

# **MALLARD EXPLORATION**

**WELD COUNTY, COLORADO (NAD 83)**

**NE SW SEC. 31 T9N R59W 6th P.M.**

**SHULL FED 31-32-9HN**

**ORIGINAL WELLBORE**

**21 December, 2017**

**Plan: PROPOSAL #1**





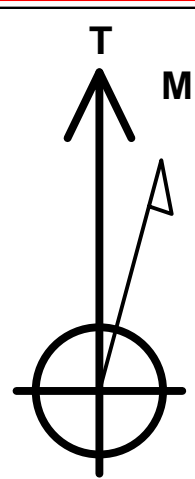
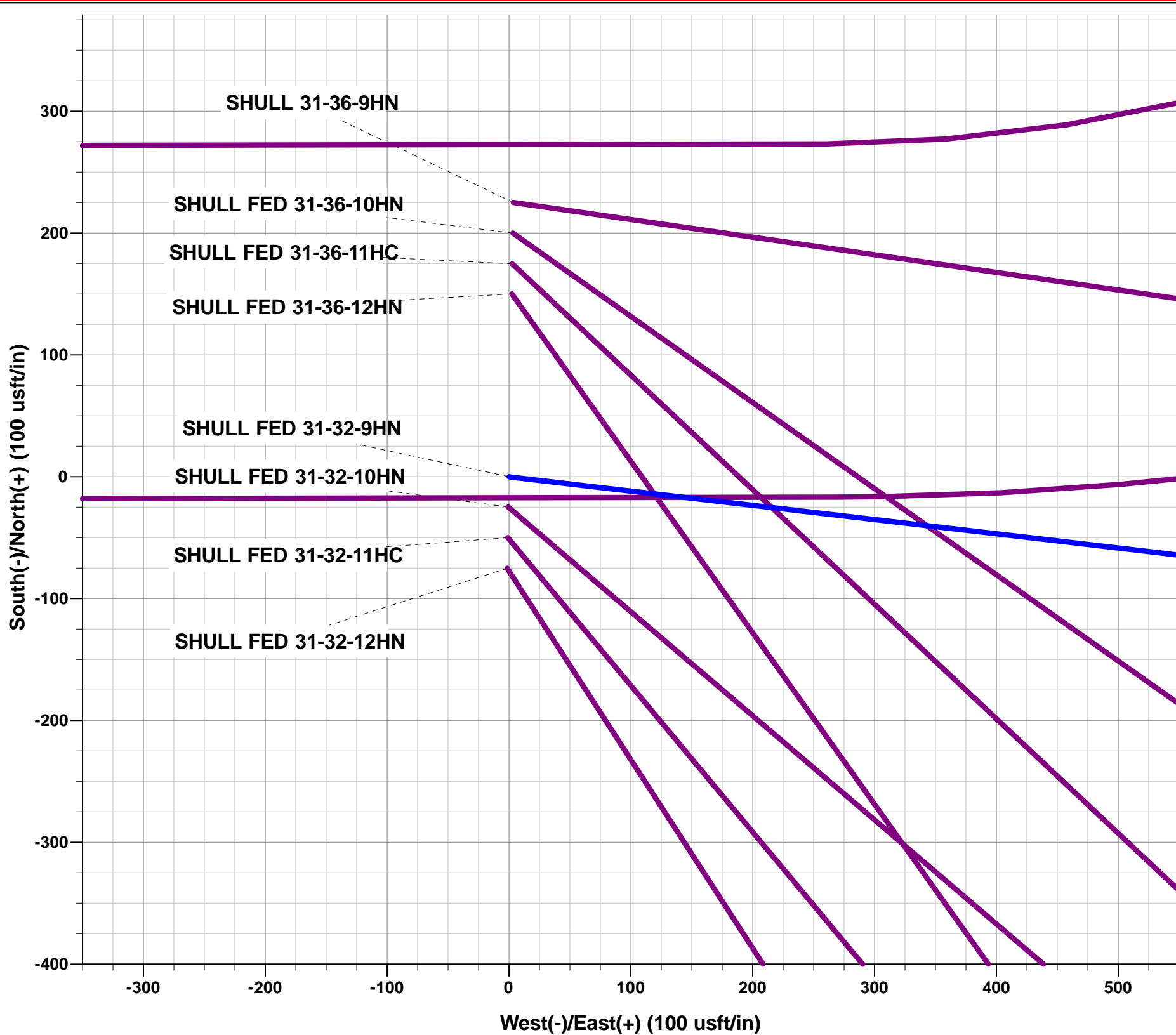
Project: WELD COUNTY, COLORADO (NAD 83)  
Site: NE SW SEC. 31 T9N R59W 6th P.M.  
Well: SHULL FED 31-32-9HN  
Wellbore: ORIGINAL WELLBORE  
Design: PROPOSAL #1

