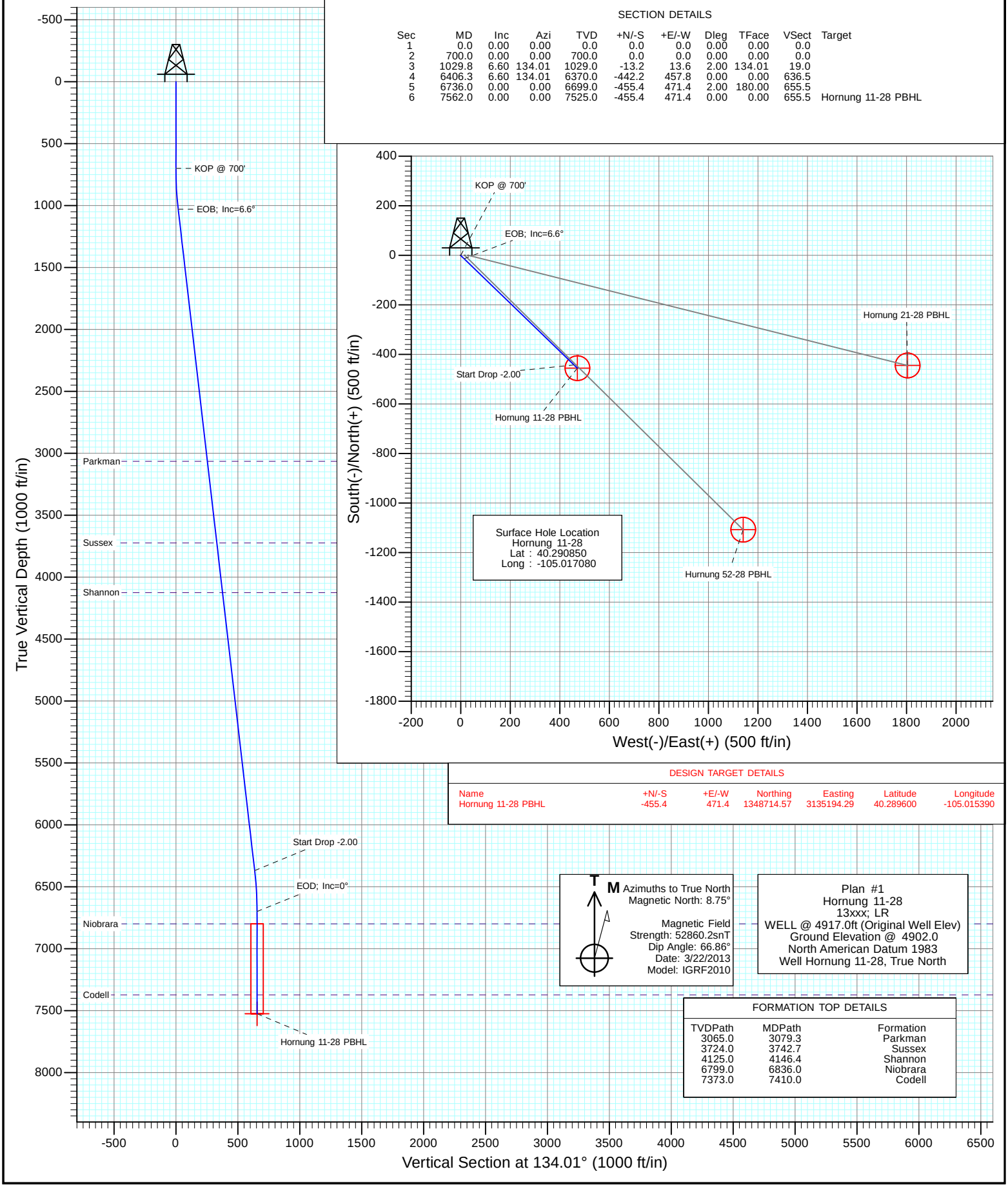
Project: Colorado
Site: SEC 28-T4N-R68W
Well: Hornung 11-28
Wellbore: DD
Design: Plan #1

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	700.0	0.00	0.00	700.0	0.0	0.0	0.00	0.00	0.0	
3	1029.8	6.60	134.01	1029.0	-13.2	13.6	2.00	134.01	19.0	
4	6406.3	6.60	134.01	6370.0	-442.2	457.8	0.00	0.00	636.5	
5	6736.0	0.00	0.00	6699.0	-455.4	471.4	2.00	180.00	655.5	
6	7562.0	0.00	0.00	7525.0	-455.4	471.4	0.00	0.00	655.5	Hornung 11-28 PBHL



DESIGN TARGET DETAILS

Name	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
Hornung 11-28 PBHL	-455.4	471.4	1348714.57	3135194.29	40.289600	-105.015390

T M Azimuths to True North
Magnetic North: 8.75°

Magnetic Field
Strength: 52860.2snT
Dip Angle: 66.86°
Date: 3/22/2013
Model: IGRF2010

Plan #1
Hornung 11-28
13xxx; LR
WELL @ 4917.0ft (Original Well Elev)
Ground Elevation @ 4902.0
North American Datum 1983
Well Hornung 11-28, True North

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
3065.0	3079.3	Parkman
3724.0	3742.7	Sussex
4125.0	4146.4	Shannon
6799.0	6836.0	Niobrara
7373.0	7410.0	Codell

