



Project: Niobrara CON'83
County: Weld
Site: Bringelson 20-9-58 Pad
Well: 13-20-9-58
Wellbore: 13-20-9-58 OH
Design: Plan #2



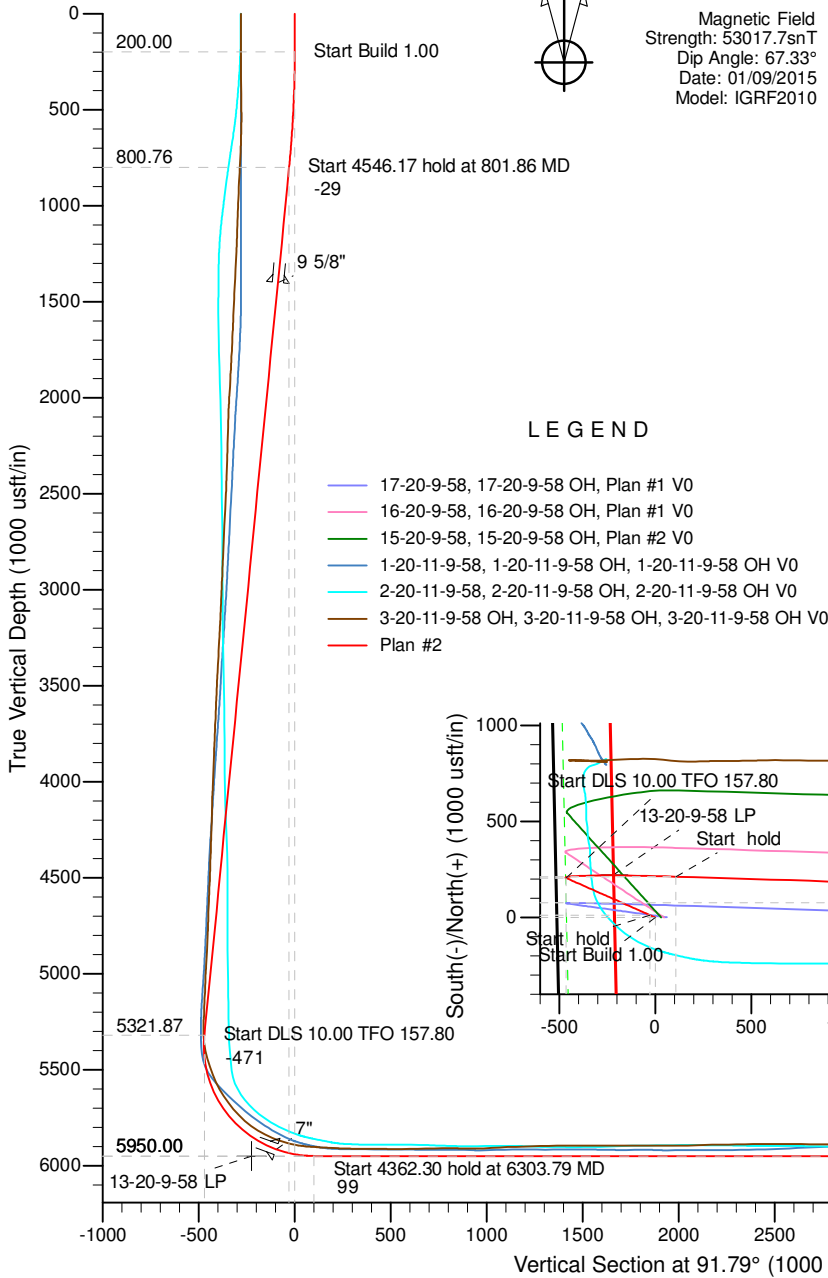
CASING DETAILS

TVD	MD	Name	Size
1400.00	1404.43	9 5/8"	9.62
5915.42	6103.63	7"	7.00



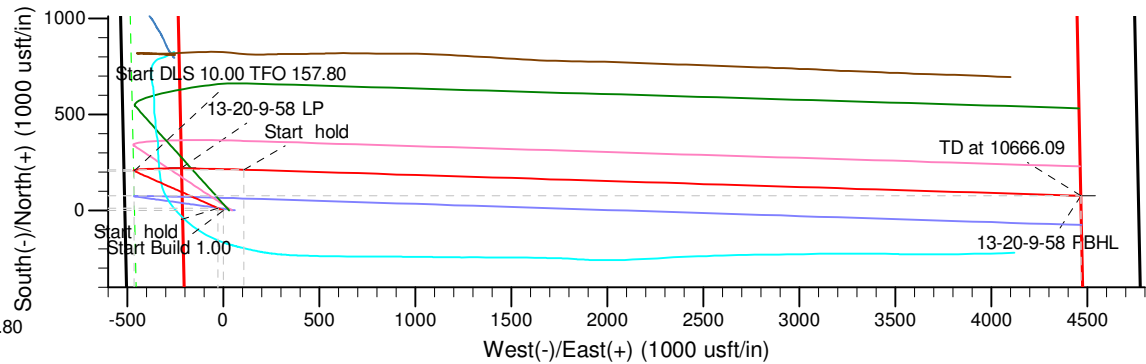
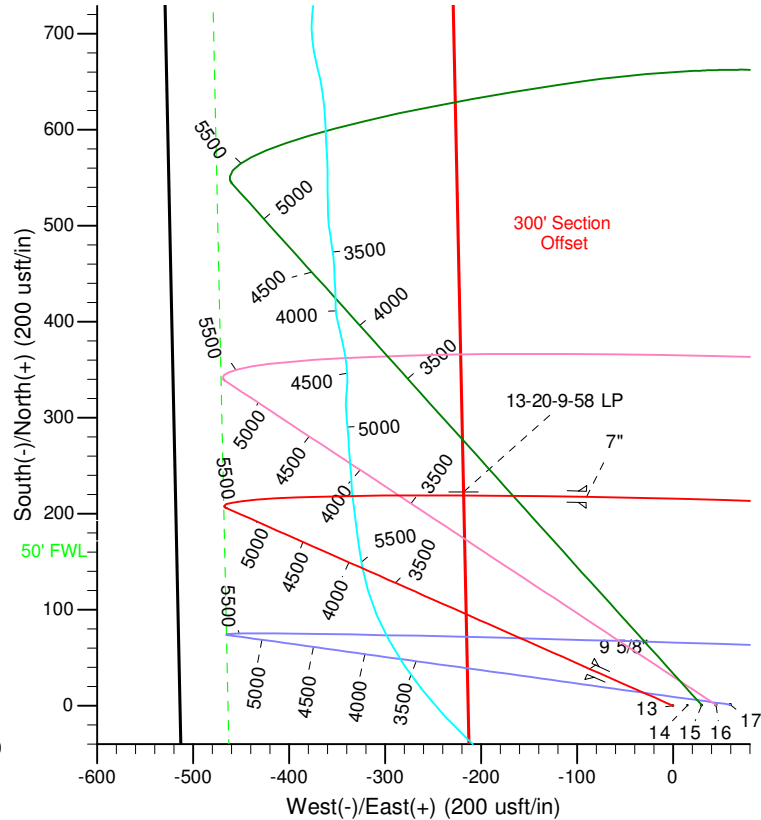
Azimuths to Grid North
True North: -1.04°
Magnetic North: 6.89°

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



LEGEND

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



Slot Name	+N/-S	+E/-W	Northing	Easting
13	0.00	0.00	1515767.89	3444534.59
14	0.26	15.00	1515768.15	3444549.59
15	0.53	29.99	1515768.42	3444564.58
16	0.79	44.99	1515768.68	3444579.58
17	1.05	59.99	1515768.94	3444594.58

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
13-20-9-58 LP	5950.00	222.78	-218.11	1515990.67	3444316.48	40° 44' 19.52 N	103° 53' 47.65 W	Point
13-20-9-58 PBHL	5950.00	76.57	4466.17	1515844.46	3449000.73	40° 44' 17.24 N	103° 52' 46.84 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	200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	
3	801.86	6.02	293.88	800.76	12.79	-28.88	1.00	293.88	-29.26	
4	5348.04	6.02	293.88	5321.87	205.76	-464.75	0.00	0.00	-470.95	
5	6303.79	90.00	91.79	5950.00	212.84	106.00	10.00	157.80	99.30	
6	10666.09	90.00	91.79	5950.00	76.57	4466.17	0.00	0.00	4461.60	13-20-9-58 PBHL

