5	-148.4	281.7	265.5	16.20	17.391		
3,800.0	3,794.5	3,775.7	3,758.2	8.5	9.5	-90.89	-258.1	-155.7	294.3	277.5	16.73	17.593		
3,900.0	3,893.5	3,874.4	3,856.1	8.8	9.8	-92.76	-268.8	-163.1	307.1	289.9	17.26	17.791		
4,000.0	3,992.5	3,973.1	3,953.9	9.0	10.1	-94.47	-279.4	-170.5	320.3	302.5	17.81	17.984		
4,100.0	4,091.4	4,071.8	4,051.7	9.3	10.4	-96.05	-290.1	-177.8	333.7	315.3	18.36	18.172		
4,200.0	4,190.4	4,170.5	4,149.6	9.6	10.8	-97.51	-300.7	-185.2	347.4	328.4	18.93	18.354		
4,300.0	4,289.3	4,269.2	4,247.4	9.9	11.1	-98.86	-311.4	-192.6	361.2	341.7	19.49	18.530		
4,400.0	4,388.3	4,367.9	4,345.2	10.2	11.4	-100.11	-322.1	-199.9	375.3	355.2	20.07	18.700		
4,500.0	4,487.2	4,466.5	4,443.1	10.5	11.7	-101.27	-332.7	-207.3	389.5	368.8	20.65	18.864		
4,600.0	4,586.2	4,565.2	4,540.9	10.8	12.1	-102.34	-343.4	-214.7	403.8	382.6	21.23	19.022		
4,702.4	4,687.5	4,668.7	4,643.5	11.1	12.4	-103.40	-354.5	-222.3	418.6	396.8	21.83	19.173		
4,800.0	4,784.3	4,779.2	4,753.3	11.3	12.7	-104.63	-364.0	-228.9	430.3	407.9	22.38	19.231		
4,900.0	4,883.9	4,893.1	4,867.0	11.6	12.9	-105.59	-370.3	-233.2	438.3	415.4	22.86	19.174		
5,000.0	4,983.7	5,007.5	4,981.4	11.8	13.1	-106.27	-372.7	-235.0	442.1	418.8	23.30	18.972		
5,100.0	5,083.7	5,109.8	5,083.7	11.9	13.3	-106.58	-372.8	-235.0	442.8	419.1	23.69	18.690		
5,116.3	5,100.0	5,126.1	5,100.0	12.0	13.3	-180.00	-372.8	-235.0	442.8	419.0	23.77	18.629		
5,200.0	5,183.7	5,209.8	5,183.7	12.1	13.4	-180.00	-372.8	-235.0	442.8	418.7	24.08	18.391		
5,300.0	5,283.7	5,309.8	5,283.7	12.3	13.6	-180.00	-372.8	-235.0	442.8	418.3	24.46	18.100		
5,400.0	5,383.7	5,409.8	5,383.7	12.5	13.8	-180.00	-372.8	-235.0	442.8	417.9	24.85	17.815		
5,500.0	5,483.7	5,509.8	5,483.7	12.7	13.9	-180.00	-372.8	-235.0	442.8	417.5	25.25	17.539		
5,600.0	5,583.7	5,609.8	5,583.7	13.0	14.1	-180.00	-372.8	-235.0	442.8	417.2	25.64	17.269		
5,700.0	5,683.7	5,709.8	5,683.7	13.2	14.3	-180.00	-372.8	-235.0	442.8	416.8	26.04	17.007		
5,800.0	5,783.7	5,809.8	5,783.7	13.4	14.4	-180.00	-372.8	-235.0	442.8	416.4	26.43	16.751		
5,900.0	5,883.7	5,909.8	5,883.7	13.6	14.6	-180.00	-372.8	-235.0	442.8	416.0	26.83	16.503		
6,000.0	5,983.7	6,009.8	5,983.7	13.8	14.8	-180.00	-372.8	-235.0	442.8	415.6	27.23	16.260		
6,100.0	6,083.7	6,109.8	6,083.7	14.0	15.0	-180.00	-372.8	-235.0	442.8	415.2	27.63	16.024		
6,200.0	6,183.7	6,209.8	6,183.7	14.2	15.1	-180.00	-372.8	-235.0	442.8	414.8	28.04	15.794		