Planning Report

Database:	USA EDM 5000 Multi Users DB	**Local Co-ordinate Reference:**	Well Hornung 11-28
Company:	Sundance Energy	**TVD Reference:**	WELL @ 4917.0ft (Original Well Elev)
Project:	Colorado	**MD Reference:**	WELL @ 4917.0ft (Original Well Elev)
Site:	SEC 28-T4N-R68W	**North Reference:**	True
Well:	Hornung 11-28	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	DD		
Design:	Plan #1		

Project	Colorado		
Map System:	US State Plane 1983	**System Datum:**	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		

Site	SEC 28-T4N-R68W				
Site Position:		**Northing:**	1,349,167.36 ft	**Latitude:**	40.290850
From:	Lat/Long	**Easting:**	3,134,720.37 ft	**Longitude:**	-105.017080
Position Uncertainty:	0.0 ft	**Slot Radius:**	13.200 in	**Grid Convergence:**	0.31 °

Well	Hornung 11-28					
Well Position	**+N/-S**	0.0 ft	**Northing:**	1,349,167.36 ft	**Latitude:**	40.290850
	+E/-W	0.0 ft	**Easting:**	3,134,720.37 ft	**Longitude:**	-105.017080
Position Uncertainty		0.0 ft	**Wellhead Elevation:**	ft	**Ground Level:**	4,902.0 ft

Wellbore	DD				
Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	IGRF2010	3/22/2013	8.75	66.86	52,860

Design	Plan #1				
Audit Notes:					
Version:		**Phase:**	PLAN	**Tie On Depth:**	0.0
Vertical Section:	**Depth From (TVD) (ft)**	**+N/-S (ft)**	**+E/-W (ft)**	**Direction (°)**	
	0.0	0.0	0.0	134.01	

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	
700.0	0.00	0.00	700.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,029.8	6.60	134.01	1,029.0	-13.2	13.6	2.00	2.00	0.00	134.01	
6,406.3	6.60	134.01	6,370.0	-442.2	457.8	0.00	0.00	0.00	0.00	
6,736.0	0.00	0.00	6,699.0	-455.4	471.4	2.00	-2.00	0.00	180.00	
7,562.0	0.00	0.00	7,525.0	-455.4	471.4	0.00	0.00	0.00	0.00	Hornung 11-28 PBHL

Database:	USA EDM 5000 Multi Users DB	**Local Co-ordinate Reference:**	Well Hornung 11-28
Company:	Sundance Energy	**TVD Reference:**	WELL @ 4917.0ft (Original Well Elev)
Project:	Colorado	**MD Reference:**	WELL @ 4917.0ft (Original Well Elev)
Site:	SEC 28-T4N-R68W	**North Reference:**	True
Well:	Hornung 11-28	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	DD		
Design:	Plan #1		

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)	Comments / Formations
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	KOP @ 700'
800.0	2.00	134.01	800.0	-1.2	1.3	1.7	2.00	2.00	
900.0	4.00	134.01	899.8	-4.8	5.0	7.0	2.00	2.00	
1,000.0	6.00	134.01	999.5	-10.9	11.3	15.7	2.00	2.00	
1,029.8	6.60	134.01	1,029.0	-13.2	13.6	19.0	2.00	2.00	EOB; Inc=6.6°
1,100.0	6.60	134.01	1,098.8	-18.8	19.4	27.0	0.00	0.00	
1,200.0	6.60	134.01	1,198.1	-26.8	27.7	38.5	0.00	0.00	
1,300.0	6.60	134.01	1,297.5	-34.7	36.0	50.0	0.00	0.00	
1,400.0	6.60	134.01	1,396.8	-42.7	44.2	61.5	0.00	0.00	
1,500.0	6.60	134.01	1,496.2	-50.7	52.5	73.0	0.00	0.00	
1,600.0	6.60	134.01	1,595.5	-58.7	60.7	84.5	0.00	0.00	
1,700.0	6.60	134.01	1,694.8	-66.7	69.0	95.9	0.00	0.00	
1,800.0	6.60	134.01	1,794.2	-74.6	77.3	107.4	0.00	0.00	
1,900.0	6.60	134.01	1,893.5	-82.6	85.5	118.9	0.00	0.00	
2,000.0	6.60	134.01	1,992.9	-90.6	93.8	130.4	0.00	0.00	
2,100.0	6.60	134.01	2,092.2	-98.6	102.1	141.9	0.00	0.00	
2,200.0	6.60	134.01	2,191.5	-106.5	110.3	153.4	0.00	0.00	
2,300.0	6.60	134.01	2,290.9	-114.5	118.6	164.9	0.00	0.00	
2,400.0	6.60	134.01	2,390.2	-122.5	126.8	176.3	0.00	0.00	
2,500.0	6.60	134.01	2,489.5	-130.5	135.1	187.8	0.00	0.00	
2,600.0	6.60	134.01	2,588.9	-138.5	143.4	199.3	0.00	0.00	
2,700.0	6.60	134.01	2,688.2	-146.4	151.6	210.8	0.00	0.00	
2,800.0	6.60	134.01	2,787.6	-154.4	159.9	222.3	0.00	0.00	
2,900.0	6.60	134.01	2,886.9	-162.4	168.1	233.8	0.00	0.00	
3,000.0	6.60	134.01	2,986.2	-170.4	176.4	245.3	0.00	0.00	
3,079.3	6.60	134.01	3,065.0	-176.7	183.0	254.4	0.00	0.00	Parkman
3,100.0	6.60	134.01	3,085.6	-178.4	184.7	256.7	0.00	0.00	
3,200.0	6.60	134.01	3,184.9	-186.3	192.9	268.2	0.00	0.00	
3,300.0	6.60	134.01	3,284.2	-194.3	201.2	279.7	0.00	0.00	
3,400.0	6.60	134.01	3,383.6	-202.3	209.5	291.2	0.00	0.00	
3,500.0	6.60	134.01	3,482.9	-210.3	217.7	302.7	0.00	0.00	
3,600.0	6.60	134.01	3,582.3	-218.3	226.0	314.2	0.00	0.00	
3,700.0	6.60	134.01	3,681.6	-226.2	234.2	325.7	0.00	0.00	
3,742.7	6.60	134.01	3,724.0	-229.6	237.8	330.6	0.00	0.00	Sussex
3,800.0	6.60	134.01	3,780.9	-234.2	242.5	337.1	0.00	0.00	
3,900.0	6.60	134.01	3,880.3	-242.2	250.8	348.6	0.00	0.00	
4,000.0	6.60	134.01	3,979.6	-250.2	259.0	360.1	0.00	0.00	
4,100.0	6.60	134.01	4,079.0	-258.2	267.3	371.6	0.00	0.00	
4,146.4	6.60	134.01	4,125.0	-261.9	271.1	376.9	0.00	0.00	Shannon
4,200.0	6.60	134.01	4,178.3	-266.1	275.5	383.1	0.00	0.00	
4,300.0	6.60	134.01	4,277.6	-274.1	283.8	394.6	0.00	0.00	
4,400.0	6.60	134.01	4,377.0	-282.1	292.1	406.1	0.00	0.00	
4,500.0	6.60	134.01	4,476.3	-290.1	300.3	417.5	0.00	0.00	
4,600.0	6.60	134.01	4,575.6	-298.1	308.6	429.0	0.00	0.00	
4,700.0	6.60	134.01	4,675.0	-306.0	316.9	440.5	0.00	0.00	

