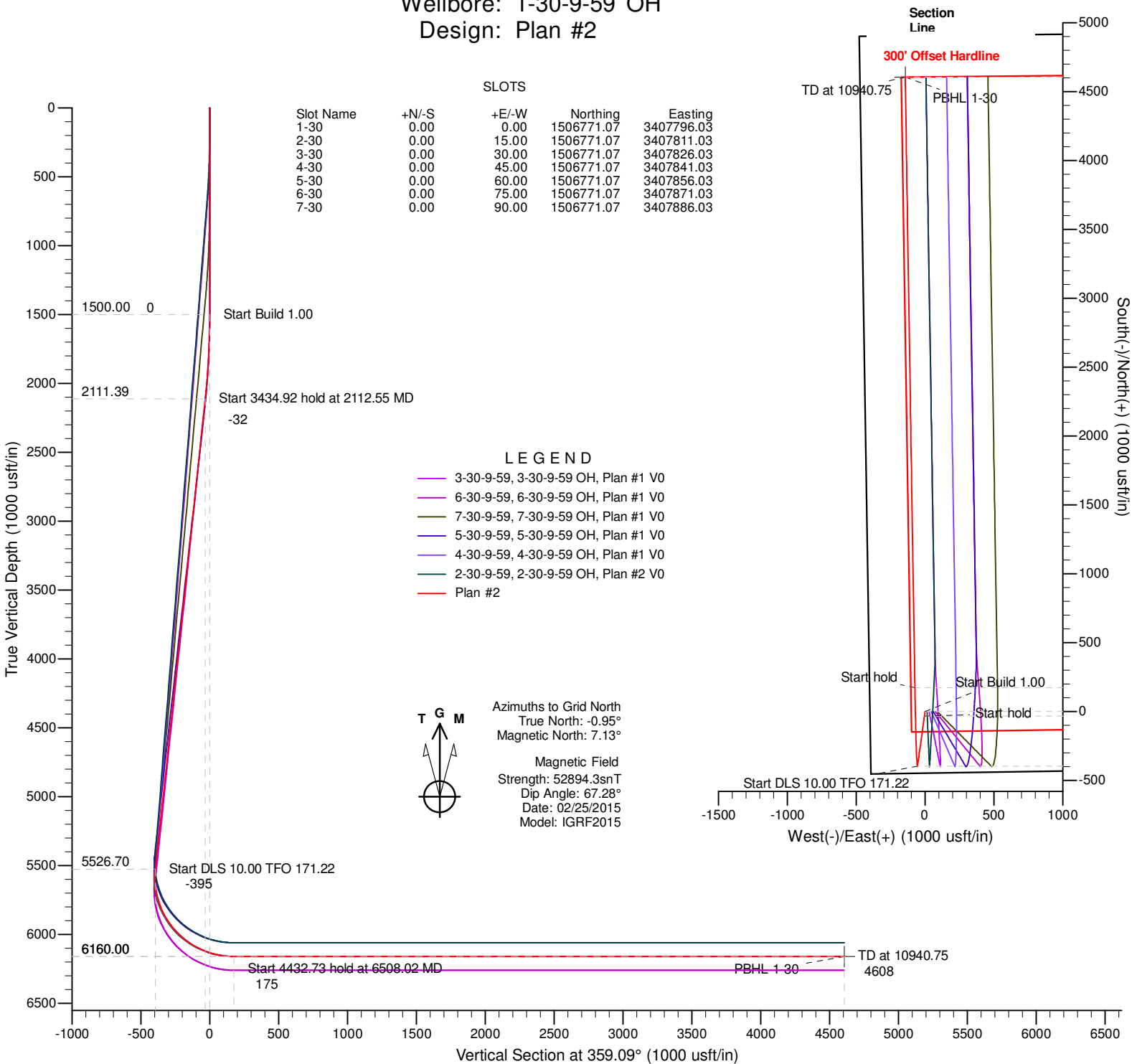




Project: Niobrara CON'83
County: Weld County, CO
Site: Ptasnik 1-30-9-59 Pad
Well: 1-30-9-59
Wellbore: 1-30-9-59 OH
Design: Plan #2



TITAN
Directional Drilling



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

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	1500.00	0.00	0.00	1500.00	0.00	0.00	0.00	0.00	0.00	
3	2112.55	6.13	187.83	2111.39	-32.41	-4.45	1.00	187.83	-32.33	
4	5547.48	6.13	187.83	5526.70	-395.53	-54.36	0.00	0.00	-394.61	
5	6508.02	90.00	359.09	6160.00	174.00	-73.68	10.00	171.22	175.15	
6	10940.75	90.00	359.09	6160.00	4606.18	-143.74	0.00	0.00	4607.88	PBHL 1-30

