

# Conoco Phillips Company

Arapahoe County, Colorado

Sec. 14-T4S-R65W

Prosper Farms 4-65 13-14 1H

Plan C (Lateral)

Design: Actual Field Surveys

## Sperry Drilling Services

### Standard Report

14 November, 2014

Well Coordinates: 1,682,895.51 N, 3,242,064.33 E (39° 42' 18.73" N, 104° 38' 22.76" W)

Ground Level: 5,691.00 usft

Local Coordinate Origin:

Viewing Datum:

TVDs to System:

North Reference:

Unit System:

Geodetic Scale Factor Applied

Version: 5000.1 Build: 70

Centered on Well Prosper Farms 4-65 13-14 1H

KB 24 ft @ 5715.00usft (H&P 280)

N

True

API - US Survey Feet - Custom





**HALLIBURTON**

<b>OPERATOR:</b>	ConocoPhillips
<b>WELL:</b>	Prosper Farms 4-65 13-14 1H
<b>FIELD:</b>	Niobrara
<b>RIG:</b>	H&P 280
<b>LEGALS:</b>	Sec. 14-T4S-R65W
<b>COUNTY:</b>	Arapahoe
<b>STATE:</b>	CO.
<b>CAL. METHOD:</b>	Min Curvature
<b>MAG. DECL. APPLIED:</b>	8.3894
<b>VERTICAL SEC. DIR. :</b>	89.290

<b>SSDS Job Number :</b>	901753107
<b>Start Date of Job :</b>	10/19/2014
<b>End Date of Job :</b>	11/1/2014
<b>Lead Directional Driller:</b>	Roland Hall
<b>Other SSDS DD's :</b>	Lual Qubain
<b>SSDS MWD Engineers :</b>	Ryan Rogge
	Kyle Wass

	Main Hole =====>		1st Side Track =====>		2nd Side Track =====>		3rd Side Track =====>		4th Side Track =====>	
	2218.00	Tie On	7223.00	Tie On		Tie On		Tie On		Tie On
First Survey Depth	2310.00									
Last Survey Depth	8138.00									
KOP Depth/Sidetrack MD		KOP	7240.00	KOP-ST1		KOP-ST2		KOP-ST3		KOP-ST4
First Survey Depth		MWD	7314.00	MWD		MWD		MWD		MWD
Last Survey Depth		MWD	14658.00	MWD		MWD		MWD		MWD
Bit Extrapolation to TD	8195.00	T.D.	14719.00	T.D.		T.D.		T.D.		T.D.

The following Sperry Sun Drilling Services personnel listed below, do certify the above survey information to be accurate :

Print Name :	Roland Hall	Print Name :	Ryan Rogge	Print Name :
Sign Name :		Sign Name :		Sign Name :
Print Name :	Lual Oubain	Print Name :	Kyle Wass	Print Name :
Sign Name :		Sign Name :		Sign Name :

### Examples of Survey Types:

<b>Tie On</b>	<b>Tie On to Surface Casing (Assumed Vertical), Tie On to existing MWD Survey (prior drilled hole)</b>
<b>MWD</b>	<b>Sperry Sun Drilling Services (SSDS) Measurement While Drilling (MWD) Survey's</b>
<b>ESS</b>	<b>Sperry Sun Drilling Services (SSDS) Electronic Survey System (ESS) Survey's</b>
<b>Gyro</b>	<b>Gyro Survey's ; Provided by third party vendor, or by Sperry Sun Drilling Services (SSDS)</b>
<b>SS</b>	<b>Single Shot (SS) Survey's ; Provided by Sperry Sun Drilling Services (SSDS) or third party vendor.</b>