Database:	USA EDM 5000 Multi Users DB	**Local Co-ordinate Reference:**	Well Hornung 11-28
Company:	Sundance Energy	**TVD Reference:**	WELL @ 4917.0ft (Original Well Elev)
Project:	Colorado	**MD Reference:**	WELL @ 4917.0ft (Original Well Elev)
Site:	SEC 28-T4N-R68W	**North Reference:**	True
Well:	Hornung 11-28	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	DD		
Design:	Plan #1		

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)	Comments / Formations
4,800.0	6.60	134.01	4,774.3	-314.0	325.1	452.0	0.00	0.00	
4,900.0	6.60	134.01	4,873.7	-322.0	333.4	463.5	0.00	0.00	
5,000.0	6.60	134.01	4,973.0	-330.0	341.6	475.0	0.00	0.00	
5,100.0	6.60	134.01	5,072.3	-338.0	349.9	486.5	0.00	0.00	
5,200.0	6.60	134.01	5,171.7	-345.9	358.2	497.9	0.00	0.00	
5,300.0	6.60	134.01	5,271.0	-353.9	366.4	509.4	0.00	0.00	
5,400.0	6.60	134.01	5,370.3	-361.9	374.7	520.9	0.00	0.00	
5,500.0	6.60	134.01	5,469.7	-369.9	382.9	532.4	0.00	0.00	
5,600.0	6.60	134.01	5,569.0	-377.9	391.2	543.9	0.00	0.00	
5,700.0	6.60	134.01	5,668.4	-385.8	399.5	555.4	0.00	0.00	
5,800.0	6.60	134.01	5,767.7	-393.8	407.7	566.9	0.00	0.00	
5,900.0	6.60	134.01	5,867.0	-401.8	416.0	578.3	0.00	0.00	
6,000.0	6.60	134.01	5,966.4	-409.8	424.2	589.8	0.00	0.00	
6,100.0	6.60	134.01	6,065.7	-417.7	432.5	601.3	0.00	0.00	
6,200.0	6.60	134.01	6,165.1	-425.7	440.8	612.8	0.00	0.00	
6,300.0	6.60	134.01	6,264.4	-433.7	449.0	624.3	0.00	0.00	
6,400.0	6.60	134.01	6,363.7	-441.7	457.3	635.8	0.00	0.00	
6,406.3	6.60	134.01	6,370.0	-442.2	457.8	636.5	0.00	0.00	Start Drop -2.00
6,500.0	4.72	134.01	6,463.2	-448.6	464.5	645.7	2.00	-2.00	
6,600.0	2.72	134.01	6,563.0	-453.1	469.1	652.2	2.00	-2.00	
6,700.0	0.72	134.01	6,663.0	-455.2	471.3	655.2	2.00	-2.00	
6,736.0	0.00	0.00	6,699.0	-455.4	471.4	655.5	2.00	-2.00	EOD; Inc=0°
6,800.0	0.00	0.00	6,763.0	-455.4	471.4	655.5	0.00	0.00	
6,836.0	0.00	0.00	6,799.0	-455.4	471.4	655.5	0.00	0.00	Niobrara
6,900.0	0.00	0.00	6,863.0	-455.4	471.4	655.5	0.00	0.00	
7,000.0	0.00	0.00	6,963.0	-455.4	471.4	655.5	0.00	0.00	
7,100.0	0.00	0.00	7,063.0	-455.4	471.4	655.5	0.00	0.00	
7,200.0	0.00	0.00	7,163.0	-455.4	471.4	655.5	0.00	0.00	
7,300.0	0.00	0.00	7,263.0	-455.4	471.4	655.5	0.00	0.00	
7,400.0	0.00	0.00	7,363.0	-455.4	471.4	655.5	0.00	0.00	
7,410.0	0.00	0.00	7,373.0	-455.4	471.4	655.5	0.00	0.00	Codell
7,500.0	0.00	0.00	7,463.0	-455.4	471.4	655.5	0.00	0.00	
7,562.0	0.00	0.00	7,525.0	-455.4	471.4	655.5	0.00	0.00	TD at 7562.0 - Hornung 11-28 PBHL

Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
Hornung 11-28 PBHL - plan hits target center - Circle (radius 50.0)	0.00	0.00	7,525.0	-455.4	471.4	1,348,714.57	3,135,194.29	40.289600	-105.015390

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Company:	Sundance Energy	**TVD Reference:**	WELL @ 4917.0ft (Original Well Elev)
Project:	Colorado	**MD Reference:**	WELL @ 4917.0ft (Original Well Elev)
Site:	SEC 28-T4N-R68W	**North Reference:**	True
Well:	Hornung 11-28	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	DD		
Design:	Plan #1		

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
3,079.3	3,065.0	Parkman		0.00	
3,742.7	3,724.0	Sussex		0.00	
4,146.4	4,125.0	Shannon		0.00	
6,836.0	6,799.0	Niobrara		0.00	
7,410.0	7,373.0	Codell		0.00	

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	Local Coordinates +E/-W (ft)	Comment
700.0	700.0	0.0	0.0	KOP @ 700'
1,029.8	1,029.0	-13.2	13.6	EOB; Inc=6.6°
6,406.3	6,370.0	-442.2	457.8	Start Drop -2.00
6,736.0	6,699.0	-455.4	471.4	EOD; Inc=0°
7,562.0	7,525.0	-455.4	471.4	TD at 7562.0

Sundance Energy

Colorado
SEC 28-T4N-R68W
Hornung 11-28
DD
Plan #1

Anticollision Report

27 March, 2013

Company:	Sundance Energy	**Local Co-ordinate Reference:**	Well Hornung 11-28
Project:	Colorado	**TVD Reference:**	WELL @ 4917.0ft (Original Well Elev)
Reference Site:	SEC 28-T4N-R68W	**MD Reference:**	WELL @ 4917.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Hornung 11-28	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	DD	**Database:**	USA EDM 5000 Multi Users DB
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Reference Plan #1

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 1,249.9ft	**Error Surface:**	Elliptical Conic
Warning Levels Evaluated at:	2.00 **Sigma**		

Survey Tool Program **Date** 3/27/2013

From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.0	7,561.4	Plan #1 (DD)	MWD	Geolink MWD

Summary

Site Name Offset Well - Wellbore - Design	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
SEC 28-T4N-R68W						
Hornung 21-28 - DD - Plan #1	500.0	500.0	30.7	29.0	18.125	CC, ES
Hornung 21-28 - DD - Plan #1	700.0	697.6	37.4	35.0	15.647	SF
Hornung 52-28 - DD - Plan #1	600.0	600.0	16.7	14.7	8.197	CC, ES
Hornung 52-28 - DD - Plan #1	700.0	699.5	18.0	15.6	7.538	SF

Company:	Sundance Energy	**Local Co-ordinate Reference:**	Well Hornung 11-28
Project:	Colorado	**TVD Reference:**	WELL @ 4917.0ft (Original Well Elev)
Reference Site:	SEC 28-T4N-R68W	**MD Reference:**	WELL @ 4917.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Hornung 11-28	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	DD	**Database:**	USA EDM 5000 Multi Users DB
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design SEC 28-T4N-R68W - Hornung 21-28 - DD - Plan #1 — **Offset Site Error:** 0.0 ft