Titan Directional Drilling, LLC

Planning Report

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

Project	Niobrara CON'83, Weld County, CO		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		Using geodetic scale factor

Site	Ptasnik 1-30-9-59 Pad,		
Site Position:		Northing:	1,506,771.07 usft
From:	Map	Easting:	3,407,796.03 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in
		Latitude:	40° 42' 54.69 N
		Longitude:	104° 1' 44.00 W
		Grid Convergence:	0.95 °

Well	1-30-9-59 - Slot 1-30		
Well Position	+N/-S	0.00 usft	Northing: 1,506,771.07 usft
	+E/-W	0.00 usft	Easting: 3,407,796.03 usft
Position Uncertainty	0.00 usft	Wellhead Elevation:	0.00 usft
		Latitude:	40° 42' 54.69 N
		Longitude:	104° 1' 44.00 W
		Ground Level:	4,917.00 usft

Wellbore	1-30-9-59 OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	02/25/15	8.08	67.28	52,894

Design	Plan #2			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	359.09

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,112.55	6.13	187.83	2,111.39	-32.41	-4.45	1.00	1.00	0.00	187.83	
5,547.48	6.13	187.83	5,526.70	-395.53	-54.36	0.00	0.00	0.00	0.00	
6,508.02	90.00	359.09	6,160.00	174.00	-73.68	10.00	8.73	17.83	171.22	
10,940.75	90.00	359.09	6,160.00	4,606.18	-143.74	0.00	0.00	0.00	0.00	PBHL 1-30

Titan Directional Drilling, LLC

Planning Report

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

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00
1,600.00	1.00	187.83	1,599.99	-0.86	-0.12	-0.86	1.00	1.00	0.00
1,700.00	2.00	187.83	1,699.96	-3.46	-0.48	-3.45	1.00	1.00	0.00
1,800.00	3.00	187.83	1,799.86	-7.78	-1.07	-7.76	1.00	1.00	0.00
1,900.00	4.00	187.83	1,899.68	-13.83	-1.90	-13.80	1.00	1.00	0.00
2,000.00	5.00	187.83	1,999.37	-21.60	-2.97	-21.55	1.00	1.00	0.00
2,100.00	6.00	187.83	2,098.90	-31.09	-4.27	-31.02	1.00	1.00	0.00
2,112.55	6.13	187.83	2,111.39	-32.41	-4.45	-32.33	1.00	1.00	0.00
2,200.00	6.13	187.83	2,198.33	-41.65	-5.72	-41.56	0.00	0.00	0.00
2,300.00	6.13	187.83	2,297.76	-52.22	-7.18	-52.10	0.00	0.00	0.00
2,400.00	6.13	187.83	2,397.19	-62.80	-8.63	-62.65	0.00	0.00	0.00
2,500.00	6.13	187.83	2,496.62	-73.37	-10.08	-73.20	0.00	0.00	0.00
2,600.00	6.13	187.83	2,596.05	-83.94	-11.54	-83.74	0.00	0.00	0.00
2,700.00	6.13	187.83	2,695.48	-94.51	-12.99	-94.29	0.00	0.00	0.00
2,800.00	6.13	187.83	2,794.91	-105.08	-14.44	-104.84	0.00	0.00	0.00
2,900.00	6.13	187.83	2,894.34	-115.65	-15.89	-115.39	0.00	0.00	0.00
3,000.00	6.13	187.83	2,993.77	-126.22	-17.35	-125.93	0.00	0.00	0.00
3,100.00	6.13	187.83	3,093.20	-136.80	-18.80	-136.48	0.00	0.00	0.00
3,200.00	6.13	187.83	3,192.63	-147.37	-20.25	-147.03	0.00	0.00	0.00
3,300.00	6.13	187.83	3,292.05	-157.94	-21.71	-157.57	0.00	0.00	0.00
3,400.00	6.13	187.83	3,391.48	-168.51	-23.16	-168.12	0.00	0.00	0.00
3,500.00	6.13	187.83	3,490.91	-179.08	-24.61	-178.67	0.00	0.00	0.00
3,600.00	6.13	187.83	3,590.34	-189.65	-26.07	-189.21	0.00	0.00	0.00
3,700.00	6.13	187.83	3,689.77	-200.22	-27.52	-199.76	0.00	0.00	0.00
3,800.00	6.13	187.83	3,789.20	-210.79	-28.97	-210.31	0.00	0.00	0.00
3,900.00	6.13	187.83	3,888.63	-221.37	-30.42	-220.85	0.00	0.00	0.00
4,000.00	6.13	187.83	3,988.06	-231.94	-31.88	-231.40	0.00	0.00	0.00
4,100.00	6.13	187.83	4,087.49	-242.51	-33.33	-241.95	0.00	0.00	0.00
4,200.00	6.13	187.83	4,186.92	-253.08	-34.78	-252.50	0.00	0.00	0.00
4,300.00	6.13	187.83	4,286.34	-263.65	-36.24	-263.04	0.00	0.00	0.00
4,400.00	6.13	187.83	4,385.77	-274.22	-37.69	-273.59	0.00	0.00	0.00
4,500.00	6.13	187.83	4,485.20	-284.79	-39.14	-284.14	0.00	0.00	0.00
4,600.00	6.13	187.83	4,584.63	-295.37	-40.59	-294.68	0.00	0.00	0.00
4,700.00	6.13	187.83	4,684.06	-305.94	-42.05	-305.23	0.00	0.00	0.00
4,800.00	6.13	187.83	4,783.49	-316.51	-43.50	-315.78	0.00	0.00	0.00
4,900.00	6.13	187.83	4,882.92	-327.08	-44.95	-326.32	0.00	0.00	0.00
5,000.00	6.13	187.83	4,982.35	-337.65	-46.41	-336.87	0.00	0.00	0.00
5,100.00	6.13	187.83	5,081.78	-348.22	-47.86	-347.42	0.00	0.00	0.00
5,200.00	6.13	187.83	5,181.21	-358.79	-49.31	-357.97	0.00	0.00	0.00