## Design Report for Prosper Farms 4-65 13-14 1H - Actual Field Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
7,223.00	0.74	94.72	7,218.66	164.32	3.14	5.19	0.24
Tie-On to Original Wellbore Surveys @ 7223.00 ft							
7,314.00	14.47	100.29	7,308.64	162.23	14.97	16.99	15.09
First Sperry MWD Survey @ 7314.00 ft							
7,346.00	17.06	100.95	7,339.44	160.62	23.52	25.51	8.11
7,377.00	18.17	96.52	7,368.99	159.21	32.78	34.76	5.61
7,409.00	19.33	91.72	7,399.29	158.48	43.03	45.01	6.03
7,440.00	21.48	89.93	7,428.34	158.34	53.84	55.81	7.22
7,472.00	23.14	90.60	7,457.95	158.28	65.99	67.95	5.25
7,503.00	24.47	91.44	7,486.31	158.05	78.50	80.46	4.43
7,535.00	26.64	90.06	7,515.18	157.88	92.30	94.26	7.03
7,566.00	29.33	87.58	7,542.55	158.19	106.84	108.80	9.45
7,598.00	31.92	85.96	7,570.08	159.12	123.11	125.08	8.49
7,629.00	34.35	86.53	7,596.04	160.23	140.02	142.00	7.90
7,661.00	36.87	88.71	7,622.06	160.99	158.63	160.62	8.82
7,692.00	39.34	91.33	7,646.45	160.97	177.75	179.75	9.52
7,724.00	42.58	92.52	7,670.61	160.26	198.72	200.70	10.41
7,755.00	46.03	92.22	7,692.79	159.37	220.35	222.32	11.15
7,786.00	49.73	91.30	7,713.58	158.66	243.33	245.28	12.14
7,818.00	53.24	90.74	7,733.51	158.22	268.36	270.31	11.05
7,849.00	56.70	90.00	7,751.30	158.06	293.74	295.68	11.33
7,881.00	60.35	88.76	7,768.00	158.36	321.02	322.97	11.88
7,912.00	64.04	87.56	7,782.46	159.25	348.42	350.38	12.39
7,944.00	68.10	87.42	7,795.44	160.53	377.64	379.61	12.69
7,976.00	72.12	87.31	7,806.32	161.91	407.69	409.68	12.57
8,007.00	75.38	87.42	7,815.00	163.28	437.42	439.42	10.52
8,039.00	78.37	87.38	7,822.26	164.69	468.54	470.56	9.34
8,070.00	81.32	87.98	7,827.73	165.93	499.03	501.06	9.70
8,102.00	83.56	88.02	7,831.94	167.04	530.73	532.77	7.00
8,133.00	86.29	88.23	7,834.68	168.05	561.59	563.64	8.83
8,165.00	89.14	88.49	7,835.95	168.96	593.55	595.61	8.94
8,196.00	90.31	88.15	7,836.10	169.87	624.53	626.60	3.93
8,228.00	90.00	87.62	7,836.02	171.05	656.51	658.59	1.92
8,286.00	90.43	87.98	7,835.80	173.28	714.47	716.57	0.97
8,379.00	90.37	90.28	7,835.15	174.69	807.45	809.56	2.47
8,471.00	91.17	90.56	7,833.91	174.01	899.44	901.54	0.92
8,565.00	90.37	90.30	7,832.65	173.31	993.42	995.51	0.89
8,659.00	90.99	89.99	7,831.53	173.07	1,087.42	1,089.49	0.74
8,753.00	92.16	90.39	7,828.95	172.76	1,181.38	1,183.44	1.32
8,848.00	91.36	90.44	7,826.03	172.07	1,276.33	1,278.38	0.84
8,942.00	90.49	91.44	7,824.52	170.53	1,370.30	1,372.32	1.41
9,037.00	91.36	91.88	7,822.98	167.78	1,465.25	1,467.23	1.03
9,131.00	90.56	91.37	7,821.41	165.11	1,559.20	1,561.14	1.01
9,226.00	90.43	91.30	7,820.59	162.90	1,654.17	1,656.07	0.16
9,320.00	90.31	91.51	7,819.98	160.60	1,748.14	1,750.00	0.26
9,414.00	90.87	91.71	7,819.01	157.95	1,842.10	1,843.92	0.63
9,509.00	91.48	90.47	7,817.06	156.15	1,937.06	1,938.85	1.45
9,603.00	90.68	90.10	7,815.29	155.68	2,031.04	2,032.82	0.94
9,698.00	90.80	89.91	7,814.06	155.67	2,126.03	2,127.81	0.24
9,792.00	90.37	90.12	7,813.10	155.65	2,220.03	2,221.79	0.51

