



Project: Niobrara CON'83
County: Weld County, CO
Site: Ptasnik 1-30-9-59 Pad
Well: 1-30-9-59
Wellbore: 1-30-9-59 OH
Design: Plan #2



TITAN
Directional Drilling

LEGEND

- 3-30-9-59, 3-30-9-59 OH, Plan #1 V0
- 6-30-9-59, 6-30-9-59 OH, Plan #1 V0
- 7-30-9-59, 7-30-9-59 OH, Plan #1 V0
- 5-30-9-59, 5-30-9-59 OH, Plan #1 V0
- 4-30-9-59, 4-30-9-59 OH, Plan #1 V0
- 2-30-9-59, 2-30-9-59 OH, Plan #2 V0
- Plan #2

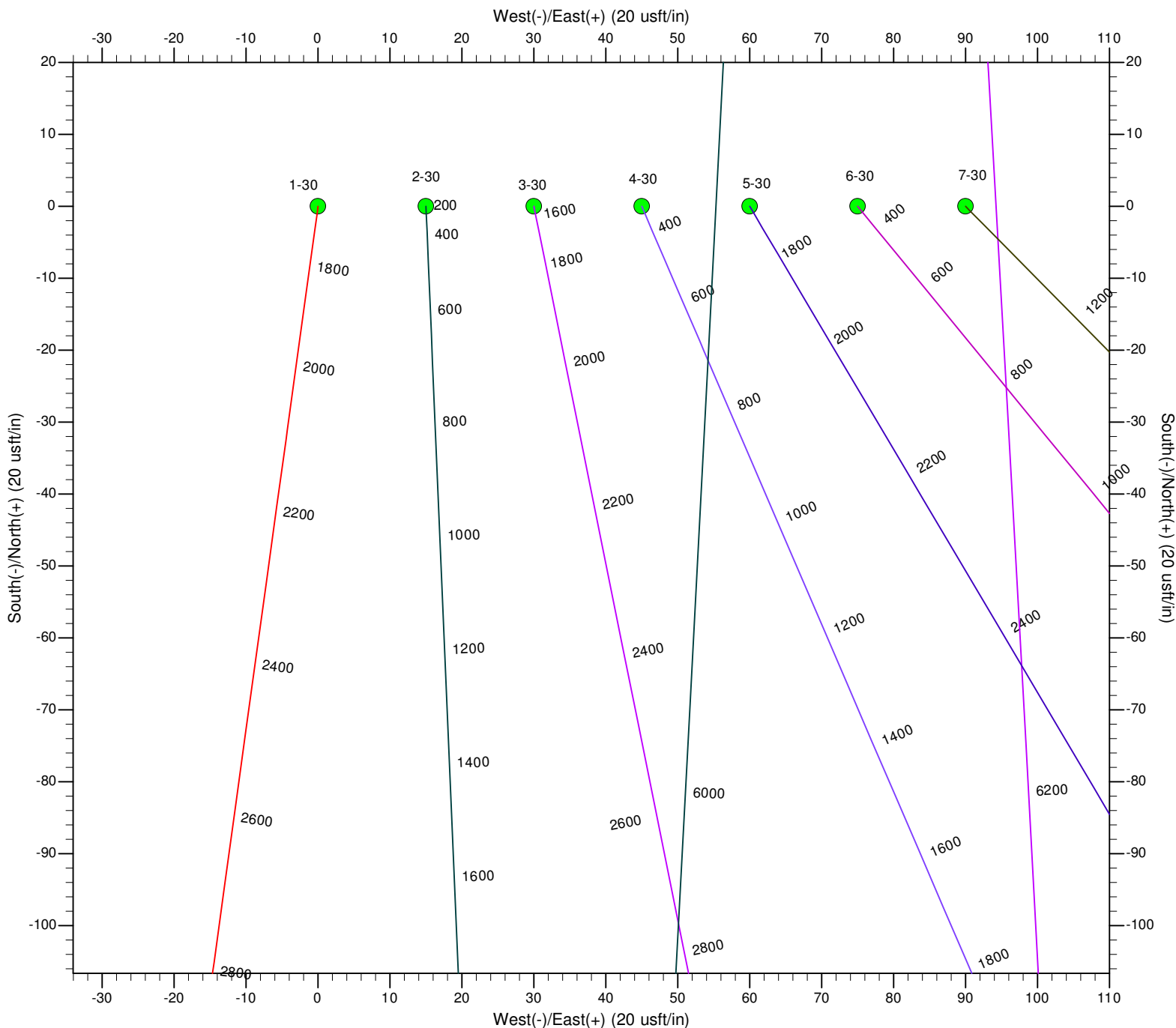


Azimuths to Grid North
True North: -0.95°
Magnetic North: 7.13°

Magnetic Field
Strength: 52894.3snT
Dip Angle: 67.28°
Date: 02/25/2015
Model: IGRF2015