ANNOTATIONS

TVD	MD	Inc	Azi	+N/-S	+E/-W	VSec	Dep	Annotation
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	SHL: 1778ft FSL & 1779ft FWL of Sec 31
600.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00	START NUDGE (2°/100ft BUR)
1195.77	1200.15	12.00	96.67	-7.27	62.21	62.27	62.63	EOB TO 12° INC
4395.27	4471.17	12.00	96.67	-86.23	737.86	738.53	742.88	END OF TANGENT
4991.04	5071.31	0.00	0.00	-93.50	800.07	800.79	805.51	EOD TO VERTICAL
5523.04	5603.31	0.00	0.00	-93.50	800.07	800.79	805.51	KOP (10°/100ft BUR)
6096.00	6503.31	90.00	89.79	-91.40	1373.02	1373.70	1378.47	HZ LP: 1705ft FSL & 2140ft FEL of Sec 32
6096.00	13433.03	90.00	89.80	-66.35	8302.69	8302.96	8308.19	BHL: 1705ft FSL & 460ft FEL of Sec 32

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude
KOP: SHULL FED 31-32-9HN	5523.04	-93.50	800.07	40.703886	-104.021020
HZLP: SHULL FED 31-32-9HN	6096.00	-91.40	1373.02	40.703892	-104.018954
BHL: SHULL FED 31-32-9HN	6096.00	-66.35	8302.70	40.703957	-103.993961



