



Project: Niobrara CON'83  
County: Weld  
Site: Bringelson 20-9-58 Pad  
Well: 14-20-9-58  
Wellbore: 14-20-9-58 OH  
Design: Plan #2



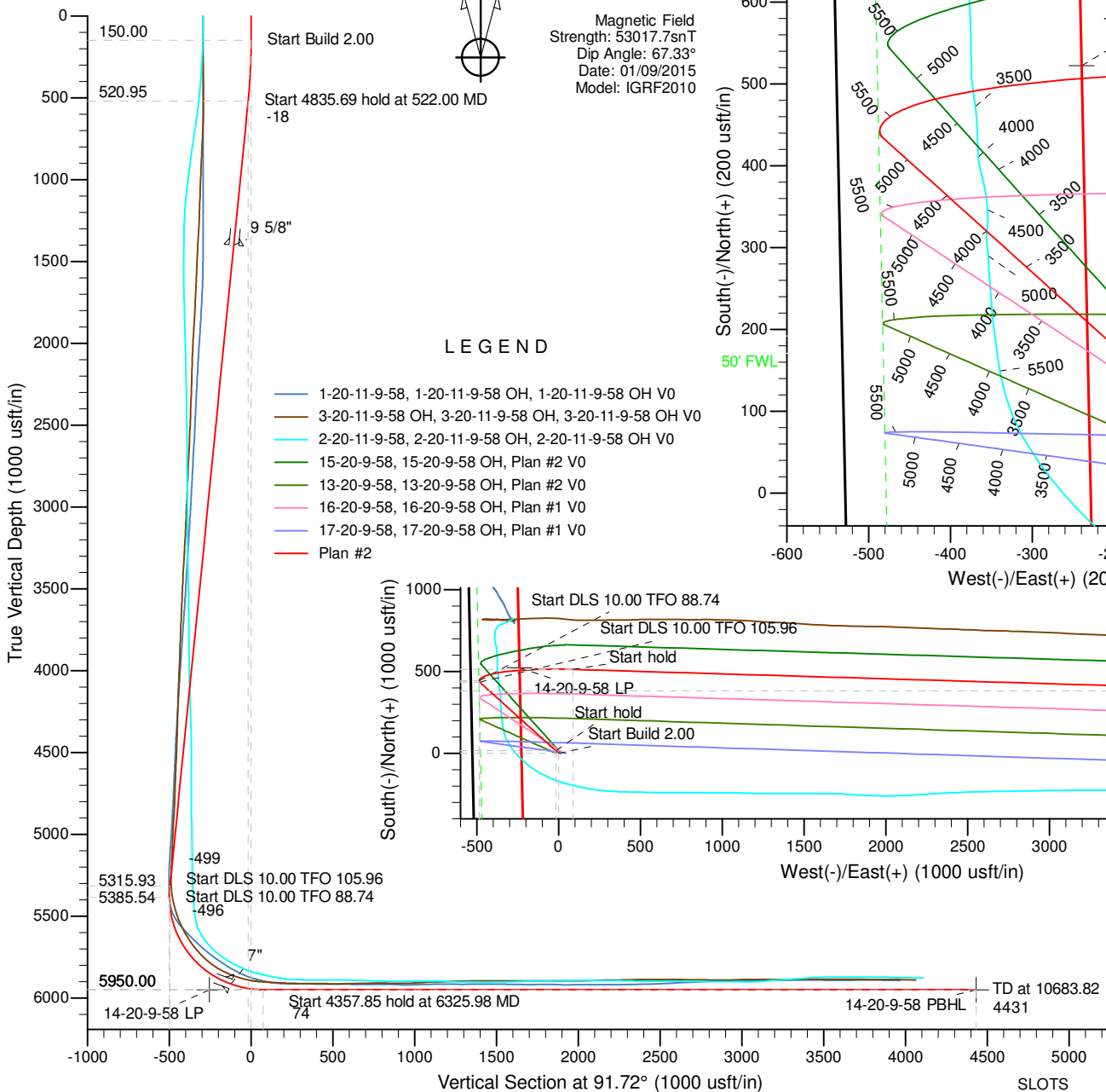
#### CASING DETAILS

TVD	MD	Name	Size
1400.00	1408.51	9 5/8"	9.62
5915.01	6123.54	7"	7.00