SLOTS

Slot Name	+N/-S	+E/-W	Northing	Easting
1-30	0.00	0.00	1506771.07	3407796.03
2-30	0.00	15.00	1506771.07	3407811.03
3-30	0.00	30.00	1506771.07	3407826.03
4-30	0.00	45.00	1506771.07	3407841.03
5-30	0.00	60.00	1506771.07	3407856.03
6-30	0.00	75.00	1506771.07	3407871.03
7-30	0.00	90.00	1506771.07	3407886.03



DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
PBHL 1-30	6160.00	4606.18	-143.74	1511377.20	3407652.29	40° 43' 40.22 N	104° 1' 44.87 W	Point

Titan Directional Drilling, LLC

Anticollision Report

Company:	Carrizo Oil & Gas, Inc.	Local Co-ordinate Reference:	Well 1-30-9-59 - Slot 1-30
Project:	Niobrara CON'83	TVD Reference:	GL+KB @ 4934.00usft (Xtreme 19)
Reference Site:	Ptasnik 1-30-9-59 Pad	MD Reference:	GL+KB @ 4934.00usft (Xtreme 19)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	1-30-9-59	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	1-30-9-59 OH	Database:	EDM 5000.1 Single User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Reference	Plan #2		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	MD Interval 100.00usft	Error Model:	ISCWSA
Depth Range:	0.00 to 31,000.00usft	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 100.00 usft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma	Casing Method:	Not applied

Survey Tool Program	Date	02/02/15		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.00	10,940.75	Plan #2 (1-30-9-59 OH)	MWD	MWD - Standard

Summary						
Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Ptasnik 1-30-9-59 Pad						
2-30-9-59 - 2-30-9-59 OH - Plan #2	200.00	200.00	15.00	13.99	14.786	CC
2-30-9-59 - 2-30-9-59 OH - Plan #2	400.00	399.90	15.54	13.13	6.429	ES
2-30-9-59 - 2-30-9-59 OH - Plan #2	5,500.00	5,494.30	85.85	44.89	2.096	SF
3-30-9-59 - 3-30-9-59 OH - Plan #1	1,500.00	1,500.00	30.00	19.67	2.903	CC
3-30-9-59 - 3-30-9-59 OH - Plan #1	1,600.00	1,599.90	30.29	19.28	2.750	ES
3-30-9-59 - 3-30-9-59 OH - Plan #1	1,800.00	1,799.67	32.62	20.30	2.647	SF
4-30-9-59 - 4-30-9-59 OH - Plan #1	200.00	200.00	45.00	43.99	44.358	CC
4-30-9-59 - 4-30-9-59 OH - Plan #1	300.00	299.68	45.35	43.64	26.428	ES
4-30-9-59 - 4-30-9-59 OH - Plan #1	1,300.00	1,295.16	99.09	90.19	11.133	SF
5-30-9-59 - 5-30-9-59 OH - Plan #1	1,500.00	1,500.00	60.00	49.67	5.806	CC
5-30-9-59 - 5-30-9-59 OH - Plan #1	1,600.00	1,599.47	60.56	49.55	5.498	ES
5-30-9-59 - 5-30-9-59 OH - Plan #1	1,800.00	1,798.32	65.06	52.73	5.279	SF
6-30-9-59 - 6-30-9-59 OH - Plan #1	200.00	200.00	75.00	73.99	73.931	CC
6-30-9-59 - 6-30-9-59 OH - Plan #1	300.00	299.17	75.55	73.84	44.041	ES
6-30-9-59 - 6-30-9-59 OH - Plan #1	800.00	793.27	97.67	92.38	18.488	SF
7-30-9-59 - 7-30-9-59 OH - Plan #1	700.00	700.00	90.00	85.40	19.569	CC
7-30-9-59 - 7-30-9-59 OH - Plan #1	800.00	798.90	90.61	85.31	17.105	ES
7-30-9-59 - 7-30-9-59 OH - Plan #1	1,000.00	996.46	95.62	88.94	14.313	SF