Azimuths to True North  
Magnetic North: 7.78°

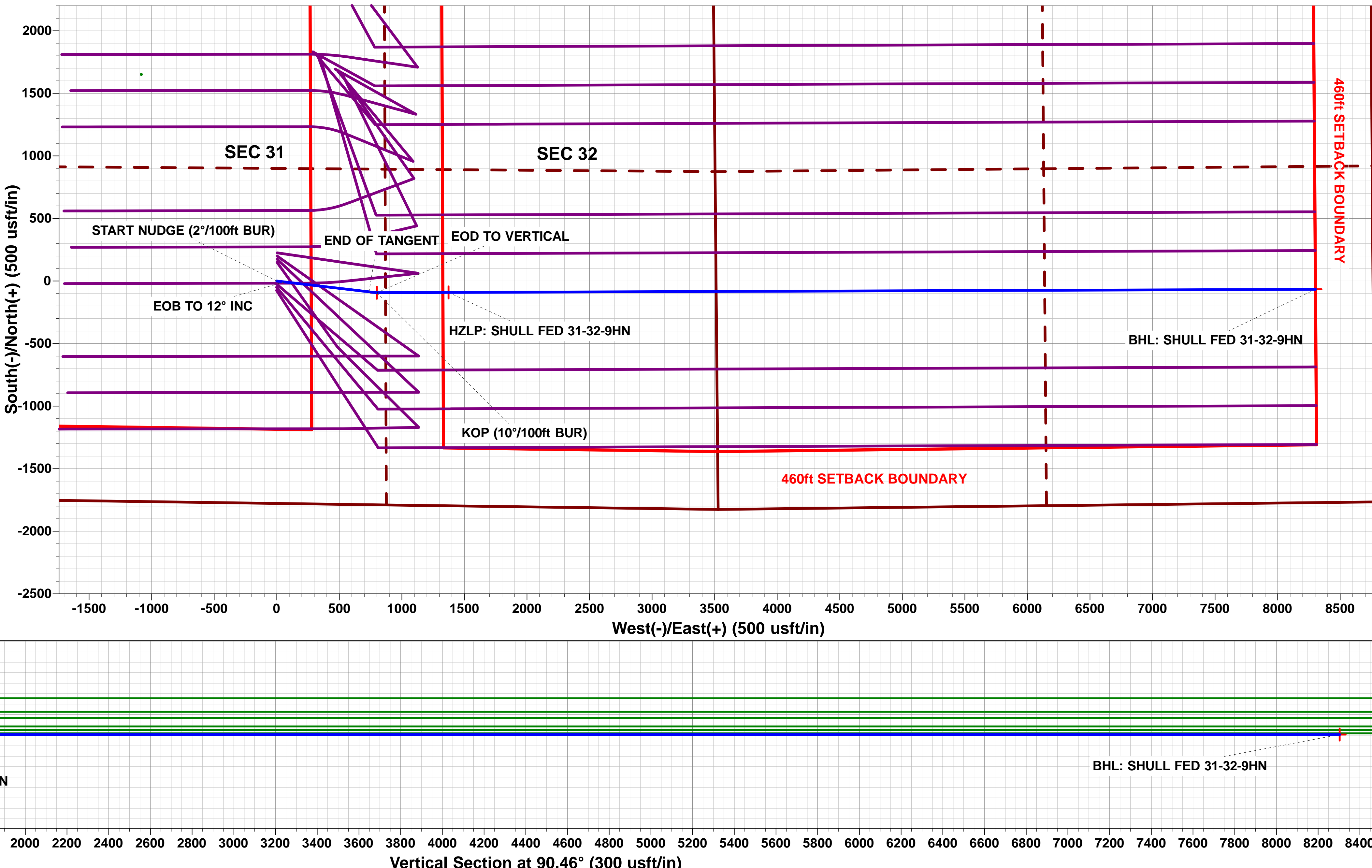
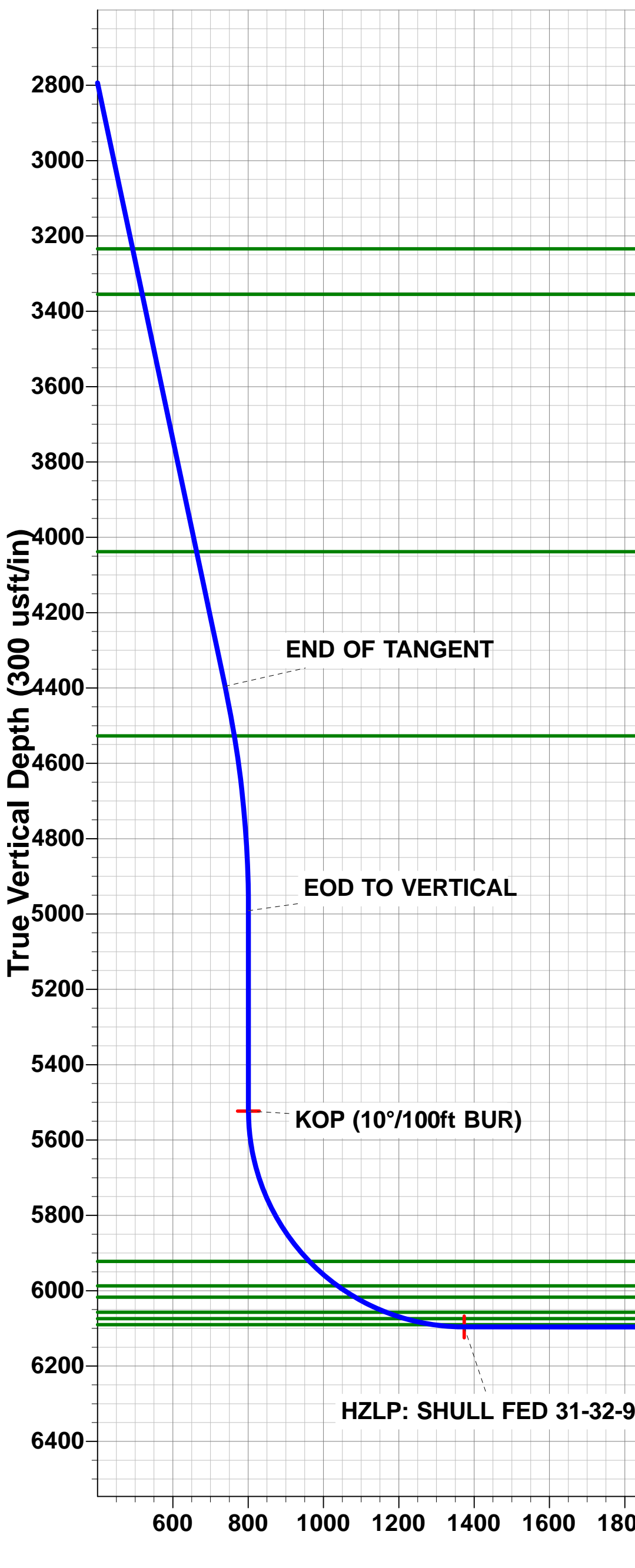