Survey Program: 0-MWD — **Offset Well Error:** 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	90.02	0.0	30.7	30.7				
100.0	100.0	100.0	100.0	0.1	0.1	90.02	0.0	30.7	30.7	30.4	0.30	103.421	
200.0	200.0	200.0	200.0	0.3	0.3	90.02	0.0	30.7	30.7	30.0	0.65	47.518	
300.0	300.0	300.0	300.0	0.5	0.5	90.02	0.0	30.7	30.7	29.7	0.99	30.845	
400.0	400.0	400.0	400.0	0.7	0.7	90.02	0.0	30.7	30.7	29.3	1.34	22.833	
500.0	500.0	500.0	500.0	0.8	0.8	90.02	0.0	30.7	30.7	29.0	1.69	18.125	CC, ES
600.0	600.0	598.9	598.9	1.0	1.0	90.75	-0.4	32.3	32.4	30.3	2.04	15.859	
700.0	700.0	697.6	697.5	1.2	1.2	92.55	-1.7	37.3	37.4	35.0	2.39	15.647	SF
800.0	800.0	796.0	795.5	1.4	1.4	-40.65	-3.7	45.5	44.6	41.8	2.74	16.288	
900.0	899.8	894.0	892.8	1.6	1.6	-41.80	-6.6	56.9	52.4	49.3	3.09	16.977	
1,000.0	999.5	991.8	989.3	1.8	1.9	-44.09	-10.2	71.5	61.1	57.6	3.45	17.684	
1,100.0	1,098.8	1,089.0	1,084.9	2.0	2.3	-46.61	-14.7	89.2	71.3	67.4	3.84	18.537	
1,200.0	1,198.1	1,185.6	1,179.1	2.2	2.6	-47.87	-19.8	109.9	84.7	80.4	4.25	19.912	
1,300.0	1,297.5	1,281.3	1,271.7	2.4	3.1	-48.17	-25.7	133.4	101.2	96.5	4.67	21.689	
1,400.0	1,396.8	1,375.9	1,362.3	2.7	3.6	-47.90	-32.3	159.6	120.8	115.8	5.08	23.774	
1,500.0	1,496.2	1,469.4	1,451.0	2.9	4.1	-47.31	-39.5	188.3	143.5	138.0	5.50	26.110	
1,600.0	1,595.5	1,566.4	1,542.6	3.2	4.7	-46.71	-47.3	219.4	167.6	161.7	5.92	28.314	
1,700.0	1,694.8	1,663.5	1,634.2	3.4	5.2	-46.26	-55.1	250.5	191.7	185.3	6.34	30.218	
1,800.0	1,794.2	1,760.5	1,725.8	3.7	5.8	-45.91	-62.8	281.6	215.8	209.0	6.77	31.876	
1,900.0	1,893.5	1,857.6	1,817.4	3.9	6.4	-45.63	-70.6	312.7	239.9	232.7	7.20	33.331	
2,000.0	1,992.9	1,954.6	1,909.0	4.2	7.0	-45.41	-78.4	343.8	264.0	256.3	7.62	34.618	
2,100.0	2,092.2	2,051.7	2,000.6	4.5	7.6	-45.22	-86.2	374.9	288.1	280.0	8.05	35.764	
2,200.0	2,191.5	2,148.7	2,092.2	4.7	8.2	-45.06	-94.0	406.0	312.2	303.7	8.49	36.790	
2,300.0	2,290.9	2,245.8	2,183.8	5.0	8.8	-44.92	-101.8	437.1	336.3	327.4	8.92	37.714	
2,400.0	2,390.2	2,342.8	2,275.4	5.2	9.4	-44.80	-109.6	468.2	360.4	351.0	9.35	38.550	
2,500.0	2,489.5	2,439.9	2,367.0	5.5	10.0	-44.70	-117.4	499.3	384.5	374.7	9.78	39.311	
2,600.0	2,588.9	2,536.9	2,458.6	5.8	10.6	-44.60	-125.2	530.4	408.6	398.4	10.21	40.005	
2,700.0	2,688.2	2,634.0	2,550.2	6.0	11.2	-44.52	-133.0	561.5	432.7	422.1	10.65	40.641	
2,800.0	2,787.6	2,731.0	2,641.8	6.3	11.8	-44.45	-140.7	592.6	456.8	445.7	11.08	41.225	
2,900.0	2,886.9	2,828.1	2,733.4	6.5	12.4	-44.38	-148.5	623.7	480.9	469.4	11.52	41.765	
3,000.0	2,986.2	2,925.1	2,825.0	6.8	13.0	-44.32	-156.3	654.8	505.0	493.1	11.95	42.264	
3,100.0	3,085.6	3,022.2	2,916.6	7.1	13.6	-44.27	-164.1	685.9	529.2	516.8	12.38	42.728	
3,200.0	3,184.9	3,119.2	3,008.2	7.3	14.2	-44.22	-171.9	717.0	553.3	540.4	12.82	43.159	
3,300.0	3,284.2	3,216.3	3,099.8	7.6	14.9	-44.18	-179.7	748.1	577.4	564.1	13.25	43.561	
3,400.0	3,383.6	3,313.3	3,191.4	7.9	15.5	-44.14	-187.5	779.2	601.5	587.8	13.69	43.937	
3,500.0	3,482.9	3,410.4	3,283.0	8.1	16.1	-44.10	-195.3	810.3	625.6	611.5	14.13	44.290	
3,600.0	3,582.3	3,507.4	3,374.6	8.4	16.7	-44.06	-203.1	841.4	649.7	635.2	14.56	44.620	
3,700.0	3,681.6	3,604.5	3,466.2	8.7	17.3	-44.03	-210.8	872.5	673.8	658.8	15.00	44.931	
3,800.0	3,780.9	3,701.5	3,557.8	8.9	17.9	-44.00	-218.6	903.6	697.9	682.5	15.43	45.225	
3,900.0	3,880.3	3,798.6	3,649.4	9.2	18.5	-43.97	-226.4	934.7	722.1	706.2	15.87	45.501	
4,000.0	3,979.6	3,895.6	3,741.0	9.5	19.1	-43.94	-234.2	965.8	746.2	729.9	16.31	45.763	
4,100.0	4,079.0	3,992.7	3,832.6	9.7	19.7	-43.92	-242.0	996.9	770.3	753.6	16.74	46.010	
4,200.0	4,178.3	4,089.7	3,924.2	10.0	20.3	-43.89	-249.8	1,028.0	794.4	777.2	17.18	46.245	
4,300.0	4,277.6	4,186.8	4,015.8	10.2	20.9	-43.87	-257.6	1,059.1	818.5	800.9	17.61	46.468	
4,400.0	4,377.0	4,283.8	4,107.4	10.5	21.6	-43.85	-265.4	1,090.2	842.6	824.6	18.05	46.680	
4,500.0	4,476.3	4,380.8	4,199.0	10.8	22.2	-43.83	-273.2	1,121.3	866.8	848.3	18.49	46.882	
4,600.0	4,575.6	4,477.9	4,290.6	11.0	22.8	-43.81	-281.0	1,152.4	890.9	871.9	18.92	47.074	
4,700.0	4,675.0	4,574.9	4,382.2	11.3	23.4	-43.79	-288.7	1,183.5	915.0	895.6	19.36	47.257	
4,800.0	4,774.3	4,672.0	4,473.8	11.6	24.0	-43.78	-296.5	1,214.6	939.1	919.3	19.80	47.432	
4,900.0	4,873.7	4,769.0	4,565.4	11.8	24.6	-43.76	-304.3	1,245.8	963.2	943.0	20.24	47.600	
5,000.0	4,973.0	4,866.1	4,657.0	12.1	25.2	-43.75	-312.1	1,276.9	987.3	966.7	20.67	47.760	
5,100.0	5,072.3	4,963.1	4,748.6	12.4	25.8	-43.73	-319.9	1,308.0	1,011.5	990.3	21.11	47.914	