Offset Design												Offset Site Error:		0.00 usft
Survey Program: 0-MWD												Offset Well Error:		0.00 usft
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			
(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(°)	+N/-S (usft)	+E/-W (usft)	(usft)	(usft)	(usft)			
0.00	0.00	0.00	0.00	0.00	0.00	90.00	0.00	15.00	15.00					
100.00	100.00	100.00	100.00	0.15	0.15	90.00	0.00	15.00	15.00	14.70	0.30	50.415		
200.00	200.00	200.00	200.00	0.51	0.51	90.00	0.00	15.00	15.00	13.99	1.01	14.786	CC	
300.00	300.00	299.98	299.97	0.87	0.85	93.32	-0.87	15.04	15.06	13.35	1.72	8.775		
400.00	400.00	399.90	399.86	1.22	1.19	102.95	-3.48	15.15	15.54	13.13	2.42	6.429	ES	
500.00	500.00	499.69	499.56	1.58	1.55	117.05	-7.83	15.33	17.22	14.09	3.13	5.503		
600.00	600.00	599.31	598.99	1.94	1.91	131.72	-13.90	15.58	20.91	17.06	3.85	5.435		
700.00	700.00	698.86	698.25	2.30	2.28	143.50	-21.49	15.90	26.80	22.23	4.57	5.869		
800.00	800.00	798.55	797.63	2.66	2.65	151.05	-29.35	16.23	33.62	28.34	5.28	6.365		
900.00	900.00	898.24	897.01	3.02	3.03	156.00	-37.20	16.56	40.83	34.83	6.00	6.805		

