

US ROCKIES WATTENBERG PLANNING

**WELD-NAD83-UTMFT13N
2N-67W-21 COWBOY 24-21HZ PAD
COWBOY 21-1HZ**

Plan A

Plan: Permit Rev-1

SHL Lat/Long: 40.124676/-104.889521
Survey Program: MWD+IFR

Standard Planning Report

08 December, 2017

Project: WELD-NAD83-UTMFT13N
Site: 2N-67W-21 COWBOY 24-21HZ PAD
Well: COWBOY 21-1HZ
Wellbore: Plan A
Design: Permit Rev-1

US ROCKIES WATTENBERG PLANNING

CASING DETAILS

TVD	MD	Size
1500.00	1523.46	9-5/8
7649.00	8308.65	5-1/2

WELL DETAILS: COWBOY 21-1HZ
GL = 5041'
RKB = 17' @ 5058.00usft (Drilling Rig)

SECTION DETAILS

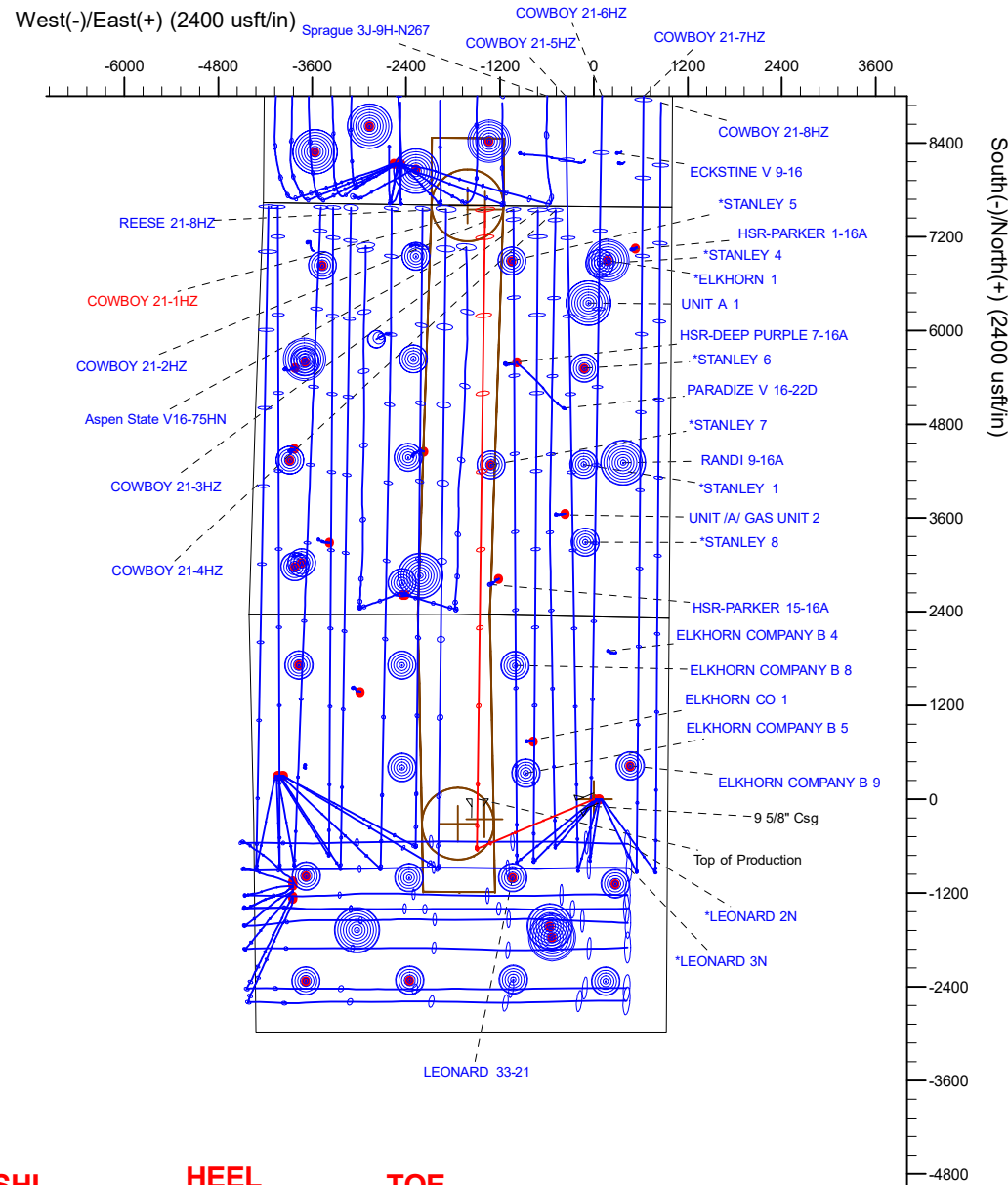
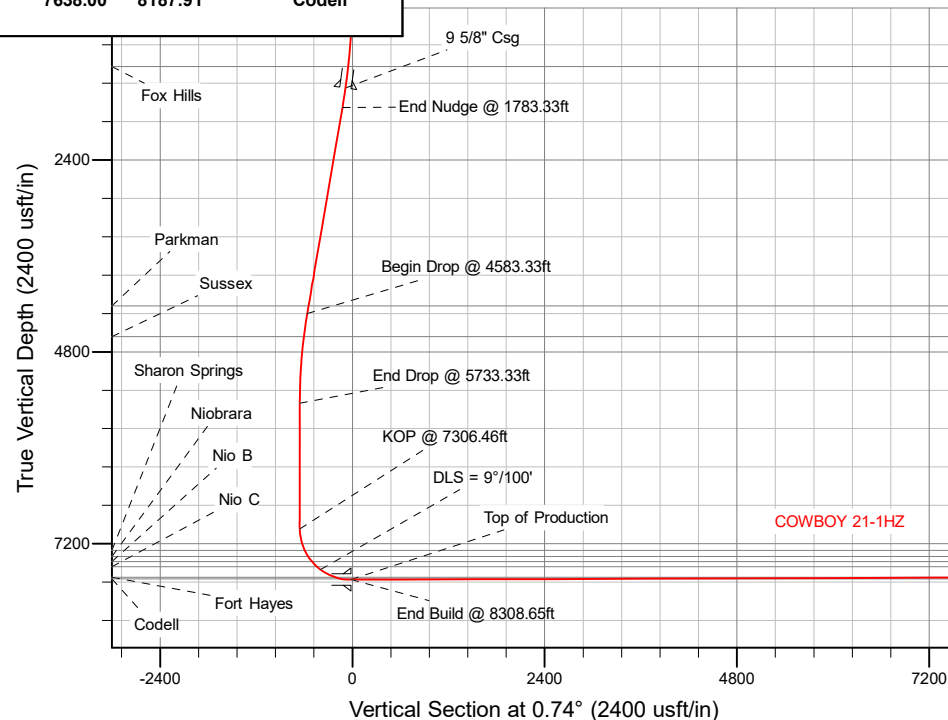
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	250.00	0.00	0.00	250.00	0.00	0.00	0.00	0.00	0.00	
3	1783.33	23.00	247.00	1742.48	-118.65	-279.51	1.50	247.00	-122.25	
4	4583.33	23.00	247.00	4319.89	-546.12	-1286.58	0.00	0.00	-562.69	