6,300.0	6,283.7	6,309.8	6,283.7	14.4	15.3	-180.00	-372.8	-235.0	442.8	414.4	28.44	15.569		
6,400.0	6,383.7	6,409.8	6,383.7	14.6	15.5	-180.00	-372.8	-235.0	442.8	413.9	28.85	15.350		
6,500.0	6,483.7	6,509.8	6,483.7	14.9	15.7	-180.00	-372.8	-235.0	442.8	413.5	29.25	15.137		
6,587.5	6,571.2	6,597.4	6,571.2	15.0	15.8	-180.00	-372.8	-235.0	442.8	413.2	29.61	14.954		
6,600.0	6,583.7	6,609.8	6,583.7	15.1	15.9	90.14	-372.8	-235.0	442.8	413.1	29.71	14.905		
6,650.0	6,633.6	6,659.8	6,633.6	15.2	15.9	90.46	-372.8	-235.0	442.8	412.9	29.88	14.818		
6,700.0	6,683.3	6,709.4	6,683.3	15.2	16.0	91.18	-372.8	-235.0	442.9	412.9	30.04	14.745		
6,750.0	6,732.5	6,758.6	6,732.5	15.3	16.1	92.30	-372.8	-235.0	443.2	413.0	30.17	14.690		
6,800.0	6,781.0	6,808.9	6,782.7	15.3	16.2	93.66	-372.8	-233.6	443.7	413.5	30.28	14.656		
6,850.0	6,828.6	6,860.0	6,833.6	15.4	16.3	95.02	-372.8	-228.9	444.6	414.2	30.37	14.640		

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

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Thornton 15E-232
Project:	SEC.15-T7N-R66W	TVD Reference:	WELL @ 4985.0ft (RKB Ensign 32 - 15')
Reference Site:	Thornton Pad Sec.15-T7N-R66W	MD Reference:	WELL @ 4985.0ft (RKB Ensign 32 - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Thornton 15E-232	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (6-12-12)	Offset TVD Reference:	Offset Datum

Offset Design Thornton Pad Sec.15-T7N-R66W - Thornton 15E-432 - Wellbore #1 - Plan #1 (6-12-12)													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
6,900.0	6,875.1	6,911.9	6,884.9	15.4	16.3	96.37	96.37	-372.8	-220.6	445.7	415.2	30.44	14.640	
6,950.0	6,920.2	6,964.7	6,936.2	15.5	16.4	97.69	97.69	-372.7	-208.6	447.0	416.5	30.51	14.650	
7,000.0	6,963.9	7,018.3	6,987.4	15.6	16.4	98.98	98.98	-372.7	-192.9	448.5	417.9	30.58	14.668	
7,050.0	7,006.0	7,072.7	7,038.2	15.7	16.5	100.24	100.24	-372.6	-173.2	450.2	419.6	30.66	14.686	
7,100.0	7,046.1	7,128.0	7,088.2	15.8	16.5	101.45	101.45	-372.6	-149.6	452.1	421.3	30.76	14.697	
7,150.0	7,084.2	7,184.2	7,137.1	15.9	16.5	102.62	102.62	-372.5	-122.0	454.1	423.2	30.90	14.693	
7,200.0	7,120.2	7,241.3	7,184.6	16.1	16.5	103.73	103.73	-372.4	-90.3	456.2	425.0	31.11	14.664	
7,250.0	7,153.7	7,299.2	7,230.2	16.4	16.5	104.77	104.77	-372.3	-54.7	458.3	426.9	31.39	14.598	
7,300.0	7,184.8	7,358.0	7,273.6	16.7	16.5	105.75	105.75	-372.2	-15.0	460.4	428.6	31.79	14.483	