## Design Report for Prosper Farms 4-65 13-14 1H - Actual Field Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
9,887.00	91.73	90.37	7,811.36	155.24	2,315.01	2,316.76	1.46
9,981.00	90.19	89.70	7,809.79	155.18	2,408.99	2,410.74	1.79
10,076.00	91.30	89.94	7,808.55	155.48	2,503.98	2,505.72	1.20
10,170.00	90.56	89.84	7,807.03	155.66	2,597.97	2,599.70	0.79
10,264.00	89.75	90.22	7,806.77	155.61	2,691.97	2,693.70	0.95
10,359.00	90.74	90.32	7,806.37	155.17	2,786.96	2,788.68	1.05
10,454.00	90.49	91.31	7,805.35	153.81	2,881.95	2,883.64	1.07
10,548.00	89.44	90.54	7,805.41	152.30	2,975.93	2,977.60	1.39
10,642.00	89.81	91.47	7,806.02	150.65	3,069.91	3,071.55	1.06
10,737.00	90.68	91.70	7,805.61	148.02	3,164.88	3,166.47	0.95
10,831.00	91.48	90.82	7,803.84	145.95	3,258.83	3,260.40	1.27
10,926.00	90.80	89.77	7,801.95	145.47	3,353.81	3,355.36	1.32
11,020.00	89.94	89.94	7,801.35	145.70	3,447.81	3,449.36	0.93
11,115.00	90.74	90.16	7,800.78	145.62	3,542.81	3,544.35	0.87
11,209.00	89.07	90.98	7,800.94	144.69	3,636.80	3,638.32	1.98
11,304.00	89.63	91.12	7,802.02	142.94	3,731.78	3,733.27	0.61
11,398.00	90.06	91.07	7,802.27	141.15	3,825.76	3,827.22	0.46
11,493.00	90.62	91.22	7,801.71	139.25	3,920.74	3,922.17	0.61
11,587.00	91.42	91.54	7,800.03	136.99	4,014.69	4,016.09	0.92
11,681.00	90.56	91.18	7,798.41	134.76	4,108.65	4,110.01	0.99
11,776.00	91.91	91.94	7,796.36	132.17	4,203.59	4,204.91	1.63
11,870.00	91.05	91.91	7,793.93	129.01	4,297.51	4,298.78	0.92
11,965.00	91.54	90.72	7,791.79	126.83	4,392.46	4,393.69	1.35
12,059.00	90.93	90.67	7,789.76	125.69	4,486.43	4,487.64	0.65
12,153.00	89.94	90.24	7,789.05	124.95	4,580.42	4,581.62	1.15
12,248.00	91.05	90.82	7,788.23	124.07	4,675.41	4,676.59	1.32
12,342.00	90.06	90.57	7,787.32	122.93	4,769.40	4,770.56	1.09
12,437.00	91.61	91.23	7,785.93	121.44	4,864.37	4,865.51	1.77
12,531.00	91.17	90.68	7,783.65	119.87	4,958.33	4,959.44	0.75
12,626.00	89.94	89.61	7,782.73	119.63	5,053.32	5,054.42	1.72
12,720.00	90.31	89.99	7,782.53	119.96	5,147.32	5,148.42	0.56
12,814.00	91.17	89.94	7,781.31	120.02	5,241.31	5,242.40	0.92
12,909.00	89.75	90.30	7,780.55	119.82	5,336.31	5,337.39	1.54
13,003.00	90.74	91.37	7,780.15	118.45	5,430.29	5,431.35	1.55
13,098.00	90.25	91.38	7,779.33	116.17	5,525.26	5,526.28	0.52
13,193.00	90.19	91.27	7,778.96	113.97	5,620.24	5,621.22	0.13
13,287.00	89.32	91.03	7,779.36	112.08	5,714.22	5,715.17	0.96
13,382.00	90.19	91.17	7,779.77	110.26	5,809.20	5,810.12	0.93
13,477.00	90.31	90.61	7,779.35	108.79	5,904.18	5,905.08	0.60
13,572.00	89.51	90.42	7,779.50	107.93	5,999.18	6,000.06	0.87
13,667.00	90.37	90.68	7,779.60	107.02	6,094.17	6,095.03	0.95
13,762.00	89.07	90.52	7,780.07	106.02	6,189.16	6,190.01	1.38
13,856.00	89.75	90.82	7,781.04	104.93	6,283.15	6,283.97	0.79
13,951.00	90.80	91.15	7,780.58	103.29	6,378.14	6,378.93	1.16
14,046.00	91.91	91.53	7,778.33	101.07	6,473.08	6,473.84	1.23
14,141.00	91.24	91.84	7,775.72	98.28	6,568.00	6,568.72	0.78
14,236.00	91.05	90.45	7,773.82	96.38	6,662.96	6,663.65	1.48
14,330.00	90.80	90.48	7,772.31	95.62	6,756.95	6,757.62	0.27
14,425.00	91.42	90.58	7,770.47	94.74	6,851.93	6,852.57	0.66
14,520.00	90.12	90.90	7,769.19	93.51	6,946.91	6,947.53	1.41