5	5733.33	0.00	0.00	5439.26	-635.11	-1496.22	2.00	180.00	-654.38	
6	7306.46	0.00	0.00	7012.39	-635.11	-1496.22	0.00	0.00	-654.38	
7	8308.65	90.20	0.74	7649.00	3.65	-1487.98	9.00	0.74	-15.56	
8	15853.68	90.20	0.74	7623.00	7548.01	-1390.70	0.00	0.00	7529.42	COWBOY 21-1HZ_BHL

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude
COWBOY 21-1HZ_SHL	0.00	0.00	0.00	40.124676	-104.889521
COWBOY 21-1HZ_BHL	7623.00	7548.01	-1390.70	40.145404	-104.894497

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
1232.00	1243.15	Fox Hills
4224.00	4479.16	Parkman
4609.00	4890.99	Sussex
7280.00	7582.66	Sharon Springs
7357.00	7670.61	Niobrara
7422.00	7751.43	Nio B
7488.00	7843.56	Nio C
7619.00	8110.23	Fort Hayes
7638.00	8187.91	Codell



SHL
2335' FNL
946' FEL

HEEL
2365' FNL
2428' FEL

TOE
50' FNL
2390' FEL

Plan: Permit Rev-1 (COWBOY 21-1HZ/Plan A)