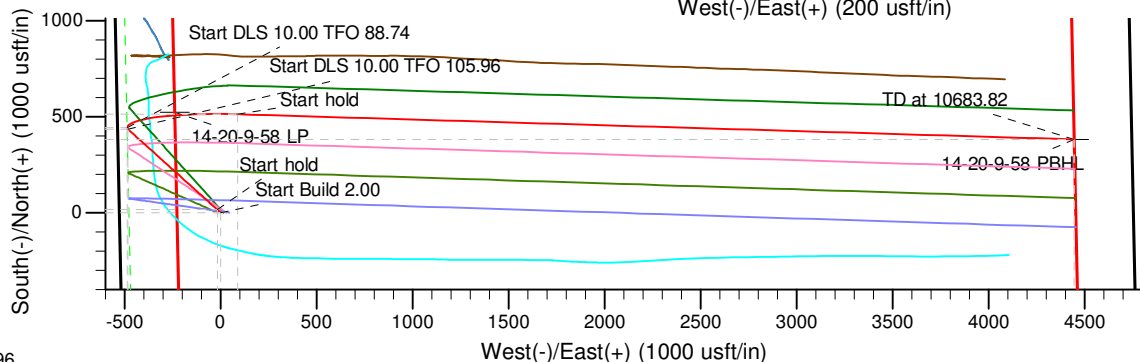
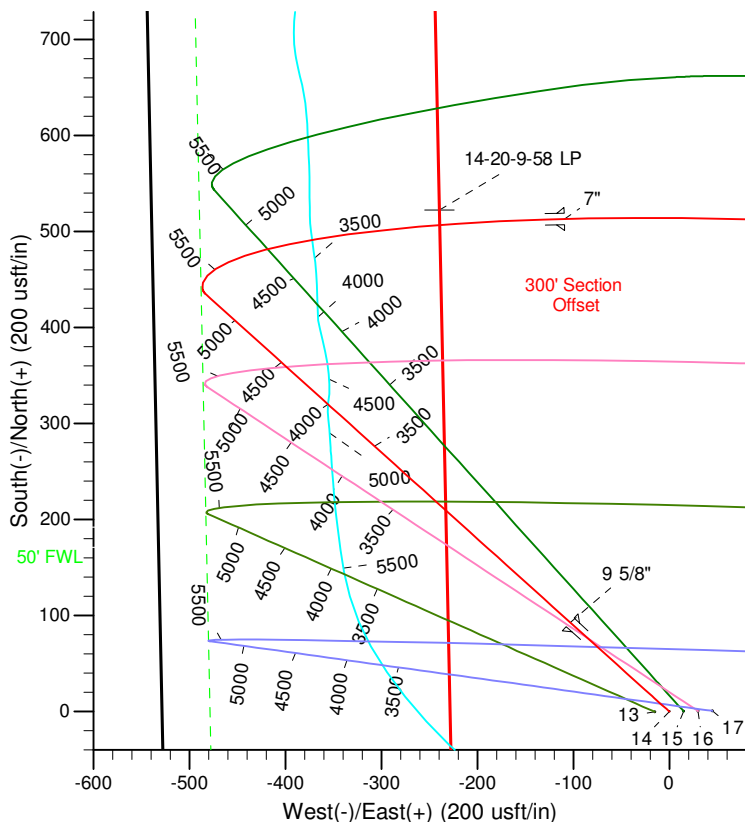
Azimuths to Grid North  
True North: -1.04°  
Magnetic North: 6.89°

Magnetic Field  
Strength: 53017.7snT  
Dip Angle: 67.33°  
Date: 01/09/2015  
Model: IGRF2010



