

PETROLEUM DEVELOPMENT CORP Weld County CO

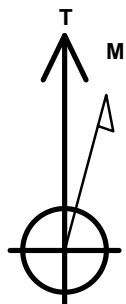
Well Name: **Thornton 14K-441**

Surface Location: Thornton 14K-441 Pad Sec.14-T7N-R66W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone
Ground Elevation: 4925.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1453710.91	3209064.53	40.576400	-104.747380	
RKB - 15' WELL @ 4940.0ft (RKB - 15')						

WELLBORE TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
SHL 2210'FNL & 1899'FWL, SEC.14	1.0	0.0	0.0	Point
BHL 2650'FSL & 1080'FWL, SEC.11	7430.0	4892.9	-858.2	Point



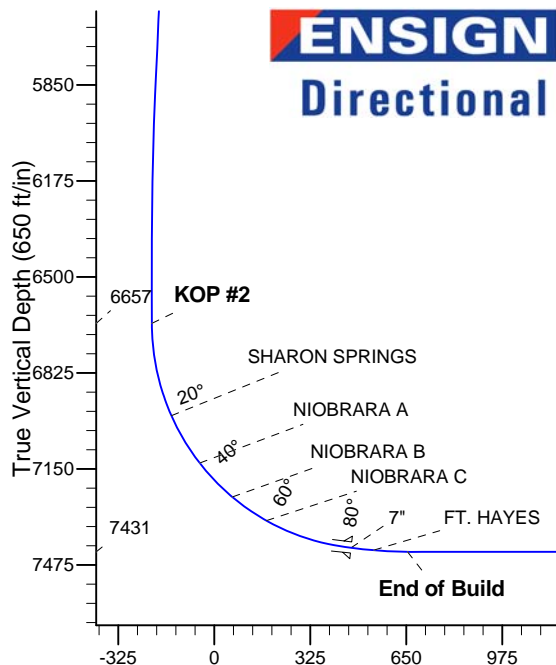
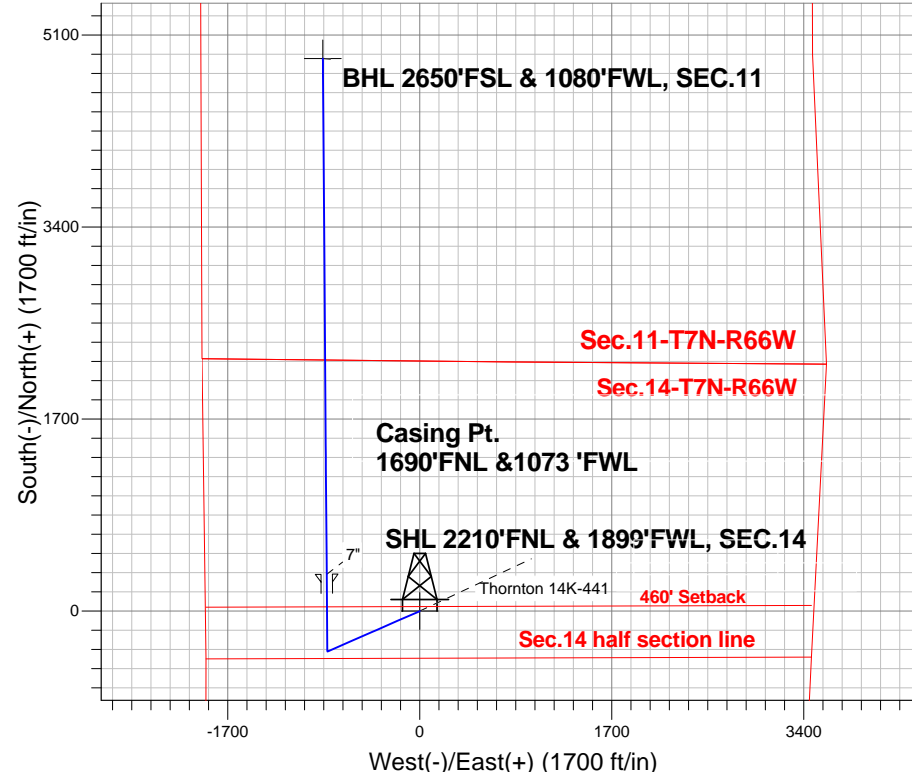
Azimuths to True North
Magnetic North: 8.57°

Magnetic Field
Strength: 52986.8snT
Dip Angle: 67.12°
Date: 9/16/2013
Model: IGRF2010