Created By: _____ Date: 12/7/2017
Reviewed: _____ Date: _____

Project	WELD-NAD83-UTMFT13N		
Map System:	Universal Transverse Mercator (US Survey Feet)	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Zone 13N (108 W to 102 W)		

Site	2N-67W-21 COWBOY 24-21HZ PAD		
Site Position:		Northing:	14,572,152.72 usft
From:	Lat/Long	Easting:	1,671,300.07 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	40.124676
		Longitude:	-104.889521
		Grid Convergence:	0.07 °

Well	COWBOY 21-1HZ		
Well Position	+N/-S	0.00 usft	Northing:
	+E/-W	0.00 usft	Easting:
Position Uncertainty	3.28 usft		Wellhead Elevation:
			Latitude:
			Longitude:
			Ground Level:

Wellbore	Plan A				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	11/30/2017	8.04	66.58	52,292.73688034

Design	Permit Rev-1			
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	0.74

Plan Survey Tool Program	Date	12/7/2017		
Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks
1	0.00	1,500.00	Permit Rev-1 (Plan A)	APC_ISCWSA REV 2 MWD+II
				Fixed:v2:crustal field declination
2	1,500.00	15,853.68	Permit Rev-1 (Plan A)	APC_ISCWSA REV 2 MWD+II
				Fixed:v2:crustal field declination

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
250.00	0.00	0.00	250.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,783.33	23.00	247.00	1,742.48	-118.65	-279.51	1.50	1.50	0.00	247.00	
4,583.33	23.00	247.00	4,319.89	-546.12	-1,286.59	0.00	0.00	0.00	0.00	
5,733.33	0.00	0.00	5,439.26	-635.11	-1,496.22	2.00	-2.00	9.83	180.00	
7,306.46	0.00	0.00	7,012.39	-635.11	-1,496.22	0.00	0.00	0.00	0.00	
8,308.65	90.20	0.74	7,649.00	3.65	-1,487.98	9.00	9.00	0.07	0.74	
15,853.68	90.20	0.74	7,623.00	7,548.01	-1,390.70	0.00	0.00	0.00	0.00	COWBOY 21-1HZ_BI