Titan Directional Drilling, LLC

Planning Report

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well 13-20-9-58 - Slot 13
Company:	Carrizo Oil & Gas, Inc.	TVD Reference:	WELL @ 4889.00usft (Original Well Elev)
Project:	Niobrara CON'83	MD Reference:	WELL @ 4889.00usft (Original Well Elev)
Site:	Bringelson 20-9-58 Pad	North Reference:	Grid
Well:	13-20-9-58	Survey Calculation Method:	Minimum Curvature
Wellbore:	13-20-9-58 OH		
Design:	Plan #2		

Project	Niobrara CON'83,		
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						Bringelson 20-9-58 Pad, Centered on 17-20-9-58											
Site Position:			Northing:			1,515,768.94 usft			Latitude:			40° 44' 17.28 N					
From:			Map			Easting:			3,444,594.58 usft			Longitude:			103° 53' 44.09 W		
Position Uncertainty:			0.00 usft			Slot Radius:			13.20 in			Grid Convergence:			1.04 °		

Well	13-20-9-58 - Slot 13					
Well Position	+N/-S	-1.05 usft	Northing:	1,515,767.89 usft	Latitude:	40° 44' 17.28 N
	+E/-W	-59.99 usft	Easting:	3,444,534.59 usft	Longitude:	103° 53' 44.87 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	4,889.00 usft	Ground Level:	4,872.00 usft

Wellbore	13-20-9-58 OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	01/09/15	7.93	67.33	53,018

Design	Plan #2			
Audit Notes:				
Version:	Phase:	PROTOTYPE	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	91.79

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	
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00	
801.86	6.02	293.88	800.76	12.79	-28.88	1.00	1.00	0.00	293.88	
5,348.04	6.02	293.88	5,321.87	205.76	-464.75	0.00	0.00	0.00	0.00	
6,303.79	90.00	91.79	5,950.00	212.84	106.00	10.00	8.79	16.52	157.80	
10,666.09	90.00	91.79	5,950.00	76.57	4,466.17	0.00	0.00	0.00	0.00	13-20-9-58 PBHL