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

Titan Directional Drilling, LLC

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Reference Well:	1-30-9-59	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	1-30-9-59 OH	Database:	EDM 5000.1 Single User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design Ptasnik 1-30-9-59 Pad - 2-30-9-59 - 2-30-9-59 OH - Plan #2													Offset Site Error:	0.00 usft
Survey Program: 0-MWD													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis			Distance						Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
1,000.00	1,000.00	997.93	996.38	3.38	3.41	159.44	-45.05	16.89	48.25	41.53	6.72	7.183		
1,100.00	1,100.00	1,097.62	1,095.76	3.73	3.79	161.96	-52.90	17.23	55.80	48.36	7.43	7.505		
1,200.00	1,200.00	1,197.31	1,195.14	4.09	4.17	163.88	-60.75	17.56	63.42	55.27	8.15	7.781		
1,300.00	1,300.00	1,297.00	1,294.52	4.45	4.55	165.39	-68.60	17.89	71.11	62.24	8.87	8.017		
1,400.00	1,400.00	1,396.69	1,393.90	4.81	4.93	166.60	-76.46	18.22	78.83	69.24	9.59	8.222		
1,500.00	1,500.00	1,496.37	1,493.28	5.17	5.31	167.59	-84.31	18.55	86.58	76.28	10.31	8.401		
1,600.00	1,599.99	1,596.13	1,592.72	5.51	5.69	-19.56	-92.16	18.88	93.54	82.54	11.00	8.505		
1,700.00	1,699.96	1,695.98	1,692.26	5.83	6.08	-19.30	-100.03	19.21	98.86	87.17	11.69	8.458		
2,300.00	2,297.76	2,295.74	2,290.16	7.89	8.38	-24.38	-147.27	21.19	99.48	83.59	15.89	6.260		
2,400.00	2,397.19	2,395.69	2,389.80	8.25	8.77	-25.84	-155.14	21.53	97.42	80.82	16.61	5.866		
2,500.00	2,496.62	2,495.64	2,489.43	8.61	9.15	-27.36	-163.01	21.86	95.43	78.11	17.33	5.507		
2,600.00	2,596.05	2,595.59	2,589.07	8.98	9.54	-28.94	-170.88	22.19	93.52	75.46	18.06	5.179		
2,700.00	2,695.48	2,695.53	2,688.71	9.35	9.92	-30.59	-178.75	22.52	91.67	72.89	18.79	4.880		
2,800.00	2,794.91	2,795.48	2,788.34	9.73	10.31	-32.31	-186.63	22.85	89.91	70.38	19.52	4.605		
2,900.00	2,894.34	2,895.43	2,887.98	10.10	10.69	-34.09	-194.50	23.18	88.23	67.96	20.26	4.354		
3,000.00	2,993.77	2,995.38	2,987.62	10.48	11.08	-35.94	-202.37	23.51	86.64	65.62	21.01	4.123		
3,100.00	3,093.20	3,095.32	3,087.25	10.86	11.46	-37.86	-210.24	23.84	85.14	63.37	21.76	3.912		
3,200.00	3,192.63	3,195.27	3,186.89	11.24	11.85	-39.84	-218.11	24.17	83.74	61.22	22.52	3.718		
3,300.00	3,292.05	3,295.22	3,286.52	11.63	12.23	-41.89	-225.99	24.50	82.44	59.16	23.29	3.540		
3,400.00	3,391.48	3,395.17	3,386.16	12.01	12.62	-44.00	-233.86	24.84	81.25	57.20	24.06	3.378		
3,500.00	3,490.91	3,495.11	3,485.80	12.40	13.00	-46.18	-241.73	25.17	80.18	55.35	24.83	3.229		
3,600.00	3,590.34	3,595.06	3,585.43	12.79	13.39	-48.40	-249.60	25.50	79.23	53.61	25.62	3.093		
3,700.00	3,689.77	3,695.01	3,685.07	13.18	13.77	-50.68	-257.47	25.83	78.39	51.99	26.41	2.969		
3,800.00	3,789.20	3,794.96	3,784.71	13.57	14.16	-53.00	-265.35	26.16	77.69	50.49	27.20	2.856		
3,900.00	3,888.63	3,894.90	3,884.34	13.96	14.54	-55.36	-273.22	26.49	77.11	49.11	28.00	2.754		
4,000.00	3,988.06	3,994.85	3,983.98	14.35	14.93	-57.76	-281.09	26.82	76.67	47.86	28.81	2.661		
4,100.00	4,087.49	4,094.80	4,083.62	14.74	15.31	-60.17	-288.96	27.15	76.36	46.74	29.62	2.578		
4,200.00	4,186.92	4,194.75	4,183.25	15.13	15.70	-62.60	-296.83	27.48	76.19	45.76	30.43	2.504		
4,274.08	4,260.57	4,268.78	4,257.06	15.42	15.98	-64.41	-302.66	27.73	76.15	45.12	31.04	2.454		
4,300.00	4,286.34	4,294.69	4,282.89	15.53	16.08	-65.04	-304.71	27.82	76.16	44.91	31.25	2.437		
4,400.00	4,385.77	4,394.64	4,382.52	15.92	16.47	-67.48	-312.58	28.15	76.26	44.19	32.07	2.378		
4,500.00	4,485.20	4,494.59	4,482.16	16.32	16.85	-69.90	-320.45	28.48	76.50	43.62	32.89	2.326		
4,600.00	4,584.63	4,594.54	4,581.80	16.71	17.24	-72.30	-328.32	28.81	76.88	43.18	33.71	2.281		
4,700.00	4,684.06	4,694.48	4,681.43	17.11	17.62	-74.68	-336.19	29.14	77.39	42.87	34.52	2.242		
4,800.00	4,783.49	4,794.43	4,781.07	17.50	18.01	-77.02	-344.07	29.47	78.04	42.70	35.34	2.208		
4,900.00	4,882.92	4,894.38	4,880.71	17.90	18.39	-79.32	-351.94	29.80	78.81	42.65	36.16	2.180		
5,000.00	4,982.35	4,994.32	4,980.34	18.30	18.78	-81.57	-359.81	30.13	79.71	42.74	36.97	2.156		
5,100.00	5,081.78	5,094.27	5,079.98	18.69	19.16	-83.77	-367.68	30.46	80.72	42.95	37.78	2.137		
5,200.00	5,181.21	5,194.22	5,179.62	19.09	19.55	-85.91	-375.55	30.80	81.86	43.28	38.58	2.122		
5,300.00	5,280.64	5,294.17	5,279.25	19.49	19.93	-87.99	-383.43	31.13	83.10	43.72	39.38	2.110		
5,400.00	5,380.06	5,394.11	5,378.89	19.89	20.32	-90.01	-391.30	31.46	84.45	44.27	40.18	2.102		
5,500.00	5,479.49	5,494.30	5,478.83	20.29	20.70	-92.75	-398.01	31.85	85.85	44.89	40.96	2.096 SF		
5,600.00	5,579.10	5,592.43	5,576.59	20.67	20.98	-143.34	-391.07	32.89	88.42	46.82	41.59	2.126		
5,700.00	5,678.69	5,687.59	5,668.91	20.97	21.19	81.79	-368.54	34.65	94.87	52.95	41.92	2.263		