## Design Report for Prosper Farms 4-65 13-14 1H - Actual Field Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
14,614.00	90.93	91.05	7,768.33	91.91	7,040.89	7,041.49	0.88
14,658.00	91.05	90.98	7,767.57	91.13	7,084.88	7,085.46	0.32
<b>Final Sperry MWD Survey @ 14658.00 ft</b>							
14,719.00	91.05	90.98	7,766.45	90.09	7,145.86	7,146.42	0.00
<b>Straight Line Projection to TD @ 14719.00 ft</b>							

### Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
2,218.00	2,217.98	-4.11	0.77	Tie-On to Gyro Surveys @ 2218.00 ft
2,310.00	2,309.98	-4.65	0.98	First Sperry MWD Survey @ 2310.00 ft
7,223.00	7,218.66	164.32	3.14	Tie-On to Original Wellbore Surveys @ 7223.00 ft
7,314.00	7,308.64	162.23	14.97	First Sperry MWD Survey @ 7314.00 ft
14,658.00	7,767.57	91.13	7,084.88	Final Sperry MWD Survey @ 14658.00 ft
14,719.00	7,766.45	90.09	7,145.86	Straight Line Projection to TD @ 14719.00 ft

### Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/-S (usft)	+E/-W (usft)	
Target	Prosper Farms 4-65 13-14 1H_Rev C0 (Lateral)_	89.29	Slot	0.00	0.00	0.00

### Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
84.00	2,218.00	Surface_Gyro	NS-GYRO-MS
2,310.00	7,223.00	Vertical_Sperry MWD Surveys	MWD
7,314.00	14,658.00	ST-1_Build & Lateral_Sperry MWD Surveys	MWD
14,719.00	14,719.00	Projection to Bit_BLIND	Blind

### Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
2,245.00		9 5/8" Casing Pt.	9-5/8	13-1/2

## Design Report for Prosper Farms 4-65 13-14 1H - Actual Field Surveys

**Wellbore Targets**

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Prosper Farms 4-65 13-14 1H	0.00	0.00	0.00	0.01	0.00	1,682,895.52	3,242,064.33	39° 42' 18.730 N	104° 38' 22.760 W
- actual wellpath misses target center by 7220.53usft at 7223.00usft MD (7218.66 TVD, 164.32 N, 3.14 E)									
- Polygon									
Point 1				0.00	2,103.12	4,972.01	1,685,045.61	3,247,016.15	
Point 2				0.00	-3,190.78	4,956.44	1,679,751.85	3,247,050.72	
Point 3				0.00	-3,259.16	10,213.29	1,679,733.25	3,252,307.94	
Point 4				0.00	2,019.81	10,234.53	1,685,012.14	3,252,279.18	
Point 5				0.00	2,103.12	4,972.01	1,685,045.61	3,247,016.15	
Point 6				0.00	2,169.30	-352.36	1,685,061.37	3,241,691.44	
Point 7				0.00	-483.66	-349.30	1,682,408.58	3,241,719.63	
Point 8				0.00	-3,137.71	-345.40	1,679,754.71	3,241,748.66	
Point 9				0.00	-3,190.78	4,956.44	1,679,751.85	3,247,050.72	
Prosper Farms 4-65 13-14 1H	0.00	0.00	0.00	0.01	0.00	1,682,895.52	3,242,064.33	39° 42' 18.730 N	104° 38' 22.760 W
- actual wellpath misses target center by 7220.53usft at 7223.00usft MD (7218.66 TVD, 164.32 N, 3.14 E)									
- Polygon									
Point 1				0.00	-2,799.16	9,753.29	1,680,188.87	3,251,843.60	
Point 2				0.00	1,559.81	9,774.53	1,684,547.81	3,251,823.56	
Point 3				0.00	1,643.12	4,972.01	1,684,585.64	3,247,020.51	
Point 4				0.00	1,709.30	107.64	1,684,605.75	3,242,155.77	
Point 5				0.00	-483.66	110.70	1,682,412.93	3,242,179.60	
Point 6				0.00	-2,677.71	114.60	1,680,219.04	3,242,204.28	
Point 7				0.00	-2,730.78	4,956.44	1,680,211.82	3,247,046.36	
Prosper Farms 4-65 13-14 1H	0.00	0.00	7,765.00	89.04	7,145.84	1,683,052.22	3,249,208.94	39° 42' 19.600 N	104° 36' 51.330 W
- actual wellpath misses target center by 1.79usft at 14719.00usft MD (7766.45 TVD, 90.09 N, 7145.86 E)									
- Point									