7,350.0	7,213.3	7,417.6	7,314.4	17.1	16.6	106.65	106.65	-372.1	28.4	462.4	430.1	32.31	14.311	
7,400.0	7,239.0	7,478.0	7,352.1	17.6	16.6	107.47	107.47	-372.0	75.6	464.4	431.4	32.99	14.076	
7,450.0	7,261.8	7,539.1	7,386.4	18.2	17.0	108.21	108.21	-371.8	126.2	466.3	432.4	33.83	13.782	
7,500.0	7,281.7	7,600.9	7,416.8	18.8	17.6	108.85	108.85	-371.7	179.9	467.9	433.1	34.87	13.421	
7,550.0	7,298.5	7,663.3	7,443.0	19.5	18.3	109.39	109.39	-371.6	236.5	469.4	433.3	36.10	13.003	
7,600.0	7,312.3	7,726.2	7,464.7	20.3	19.2	109.84	109.84	-371.4	295.6	470.6	433.1	37.52	12.543	
7,650.0	7,322.8	7,789.5	7,481.5	21.1	20.2	110.18	110.18	-371.2	356.6	471.6	432.4	39.12	12.054	
7,700.0	7,330.1	7,853.1	7,493.2	22.0	21.3	110.42	110.42	-371.1	419.1	472.2	431.3	40.89	11.548	
7,750.0	7,334.2	7,909.7	7,499.7	23.0	22.4	110.58	110.58	-370.9	475.2	472.8	430.1	42.68	11.078	
7,793.2	7,335.1	7,952.7	7,504.3	23.8	23.2	110.90	110.90	-370.8	518.1	474.0	429.9	44.14	10.740	
7,800.0	7,335.1	7,959.8	7,505.0	23.9	23.3	110.99	110.99	-370.8	525.1	474.3	429.9	44.37	10.689	
7,900.0	7,334.3	8,077.5	7,511.0	26.0	25.8	111.77	111.77	-370.5	642.6	476.4	428.1	48.35	9.853	
8,000.0	7,333.6	8,178.2	7,510.6	28.2	28.0	111.81	111.81	-370.2	743.3	476.5	424.1	52.44	9.086	
8,100.0	7,332.8	8,278.2	7,510.2	30.5	30.3	111.85	111.85	-370.0	843.3	476.6	419.9	56.70	8.405	
8,200.0	7,332.1	8,378.2	7,509.8	32.9	32.7	111.89	111.89	-369.7	943.3	476.7	415.6	61.11	7.800	
8,300.0	7,331.3	8,478.2	7,509.4	35.3	35.1	111.93	111.93	-369.4	1,043.3	476.8	411.1	65.64	7.263	
8,400.0	7,330.6	8,578.2	7,509.0	37.8	37.6	111.97	111.97	-369.2	1,143.3	476.9	406.6	70.26	6.787	
8,500.0	7,329.8	8,678.2	7,508.6	40.3	40.1	112.01	112.01	-368.9	1,243.3	476.9	402.0	74.96	6.362	
8,600.0	7,329.1	8,778.2	7,508.2	42.9	42.7	112.05	112.05	-368.7	1,343.3	477.0	397.3	79.73	5.984	
8,700.0	7,328.3	8,878.2	7,507.7	45.5	45.3	112.09	112.09	-368.4	1,443.3	477.1	392.6	84.54	5.644	
8,800.0	7,327.6	8,978.2	7,507.3	48.1	47.9	112.13	112.13	-368.1	1,543.3	477.2	387.8	89.40	5.338	
8,900.0	7,326.8	9,078.2	7,506.9	50.8	50.5	112.17	112.17	-367.9	1,643.3	477.3	383.0	94.29	5.062	
9,000.0	7,326.1	9,178.2	7,506.5	53.4	53.2	112.21	112.21	-367.6	1,743.3	477.4	378.2	99.21	4.812	
9,100.0	7,325.3	9,278.2	7,506.1	56.1	55.9	112.25	112.25	-367.4	1,843.3	477.5	373.3	104.16	4.584	
9,200.0	7,324.6	9,378.2	7,505.7	58.8	58.6	112.29	112.29	-367.1	1,943.3	477.6	368.5	109.13	4.376	