#### LEGEND

- 1-20-11-9-58, 1-20-11-9-58 OH, 1-20-11-9-58 OH V0
- 3-20-11-9-58 OH, 3-20-11-9-58 OH, 3-20-11-9-58 OH V0
- 2-20-11-9-58, 2-20-11-9-58 OH, 2-20-11-9-58 OH V0
- 15-20-9-58, 15-20-9-58 OH, Plan #2 V0
- 13-20-9-58, 13-20-9-58 OH, Plan #2 V0
- 16-20-9-58, 16-20-9-58 OH, Plan #1 V0
- 17-20-9-58, 17-20-9-58 OH, Plan #1 V0
- Plan #2



Slot Name	+N/-S	+E/-W	Northing	Easting
13	-0.26	-15.00	1515767.89	3444534.59
14	0.00	0.00	1515768.15	3444549.59
15	0.27	14.99	1515768.42	3444564.58
16	0.53	29.99	1515768.68	3444579.58
17	0.79	44.99	1515768.94	3444594.58

#### DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
14-20-9-58 LP	5950.00	522.46	-239.48	1516290.61	3444310.11	40° 44' 22.49 N	103° 53' 47.66 W	Point
14-20-9-58 PBHL	5950.00	381.65	4444.81	1516149.80	3448994.37	40° 44' 20.25 N	103° 52' 46.85 W	Point

#### SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	150.00	0.00	0.00	150.00	0.00	0.00	0.00	0.00	0.00	
3	522.00	7.44	312.00	520.95	16.14	-17.92	2.00	312.00	-18.40	
4	5357.69	7.44	312.00	5315.93	435.12	-483.25	0.00	0.00	-496.10	
5	5427.91	8.70	3.00	5385.54	443.48	-486.36	10.00	105.96	-499.45	
6	6325.98	90.00	91.72	5950.00	512.58	88.93	10.00	88.74	73.51	
7	10683.82	90.00	91.72	5950.00	381.65	4444.81	0.00	0.00	4431.35	14-20-9-58 PBHL

# Titan Directional Drilling, LLC

## Planning Report

<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well 14-20-9-58 - Slot 14
<b>Company:</b>	Carrizo Oil & Gas, Inc.	<b>TVD Reference:</b>	WELL @ 4889.00usft (Original Well Elev)
<b>Project:</b>	Niobrara CON'83	<b>MD Reference:</b>	WELL @ 4889.00usft (Original Well Elev)
<b>Site:</b>	Bringelson 20-9-58 Pad	<b>North Reference:</b>	Grid
<b>Well:</b>	14-20-9-58	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	14-20-9-58 OH		
<b>Design:</b>	Plan #2		

<b>Project</b>	Niobrara CON'83,		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		
<b>Map Zone:</b>	Colorado Northern Zone		Using geodetic scale factor

<b>Site</b>	Bringelson 20-9-58 Pad, Centered on 17-20-9-58		
<b>Site Position:</b>	<b>Northing:</b>	1,515,768.94 usft	<b>Latitude:</b> 40° 44' 17.28 N
<b>From:</b> Map	<b>Easting:</b>	3,444,594.58 usft	<b>Longitude:</b> 103° 53' 44.09 W
<b>Position Uncertainty:</b> 0.00 usft	<b>Slot Radius:</b> 13.20 in		<b>Grid Convergence:</b> 1.04 °

<b>Well</b>	14-20-9-58 - Slot 14		
<b>Well Position</b>	<b>+N/-S</b>	-0.79 usft	<b>Northing:</b> 1,515,768.15 usft
	<b>+E/-W</b>	-44.99 usft	<b>Easting:</b> 3,444,549.59 usft
<b>Position Uncertainty</b> 0.00 usft			<b>Latitude:</b> 40° 44' 17.28 N
			<b>Longitude:</b> 103° 53' 44.67 W
		<b>Wellhead Elevation:</b> 4,889.00 usft	<b>Ground Level:</b> 4,872.00 usft

<b>Wellbore</b>	14-20-9-58 OH				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2010	01/09/15	7.93	67.33	53,018