**Directional Difficulty Index**

Average Dogleg over Survey:	1.31 °/100usft	Maximum Dogleg over Survey:	15.09 °/100usft at 7,314.00 usft
Net Tortousity applicable to Plans:	0.46 °/100usft	Directional Difficulty Index:	6.423

**Audit Info**

# North Reference Sheet for Sec. 14-T4S-R65W - Prosper Farms 4-65 13-14 1H - Plan C (Lateral)

All data is in US Feet unless otherwise stated. Directions and Coordinates are relative to True North Reference.

Vertical Depths are relative to KB 24 ft @ 5715.00usft (H&P 280). Northing and Easting are relative to Prosper Farms 4-65 13-14 1H

Coordinate System is US State Plane 1983, Colorado Central Zone using datum North American Datum 1983, ellipsoid GRS 1980

Projection method is Lambert Conformal Conic (2 parallel)

Central Meridian is 105° 30' 0.000 W°, Longitude Origin:0° 0' 0.000 E°, Latitude Origin:39° 45' 0.000 N°

False Easting: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 0.99999145

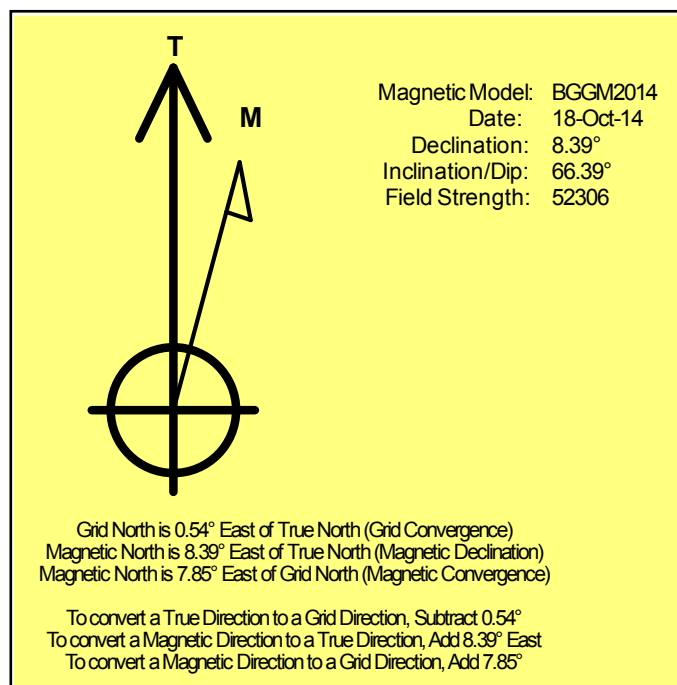
Grid Coordinates of Well: 1,682,895.51 usft N, 3,242,064.33 usft E

Geographical Coordinates of Well: 39° 42' 18.73" N, 104° 38' 22.76" W

Grid Convergence at Surface is: 0.54°

Based upon Minimum Curvature type calculations, at a Measured Depth of 14,719.00usft the Bottom Hole Displacement is 7,146.42usft in the Direction of 89.28° ( True).