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
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	
250.00	0.00	0.00	250.00	0.00	0.00	0.00	0.00	0.00	0.00	
Begin Nudge @ 250.00ft										
300.00	0.75	247.00	300.00	-0.13	-0.30	-0.13	1.50	1.50	0.00	
400.00	2.25	247.00	399.96	-1.15	-2.71	-1.19	1.50	1.50	0.00	
500.00	3.75	247.00	499.82	-3.20	-7.53	-3.29	1.50	1.50	0.00	
600.00	5.25	247.00	599.51	-6.26	-14.75	-6.45	1.50	1.50	0.00	
700.00	6.75	247.00	698.96	-10.35	-24.37	-10.66	1.50	1.50	0.00	
800.00	8.25	247.00	798.10	-15.45	-36.39	-15.91	1.50	1.50	0.00	
900.00	9.75	247.00	896.87	-21.56	-50.79	-22.21	1.50	1.50	0.00	
1,000.00	11.25	247.00	995.19	-28.68	-67.56	-29.55	1.50	1.50	0.00	
1,100.00	12.75	247.00	1,093.00	-36.80	-86.70	-37.92	1.50	1.50	0.00	
1,200.00	14.25	247.00	1,190.24	-45.92	-108.19	-47.32	1.50	1.50	0.00	
1,243.15	14.90	247.00	1,232.00	-50.16	-118.18	-51.69	1.50	1.50	0.00	
Fox Hills										
1,300.00	15.75	247.00	1,286.83	-56.03	-132.01	-57.74	1.50	1.50	0.00	
1,400.00	17.25	247.00	1,382.71	-67.13	-158.15	-69.17	1.50	1.50	0.00	
1,500.00	18.75	247.00	1,477.81	-79.21	-186.60	-81.61	1.50	1.50	0.00	
1,523.46	19.10	247.00	1,500.00	-82.18	-193.60	-84.67	1.50	1.50	0.00	
9 5/8" Csg										
1,600.00	20.25	247.00	1,572.07	-92.25	-217.32	-95.05	1.50	1.50	0.00	
1,700.00	21.75	247.00	1,665.43	-106.25	-250.31	-109.47	1.50	1.50	0.00	
1,783.33	23.00	247.00	1,742.48	-118.65	-279.51	-122.25	1.50	1.50	0.00	
End Nudge @ 1783.33ft										
1,800.00	23.00	247.00	1,757.82	-121.19	-285.50	-124.87	0.00	0.00	0.00	
1,900.00	23.00	247.00	1,849.88	-136.46	-321.47	-140.60	0.00	0.00	0.00	
2,000.00	23.00	247.00	1,941.93	-151.72	-357.44	-156.33	0.00	0.00	0.00	
2,100.00	23.00	247.00	2,033.98	-166.99	-393.41	-172.06	0.00	0.00	0.00	
2,200.00	23.00	247.00	2,126.03	-182.26	-429.37	-187.79	0.00	0.00	0.00	
2,300.00	23.00	247.00	2,218.08	-197.53	-465.34	-203.52	0.00	0.00	0.00	
2,400.00	23.00	247.00	2,310.13	-212.79	-501.31	-219.25	0.00	0.00	0.00	
2,500.00	23.00	247.00	2,402.18	-228.06	-537.27	-234.98	0.00	0.00	0.00	
2,600.00	23.00	247.00	2,494.23	-243.33	-573.24	-250.71	0.00	0.00	0.00	
2,700.00	23.00	247.00	2,586.28	-258.59	-609.21	-266.44	0.00	0.00	0.00	
2,800.00	23.00	247.00	2,678.33	-273.86	-645.17	-282.17	0.00	0.00	0.00	
2,900.00	23.00	247.00	2,770.38	-289.13	-681.14	-297.90	0.00	0.00	0.00	
3,000.00	23.00	247.00	2,862.43	-304.39	-717.11	-313.63	0.00	0.00	0.00	
3,100.00	23.00	247.00	2,954.48	-319.66	-753.08	-329.36	0.00	0.00	0.00	
3,200.00	23.00	247.00	3,046.53	-334.93	-789.04	-345.09	0.00	0.00	0.00	
3,300.00	23.00	247.00	3,138.58	-350.20	-825.01	-360.82	0.00	0.00	0.00	
3,400.00	23.00	247.00	3,230.63	-365.46	-860.98	-376.55	0.00	0.00	0.00	
3,500.00	23.00	247.00	3,322.68	-380.73	-896.94	-392.28	0.00	0.00	0.00	
3,600.00	23.00	247.00	3,414.73	-396.00	-932.91	-408.01	0.00	0.00	0.00	
3,700.00	23.00	247.00	3,506.78	-411.26	-968.88	-423.74	0.00	0.00	0.00	
3,800.00	23.00	247.00	3,598.83	-426.53	-1,004.84	-439.47	0.00	0.00	0.00	
3,900.00	23.00	247.00	3,690.88	-441.80	-1,040.81	-455.20	0.00	0.00	0.00	
4,000.00	23.00	247.00	3,782.94	-457.07	-1,076.78	-470.93	0.00	0.00	0.00	
4,100.00	23.00	247.00	3,874.99	-472.33	-1,112.75	-486.66	0.00	0.00	0.00	
4,200.00	23.00	247.00	3,967.04	-487.60	-1,148.71	-502.39	0.00	0.00	0.00	
4,300.00	23.00	247.00	4,059.09	-502.87	-1,184.68	-518.13	0.00	0.00	0.00	
4,400.00	23.00	247.00	4,151.14	-518.13	-1,220.65	-533.86	0.00	0.00	0.00	
4,479.16	23.00	247.00	4,224.00	-530.22	-1,249.12	-546.31	0.00	0.00	0.00	
Parkman										
4,500.00	23.00	247.00	4,243.19	-533.40	-1,256.61	-549.59	0.00	0.00	0.00	
4,583.33	23.00	247.00	4,319.89	-546.12	-1,286.59	-562.69	0.00	0.00	0.00	
Begin Drop @ 4583.33ft										
4,600.00	22.67	247.00	4,335.26	-548.65	-1,292.54	-565.30	2.00	-2.00	0.00	
4,700.00	20.67	247.00	4,428.19	-563.08	-1,326.52	-580.16	2.00	-2.00	0.00	
4,800.00	18.67	247.00	4,522.35	-576.23	-1,357.50	-593.71	2.00	-2.00	0.00	
4,890.99	16.85	247.00	4,609.00	-587.07	-1,383.04	-604.88	2.00	-2.00	0.00	
Sussex										
4,900.00	16.67	247.00	4,617.63	-588.08	-1,385.43	-605.93	2.00	-2.00	0.00	
5,000.00	14.67	247.00	4,713.91	-598.63	-1,410.29	-616.80	2.00	-2.00	0.00	
5,100.00	12.67	247.00	4,811.07	-607.86	-1,432.04	-626.31	2.00	-2.00	0.00	