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

Company:	Sundance Energy	**Local Co-ordinate Reference:**	Well Hornung 11-28
Project:	Colorado	**TVD Reference:**	WELL @ 4917.0ft (Original Well Elev)
Reference Site:	SEC 28-T4N-R68W	**MD Reference:**	WELL @ 4917.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Hornung 11-28	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	DD	**Database:**	USA EDM 5000 Multi Users DB
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design SEC 28-T4N-R68W - Hornung 21-28 - DD - Plan #1

Survey Program: 0-MWD

Offset Site Error: 0.0 ft

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor	Warning
5,200.0	5,171.7	5,060.2	4,840.2	12.6	26.4	-43.72	-327.7	1,339.1	1,035.6	1,014.0	21.55	48.061	
5,300.0	5,271.0	5,157.2	4,931.8	12.9	27.0	-43.71	-335.5	1,370.2	1,059.7	1,037.7	21.98	48.202	
5,400.0	5,370.3	5,254.3	5,023.4	13.2	27.7	-43.69	-343.3	1,401.3	1,083.8	1,061.4	22.42	48.338	
5,500.0	5,469.7	5,351.3	5,115.0	13.4	28.3	-43.68	-351.1	1,432.4	1,107.9	1,085.1	22.86	48.468	
5,600.0	5,569.0	5,448.4	5,206.6	13.7	28.9	-43.67	-358.9	1,463.5	1,132.0	1,108.7	23.30	48.593	
5,700.0	5,668.4	5,545.4	5,298.2	14.0	29.5	-43.66	-366.6	1,494.6	1,156.1	1,132.4	23.73	48.714	
5,800.0	5,767.7	5,642.5	5,389.8	14.2	30.1	-43.65	-374.4	1,525.7	1,180.3	1,156.1	24.17	48.830	
5,900.0	5,867.0	5,739.5	5,481.3	14.5	30.7	-43.64	-382.2	1,556.8	1,204.4	1,179.8	24.61	48.942	
6,000.0	5,966.4	5,836.6	5,572.9	14.8	31.3	-43.63	-390.0	1,587.9	1,228.5	1,203.5	25.05	49.050	

Company:	Sundance Energy	**Local Co-ordinate Reference:**	Well Hornung 11-28
Project:	Colorado	**TVD Reference:**	WELL @ 4917.0ft (Original Well Elev)
Reference Site:	SEC 28-T4N-R68W	**MD Reference:**	WELL @ 4917.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Hornung 11-28	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	DD	**Database:**	USA EDM 5000 Multi Users DB
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design SEC 28-T4N-R68W - Hornung 52-28 - DD - Plan #1 — **Offset Site Error:** 0.0 ft