Magnetic Convergence at surface is: -7.85° (18 October 2014, , BGGM2014)



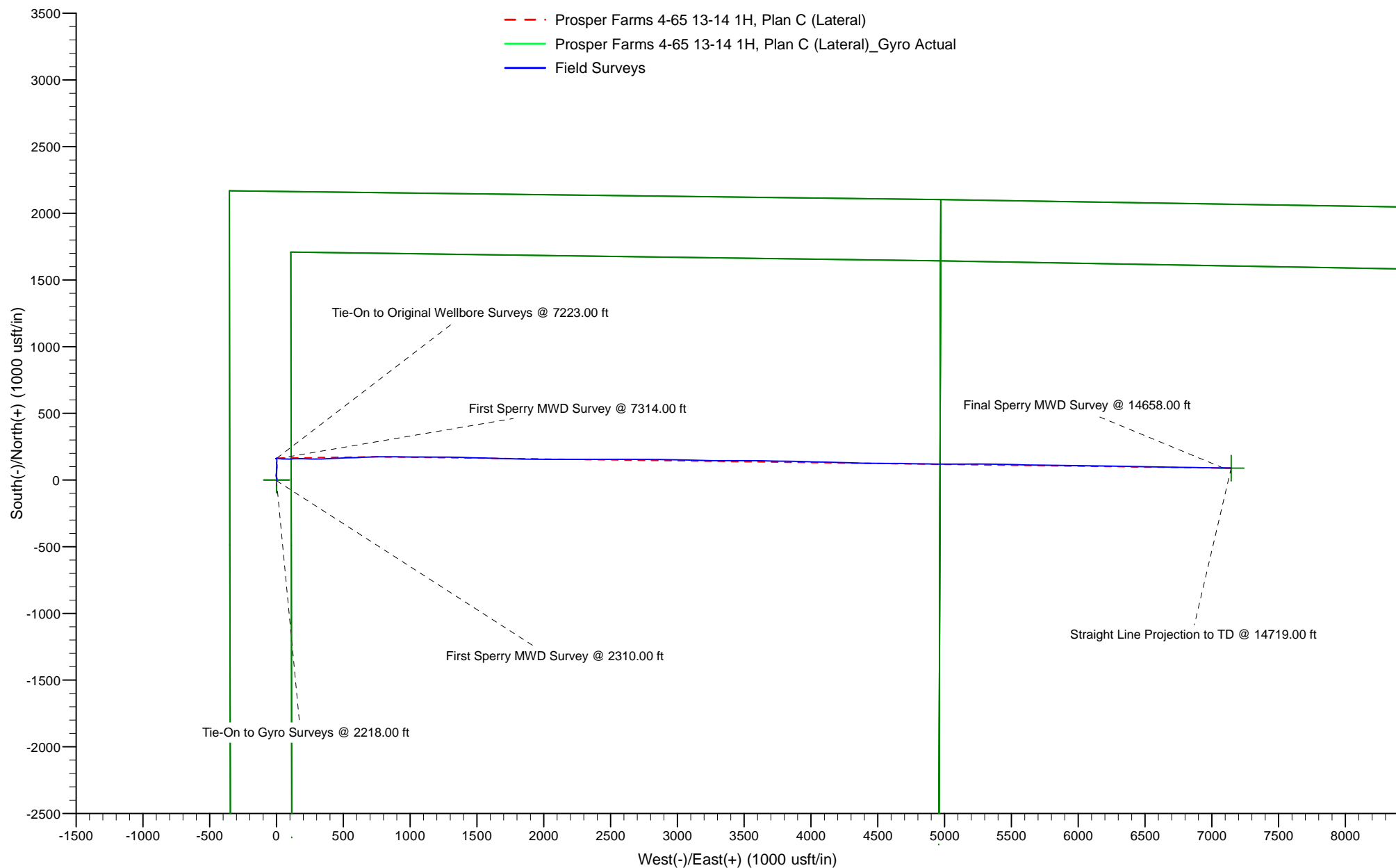
Project: Arapahoe County, Colorado  
Site: Sec. 14-T4S-R65W  
Well: Prosper Farms 4-65 13-14 1H

# Conoco Phillips Company



## LEGEND

- Prosper Farms 4-65 13-14 1H, Plan C (Lateral)
- Prosper Farms 4-65 13-14 1H, Plan C (Lateral)\_Gyro Actual
- Field Surveys





LEGEND

- Prosper Farms 4-65 13-14 1H, Plan C (Lateral)
- Prosper Farms 4-65 13-14 1H, Plan C (Lateral)\_Gyro
- Actual Field Surveys