9,300.0	7,323.8	9,478.2	7,505.3	61.5	61.3	112.33	112.33	-366.8	2,043.3	477.7	363.6	114.12	4.186	
9,400.0	7,323.1	9,578.2	7,504.9	64.2	64.0	112.37	112.37	-366.6	2,143.3	477.8	358.6	119.12	4.011	
9,500.0	7,322.3	9,678.2	7,504.5	66.9	66.7	112.41	112.41	-366.3	2,243.3	477.9	353.7	124.14	3.849	
9,600.0	7,321.6	9,778.2	7,504.1	69.6	69.4	112.45	112.45	-366.0	2,343.3	478.0	348.8	129.17	3.700	
9,700.0	7,320.8	9,878.2	7,503.7	72.3	72.1	112.49	112.49	-365.8	2,443.3	478.0	343.8	134.20	3.562	
9,800.0	7,320.1	9,978.2	7,503.2	75.1	74.8	112.53	112.53	-365.5	2,543.3	478.1	338.9	139.25	3.434	
9,900.0	7,319.3	10,078.2	7,502.8	77.8	77.6	112.56	112.56	-365.3	2,643.3	478.2	333.9	144.31	3.314	
10,000.0	7,318.6	10,178.2	7,502.4	80.5	80.3	112.60	112.60	-365.0	2,743.3	478.3	329.0	149.37	3.202	
10,100.0	7,317.8	10,278.2	7,502.0	83.3	83.1	112.64	112.64	-364.7	2,843.3	478.4	324.0	154.43	3.098	
10,200.0	7,317.1	10,378.2	7,501.6	86.0	85.8	112.68	112.68	-364.5	2,943.3	478.5	319.0	159.50	3.000	
10,300.0	7,316.3	10,478.2	7,501.2	88.8	88.6	112.72	112.72	-364.2	3,043.3	478.6	314.0	164.58	2.908	
10,400.0	7,315.6	10,578.2	7,500.8	91.6	91.3	112.76	112.76	-363.9	3,143.3	478.7	309.0	169.65	2.822	
10,500.0	7,314.8	10,678.2	7,500.4	94.3	94.1	112.80	112.80	-363.7	3,243.3	478.8	304.1	174.73	2.740	
10,600.0	7,314.1	10,778.2	7,500.0	97.1	96.9	112.84	112.84	-363.4	3,343.3	478.9	299.1	179.82	2.663	
10,700.0	7,313.3	10,878.2	7,499.6	99.9	99.6	112.88	112.88	-363.2	3,443.3	479.0	294.1	184.90	2.590	
10,800.0	7,312.6	10,978.2	7,499.1	102.6	102.4	112.92	112.92	-362.9	3,543.3	479.1	289.1	189.99	2.522	
10,900.0	7,311.8	11,078.2	7,498.7	105.4	105.2	112.96	112.96	-362.6	3,643.3	479.2	284.1	195.07	2.456	

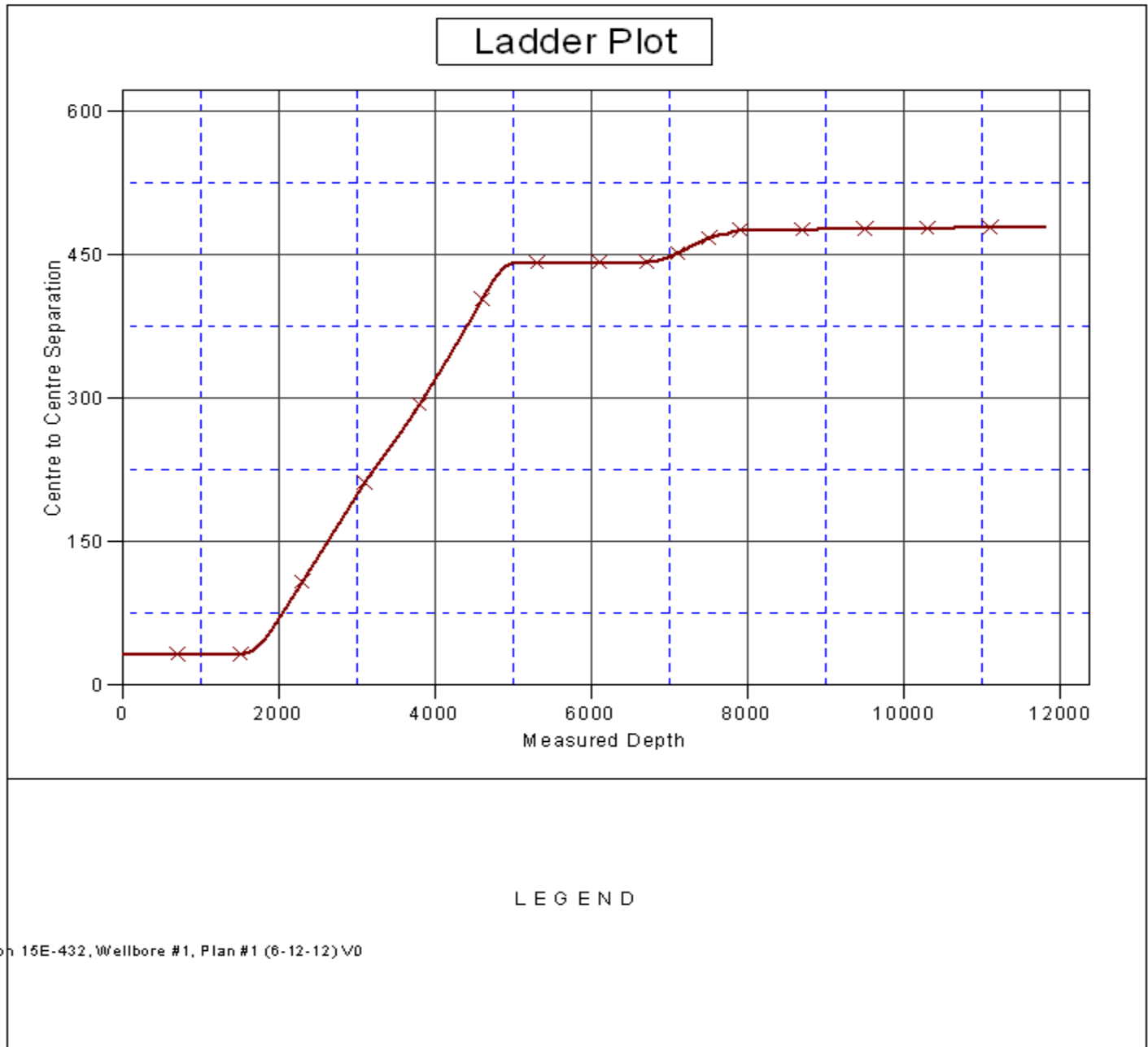
CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Thornton 15E-232
Project:	SEC.15-T7N-R66W	TVD Reference:	WELL @ 4985.0ft (RKB Ensign 32 - 15')
Reference Site:	Thornton Pad Sec.15-T7N-R66W	MD Reference:	WELL @ 4985.0ft (RKB Ensign 32 - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Thornton 15E-232	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (6-12-12)	Offset TVD Reference:	Offset Datum

Offset Design Thornton Pad Sec.15-T7N-R66W - Thornton 15E-432 - Wellbore #1 - Plan #1 (6-12-12)													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)	Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (ft)	Separation Factor	Warning	