ANNOTATIONS

TVD	MD	Annotation
1000.0	1000.0	KOP #1
6657.0	6735.3	KOP #2
7430.8	8049.5	End of Build

Thornton 14K-441 Pad Sec.14-T7N-R66W
Thornton 14K-441
Plan #1 (9-16-13)
14:07, September 19 2013



SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	Target	VSec
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	1000.0	0.00	0.00	1000.0	0.0	0.0	0.00	0.00	0.0	
3	1519.0	10.38	246.39	1516.2	-18.8	-43.0	2.00	246.39	-11.1	
4	5959.3	10.38	246.39	5883.8	-339.2	-776.0	0.00	0.00	-200.0	
5	6478.3	0.00	0.00	6400.0	-358.0	-819.0	2.00	180.00	-211.1	
6	6735.3	0.00	0.00	6657.0	-358.0	-819.0	0.00	0.00	-211.1	
7	7855.3	84.00	359.57	7416.8	326.1	-824.1	7.50	359.57	463.5	
8	7929.3	84.00	359.57	7424.5	399.7	-824.7	0.00	0.00	536.1	
9	8049.5	90.01	359.57	7430.8	519.6	-825.6	5.00	0.00	654.5	
10	12422.9	90.01	359.57	7430.0	4892.9	-858.2	0.00	0.00	4967.6	BHL 2650'FSL & 1080'FWL, SEC.11

BHL 2650'FSL & 1080'FWL, SEC.11

Vertical Section at 350.05° (650 ft/in)



PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.14-T7N-R66W

Thornton 14K-441 Pad Sec.14-T7N-R66W

Thornton 14K-441

Wellbore #1

Plan: Plan #1 (9-16-13)

Standard Planning Report

19 September, 2013

Database:	Landmark	Local Co-ordinate Reference:	Well Thornton 14K-441
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4940.0ft (RKB - 15')
Project:	SEC.14-T7N-R66W	MD Reference:	WELL @ 4940.0ft (RKB - 15')
Site:	Thornton 14K-441 Pad Sec.14-T7N-R66W	North Reference:	True
Well:	Thornton 14K-441	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (9-16-13)		

Project	SEC.14-T7N-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	Thornton 14K-441 Pad Sec.14-T7N-R66W		
Site Position:		Northing:	1,453,710.92 ft
From:	Lat/Long	Easting:	3,209,064.53 ft
Position Uncertainty:	0.0 ft	Slot Radius:	"
		Latitude:	40.576400
		Longitude:	-104.747380
		Grid Convergence:	0.49 °

Well	Thornton 14K-441		
Well Position	+N/-S	0.0 ft	Northing: 1,453,710.91 ft
	+E/-W	0.0 ft	Easting: 3,209,064.53 ft
Position Uncertainty		0.0 ft	Wellhead Elevation: ft
			Latitude: 40.576400
			Longitude: -104.747380
			Ground Level: 4,925.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	9/16/2013	8.57	67.12	52,987

Design	Plan #1 (9-16-13)			
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	350.05

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	
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,519.0	10.38	246.39	1,516.2	-18.8	-43.0	2.00	2.00	0.00	246.39	
5,959.3	10.38	246.39	5,883.8	-339.2	-776.0	0.00	0.00	0.00	0.00	
6,478.3	0.00	0.00	6,400.0	-358.0	-819.0	2.00	-2.00	0.00	180.00	
6,735.3	0.00	0.00	6,657.0	-358.0	-819.0	0.00	0.00	0.00	0.00	
7,855.3	84.00	359.57	7,416.8	326.1	-824.1	7.50	7.50	0.00	359.57	
7,929.3	84.00	359.57	7,424.5	399.7	-824.7	0.00	0.00	0.00	0.00	
8,049.5	90.01	359.57	7,430.8	519.6	-825.6	5.00	5.00	0.00	0.00	
12,422.9	90.01	359.57	7,430.0	4,892.9	-858.2	0.00	0.00	0.00	0.00	BHL 2650'FSL & 1C

Database:	Landmark	Local Co-ordinate Reference:	Well Thornton 14K-441
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4940.0ft (RKB - 15')
Project:	SEC.14-T7N-R66W	MD Reference:	WELL @ 4940.0ft (RKB - 15')
Site:	Thornton 14K-441 Pad Sec.14-T7N-R66W	North Reference:	True
Well:	Thornton 14K-441	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (9-16-13)		