Titan Directional Drilling, LLC

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Project:	Niobrara CON'83	MD Reference:	WELL @ 4889.00usft (Original Well Elev)
Site:	Bringelson 20-9-58 Pad	North Reference:	Grid
Well:	13-20-9-58	Survey Calculation Method:	Minimum Curvature
Wellbore:	13-20-9-58 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	1.00	293.88	299.99	0.35	-0.80	-0.81	1.00	1.00	0.00
400.00	2.00	293.88	399.96	1.41	-3.19	-3.23	1.00	1.00	0.00
500.00	3.00	293.88	499.86	3.18	-7.18	-7.28	1.00	1.00	0.00
600.00	4.00	293.88	599.68	5.65	-12.76	-12.93	1.00	1.00	0.00
700.00	5.00	293.88	699.37	8.83	-19.94	-20.20	1.00	1.00	0.00
800.00	6.00	293.88	798.90	12.71	-28.70	-29.08	1.00	1.00	0.00
801.86	6.02	293.88	800.76	12.79	-28.88	-29.26	1.00	1.00	0.00
900.00	6.02	293.88	898.35	16.95	-38.29	-38.80	0.00	0.00	0.00
1,000.00	6.02	293.88	997.80	21.20	-47.88	-48.51	0.00	0.00	0.00
1,100.00	6.02	293.88	1,097.25	25.44	-57.46	-58.23	0.00	0.00	0.00
1,200.00	6.02	293.88	1,196.70	29.69	-67.05	-67.94	0.00	0.00	0.00
1,300.00	6.02	293.88	1,296.15	33.93	-76.64	-77.66	0.00	0.00	0.00
1,400.00	6.02	293.88	1,395.60	38.18	-86.23	-87.38	0.00	0.00	0.00
1,404.43	6.02	293.88	1,400.00	38.36	-86.65	-87.81	0.00	0.00	0.00
9 5/8"									
1,500.00	6.02	293.88	1,495.05	42.42	-95.81	-97.09	0.00	0.00	0.00
1,600.00	6.02	293.88	1,594.49	46.66	-105.40	-106.81	0.00	0.00	0.00
1,700.00	6.02	293.88	1,693.94	50.91	-114.99	-116.52	0.00	0.00	0.00
1,800.00	6.02	293.88	1,793.39	55.15	-124.58	-126.24	0.00	0.00	0.00
1,900.00	6.02	293.88	1,892.84	59.40	-134.16	-135.95	0.00	0.00	0.00
2,000.00	6.02	293.88	1,992.29	63.64	-143.75	-145.67	0.00	0.00	0.00
2,100.00	6.02	293.88	2,091.74	67.89	-153.34	-155.38	0.00	0.00	0.00
2,200.00	6.02	293.88	2,191.19	72.13	-162.93	-165.10	0.00	0.00	0.00
2,300.00	6.02	293.88	2,290.64	76.38	-172.51	-174.81	0.00	0.00	0.00
2,400.00	6.02	293.88	2,390.08	80.62	-182.10	-184.53	0.00	0.00	0.00
2,500.00	6.02	293.88	2,489.53	84.87	-191.69	-194.25	0.00	0.00	0.00
2,600.00	6.02	293.88	2,588.98	89.11	-201.28	-203.96	0.00	0.00	0.00
2,700.00	6.02	293.88	2,688.43	93.36	-210.86	-213.68	0.00	0.00	0.00
2,800.00	6.02	293.88	2,787.88	97.60	-220.45	-223.39	0.00	0.00	0.00
2,900.00	6.02	293.88	2,887.33	101.85	-230.04	-233.11	0.00	0.00	0.00
3,000.00	6.02	293.88	2,986.78	106.09	-239.63	-242.82	0.00	0.00	0.00
3,100.00	6.02	293.88	3,086.23	110.34	-249.21	-252.54	0.00	0.00	0.00
3,200.00	6.02	293.88	3,185.67	114.58	-258.80	-262.25	0.00	0.00	0.00
3,300.00	6.02	293.88	3,285.12	118.83	-268.39	-271.97	0.00	0.00	0.00
3,400.00	6.02	293.88	3,384.57	123.07	-277.98	-281.69	0.00	0.00	0.00
3,500.00	6.02	293.88	3,484.02	127.32	-287.56	-291.40	0.00	0.00	0.00
3,600.00	6.02	293.88	3,583.47	131.56	-297.15	-301.12	0.00	0.00	0.00
3,700.00	6.02	293.88	3,682.92	135.80	-306.74	-310.83	0.00	0.00	0.00
3,800.00	6.02	293.88	3,782.37	140.05	-316.33	-320.55	0.00	0.00	0.00
3,900.00	6.02	293.88	3,881.82	144.29	-325.91	-330.26	0.00	0.00	0.00
4,000.00	6.02	293.88	3,981.27	148.54	-335.50	-339.98	0.00	0.00	0.00
4,100.00	6.02	293.88	4,080.71	152.78	-345.09	-349.69	0.00	0.00	0.00
4,200.00	6.02	293.88	4,180.16	157.03	-354.68	-359.41	0.00	0.00	0.00
4,300.00	6.02	293.88	4,279.61	161.27	-364.26	-369.12	0.00	0.00	0.00
4,400.00	6.02	293.88	4,379.06	165.52	-373.85	-378.84	0.00	0.00	0.00
4,500.00	6.02	293.88	4,478.51	169.76	-383.44	-388.56	0.00	0.00	0.00
4,600.00	6.02	293.88	4,577.96	174.01	-393.03	-398.27	0.00	0.00	0.00
4,700.00	6.02	293.88	4,677.41	178.25	-402.61	-407.99	0.00	0.00	0.00
4,800.00	6.02	293.88	4,776.86	182.50	-412.20	-417.70	0.00	0.00	0.00
4,900.00	6.02	293.88	4,876.30	186.74	-421.79	-427.42	0.00	0.00	0.00
5,000.00	6.02	293.88	4,975.75	190.99	-431.38	-437.13	0.00	0.00	0.00