<b>Design</b>	Plan #2			
<b>Audit Notes:</b>				
<b>Version:</b>	<b>Phase:</b>	PROTOTYPE	<b>Tie On Depth:</b>	0.00
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>
	0.00	0.00	0.00	91.72

<b>Plan Sections</b>										
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	
150.00	0.00	0.00	150.00	0.00	0.00	0.00	0.00	0.00	0.00	
522.00	7.44	312.00	520.95	16.14	-17.92	2.00	2.00	0.00	312.00	
5,357.69	7.44	312.00	5,315.93	435.12	-483.25	0.00	0.00	0.00	0.00	
5,427.91	8.70	3.00	5,385.54	443.48	-486.36	10.00	1.79	72.62	105.96	
6,325.98	90.00	91.72	5,950.00	512.58	88.93	10.00	9.05	9.88	88.74	
10,683.82	90.00	91.72	5,950.00	381.65	4,444.81	0.00	0.00	0.00	0.00	14-20-9-58 PBHL

## Titan Directional Drilling, LLC

## Planning Report

<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well 14-20-9-58 - Slot 14
<b>Company:</b>	Carrizo Oil & Gas, Inc.	<b>TVD Reference:</b>	WELL @ 4889.00usft (Original Well Elev)
<b>Project:</b>	Niobrara CON'83	<b>MD Reference:</b>	WELL @ 4889.00usft (Original Well Elev)
<b>Site:</b>	Bringelson 20-9-58 Pad	<b>North Reference:</b>	Grid
<b>Well:</b>	14-20-9-58	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	14-20-9-58 OH		
<b>Design:</b>	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
150.00	0.00	0.00	150.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	1.00	312.00	200.00	0.29	-0.32	-0.33	2.00	2.00	0.00
300.00	3.00	312.00	299.93	2.63	-2.92	-3.00	2.00	2.00	0.00
400.00	5.00	312.00	399.68	7.29	-8.10	-8.32	2.00	2.00	0.00
500.00	7.00	312.00	499.13	14.29	-15.87	-16.29	2.00	2.00	0.00
522.00	7.44	312.00	520.95	16.14	-17.92	-18.40	2.00	2.00	0.00
600.00	7.44	312.00	598.30	22.90	-25.43	-26.11	0.00	0.00	0.00
700.00	7.44	312.00	697.46	31.56	-35.05	-35.98	0.00	0.00	0.00
800.00	7.44	312.00	796.61	40.23	-44.68	-45.86	0.00	0.00	0.00
900.00	7.44	312.00	895.77	48.89	-54.30	-55.74	0.00	0.00	0.00
1,000.00	7.44	312.00	994.93	57.55	-63.92	-65.62	0.00	0.00	0.00
1,100.00	7.44	312.00	1,094.09	66.22	-73.54	-75.50	0.00	0.00	0.00
1,200.00	7.44	312.00	1,193.25	74.88	-83.17	-85.38	0.00	0.00	0.00
1,300.00	7.44	312.00	1,292.41	83.55	-92.79	-95.26	0.00	0.00	0.00
1,400.00	7.44	312.00	1,391.56	92.21	-102.41	-105.13	0.00	0.00	0.00
1,408.51	7.44	312.00	1,400.00	92.95	-103.23	-105.97	0.00	0.00	0.00
9 5/8"									
1,500.00	7.44	312.00	1,490.72	100.88	-112.03	-115.01	0.00	0.00	0.00