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
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	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
KOP #1									
1,100.0	2.00	246.39	1,100.0	-0.7	-1.6	-0.4	2.00	2.00	0.00
1,200.0	4.00	246.39	1,199.8	-2.8	-6.4	-1.6	2.00	2.00	0.00
1,300.0	6.00	246.39	1,299.5	-6.3	-14.4	-3.7	2.00	2.00	0.00
1,400.0	8.00	246.39	1,398.7	-11.2	-25.5	-6.6	2.00	2.00	0.00
1,500.0	10.00	246.39	1,497.5	-17.4	-39.9	-10.3	2.00	2.00	0.00
1,519.0	10.38	246.39	1,516.2	-18.8	-43.0	-11.1	2.00	2.00	0.00
1,600.0	10.38	246.39	1,595.8	-24.6	-56.3	-14.5	0.00	0.00	0.00
1,700.0	10.38	246.39	1,694.2	-31.8	-72.8	-18.8	0.00	0.00	0.00
1,800.0	10.38	246.39	1,792.6	-39.1	-89.4	-23.0	0.00	0.00	0.00
1,900.0	10.38	246.39	1,890.9	-46.3	-105.9	-27.3	0.00	0.00	0.00
2,000.0	10.38	246.39	1,989.3	-53.5	-122.4	-31.5	0.00	0.00	0.00
2,100.0	10.38	246.39	2,087.7	-60.7	-138.9	-35.8	0.00	0.00	0.00
2,200.0	10.38	246.39	2,186.0	-67.9	-155.4	-40.1	0.00	0.00	0.00
2,300.0	10.38	246.39	2,284.4	-75.1	-171.9	-44.3	0.00	0.00	0.00
2,400.0	10.38	246.39	2,382.7	-82.4	-188.4	-48.6	0.00	0.00	0.00
2,500.0	10.38	246.39	2,481.1	-89.6	-204.9	-52.8	0.00	0.00	0.00
2,600.0	10.38	246.39	2,579.5	-96.8	-221.4	-57.1	0.00	0.00	0.00
2,700.0	10.38	246.39	2,677.8	-104.0	-237.9	-61.3	0.00	0.00	0.00
2,800.0	10.38	246.39	2,776.2	-111.2	-254.4	-65.6	0.00	0.00	0.00
2,900.0	10.38	246.39	2,874.6	-118.4	-271.0	-69.8	0.00	0.00	0.00
3,000.0	10.38	246.39	2,972.9	-125.7	-287.5	-74.1	0.00	0.00	0.00
3,100.0	10.38	246.39	3,071.3	-132.9	-304.0	-78.4	0.00	0.00	0.00
3,200.0	10.38	246.39	3,169.7	-140.1	-320.5	-82.6	0.00	0.00	0.00
3,300.0	10.38	246.39	3,268.0	-147.3	-337.0	-86.9	0.00	0.00	0.00
3,400.0	10.38	246.39	3,366.4	-154.5	-353.5	-91.1	0.00	0.00	0.00
3,500.0	10.38	246.39	3,464.7	-161.7	-370.0	-95.4	0.00	0.00	0.00
3,600.0	10.38	246.39	3,563.1	-169.0	-386.5	-99.6	0.00	0.00	0.00
3,700.0	10.38	246.39	3,661.5	-176.2	-403.0	-103.9	0.00	0.00	0.00
3,800.0	10.38	246.39	3,759.8	-183.4	-419.5	-108.2	0.00	0.00	0.00
3,900.0	10.38	246.39	3,858.2	-190.6	-436.1	-112.4	0.00	0.00	0.00
3,922.2	10.38	246.39	3,880.0	-192.2	-439.7	-113.4	0.00	0.00	0.00
PARKMAN									
4,000.0	10.38	246.39	3,956.6	-197.8	-452.6	-116.7	0.00	0.00	0.00
4,100.0	10.38	246.39	4,054.9	-205.0	-469.1	-120.9	0.00	0.00	0.00
4,200.0	10.38	246.39	4,153.3	-212.3	-485.6	-125.2	0.00	0.00	0.00
4,300.0	10.38	246.39	4,251.7	-219.5	-502.1	-129.4	0.00	0.00	0.00
4,400.0	10.38	246.39	4,350.0	-226.7	-518.6	-133.7	0.00	0.00	0.00
4,471.1	10.38	246.39	4,420.0	-231.8	-530.3	-136.7	0.00	0.00	0.00
SUSSEX									
4,500.0	10.38	246.39	4,448.4	-233.9	-535.1	-137.9	0.00	0.00	0.00
4,600.0	10.38	246.39	4,546.7	-241.1	-551.6	-142.2	0.00	0.00	0.00