Titan Directional Drilling, LLC

Planning Report

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

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
5,300.00	6.13	187.83	5,280.64	-369.37	-50.76	-368.51	0.00	0.00	0.00
5,400.00	6.13	187.83	5,380.06	-379.94	-52.22	-379.06	0.00	0.00	0.00
5,500.00	6.13	187.83	5,479.49	-390.51	-53.67	-389.61	0.00	0.00	0.00
5,547.48	6.13	187.83	5,526.70	-395.53	-54.36	-394.61	0.00	0.00	0.00
5,600.00	1.23	228.43	5,579.10	-398.68	-55.16	-397.75	10.00	-9.32	77.30
5,700.00	9.25	353.35	5,678.69	-391.39	-56.90	-390.44	10.00	8.01	124.92
5,800.00	19.22	356.42	5,775.50	-366.93	-58.87	-365.94	10.00	9.97	3.07
5,900.00	29.21	357.42	5,866.59	-326.02	-61.00	-325.01	10.00	9.99	1.01
6,000.00	39.21	357.95	5,949.18	-269.91	-63.23	-268.87	10.00	10.00	0.53
6,100.00	49.20	358.29	6,020.78	-200.31	-65.50	-199.25	10.00	10.00	0.34
6,200.00	59.20	358.54	6,079.19	-119.34	-67.73	-118.24	10.00	10.00	0.25
6,300.00	69.20	358.74	6,122.66	-29.44	-69.86	-28.33	10.00	10.00	0.20
6,400.00	79.20	358.92	6,149.85	66.64	-71.82	67.77	10.00	10.00	0.18
6,500.00	89.20	359.08	6,159.94	165.99	-73.55	167.13	10.00	10.00	0.16
6,508.02	90.00	359.09	6,160.00	174.00	-73.68	175.15	10.00	10.00	0.16
6,600.00	90.00	359.09	6,160.00	265.97	-75.13	267.13	0.00	0.00	0.00
6,700.00	90.00	359.09	6,160.00	365.96	-76.71	367.13	0.00	0.00	0.00
6,800.00	90.00	359.09	6,160.00	465.95	-78.29	467.13	0.00	0.00	0.00
6,900.00	90.00	359.09	6,160.00	565.93	-79.87	567.13	0.00	0.00	0.00
7,000.00	90.00	359.09	6,160.00	665.92	-81.46	667.13	0.00	0.00	0.00
7,100.00	90.00	359.09	6,160.00	765.91	-83.04	767.13	0.00	0.00	0.00
7,200.00	90.00	359.09	6,160.00	865.90	-84.62	867.13	0.00	0.00	0.00
7,300.00	90.00	359.09	6,160.00	965.88	-86.20	967.13	0.00	0.00	0.00
7,400.00	90.00	359.09	6,160.00	1,065.87	-87.78	1,067.13	0.00	0.00	0.00
7,500.00	90.00	359.09	6,160.00	1,165.86	-89.36	1,167.13	0.00	0.00	0.00
7,600.00	90.00	359.09	6,160.00	1,265.85	-90.94	1,267.13	0.00	0.00	0.00
7,700.00	90.00	359.09	6,160.00	1,365.83	-92.52	1,367.13	0.00	0.00	0.00
7,800.00	90.00	359.09	6,160.00	1,465.82	-94.10	1,467.13	0.00	0.00	0.00
7,900.00	90.00	359.09	6,160.00	1,565.81	-95.68	1,567.13	0.00	0.00	0.00
8,000.00	90.00	359.09	6,160.00	1,665.80	-97.26	1,667.13	0.00	0.00	0.00
8,100.00	90.00	359.09	6,160.00	1,765.78	-98.84	1,767.13	0.00	0.00	0.00
8,200.00	90.00	359.09	6,160.00	1,865.77	-100.42	1,867.13	0.00	0.00	0.00
8,300.00	90.00	359.09	6,160.00	1,965.76	-102.00	1,967.13	0.00	0.00	0.00