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Wellbore:	13-20-9-58 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)
5,100.00	6.02	293.88	5,075.20	195.23	-440.97	-446.85	0.00	0.00	0.00
5,200.00	6.02	293.88	5,174.65	199.48	-450.55	-456.56	0.00	0.00	0.00
5,300.00	6.02	293.88	5,274.10	203.72	-460.14	-466.28	0.00	0.00	0.00
5,348.04	6.02	293.88	5,321.87	205.76	-464.75	-470.95	0.00	0.00	0.00
5,400.00	2.30	352.31	5,373.71	207.90	-467.38	-473.64	10.00	-7.15	112.44
5,500.00	9.88	78.63	5,473.18	211.59	-459.21	-465.60	10.00	7.58	86.32
5,600.00	19.75	85.45	5,569.74	214.63	-433.90	-440.39	10.00	9.86	6.81
5,700.00	29.70	87.80	5,660.46	216.92	-392.19	-398.78	10.00	9.95	2.36
5,800.00	39.68	89.05	5,742.58	218.41	-335.38	-342.04	10.00	9.98	1.25
5,900.00	49.66	89.86	5,813.62	219.03	-265.17	-271.88	10.00	9.98	0.81
6,000.00	59.65	90.46	5,871.39	218.78	-183.71	-190.45	10.00	9.99	0.60
6,100.00	69.64	90.95	5,914.17	217.65	-93.47	-100.22	10.00	9.99	0.49
6,103.63	70.00	90.96	5,915.42	217.60	-90.06	-96.81	10.00	9.99	0.45
7"									
6,200.00	79.63	91.37	5,940.63	215.69	2.82	-3.92	10.00	9.99	0.43
6,300.00	89.62	91.78	5,949.99	212.96	102.21	95.51	10.00	9.99	0.40
6,303.79	90.00	91.79	5,950.00	212.84	106.00	99.30	10.00	9.99	0.40
6,400.00	90.00	91.79	5,950.00	209.83	202.16	195.51	0.00	0.00	0.00
6,500.00	90.00	91.79	5,950.00	206.71	302.12	295.51	0.00	0.00	0.00
6,600.00	90.00	91.79	5,950.00	203.59	402.07	395.51	0.00	0.00	0.00
6,700.00	90.00	91.79	5,950.00	200.46	502.02	495.51	0.00	0.00	0.00
6,800.00	90.00	91.79	5,950.00	197.34	601.97	595.51	0.00	0.00	0.00
6,900.00	90.00	91.79	5,950.00	194.22	701.92	695.51	0.00	0.00	0.00
7,000.00	90.00	91.79	5,950.00	191.09	801.87	795.51	0.00	0.00	0.00
7,100.00	90.00	91.79	5,950.00	187.97	901.82	895.51	0.00	0.00	0.00
7,200.00	90.00	91.79	5,950.00	184.84	1,001.77	995.51	0.00	0.00	0.00
7,300.00	90.00	91.79	5,950.00	181.72	1,101.73	1,095.51	0.00	0.00	0.00
7,400.00	90.00	91.79	5,950.00	178.60	1,201.68	1,195.51	0.00	0.00	0.00
7,500.00	90.00	91.79	5,950.00	175.47	1,301.63	1,295.51	0.00	0.00	0.00
7,600.00	90.00	91.79	5,950.00	172.35	1,401.58	1,395.51	0.00	0.00	0.00
7,700.00	90.00	91.79	5,950.00	169.23	1,501.53	1,495.51	0.00	0.00	0.00
7,800.00	90.00	91.79	5,950.00	166.10	1,601.48	1,595.51	0.00	0.00	0.00
7,900.00	90.00	91.79	5,950.00	162.98	1,701.43	1,695.51	0.00	0.00	0.00
8,000.00	90.00	91.79	5,950.00	159.85	1,801.38	1,795.51	0.00	0.00	0.00
8,100.00	90.00	91.79	5,950.00	156.73	1,901.33	1,895.51	0.00	0.00	0.00
8,200.00	90.00	91.79	5,950.00	153.61	2,001.29	1,995.51	0.00	0.00	0.00
8,300.00	90.00	91.79	5,950.00	150.48	2,101.24	2,095.51	0.00	0.00	0.00
8,400.00	90.00	91.79	5,950.00	147.36	2,201.19	2,195.51	0.00	0.00	0.00
8,500.00	90.00	91.79	5,950.00	144.23	2,301.14	2,295.51	0.00	0.00	0.00
8,600.00	90.00	91.79	5,950.00	141.11	2,401.09	2,395.51	0.00	0.00	0.00
8,700.00	90.00	91.79	5,950.00	137.99	2,501.04	2,495.51	0.00	0.00	0.00
8,800.00	90.00	91.79	5,950.00	134.86	2,600.99	2,595.51	0.00	0.00	0.00
8,900.00	90.00	91.79	5,950.00	131.74	2,700.94	2,695.51	0.00	0.00	0.00
9,000.00	90.00	91.79	5,950.00	128.62	2,800.90	2,795.51	0.00	0.00	0.00
9,100.00	90.00	91.79	5,950.00	125.49	2,900.85	2,895.51	0.00	0.00	0.00
9,200.00	90.00	91.79	5,950.00	122.37	3,000.80	2,995.51	0.00	0.00	0.00
9,300.00	90.00	91.79	5,950.00	119.24	3,100.75	3,095.51	0.00	0.00	0.00
9,400.00	90.00	91.79	5,950.00	116.12	3,200.70	3,195.51	0.00	0.00	0.00
9,500.00	90.00	91.79	5,950.00	113.00	3,300.65	3,295.51	0.00	0.00	0.00
9,600.00	90.00	91.79	5,950.00	109.87	3,400.60	3,395.51	0.00	0.00	0.00
9,700.00	90.00	91.79	5,950.00	106.75	3,500.55	3,495.51	0.00	0.00	0.00
9,800.00	90.00	91.79	5,950.00	103.63	3,600.51	3,595.51	0.00	0.00	0.00
9,900.00	90.00	91.79	5,950.00	100.50	3,700.46	3,695.51	0.00	0.00	0.00