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,200.00	10.67	247.00	4,909.00	-615.77	-1,450.65	-634.45	2.00	-2.00	0.00
5,300.00	8.67	247.00	5,007.58	-622.33	-1,466.11	-641.21	2.00	-2.00	0.00
5,400.00	6.67	247.00	5,106.68	-627.54	-1,478.39	-646.58	2.00	-2.00	0.00
5,500.00	4.67	247.00	5,206.18	-631.40	-1,487.48	-650.55	2.00	-2.00	0.00
5,600.00	2.67	247.00	5,305.97	-633.89	-1,493.36	-653.13	2.00	-2.00	0.00
5,700.00	0.67	247.00	5,405.93	-635.03	-1,496.04	-654.30	2.00	-2.00	0.00
5,733.33	0.00	0.00	5,439.26	-635.11	-1,496.22	-654.38	2.00	-2.00	339.03
End Drop @ 5733.33ft									
5,800.00	0.00	0.00	5,505.93	-635.11	-1,496.22	-654.38	0.00	0.00	0.00
5,900.00	0.00	0.00	5,605.93	-635.11	-1,496.22	-654.38	0.00	0.00	0.00
6,000.00	0.00	0.00	5,705.93	-635.11	-1,496.22	-654.38	0.00	0.00	0.00
6,100.00	0.00	0.00	5,805.93	-635.11	-1,496.22	-654.38	0.00	0.00	0.00
6,200.00	0.00	0.00	5,905.93	-635.11	-1,496.22	-654.38	0.00	0.00	0.00
6,300.00	0.00	0.00	6,005.93	-635.11	-1,496.22	-654.38	0.00	0.00	0.00
6,400.00	0.00	0.00	6,105.93	-635.11	-1,496.22	-654.38	0.00	0.00	0.00
6,500.00	0.00	0.00	6,205.93	-635.11	-1,496.22	-654.38	0.00	0.00	0.00
6,600.00	0.00	0.00	6,305.93	-635.11	-1,496.22	-654.38	0.00	0.00	0.00
6,700.00	0.00	0.00	6,405.93	-635.11	-1,496.22	-654.38	0.00	0.00	0.00
6,800.00	0.00	0.00	6,505.93	-635.11	-1,496.22	-654.38	0.00	0.00	0.00
6,900.00	0.00	0.00	6,605.93	-635.11	-1,496.22	-654.38	0.00	0.00	0.00
7,000.00	0.00	0.00	6,705.93	-635.11	-1,496.22	-654.38	0.00	0.00	0.00
7,100.00	0.00	0.00	6,805.93	-635.11	-1,496.22	-654.38	0.00	0.00	0.00
7,200.00	0.00	0.00	6,905.93	-635.11	-1,496.22	-654.38	0.00	0.00	0.00
7,300.00	0.00	0.00	7,005.93	-635.11	-1,496.22	-654.38	0.00	0.00	0.00
7,306.46	0.00	0.00	7,012.39	-635.11	-1,496.22	-654.38	0.00	0.00	0.00
KOP @ 7306.46ft									
7,400.00	8.42	0.74	7,105.59	-628.25	-1,496.13	-647.52	9.00	9.00	0.79
7,500.00	17.42	0.74	7,202.96	-605.92	-1,495.84	-625.18	9.00	9.00	0.00
7,582.66	24.86	0.74	7,280.00	-576.13	-1,495.46	-595.40	9.00	9.00	0.00
Sharon Springs									
7,600.00	26.42	0.74	7,295.63	-568.63	-1,495.36	-587.89	9.00	9.00	0.00
7,670.61	32.77	0.74	7,357.00	-533.78	-1,494.91	-553.04	9.00	9.00	0.00
Niobrara									
7,700.00	35.42	0.74	7,381.34	-517.30	-1,494.70	-536.56	9.00	9.00	0.00
7,751.43	40.05	0.74	7,422.00	-485.84	-1,494.29	-505.10	9.00	9.00	0.00
Nio B									
7,800.00	44.42	0.74	7,457.95	-453.20	-1,493.87	-472.46	9.00	9.00	0.00
7,843.56	48.34	0.74	7,488.00	-421.68	-1,493.47	-440.93	9.00	9.00	0.00
Nio C									