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Project:	SEC.14-T7N-R66W	MD Reference:	WELL @ 4940.0ft (RKB - 15')
Site:	Thornton 14K-441 Pad Sec.14-T7N-R66W	North Reference:	True
Well:	Thornton 14K-441	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (9-16-13)		

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)
4,700.0	10.38	246.39	4,645.1	-248.3	-568.1	-146.5	0.00	0.00	0.00
4,800.0	10.38	246.39	4,743.5	-255.6	-584.6	-150.7	0.00	0.00	0.00
4,900.0	10.38	246.39	4,841.8	-262.8	-601.1	-155.0	0.00	0.00	0.00
5,000.0	10.38	246.39	4,940.2	-270.0	-617.7	-159.2	0.00	0.00	0.00
5,100.0	10.38	246.39	5,038.6	-277.2	-634.2	-163.5	0.00	0.00	0.00
5,142.1	10.38	246.39	5,080.0	-280.2	-641.1	-165.3	0.00	0.00	0.00
SHANNON									
5,200.0	10.38	246.39	5,136.9	-284.4	-650.7	-167.7	0.00	0.00	0.00
5,300.0	10.38	246.39	5,235.3	-291.6	-667.2	-172.0	0.00	0.00	0.00
5,400.0	10.38	246.39	5,333.6	-298.9	-683.7	-176.2	0.00	0.00	0.00
5,500.0	10.38	246.39	5,432.0	-306.1	-700.2	-180.5	0.00	0.00	0.00
5,600.0	10.38	246.39	5,530.4	-313.3	-716.7	-184.8	0.00	0.00	0.00
5,700.0	10.38	246.39	5,628.7	-320.5	-733.2	-189.0	0.00	0.00	0.00
5,800.0	10.38	246.39	5,727.1	-327.7	-749.7	-193.3	0.00	0.00	0.00
5,900.0	10.38	246.39	5,825.5	-334.9	-766.2	-197.5	0.00	0.00	0.00
5,959.3	10.38	246.39	5,883.8	-339.2	-776.0	-200.0	0.00	0.00	0.00
6,000.0	9.57	246.39	5,923.9	-342.0	-782.5	-201.7	2.00	-2.00	0.00
6,100.0	7.57	246.39	6,022.8	-348.0	-796.1	-205.2	2.00	-2.00	0.00
6,200.0	5.57	246.39	6,122.1	-352.6	-806.6	-207.9	2.00	-2.00	0.00
6,300.0	3.57	246.39	6,221.8	-355.8	-813.9	-209.8	2.00	-2.00	0.00
6,400.0	1.57	246.39	6,321.7	-357.6	-818.0	-210.9	2.00	-2.00	0.00
6,478.3	0.00	0.00	6,400.0	-358.0	-819.0	-211.1	2.00	-2.00	0.00
6,500.0	0.00	0.00	6,421.7	-358.0	-819.0	-211.1	0.00	0.00	0.00
6,600.0	0.00	0.00	6,521.7	-358.0	-819.0	-211.1	0.00	0.00	0.00
6,700.0	0.00	0.00	6,621.7	-358.0	-819.0	-211.1	0.00	0.00	0.00
6,735.3	0.00	0.00	6,657.0	-358.0	-819.0	-211.1	0.00	0.00	0.00
KOP #2									
6,800.0	4.85	359.57	6,721.6	-355.3	-819.0	-208.4	7.50	7.50	0.00
6,900.0	12.35	359.57	6,820.4	-340.3	-819.1	-193.7	7.50	7.50	0.00
7,000.0	19.85	359.57	6,916.4	-312.6	-819.3	-166.4	7.50	7.50	0.00
7,057.8	24.19	359.57	6,970.0	-290.9	-819.5	-145.0	7.50	7.50	0.00
SHARON SPRINGS									
7,100.0	27.35	359.57	7,008.0	-272.6	-819.6	-126.9	7.50	7.50	0.00
7,200.0	34.85	359.57	7,093.5	-221.0	-820.0	-76.0	7.50	7.50	0.00
7,245.4	38.26	359.57	7,130.0	-194.0	-820.2	-49.3	7.50	7.50	0.00
NIORARA A									
7,300.0	42.35	359.57	7,171.6	-158.6	-820.5	-14.5	7.50	7.50	0.00
7,400.0	49.85	359.57	7,240.9	-86.6	-821.0	56.5	7.50	7.50	0.00
7,406.4	50.33	359.57	7,245.0	-81.8	-821.1	61.3	7.50	7.50	0.00
NIORARA B									
7,500.0	57.35	359.57	7,300.2	-6.2	-821.6	135.8	7.50	7.50	0.00
7,548.4	60.98	359.57	7,325.0	35.3	-821.9	176.8	7.50	7.50	0.00
NIORARA C									
7,600.0	64.85	359.57	7,348.5	81.3	-822.3	222.1	7.50	7.50	0.00
7,700.0	72.35	359.57	7,385.0	174.3	-823.0	313.9	7.50	7.50	0.00
7,800.0	79.85	359.57	7,409.0	271.3	-823.7	409.5	7.50	7.50	0.00
7,855.3	84.00	359.57	7,416.7	326.0	-824.1	463.5	7.50	7.50	0.00
7"									
7,900.0	84.00	359.57	7,421.4	370.5	-824.4	507.4	0.01	0.01	0.00
7,929.3	84.00	359.57	7,424.5	399.7	-824.7	536.1	0.00	0.00	0.00
7,934.4	84.25	359.57	7,425.0	404.7	-824.7	541.1	5.00	5.00	0.00
FT. HAYES									