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

Titan Directional Drilling, LLC

Anticollision Report

Company:	Carrizo Oil & Gas, Inc.	Local Co-ordinate Reference:	Well 1-30-9-59 - Slot 1-30
Project:	Niobrara CON'83	TVD Reference:	GL+KB @ 4934.00usft (Xtreme 19)
Reference Site:	Ptasnik 1-30-9-59 Pad	MD Reference:	GL+KB @ 4934.00usft (Xtreme 19)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	1-30-9-59	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	1-30-9-59 OH	Database:	EDM 5000.1 Single User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design												Offset Site Error:	0.00 usft
Survey Program: 0-MWD												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Distance							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
0.00	0.00	0.00	0.00	0.00	0.00	90.00	0.00	30.00	30.00				
100.00	100.00	100.00	100.00	0.15	0.15	90.00	0.00	30.00	30.00	29.70	0.30	100.831	
200.00	200.00	200.00	200.00	0.51	0.51	90.00	0.00	30.00	30.00	28.99	1.01	29.572	
300.00	300.00	300.00	300.00	0.87	0.87	90.00	0.00	30.00	30.00	28.27	1.73	17.327	
400.00	400.00	400.00	400.00	1.22	1.22	90.00	0.00	30.00	30.00	27.55	2.45	12.253	
500.00	500.00	500.00	500.00	1.58	1.58	90.00	0.00	30.00	30.00	26.84	3.17	9.478	
600.00	600.00	600.00	600.00	1.94	1.94	90.00	0.00	30.00	30.00	26.12	3.88	7.728	
700.00	700.00	700.00	700.00	2.30	2.30	90.00	0.00	30.00	30.00	25.40	4.60	6.523	
800.00	800.00	800.00	800.00	2.66	2.66	90.00	0.00	30.00	30.00	24.68	5.32	5.643	
900.00	900.00	900.00	900.00	3.02	3.02	90.00	0.00	30.00	30.00	23.97	6.03	4.973	
1,000.00	1,000.00	1,000.00	1,000.00	3.38	3.38	90.00	0.00	30.00	30.00	23.25	6.75	4.444	
1,100.00	1,100.00	1,100.00	1,100.00	3.73	3.73	90.00	0.00	30.00	30.00	22.53	7.47	4.018	
1,200.00	1,200.00	1,200.00	1,200.00	4.09	4.09	90.00	0.00	30.00	30.00	21.82	8.18	3.666	
1,300.00	1,300.00	1,300.00	1,300.00	4.45	4.45	90.00	0.00	30.00	30.00	21.10	8.90	3.371	
1,400.00	1,400.00	1,400.00	1,400.00	4.81	4.81	90.00	0.00	30.00	30.00	20.38	9.62	3.119	
1,500.00	1,500.00	1,500.00	1,500.00	5.17	5.17	90.00	0.00	30.00	30.00	19.67	10.33	2.903 CC	
1,600.00	1,599.99	1,599.90	1,599.89	5.51	5.51	-97.84	-0.85	30.17	30.29	19.28	11.01	2.750 ES	
1,700.00	1,699.96	1,699.79	1,699.75	5.83	5.83	-97.89	-3.41	30.69	31.16	19.50	11.66	2.672	
1,800.00	1,799.86	1,799.67	1,799.53	6.16	6.16	-97.96	-7.68	31.55	32.62	20.30	12.32	2.647 SF	
1,900.00	1,899.68	1,899.53	1,899.21	6.50	6.50	-98.05	-13.65	32.75	34.65	21.67	12.99	2.668	
2,000.00	1,999.37	1,999.38	1,998.75	6.83	6.83	-98.14	-21.32	34.30	37.27	23.61	13.67	2.727	
2,100.00	2,098.90	2,099.20	2,098.11	7.18	7.18	-98.24	-30.69	36.18	40.47	26.11	14.35	2.819	
2,200.00	2,198.33	2,199.13	2,197.49	7.53	7.53	-98.57	-40.95	38.25	43.99	28.94	15.05	2.922	
2,300.00	2,297.76	2,299.07	2,296.88	7.89	7.88	-98.87	-51.22	40.32	47.52	31.75	15.77	3.014	
2,400.00	2,397.19	2,399.01	2,396.27	8.25	8.25	-99.13	-61.49	42.39	51.05	34.56	16.49	3.096	
2,500.00	2,496.62	2,498.95	2,495.65	8.61	8.61	-99.35	-71.76	44.46	54.57	37.36	17.21	3.171	
2,600.00	2,596.05	2,598.88	2,595.04	8.98	8.98	-99.55	-82.03	46.53	58.10	40.16	17.95	3.238	
2,700.00	2,695.48	2,698.82	2,694.43	9.35	9.35	-99.72	-92.30	48.60	61.63	42.95	18.69	3.298	
2,800.00	2,794.91	2,798.76	2,793.81	9.73	9.72	-99.88	-102.57	50.67	65.16	45.73	19.43	3.353	
2,900.00	2,894.34	2,898.70	2,893.20	10.10	10.10	-100.02	-112.84	52.73	68.70	48.51	20.18	3.404	
3,000.00	2,993.77	2,998.63	2,992.59	10.48	10.47	-100.15	-123.10	54.80	72.23	51.29	20.94	3.450	
3,100.00	3,093.20	3,098.57	3,091.97	10.86	10.85	-100.26	-133.37	56.87	75.76	54.06	21.70	3.492	
3,200.00	3,192.63	3,198.51	3,191.36	11.24	11.23	-100.36	-143.64	58.94	79.29	56.83	22.46	3.531	
3,300.00	3,292.05	3,298.45	3,290.75	11.63	11.62	-100.46	-153.91	61.01	82.82	59.60	23.22	3.567	
3,400.00	3,391.48	3,398.38	3,390.14	12.01	12.00	-100.55	-164.18	63.08	86.36	62.37	23.99	3.600	
3,500.00	3,490.91	3,498.32	3,489.52	12.40	12.39	-100.63	-174.45	65.15	89.89	65.13	24.76	3.630	
3,600.00	3,590.34	3,598.26	3,588.91	12.79	12.77	-100.70	-184.72	67.22	93.42	67.89	25.53	3.659	
3,700.00	3,689.77	3,698.20	3,688.30	13.18	13.16	-100.77	-194.98	69.29	96.96	70.65	26.31	3.686	