7,900.00	53.42	0.74	7,523.60	-377.91	-1,492.90	-397.16	9.00	9.00	0.00
DLS = 9°/100'									
8,000.00	62.42	0.74	7,576.66	-293.28	-1,491.81	-312.52	9.00	9.00	0.00
8,100.00	71.42	0.74	7,615.82	-201.38	-1,490.62	-220.62	9.00	9.00	0.00
8,110.23	72.34	0.74	7,619.00	-191.67	-1,490.50	-210.90	9.00	9.00	0.00
Fort Hayes									
8,187.91	79.33	0.74	7,638.00	-116.39	-1,489.53	-135.62	9.00	9.00	0.00
Codell									
8,200.00	80.42	0.74	7,640.12	-104.50	-1,489.38	-123.72	9.00	9.00	0.00
8,300.00	89.42	0.74	7,648.97	-5.00	-1,488.09	-24.22	9.00	9.00	0.00
8,308.65	90.20	0.74	7,649.00	3.65	-1,487.98	-15.57	9.00	9.00	0.00
End Build @ 8308.65ft - Top of Production									
8,400.00	90.20	0.74	7,648.69	94.99	-1,486.80	75.78	0.00	0.00	0.00
8,500.00	90.20	0.74	7,648.34	194.98	-1,485.51	175.78	0.00	0.00	0.00
8,600.00	90.20	0.74	7,648.00	294.97	-1,484.22	275.78	0.00	0.00	0.00
8,700.00	90.20	0.74	7,647.65	394.97	-1,482.94	375.78	0.00	0.00	0.00
8,800.00	90.20	0.74	7,647.31	494.96	-1,481.65	475.78	0.00	0.00	0.00
8,900.00	90.20	0.74	7,646.96	594.95	-1,480.36	575.78	0.00	0.00	0.00
9,000.00	90.20	0.74	7,646.62	694.94	-1,479.07	675.78	0.00	0.00	0.00
9,100.00	90.20	0.74	7,646.27	794.93	-1,477.78	775.78	0.00	0.00	0.00
9,200.00	90.20	0.74	7,645.93	894.92	-1,476.49	875.78	0.00	0.00	0.00
9,300.00	90.20	0.74	7,645.59	994.91	-1,475.20	975.78	0.00	0.00	0.00
9,400.00	90.20	0.74	7,645.24	1,094.90	-1,473.91	1,075.78	0.00	0.00	0.00
9,500.00	90.20	0.74	7,644.90	1,194.89	-1,472.62	1,175.78	0.00	0.00	0.00
9,600.00	90.20	0.74	7,644.55	1,294.88	-1,471.33	1,275.77	0.00	0.00	0.00
9,700.00	90.20	0.74	7,644.21	1,394.88	-1,470.04	1,375.77	0.00	0.00	0.00

Casing Points					
	Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
	1,523.46	1,500.00	9 5/8" Csg	9-5/8	13-1/2
	8,308.65	7,649.00	Top of Production	5-1/2	7-7/8

Formations					
	Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip Direction (°)
	1,243.15	1,232.00	Fox Hills		
	4,479.16	4,224.00	Parkman		
	4,890.99	4,609.00	Sussex		
	7,582.66	7,280.00	Sharon Springs		
	7,670.61	7,357.00	Niobrara		
	7,751.43	7,422.00	Nio B		
	7,843.56	7,488.00	Nio C		
	8,110.23	7,619.00	Fort Hayes		
	8,187.91	7,638.00	Codell		

Plan Annotations				
	Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates	
			+N/-S (usft)	+E/-W (usft)
				Comment
	250.00	250.00	0.00	0.00
	1,783.33	1,742.48	-118.65	-279.51
	4,583.33	4,319.89	-546.12	-1,286.59
	5,733.33	5,439.26	-635.11	-1,496.22
	7,306.46	7,012.39	-635.11	-1,496.22
	7,900.00	7,523.60	-377.91	-1,492.90
	8,308.65	7,649.00	3.65	-1,487.98
	15,853.68	7,623.00	7,548.01	-1,390.70