1,600.00	7.44	312.00	1,589.88	109.54	-121.66	-124.89	0.00	0.00	0.00
1,700.00	7.44	312.00	1,689.04	118.21	-131.28	-134.77	0.00	0.00	0.00
1,800.00	7.44	312.00	1,788.20	126.87	-140.90	-144.65	0.00	0.00	0.00
1,900.00	7.44	312.00	1,887.35	135.53	-150.53	-154.53	0.00	0.00	0.00
2,000.00	7.44	312.00	1,986.51	144.20	-160.15	-164.41	0.00	0.00	0.00
2,100.00	7.44	312.00	2,085.67	152.86	-169.77	-174.28	0.00	0.00	0.00
2,200.00	7.44	312.00	2,184.83	161.53	-179.39	-184.16	0.00	0.00	0.00
2,300.00	7.44	312.00	2,283.99	170.19	-189.02	-194.04	0.00	0.00	0.00
2,400.00	7.44	312.00	2,383.14	178.86	-198.64	-203.92	0.00	0.00	0.00
2,500.00	7.44	312.00	2,482.30	187.52	-208.26	-213.80	0.00	0.00	0.00
2,600.00	7.44	312.00	2,581.46	196.19	-217.89	-223.68	0.00	0.00	0.00
2,700.00	7.44	312.00	2,680.62	204.85	-227.51	-233.55	0.00	0.00	0.00
2,800.00	7.44	312.00	2,779.78	213.51	-237.13	-243.43	0.00	0.00	0.00
2,900.00	7.44	312.00	2,878.94	222.18	-246.75	-253.31	0.00	0.00	0.00
3,000.00	7.44	312.00	2,978.09	230.84	-256.38	-263.19	0.00	0.00	0.00
3,100.00	7.44	312.00	3,077.25	239.51	-266.00	-273.07	0.00	0.00	0.00
3,200.00	7.44	312.00	3,176.41	248.17	-275.62	-282.95	0.00	0.00	0.00
3,300.00	7.44	312.00	3,275.57	256.84	-285.25	-292.83	0.00	0.00	0.00
3,400.00	7.44	312.00	3,374.73	265.50	-294.87	-302.70	0.00	0.00	0.00
3,500.00	7.44	312.00	3,473.88	274.17	-304.49	-312.58	0.00	0.00	0.00
3,600.00	7.44	312.00	3,573.04	282.83	-314.11	-322.46	0.00	0.00	0.00
3,700.00	7.44	312.00	3,672.20	291.49	-323.74	-332.34	0.00	0.00	0.00
3,800.00	7.44	312.00	3,771.36	300.16	-333.36	-342.22	0.00	0.00	0.00
3,900.00	7.44	312.00	3,870.52	308.82	-342.98	-352.10	0.00	0.00	0.00
4,000.00	7.44	312.00	3,969.67	317.49	-352.61	-361.98	0.00	0.00	0.00
4,100.00	7.44	312.00	4,068.83	326.15	-362.23	-371.85	0.00	0.00	0.00
4,200.00	7.44	312.00	4,167.99	334.82	-371.85	-381.73	0.00	0.00	0.00
4,300.00	7.44	312.00	4,267.15	343.48	-381.47	-391.61	0.00	0.00	0.00
4,400.00	7.44	312.00	4,366.31	352.15	-391.10	-401.49	0.00	0.00	0.00
4,500.00	7.44	312.00	4,465.46	360.81	-400.72	-411.37	0.00	0.00	0.00
4,600.00	7.44	312.00	4,564.62	369.47	-410.34	-421.25	0.00	0.00	0.00
4,700.00	7.44	312.00	4,663.78	378.14	-419.97	-431.13	0.00	0.00	0.00
4,800.00	7.44	312.00	4,762.94	386.80	-429.59	-441.00	0.00	0.00	0.00
4,900.00	7.44	312.00	4,862.10	395.47	-439.21	-450.88	0.00	0.00	0.00