Reference	Offset	Reference	Offset	(ft)	(ft)		+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)				
11,000.0	7,311.1	11,178.2	7,498.3	108.2	107.9	113.00	-362.4	3,743.3	479.3	279.1	200.16	2.394		
11,100.0	7,310.3	11,278.2	7,497.9	110.9	110.7	113.04	-362.1	3,843.3	479.4	274.1	205.25	2.336		
11,200.0	7,309.6	11,378.2	7,497.5	113.7	113.5	113.08	-361.9	3,943.3	479.5	269.1	210.34	2.279		
11,300.0	7,308.8	11,478.2	7,497.1	116.5	116.3	113.12	-361.6	4,043.2	479.6	264.1	215.42	2.226		
11,400.0	7,308.1	11,578.2	7,496.7	119.3	119.1	113.16	-361.3	4,143.2	479.7	259.1	220.51	2.175		
11,500.0	7,307.3	11,678.2	7,496.3	122.1	121.8	113.20	-361.1	4,243.2	479.8	254.2	225.60	2.127		
11,600.0	7,306.6	11,778.2	7,495.9	124.8	124.6	113.24	-360.8	4,343.2	479.8	249.2	230.69	2.080		
11,700.0	7,305.8	11,878.2	7,495.5	127.6	127.4	113.27	-360.5	4,443.2	479.9	244.2	235.77	2.036		
11,808.6	7,305.0	11,986.8	7,495.0	129.6	130.4	113.32	-360.3	4,551.8	480.1	239.7	240.30	1.998 SF		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Thornton 15E-232
Project:	SEC.15-T7N-R66W	TVD Reference:	WELL @ 4985.0ft (RKB Ensign 32 - 15')
Reference Site:	Thornton Pad Sec.15-T7N-R66W	MD Reference:	WELL @ 4985.0ft (RKB Ensign 32 - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Thornton 15E-232	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (6-12-12)	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 4985.0ft (RKB Ensign 32 - 1 Coordinates are relative to: Thornton 15E-232
Offset Depths are relative to Offset Datum
Central Meridian is -105.500000 °
Coordinate System is US State Plane 1983, Colorado Northern Zone
Grid Convergence at Surface is: 0.47°



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Thornton 15E-232
Project:	SEC.15-T7N-R66W	TVD Reference:	WELL @ 4985.0ft (RKB Ensign 32 - 15')
Reference Site:	Thornton Pad Sec.15-T7N-R66W	MD Reference:	WELL @ 4985.0ft (RKB Ensign 32 - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Thornton 15E-232	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (6-12-12)	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 4985.0ft (RKB Ensign 32 - 1 Coordinates are relative to: Thornton 15E-232
Offset Depths are relative to Offset Datum
Central Meridian is -105.500000 °
Coordinate System is US State Plane 1983, Colorado Northern Zone
Grid Convergence at Surface is: 0.47°