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

Titan Directional Drilling, LLC

Anticollision Report

Company:	Carrizo Oil & Gas, Inc.	Local Co-ordinate Reference:	Well 1-30-9-59 - Slot 1-30
Project:	Niobrara CON'83	TVD Reference:	GL+KB @ 4934.00usft (Xtreme 19)
Reference Site:	Ptasnik 1-30-9-59 Pad	MD Reference:	GL+KB @ 4934.00usft (Xtreme 19)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	1-30-9-59	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	1-30-9-59 OH	Database:	EDM 5000.1 Single User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design												Offset Site Error:	0.00 usft
Survey Program: 0-MWD												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
0.00	0.00	0.00	0.00	0.00	0.00	90.00	0.00	45.00	45.00				
100.00	100.00	100.00	100.00	0.15	0.15	90.00	0.00	45.00	45.00	44.70	0.30	151.246	
200.00	200.00	200.00	200.00	0.51	0.51	90.00	0.00	45.00	45.00	43.99	1.01	44.358 CC	
300.00	300.00	299.68	299.68	0.87	0.85	91.01	-0.80	45.34	45.35	43.64	1.72	26.428 ES	
400.00	400.00	399.30	399.26	1.22	1.19	93.93	-3.18	46.37	46.48	44.07	2.42	19.232	
500.00	500.00	498.80	498.67	1.58	1.55	98.47	-7.16	48.08	48.63	45.50	3.13	15.546	
600.00	600.00	598.12	597.80	1.94	1.91	104.13	-12.70	50.46	52.08	48.24	3.85	13.545	
700.00	700.00	697.30	696.67	2.30	2.27	110.30	-19.80	53.51	57.16	52.59	4.57	12.514	
800.00	800.00	796.94	795.96	2.66	2.65	115.83	-27.52	56.83	63.27	57.98	5.29	11.958	
900.00	900.00	896.58	895.25	3.02	3.03	120.36	-35.23	60.15	69.87	63.86	6.01	11.617	
1,000.00	1,000.00	996.23	994.54	3.38	3.41	124.09	-42.95	63.47	76.83	70.09	6.74	11.404	
1,100.00	1,100.00	1,095.87	1,093.83	3.73	3.79	127.18	-50.67	66.79	84.06	76.60	7.46	11.270	
1,200.00	1,200.00	1,195.52	1,193.12	4.09	4.18	129.79	-58.38	70.11	91.50	83.32	8.18	11.186	
1,300.00	1,300.00	1,295.16	1,292.41	4.45	4.56	131.99	-66.10	73.43	99.09	90.19	8.90	11.133 SF	