Database:	Landmark	Local Co-ordinate Reference:	Well Thornton 14K-441
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4940.0ft (RKB - 15')
Project:	SEC.14-T7N-R66W	MD Reference:	WELL @ 4940.0ft (RKB - 15')
Site:	Thornton 14K-441 Pad Sec.14-T7N-R66W	North Reference:	True
Well:	Thornton 14K-441	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (9-16-13)		

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)
8,000.0	87.53	359.57	7,429.7	470.1	-825.2	605.6	5.00	5.00	0.00
8,049.5	90.01	359.57	7,430.8	519.6	-825.6	654.4	5.00	5.00	0.00
End of Build									
8,100.0	90.01	359.57	7,430.8	570.1	-825.9	704.2	0.00	0.00	0.00
8,200.0	90.01	359.57	7,430.7	670.1	-826.7	802.8	0.00	0.00	0.00
8,300.0	90.01	359.57	7,430.7	770.1	-827.4	901.5	0.00	0.00	0.00
8,400.0	90.01	359.57	7,430.7	870.1	-828.2	1,000.1	0.00	0.00	0.00
8,500.0	90.01	359.57	7,430.7	970.1	-828.9	1,098.7	0.00	0.00	0.00
8,600.0	90.01	359.57	7,430.7	1,070.1	-829.7	1,197.3	0.00	0.00	0.00
8,700.0	90.01	359.57	7,430.6	1,170.1	-830.4	1,296.0	0.00	0.00	0.00
8,800.0	90.01	359.57	7,430.6	1,270.1	-831.2	1,394.6	0.00	0.00	0.00
8,900.0	90.01	359.57	7,430.6	1,370.1	-831.9	1,493.2	0.00	0.00	0.00
9,000.0	90.01	359.57	7,430.6	1,470.1	-832.7	1,591.8	0.00	0.00	0.00
9,100.0	90.01	359.57	7,430.6	1,570.1	-833.4	1,690.5	0.00	0.00	0.00
9,200.0	90.01	359.57	7,430.6	1,670.1	-834.1	1,789.1	0.00	0.00	0.00
9,300.0	90.01	359.57	7,430.5	1,770.1	-834.9	1,887.7	0.00	0.00	0.00
9,400.0	90.01	359.57	7,430.5	1,870.1	-835.6	1,986.3	0.00	0.00	0.00
9,500.0	90.01	359.57	7,430.5	1,970.1	-836.4	2,084.9	0.00	0.00	0.00
9,600.0	90.01	359.57	7,430.5	2,070.1	-837.1	2,183.6	0.00	0.00	0.00
9,700.0	90.01	359.57	7,430.5	2,170.1	-837.9	2,282.2	0.00	0.00	0.00
9,800.0	90.01	359.57	7,430.5	2,270.1	-838.6	2,380.8	0.00	0.00	0.00
9,900.0	90.01	359.57	7,430.4	2,370.1	-839.4	2,479.4	0.00	0.00	0.00
10,000.0	90.01	359.57	7,430.4	2,470.1	-840.1	2,578.1	0.00	0.00	0.00
10,100.0	90.01	359.57	7,430.4	2,570.1	-840.9	2,676.7	0.00	0.00	0.00
10,200.0	90.01	359.57	7,430.4	2,670.0	-841.6	2,775.3	0.00	0.00	0.00
10,300.0	90.01	359.57	7,430.4	2,770.0	-842.4	2,873.9	0.00	0.00	0.00
10,400.0	90.01	359.57	7,430.4	2,870.0	-843.1	2,972.5	0.00	0.00	0.00
10,500.0	90.01	359.57	7,430.3	2,970.0	-843.9	3,071.2	0.00	0.00	0.00
10,600.0	90.01	359.57	7,430.3	3,070.0	-844.6	3,169.8	0.00	0.00	0.00