## Titan Directional Drilling, LLC

## Planning Report

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<b>Site:</b>	Bringelson 20-9-58 Pad	<b>North Reference:</b>	Grid
<b>Well:</b>	14-20-9-58	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	14-20-9-58 OH		
<b>Design:</b>	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)
5,000.00	7.44	312.00	4,961.26	404.13	-448.83	-460.76	0.00	0.00	0.00
5,100.00	7.44	312.00	5,060.41	412.80	-458.46	-470.64	0.00	0.00	0.00
5,200.00	7.44	312.00	5,159.57	421.46	-468.08	-480.52	0.00	0.00	0.00
5,300.00	7.44	312.00	5,258.73	430.13	-477.70	-490.40	0.00	0.00	0.00
5,357.69	7.44	312.00	5,315.93	435.12	-483.25	-496.10	0.00	0.00	0.00
5,400.00	7.47	345.05	5,357.91	439.62	-486.00	-498.98	10.00	0.08	78.11
5,427.91	8.70	3.00	5,385.54	443.48	-486.36	-499.45	10.00	4.39	64.30
5,500.00	11.40	42.39	5,456.60	454.20	-481.26	-494.68	10.00	3.75	54.64
5,600.00	19.39	65.96	5,553.02	468.30	-459.38	-473.23	10.00	7.99	23.58
5,700.00	28.65	75.46	5,644.29	481.12	-420.91	-435.17	10.00	9.25	9.49
5,800.00	38.26	80.53	5,727.65	492.25	-367.04	-381.65	10.00	9.61	5.08
5,900.00	48.01	83.81	5,800.55	501.38	-299.39	-314.30	10.00	9.75	3.27
6,000.00	57.82	86.20	5,860.78	508.21	-220.01	-235.17	10.00	9.82	2.39
6,100.00	67.68	88.12	5,906.52	512.55	-131.33	-146.66	10.00	9.85	1.92
6,123.54	70.00	88.53	5,915.02	513.19	-109.39	-124.75	10.00	9.87	1.74
7"									
6,200.00	77.55	89.79	5,936.37	514.25	-36.04	-51.46	10.00	9.87	1.64
6,300.00	87.43	91.33	5,949.42	513.27	62.97	47.54	10.00	9.88	1.54
6,325.98	90.00	91.72	5,950.00	512.58	88.93	73.51	10.00	9.88	1.51
6,400.00	90.00	91.72	5,950.00	510.36	162.92	147.53	0.00	0.00	0.00
6,500.00	90.00	91.72	5,950.00	507.35	262.88	247.53	0.00	0.00	0.00
6,600.00	90.00	91.72	5,950.00	504.35	362.83	347.53	0.00	0.00	0.00
6,700.00	90.00	91.72	5,950.00	501.34	462.78	447.53	0.00	0.00	0.00
6,800.00	90.00	91.72	5,950.00	498.34	562.74	547.53	0.00	0.00	0.00
6,900.00	90.00	91.72	5,950.00	495.33	662.69	647.53	0.00	0.00	0.00
7,000.00	90.00	91.72	5,950.00	492.33	762.65	747.53	0.00	0.00	0.00
7,100.00	90.00	91.72	5,950.00	489.32	862.60	847.53	0.00	0.00	0.00
7,200.00	90.00	91.72	5,950.00	486.32	962.56	947.53	0.00	0.00	0.00
7,300.00	90.00	91.72	5,950.00	483.32	1,062.51	1,047.53	0.00	0.00	0.00
7,400.00	90.00	91.72	5,950.00	480.31	1,162.47	1,147.53	0.00	0.00	0.00
7,500.00	90.00	91.72	5,950.00	477.31	1,262.42	1,247.53	0.00	0.00	0.00
7,600.00	90.00	91.72	5,950.00	474.30	1,362.38	1,347.53	0.00	0.00	0.00
7,700.00	90.00	91.72	5,950.00	471.30	1,462.33	1,447.53	0.00	0.00	0.00
7,800.00	90.00	91.72	5,950.00	468.29	1,562.29	1,547.53	0.00	0.00	0.00
7,900.00	90.00	91.72	5,950.00	465.29	1,662.24	1,647.53	0.00	0.00	0.00
8,000.00	90.00	91.72	5,950.00	462.29	1,762.20	1,747.53	0.00	0.00	0.00
8,100.00	90.00	91.72	5,950.00	459.28	1,862.15	1,847.53	0.00	0.00	0.00
8,200.00	90.00	91.72	5,950.00	456.28	1,962.11	1,947.53	0.00	0.00	0.00
8,300.00	90.00	91.72	5,950.00	453.27	2,062.06	2,047.53	0.00	0.00	0.00
8,400.00	90.00	91.72	5,950.00	450.27	2,162.02	2,147.53	0.00	0.00	0.00
8,500.00	90.00	91.72	5,950.00	447.26	2,261.97	2,247.53	0.00	0.00	0.00
8,600.00	90.00	91.72	5,950.00	444.26	2,361.93	2,347.53	0.00	0.00	0.00
8,700.00	90.00	91.72	5,950.00	441.25	2,461.88	2,447.53	0.00	0.00	0.00
8,800.00	90.00	91.72	5,950.00	438.25	2,561.84	2,547.53	0.00	0.00	0.00
8,900.00	90.00	91.72	5,950.00	435.25	2,661.79	2,647.53	0.00	0.00	0.00
9,000.00	90.00	91.72	5,950.00	432.24	2,761.75	2,747.53	0.00	0.00	0.00
9,100.00	90.00	91.72	5,950.00	429.24	2,861.70	2,847.53	0.00	0.00	0.00
9,200.00	90.00	91.72	5,950.00	426.23	2,961.66	2,947.53	0.00	0.00	0.00
9,300.00	90.00	91.72	5,950.00	423.23	3,061.61	3,047.53	0.00	0.00	0.00
9,400.00	90.00	91.72	5,950.00	420.22	3,161.57	3,147.53	0.00	0.00	0.00
9,500.00	90.00	91.72	5,950.00	417.22	3,261.52	3,247.53	0.00	0.00	0.00
9,600.00	90.00	91.72	5,950.00	414.22	3,361.48	3,347.53	0.00	0.00	0.00
9,700.00	90.00	91.72	5,950.00	411.21	3,461.43	3,447.53	0.00	0.00	0.00