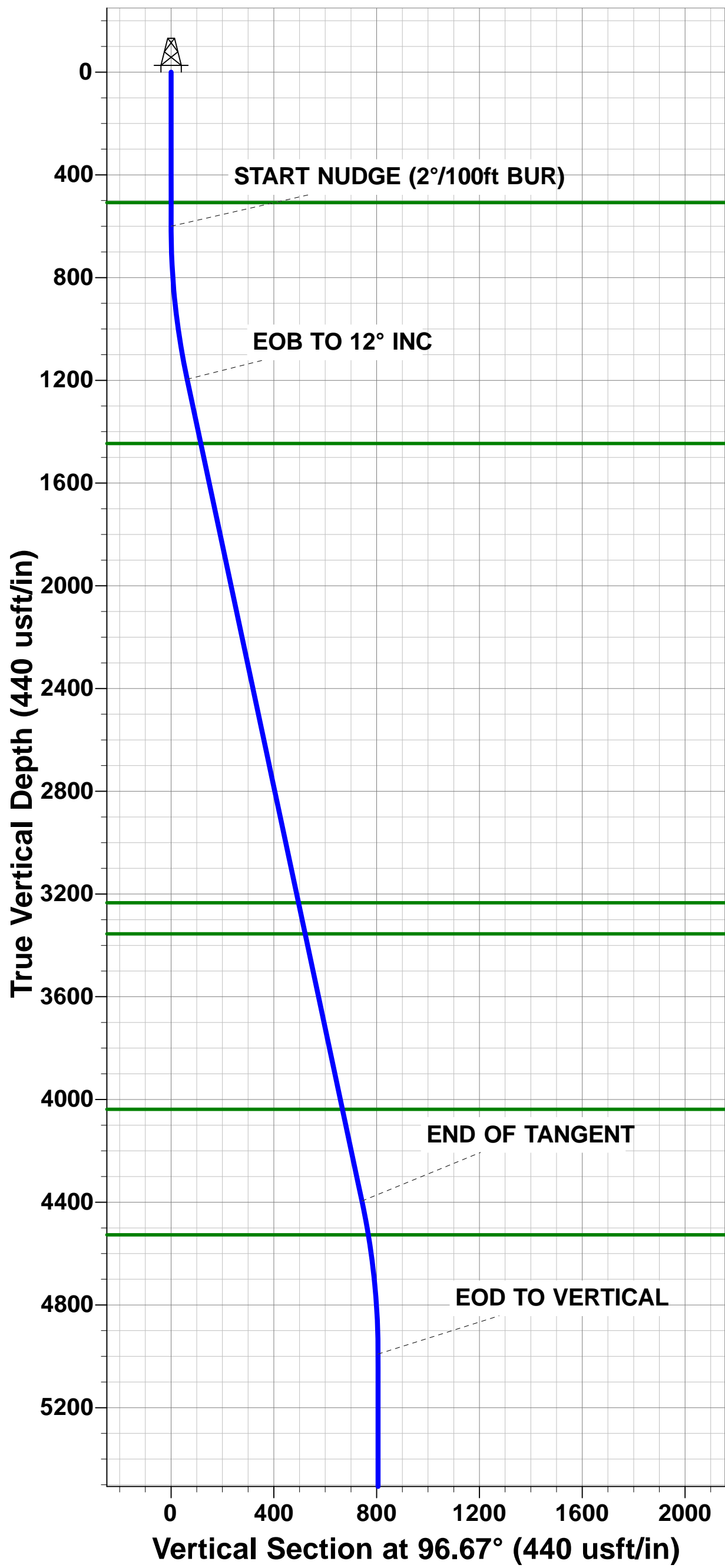
Magnetic Field  
Strength: 52566.3snT  
Dip Angle: 67.20°  
Date: 19/12/2017  
Model: IGRF2015