Survey Program: 0-MWD — **Offset Well Error:** 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	90.07	0.0	16.7	16.7				
100.0	100.0	100.0	100.0	0.1	0.1	90.07	0.0	16.7	16.7	16.4	0.30	56.411	
200.0	200.0	200.0	200.0	0.3	0.3	90.07	0.0	16.7	16.7	16.1	0.65	25.919	
300.0	300.0	300.0	300.0	0.5	0.5	90.07	0.0	16.7	16.7	15.7	0.99	16.824	
400.0	400.0	400.0	400.0	0.7	0.7	90.07	0.0	16.7	16.7	15.4	1.34	12.454	
500.0	500.0	500.0	500.0	0.8	0.8	90.07	0.0	16.7	16.7	15.0	1.69	9.887	
600.0	600.0	600.0	600.0	1.0	1.0	90.07	0.0	16.7	16.7	14.7	2.04	8.197	CC, ES
700.0	700.0	699.5	699.5	1.2	1.2	93.93	-1.2	18.0	18.0	15.6	2.39	7.538	SF
800.0	800.0	799.0	798.8	1.4	1.4	-33.80	-4.9	21.7	20.8	18.0	2.74	7.571	
900.0	899.8	898.2	897.7	1.6	1.6	-28.99	-10.9	27.8	23.7	20.6	3.10	7.640	
1,000.0	999.5	997.4	996.1	1.8	1.8	-25.21	-19.3	36.3	26.6	23.2	3.45	7.713	
1,100.0	1,098.8	1,096.4	1,093.9	2.0	2.1	-21.58	-30.1	47.3	30.5	26.7	3.82	7.988	
1,200.0	1,198.1	1,195.0	1,190.8	2.2	2.4	-17.13	-43.2	60.6	37.5	33.4	4.17	9.001	
1,300.0	1,297.5	1,293.0	1,286.3	2.4	2.8	-13.08	-58.6	76.2	48.1	43.5	4.52	10.644	
1,400.0	1,396.8	1,390.2	1,380.2	2.7	3.2	-9.91	-76.0	93.9	62.1	57.2	4.86	12.780	
1,500.0	1,496.2	1,487.7	1,473.7	2.9	3.7	-7.59	-95.4	113.6	79.0	73.8	5.20	15.208	
1,600.0	1,595.5	1,586.1	1,568.0	3.2	4.2	-6.05	-115.3	133.8	96.4	90.9	5.54	17.406	
1,700.0	1,694.8	1,684.6	1,662.2	3.4	4.7	-4.98	-135.2	153.9	113.9	108.0	5.88	19.353	
1,800.0	1,794.2	1,783.0	1,756.5	3.7	5.2	-4.19	-155.0	174.1	131.3	125.1	6.23	21.087	
1,900.0	1,893.5	1,881.4	1,850.8	3.9	5.7	-3.59	-174.9	194.3	148.8	142.3	6.57	22.640	
2,000.0	1,992.9	1,979.9	1,945.1	4.2	6.2	-3.11	-194.7	214.4	166.4	159.4	6.92	24.040	
2,100.0	2,092.2	2,078.3	2,039.4	4.5	6.7	-2.73	-214.6	234.6	183.9	176.6	7.27	25.306	
2,200.0	2,191.5	2,176.8	2,133.7	4.7	7.2	-2.41	-234.5	254.7	201.4	193.8	7.61	26.458	
2,300.0	2,290.9	2,275.2	2,228.0	5.0	7.8	-2.14	-254.3	274.9	218.9	211.0	7.96	27.510	
2,400.0	2,390.2	2,373.7	2,322.3	5.2	8.3	-1.92	-274.2	295.1	236.5	228.2	8.30	28.475	
2,500.0	2,489.5	2,472.1	2,416.6	5.5	8.8	-1.72	-294.0	315.2	254.0	245.4	8.65	29.362	
2,600.0	2,588.9	2,570.6	2,510.9	5.8	9.3	-1.55	-313.9	335.4	271.5	262.5	9.00	30.181	
2,700.0	2,688.2	2,669.0	2,605.2	6.0	9.9	-1.40	-333.8	355.6	289.1	279.7	9.34	30.940	
2,800.0	2,787.6	2,767.5	2,699.5	6.3	10.4	-1.27	-353.6	375.7	306.6	296.9	9.69	31.644	
2,900.0	2,886.9	2,865.9	2,793.7	6.5	10.9	-1.15	-373.5	395.9	324.2	314.1	10.04	32.300	
3,000.0	2,986.2	2,964.4	2,888.0	6.8	11.4	-1.04	-393.3	416.0	341.7	331.3	10.38	32.912	
3,100.0	3,085.6	3,062.8	2,982.3	7.1	12.0	-0.95	-413.2	436.2	359.3	348.5	10.73	33.485	
3,200.0	3,184.9	3,161.3	3,076.6	7.3	12.5	-0.86	-433.1	456.4	376.8	365.7	11.08	34.022	
3,300.0	3,284.2	3,259.7	3,170.9	7.6	13.0	-0.78	-452.9	476.5	394.4	382.9	11.42	34.526	
3,400.0	3,383.6	3,358.1	3,265.2	7.9	13.5	-0.71	-472.8	496.7	411.9	400.1	11.77	35.001	
3,500.0	3,482.9	3,456.6	3,359.5	8.1	14.1	-0.64	-492.6	516.9	429.5	417.4	12.12	35.448	
3,600.0	3,582.3	3,555.0	3,453.8	8.4	14.6	-0.58	-512.5	537.0	447.0	434.6	12.46	35.871	
3,700.0	3,681.6	3,653.5	3,548.1	8.7	15.1	-0.52	-532.4	557.2	464.6	451.8	12.81	36.271	
3,800.0	3,780.9	3,751.9	3,642.4	8.9	15.7	-0.47	-552.2	577.3	482.1	469.0	13.15	36.649	
3,900.0	3,880.3	3,850.4	3,736.7	9.2	16.2	-0.42	-572.1	597.5	499.7	486.2	13.50	37.009	
4,000.0	3,979.6	3,948.8	3,830.9	9.5	16.7	-0.38	-591.9	617.7	517.2	503.4	13.85	37.350	
4,100.0	4,079.0	4,047.3	3,925.2	9.7	17.3	-0.33	-611.8	637.8	534.8	520.6	14.19	37.675	
4,200.0	4,178.3	4,145.7	4,019.5	10.0	17.8	-0.29	-631.7	658.0	552.3	537.8	14.54	37.984	
4,300.0	4,277.6	4,244.2	4,113.8	10.2	18.3	-0.26	-651.5	678.2	569.9	555.0	14.89	38.279	
4,400.0	4,377.0	4,342.6	4,208.1	10.5	18.8	-0.22	-671.4	698.3	587.4	572.2	15.23	38.560	
4,500.0	4,476.3	4,441.1	4,302.4	10.8	19.4	-0.19	-691.2	718.5	605.0	589.4	15.58	38.829	
4,600.0	4,575.6	4,539.5	4,396.7	11.0	19.9	-0.16	-711.1	738.6	622.5	606.6	15.93	39.086	
4,700.0	4,675.0	4,638.0	4,491.0	11.3	20.4	-0.13	-731.0	758.8	640.1	623.8	16.27	39.332	
4,800.0	4,774.3	4,736.4	4,585.3	11.6	21.0	-0.10	-750.8	779.0	657.7	641.0	16.62	39.568	
4,900.0	4,873.7	4,834.9	4,679.6	11.8	21.5	-0.07	-770.7	799.1	675.2	658.2	16.97	39.794	
5,000.0	4,973.0	4,933.3	4,773.9	12.1	22.0	-0.05	-790.5	819.3	692.8	675.4	17.31	40.012	
5,100.0	5,072.3	5,031.7	4,868.1	12.4	22.6	-0.02	-810.4	839.5	710.3	692.7	17.66	40.220	