# Titan Directional Drilling, LLC

## Planning Report

<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well 14-20-9-58 - Slot 14
<b>Company:</b>	Carrizo Oil & Gas, Inc.	<b>TVD Reference:</b>	WELL @ 4889.00usft (Original Well Elev)
<b>Project:</b>	Niobrara CON'83	<b>MD Reference:</b>	WELL @ 4889.00usft (Original Well Elev)
<b>Site:</b>	Bringelson 20-9-58 Pad	<b>North Reference:</b>	Grid
<b>Well:</b>	14-20-9-58	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	14-20-9-58 OH		
<b>Design:</b>	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)
9,800.00	90.00	91.72	5,950.00	408.21	3,561.39	3,547.53	0.00	0.00	0.00
9,900.00	90.00	91.72	5,950.00	405.20	3,661.34	3,647.53	0.00	0.00	0.00
10,000.00	90.00	91.72	5,950.00	402.20	3,761.30	3,747.53	0.00	0.00	0.00
10,100.00	90.00	91.72	5,950.00	399.19	3,861.25	3,847.53	0.00	0.00	0.00
10,200.00	90.00	91.72	5,950.00	396.19	3,961.21	3,947.53	0.00	0.00	0.00
10,300.00	90.00	91.72	5,950.00	393.18	4,061.16	4,047.53	0.00	0.00	0.00
10,400.00	90.00	91.72	5,950.00	390.18	4,161.11	4,147.53	0.00	0.00	0.00
10,500.00	90.00	91.72	5,950.00	387.18	4,261.07	4,247.53	0.00	0.00	0.00
10,600.00	90.00	91.72	5,950.00	384.17	4,361.02	4,347.53	0.00	0.00	0.00
10,683.82	90.00	91.72	5,950.00	381.65	4,444.81	4,431.35	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									
14-20-9-58 LP	0.00	0.00	5,950.00	522.46	-239.48	1,516,290.61	3,444,310.11	40° 44' 22.49 N	103° 53' 47.66 W
- plan misses target center by 87.60usft at 6024.22usft MD (5873.25 TVD, 509.50 N, -199.29 E)									
- Point									
14-20-9-58 PBHL	0.00	0.00	5,950.00	381.65	4,444.81	1,516,149.80	3,448,994.37	40° 44' 20.25 N	103° 52' 46.85 W
- plan hits target center									
- Point									

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (in)	Hole Diameter (in)	
1,408.51	1,400.00	9 5/8"	9.62	12.25	
6,123.54	5,915.02	7"	7.00	8.75	