10,700.0	90.01	359.57	7,430.3	3,170.0	-845.3	3,268.4	0.00	0.00	0.00
10,800.0	90.01	359.57	7,430.3	3,270.0	-846.1	3,367.0	0.00	0.00	0.00
10,900.0	90.01	359.57	7,430.3	3,370.0	-846.8	3,465.7	0.00	0.00	0.00
11,000.0	90.01	359.57	7,430.2	3,470.0	-847.6	3,564.3	0.00	0.00	0.00
11,100.0	90.01	359.57	7,430.2	3,570.0	-848.3	3,662.9	0.00	0.00	0.00
11,200.0	90.01	359.57	7,430.2	3,670.0	-849.1	3,761.5	0.00	0.00	0.00
11,300.0	90.01	359.57	7,430.2	3,770.0	-849.8	3,860.1	0.00	0.00	0.00
11,400.0	90.01	359.57	7,430.2	3,870.0	-850.6	3,958.8	0.00	0.00	0.00
11,500.0	90.01	359.57	7,430.2	3,970.0	-851.3	4,057.4	0.00	0.00	0.00
11,600.0	90.01	359.57	7,430.1	4,070.0	-852.1	4,156.0	0.00	0.00	0.00
11,700.0	90.01	359.57	7,430.1	4,170.0	-852.8	4,254.6	0.00	0.00	0.00
11,800.0	90.01	359.57	7,430.1	4,270.0	-853.6	4,353.3	0.00	0.00	0.00
11,900.0	90.01	359.57	7,430.1	4,370.0	-854.3	4,451.9	0.00	0.00	0.00
12,000.0	90.01	359.57	7,430.1	4,470.0	-855.1	4,550.5	0.00	0.00	0.00
12,100.0	90.01	359.57	7,430.1	4,570.0	-855.8	4,649.1	0.00	0.00	0.00
12,200.0	90.01	359.57	7,430.0	4,670.0	-856.5	4,747.8	0.00	0.00	0.00
12,300.0	90.01	359.57	7,430.0	4,770.0	-857.3	4,846.4	0.00	0.00	0.00
12,400.0	90.01	359.57	7,430.0	4,870.0	-858.0	4,945.0	0.00	0.00	0.00
12,422.9	90.01	359.57	7,430.0	4,892.9	-858.2	4,967.6	0.00	0.00	0.00

Database:	Landmark	Local Co-ordinate Reference:	Well Thornton 14K-441
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4940.0ft (RKB - 15')
Project:	SEC.14-T7N-R66W	MD Reference:	WELL @ 4940.0ft (RKB - 15')
Site:	Thornton 14K-441 Pad Sec.14-T7N-R66W	North Reference:	True
Well:	Thornton 14K-441	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (9-16-13)		

Casing Points

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
7,855.3	7,416.7	7"	7	7-1/2

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
3,922.2	3,880.0	PARKMAN		0.00	
4,471.1	4,420.0	SUSSEX		0.00	
5,142.1	5,080.0	SHANNON		0.00	
7,057.8	6,970.0	SHARON SPRINGS		0.00	
7,245.4	7,130.0	NIOBRARA A		0.00	
7,406.4	7,245.0	NIOBRARA B		0.00	
7,548.4	7,325.0	NIOBRARA C		0.00	
7,934.4	7,425.0	FT. HAYES		0.00	

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
1,000.0	1,000.0	0.0	0.0	KOP #1
6,735.3	6,657.0	-358.0	-819.0	KOP #2
8,049.5	7,430.8	519.6	-825.6	End of Build