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

Titan Directional Drilling, LLC

Anticollision Report

Company:	Carrizo Oil & Gas, Inc.	Local Co-ordinate Reference:	Well 1-30-9-59 - Slot 1-30
Project:	Niobrara CON'83	TVD Reference:	GL+KB @ 4934.00usft (Xtreme 19)
Reference Site:	Ptasnik 1-30-9-59 Pad	MD Reference:	GL+KB @ 4934.00usft (Xtreme 19)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	1-30-9-59	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	1-30-9-59 OH	Database:	EDM 5000.1 Single User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design												Offset Site Error:	0.00 usft
Survey Program: 0-MWD												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Distance		Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)					
0.00	0.00	0.00	0.00	0.00	0.00	90.00	0.00	60.00	60.00				
100.00	100.00	100.00	100.00	0.15	0.15	90.00	0.00	60.00	60.00	59.70	0.30	201.661	
200.00	200.00	200.00	200.00	0.51	0.51	90.00	0.00	60.00	60.00	58.99	1.01	59.145	
300.00	300.00	300.00	300.00	0.87	0.87	90.00	0.00	60.00	60.00	58.27	1.73	34.654	
400.00	400.00	400.00	400.00	1.22	1.22	90.00	0.00	60.00	60.00	57.55	2.45	24.506	
500.00	500.00	500.00	500.00	1.58	1.58	90.00	0.00	60.00	60.00	56.84	3.17	18.956	
600.00	600.00	600.00	600.00	1.94	1.94	90.00	0.00	60.00	60.00	56.12	3.88	15.455	
700.00	700.00	700.00	700.00	2.30	2.30	90.00	0.00	60.00	60.00	55.40	4.60	13.046	
800.00	800.00	800.00	800.00	2.66	2.66	90.00	0.00	60.00	60.00	54.68	5.32	11.287	
900.00	900.00	900.00	900.00	3.02	3.02	90.00	0.00	60.00	60.00	53.97	6.03	9.945	
1,000.00	1,000.00	1,000.00	1,000.00	3.38	3.38	90.00	0.00	60.00	60.00	53.25	6.75	8.889	
1,100.00	1,100.00	1,100.00	1,100.00	3.73	3.73	90.00	0.00	60.00	60.00	52.53	7.47	8.035	
1,200.00	1,200.00	1,200.00	1,200.00	4.09	4.09	90.00	0.00	60.00	60.00	51.82	8.18	7.332	
1,300.00	1,300.00	1,300.00	1,300.00	4.45	4.45	90.00	0.00	60.00	60.00	51.10	8.90	6.741	
1,400.00	1,400.00	1,400.00	1,400.00	4.81	4.81	90.00	0.00	60.00	60.00	50.38	9.62	6.239	
1,500.00	1,500.00	1,500.00	1,500.00	5.17	5.17	90.00	0.00	60.00	60.00	49.67	10.33	5.806 CC	
1,600.00	1,599.99	1,599.47	1,599.46	5.51	5.51	-97.93	-0.74	60.44	60.56	49.55	11.01	5.498 ES	
1,700.00	1,699.96	1,698.91	1,698.87	5.83	5.83	-98.23	-2.97	61.76	62.25	50.58	11.67	5.336	
1,800.00	1,799.86	1,798.32	1,798.19	6.16	6.16	-98.70	-6.68	63.96	65.06	52.73	12.32	5.279 SF	
1,900.00	1,899.68	1,897.67	1,897.35	6.50	6.50	-99.29	-11.87	67.03	68.99	56.00	12.99	5.311	
2,000.00	1,999.37	1,996.94	1,996.32	6.83	6.84	-99.96	-18.53	70.97	74.06	60.40	13.66	5.420	
2,100.00	2,098.90	2,096.12	2,095.04	7.18	7.18	-100.65	-26.66	75.78	80.27	65.92	14.35	5.594	
2,200.00	2,198.33	2,195.19	2,193.49	7.53	7.53	-100.97	-36.25	81.45	87.48	72.43	15.05	5.814	
2,300.00	2,297.76	2,294.58	2,292.07	7.89	7.89	-100.50	-47.09	87.87	95.36	79.60	15.76	6.051	