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

Company:	Sundance Energy	**Local Co-ordinate Reference:**	Well Hornung 11-28
Project:	Colorado	**TVD Reference:**	WELL @ 4917.0ft (Original Well Elev)
Reference Site:	SEC 28-T4N-R68W	**MD Reference:**	WELL @ 4917.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Hornung 11-28	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	DD	**Database:**	USA EDM 5000 Multi Users DB
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Offset Design SEC 28-T4N-R68W - Hornung 52-28 - DD - Plan #1

Offset Site Error: 0.0 ft

Survey Program: 0-MWD

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Total Uncertainty Axis	Separation Factor	Warning
5,200.0	5,171.7	5,130.2	4,962.4	12.6	23.1	0.00	-830.2	859.6	727.9	709.9	18.01	40.421	
5,300.0	5,271.0	5,228.6	5,056.7	12.9	23.6	0.02	-850.1	879.8	745.4	727.1	18.35	40.614	
5,400.0	5,370.3	5,327.1	5,151.0	13.2	24.2	0.04	-870.0	899.9	763.0	744.3	18.70	40.800	
5,500.0	5,469.7	5,425.5	5,245.3	13.4	24.7	0.06	-889.8	920.1	780.5	761.5	19.05	40.979	
5,600.0	5,569.0	5,524.0	5,339.6	13.7	25.2	0.08	-909.7	940.3	798.1	778.7	19.39	41.152	
5,700.0	5,668.4	5,622.4	5,433.9	14.0	25.8	0.10	-929.5	960.4	815.6	795.9	19.74	41.319	
5,800.0	5,767.7	5,720.9	5,528.2	14.2	26.3	0.12	-949.4	980.6	833.2	813.1	20.09	41.480	
5,900.0	5,867.0	5,819.3	5,622.5	14.5	26.8	0.13	-969.3	1,000.7	850.8	830.3	20.43	41.635	
6,000.0	5,966.4	5,917.8	5,716.8	14.8	27.3	0.15	-989.1	1,020.9	868.3	847.5	20.78	41.786	
6,100.0	6,065.7	6,016.2	5,811.1	15.0	27.9	0.16	-1,009.0	1,041.1	885.9	864.7	21.13	41.931	
6,200.0	6,165.1	6,129.0	5,919.2	15.3	28.5	0.18	-1,031.5	1,063.9	903.2	881.7	21.50	42.011	
6,300.0	6,264.4	6,274.3	6,059.9	15.6	29.1	0.20	-1,056.7	1,089.6	916.7	894.7	21.93	41.806	
6,400.0	6,363.7	6,421.1	6,203.8	15.8	29.6	0.21	-1,077.2	1,110.3	925.1	902.7	22.36	41.376	
6,500.0	6,463.2	6,568.8	6,349.9	16.0	30.0	0.22	-1,092.4	1,125.8	929.9	907.1	22.76	40.865	
6,600.0	6,563.0	6,716.9	6,497.3	16.2	30.3	0.23	-1,102.4	1,135.9	933.0	909.9	23.13	40.334	
6,700.0	6,663.0	6,865.3	6,645.5	16.4	30.5	0.24	-1,107.1	1,140.6	934.5	911.0	23.49	39.778	
6,800.0	6,763.0	6,982.7	6,763.0	16.5	30.6	134.24	-1,107.4	1,141.0	934.6	910.7	23.84	39.198	
6,900.0	6,863.0	7,082.7	6,863.0	16.6	30.7	134.24	-1,107.4	1,141.0	934.6	910.4	24.19	38.629	
7,000.0	6,963.0	7,182.7	6,963.0	16.7	30.7	134.24	-1,107.4	1,141.0	934.6	910.0	24.55	38.076	
7,100.0	7,063.0	7,282.7	7,063.0	16.9	30.8	134.24	-1,107.4	1,141.0	934.6	909.7	24.90	37.539	
7,200.0	7,163.0	7,382.7	7,163.0	17.0	30.9	134.24	-1,107.4	1,141.0	934.6	909.3	25.25	37.017	
7,300.0	7,263.0	7,482.7	7,263.0	17.1	30.9	134.24	-1,107.4	1,141.0	934.6	909.0	25.60	36.509	
7,400.0	7,363.0	7,582.7	7,363.0	17.3	31.0	134.24	-1,107.4	1,141.0	934.6	908.6	25.95	36.015	
7,500.0	7,463.0	7,682.7	7,463.0	17.4	31.1	134.24	-1,107.4	1,141.0	934.6	908.3	26.30	35.535	
7,562.0	7,525.0	7,744.8	7,525.0	17.5	31.1	134.24	-1,107.4	1,141.0	934.6	908.1	26.52	35.243	

Company:	Sundance Energy	**Local Co-ordinate Reference:**	Well Hornung 11-28
Project:	Colorado	**TVD Reference:**	WELL @ 4917.0ft (Original Well Elev)
Reference Site:	SEC 28-T4N-R68W	**MD Reference:**	WELL @ 4917.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Hornung 11-28	**Survey Calculation Method:**	Minimum Curvature
Well Error:	0.0ft	**Output errors are at**	2.00 sigma
Reference Wellbore	DD	**Database:**	USA EDM 5000 Multi Users DB
Reference Design:	Plan #1	**Offset TVD Reference:**	Offset Datum

Reference Depths are relative to WELL @ 4917.0ft (Original Well Elev)
Offset Depths are relative to Offset Datum
Central Meridian is -105.500000 °

Coordinates are relative to: Hornung 11-28
Coordinate System is US State Plane 1983, Colorado Northern Zone
Grid Convergence at Surface is: 0.31°