8,400.00	90.00	359.09	6,160.00	2,065.75	-103.58	2,067.13	0.00	0.00	0.00
8,500.00	90.00	359.09	6,160.00	2,165.73	-105.16	2,167.13	0.00	0.00	0.00
8,600.00	90.00	359.09	6,160.00	2,265.72	-106.74	2,267.13	0.00	0.00	0.00
8,700.00	90.00	359.09	6,160.00	2,365.71	-108.32	2,367.13	0.00	0.00	0.00
8,800.00	90.00	359.09	6,160.00	2,465.70	-109.90	2,467.13	0.00	0.00	0.00
8,900.00	90.00	359.09	6,160.00	2,565.69	-111.48	2,567.13	0.00	0.00	0.00
9,000.00	90.00	359.09	6,160.00	2,665.67	-113.06	2,667.13	0.00	0.00	0.00
9,100.00	90.00	359.09	6,160.00	2,765.66	-114.64	2,767.13	0.00	0.00	0.00
9,200.00	90.00	359.09	6,160.00	2,865.65	-116.22	2,867.13	0.00	0.00	0.00
9,300.00	90.00	359.09	6,160.00	2,965.64	-117.81	2,967.13	0.00	0.00	0.00
9,400.00	90.00	359.09	6,160.00	3,065.62	-119.39	3,067.13	0.00	0.00	0.00
9,500.00	90.00	359.09	6,160.00	3,165.61	-120.97	3,167.13	0.00	0.00	0.00
9,600.00	90.00	359.09	6,160.00	3,265.60	-122.55	3,267.13	0.00	0.00	0.00
9,700.00	90.00	359.09	6,160.00	3,365.59	-124.13	3,367.13	0.00	0.00	0.00
9,800.00	90.00	359.09	6,160.00	3,465.57	-125.71	3,467.13	0.00	0.00	0.00
9,900.00	90.00	359.09	6,160.00	3,565.56	-127.29	3,567.13	0.00	0.00	0.00
10,000.00	90.00	359.09	6,160.00	3,665.55	-128.87	3,667.13	0.00	0.00	0.00
10,100.00	90.00	359.09	6,160.00	3,765.54	-130.45	3,767.13	0.00	0.00	0.00
10,200.00	90.00	359.09	6,160.00	3,865.52	-132.03	3,867.13	0.00	0.00	0.00
10,300.00	90.00	359.09	6,160.00	3,965.51	-133.61	3,967.13	0.00	0.00	0.00
10,400.00	90.00	359.09	6,160.00	4,065.50	-135.19	4,067.13	0.00	0.00	0.00

Titan Directional Drilling, LLC

Planning Report

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

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	
10,500.00	90.00	359.09	6,160.00	4,165.49	-136.77	4,167.13	0.00	0.00	0.00	
10,600.00	90.00	359.09	6,160.00	4,265.47	-138.35	4,267.13	0.00	0.00	0.00	
10,700.00	90.00	359.09	6,160.00	4,365.46	-139.93	4,367.13	0.00	0.00	0.00	
10,800.00	90.00	359.09	6,160.00	4,465.45	-141.51	4,467.13	0.00	0.00	0.00	
10,900.00	90.00	359.09	6,160.00	4,565.44	-143.09	4,567.13	0.00	0.00	0.00	
10,940.75	90.00	359.09	6,160.00	4,606.18	-143.74	4,607.88	0.00	0.00	0.00	

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude	
- hit/miss target										
- Shape										
PBHL 1-30	0.00	0.00	6,160.00	4,606.18	-143.74	1,511,377.20	3,407,652.29	40° 43' 40.22 N	104° 1' 44.87 W	
- plan misses target center by 0.01usft at 10940.75usft MD (6160.00 TVD, 4606.18 N, -143.74 E)										
- Point										