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

Titan Directional Drilling, LLC

Anticollision Report

Company:	Carrizo Oil & Gas, Inc.	Local Co-ordinate Reference:	Well 1-30-9-59 - Slot 1-30
Project:	Niobrara CON'83	TVD Reference:	GL+KB @ 4934.00usft (Xtreme 19)
Reference Site:	Ptasnik 1-30-9-59 Pad	MD Reference:	GL+KB @ 4934.00usft (Xtreme 19)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	1-30-9-59	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	1-30-9-59 OH	Database:	EDM 5000.1 Single User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design Ptasnik 1-30-9-59 Pad - 6-30-9-59 - 6-30-9-59 OH - Plan #1												Offset Site Error:	0.00 usft
Survey Program: 0-MWD												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
0.00	0.00	0.00	0.00	0.00	0.00	90.00	0.00	75.00	75.00				
100.00	100.00	100.00	100.00	0.15	0.15	90.00	0.00	75.00	75.00	74.70	0.30	252.077	
200.00	200.00	200.00	200.00	0.51	0.51	90.00	0.00	75.00	75.00	73.99	1.01	73.931 CC	
300.00	300.00	299.17	299.16	0.87	0.85	90.50	-0.66	75.55	75.55	73.84	1.72	44.041 ES	
400.00	400.00	398.27	398.23	1.22	1.19	91.97	-2.65	77.18	77.24	74.83	2.42	31.969	
500.00	500.00	497.26	497.13	1.58	1.54	94.27	-5.96	79.89	80.16	77.04	3.13	25.649	
600.00	600.00	596.07	595.76	1.94	1.90	97.21	-10.58	83.68	84.45	80.61	3.84	21.991	
700.00	700.00	694.65	694.04	2.30	2.27	100.56	-16.50	88.53	90.26	85.70	4.56	19.796	
800.00	800.00	793.27	792.21	2.66	2.64	104.08	-23.69	94.43	97.67	92.38	5.28	18.488 SF	

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

Titan Directional Drilling, LLC

Anticollision Report

Company:	Carrizo Oil & Gas, Inc.	Local Co-ordinate Reference:	Well 1-30-9-59 - Slot 1-30
Project:	Niobrara CON'83	TVD Reference:	GL+KB @ 4934.00usft (Xtreme 19)
Reference Site:	Ptasnik 1-30-9-59 Pad	MD Reference:	GL+KB @ 4934.00usft (Xtreme 19)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	1-30-9-59	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	1-30-9-59 OH	Database:	EDM 5000.1 Single User Db
Reference Design:	Plan #2	Offset TVD Reference:	Offset Datum

Offset Design Ptasnik 1-30-9-59 Pad - 7-30-9-59 - 7-30-9-59 OH - Plan #1												Offset Site Error:	0.00 usft
Survey Program: 0-MWD												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
0.00	0.00	0.00	0.00	0.00	0.00	90.00	0.00	90.00	90.00				
100.00	100.00	100.00	100.00	0.15	0.15	90.00	0.00	90.00	90.00	89.70	0.30	302.492	
200.00	200.00	200.00	200.00	0.51	0.51	90.00	0.00	90.00	90.00	88.99	1.01	88.717	
300.00	300.00	300.00	300.00	0.87	0.87	90.00	0.00	90.00	90.00	88.27	1.73	51.981	
400.00	400.00	400.00	400.00	1.22	1.22	90.00	0.00	90.00	90.00	87.55	2.45	36.760	
500.00	500.00	500.00	500.00	1.58	1.58	90.00	0.00	90.00	90.00	86.84	3.17	28.434	
600.00	600.00	600.00	600.00	1.94	1.94	90.00	0.00	90.00	90.00	86.12	3.88	23.183	
700.00	700.00	700.00	700.00	2.30	2.30	90.00	0.00	90.00	90.00	85.40	4.60	19.569 CC	
800.00	800.00	798.90	798.89	2.66	2.64	90.38	-0.61	90.60	90.61	85.31	5.30	17.105 ES	
900.00	900.00	897.74	897.70	3.02	2.97	91.50	-2.43	92.40	92.46	86.47	5.99	15.445	
1,000.00	1,000.00	996.46	996.33	3.38	3.31	93.27	-5.45	95.39	95.62	88.94	6.68	14.313 SF	