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Wellbore:	13-20-9-58 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)
10,000.00	90.00	91.79	5,950.00	97.38	3,800.41	3,795.51	0.00	0.00	0.00
10,100.00	90.00	91.79	5,950.00	94.25	3,900.36	3,895.51	0.00	0.00	0.00
10,200.00	90.00	91.79	5,950.00	91.13	4,000.31	3,995.51	0.00	0.00	0.00
10,300.00	90.00	91.79	5,950.00	88.01	4,100.26	4,095.51	0.00	0.00	0.00
10,400.00	90.00	91.79	5,950.00	84.88	4,200.21	4,195.51	0.00	0.00	0.00
10,500.00	90.00	91.79	5,950.00	81.76	4,300.16	4,295.51	0.00	0.00	0.00
10,600.00	90.00	91.79	5,950.00	78.64	4,400.11	4,395.51	0.00	0.00	0.00
10,666.09	90.00	91.79	5,950.00	76.57	4,466.17	4,461.60	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
13-20-9-58 LP	0.00	0.00	5,950.00	222.78	-218.11	1,515,990.67	3,444,316.48	40° 44' 19.52 N	103° 53' 47.65 W
- hit/miss target									
- Shape									
- plan misses target center by 85.64usft at 6002.54usft MD (5872.67 TVD, 218.76 N, -181.52 E)									
- Point									
13-20-9-58 PBHL	0.00	0.00	5,950.00	76.57	4,466.17	1,515,844.46	3,449,000.73	40° 44' 17.24 N	103° 52' 46.84 W
- plan hits target center									
- Point									

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (in)	Hole Diameter (in)	
1,404.43	1,400.00	9 5/8"	9.62	12.25	
6,103.63	5,915.42	7"	7.00	8.75	