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
508.00	508.00	FOX HILLS BASE
1446.00	1455.97	PIERRE SHALE TOP
3234.00	3283.94	RICHARD SNADSTONE
3355.00	3407.64	PARKMAN SANDSTONE
4038.00	4105.91	SUSSEX SANDSTONE
4527.00	4605.22	SHANNON SANDSTONE
5922.00	6044.64	SHARON SPRINGS
5987.00	6144.04	NIOBRARA A CHALK
6017.00	6198.87	NIOBRARA A CHALK BASE
6057.00	6290.70	NIOBRARA B1 CHALK TOP
6074.00	6344.03	NIOBRARA B1 CHALK BASE
6090.00	6420.33	NIOBRARA B2 CHALK TOP

PROPOSED LOCAL COORDINATES:

SHL: 1778ft FSL & 1779ft FWL of Sec 31  
HZ LP: 1705ft FSL & 2140ft FEL of Sec 32  
BHL: 1705ft FSL & 460ft FEL of Sec 32



# Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well SHULL FED 31-32-9HN
<b>Company:</b>	MALLARD EXPLORATION	<b>TVD Reference:</b>	WELL @ 4900.00usft (Original Well Elev)
<b>Project:</b>	WELD COUNTY, COLORADO (NAD 83)	<b>MD Reference:</b>	WELL @ 4900.00usft (Original Well Elev)
<b>Site:</b>	NE SW SEC. 31 T9N R59W 6th P.M.	<b>North Reference:</b>	True
<b>Well:</b>	SHULL FED 31-32-9HN	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	ORIGINAL WELLBORE		
<b>Design:</b>	PROPOSAL #1		

<b>Project</b>	WELD COUNTY, COLORADO (NAD 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

Site	NE SW SEC. 31 T9N R59W 6th P.M.				
Site Position:		Northing:	1,502,994.38 usft	Latitude:	40.704761
From:	Lat/Long	Easting:	3,409,243.99 usft	Longitude:	-104.023893
Position Uncertainty:	0.00 usft	Slot Radius:	1.10000 ft	Grid Convergence:	0.95 °

Well	SHULL FED 31-32-9HN					
Well Position	+N/-S	-225.17 usft	Northing:	1,502,769.18 usft	Latitude:	40.704143
	+E/-W	-3.60 usft	Easting:	3,409,244.13 usft	Longitude:	-104.023906
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	4,880.00 usft

<b>Wellbore</b>	ORIGINAL WELLBORE				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2015	19/12/2017	7.78	67.20	52,566

<b>Design</b>	PROPOSAL #1			
<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	90.46

<b>Plan Sections</b>											
MD (usft)	Inc (°)	Azi (°)	Vertical Depth	SS (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usf)	Build Rate (°/100usf)	Turn Rate (°/100usf)	TFO (°)	Target
0.00	0.00	0.00	0.00	-4,900.00	0.00	0.00	0.00	0.00	0.00	0.00	
600.00	0.00	0.00	600.00	-4,300.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,200.15	12.00	96.67	1,195.77	-3,704.23	-7.27	62.21	2.00	2.00	0.00	96.67	
4,471.17	12.00	96.67	4,395.27	-504.73	-86.23	737.86	0.00	0.00	0.00	0.00	
5,071.31	0.00	0.00	4,991.04	91.04	-93.50	800.07	2.00	-2.00	0.00	180.00	
5,603.31	0.00	0.00	5,523.04	623.04	-93.50	800.07	0.00	0.00	0.00	0.00	KOP: SHULL FED 31-
6,503.31	90.00	89.79	6,096.00	1,196.00	-91.40	1,373.02	10.00	10.00	9.98	89.79	HZLP: SHULL FED 3-
13,433.03	90.00	89.80	6,096.00	1,196.00	-66.35	8,302.70	0.00	0.00	0.00	74.34	BHL: SHULL FED 31-

# Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well SHULL FED 31-32-9HN
<b>Company:</b>	MALLARD EXPLORATION	<b>TVD Reference:</b>	WELL @ 4900.00usft (Original Well Elev)
<b>Project:</b>	WELD COUNTY, COLORADO (NAD 83)	<b>MD Reference:</b>	WELL @ 4900.00usft (Original Well Elev)
<b>Site:</b>	NE SW SEC. 31 T9N R59W 6th P.M.	<b>North Reference:</b>	True
<b>Well:</b>	SHULL FED 31-32-9HN	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	ORIGINAL WELLBORE		
<b>Design:</b>	PROPOSAL #1		

Planned Survey										
MD (usft)	Inc (°)	Azi (°)	TVD (usft)	SS (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
<b>SHL: 1778ft FSL &amp; 1779ft FWL of Sec 31</b>										
0.00	0.00	0.00	0.00	4,900.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	4,800.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	4,700.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	4,600.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	4,500.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	4,400.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>FOX HILLS BASE</b>										
508.00	0.00	0.00	508.00	4,392.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>START NUDGE (2°/100ft BUR)</b>										
600.00	0.00	0.00	600.00	4,300.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	2.00	96.67	699.98	4,200.02	-0.20	1.73	1.73	2.00	2.00	0.00
800.00	4.00	96.67	799.84	4,100.16	-0.81	6.93	6.94	2.00	2.00	0.00
900.00	6.00	96.67	899.45	4,000.55	-1.82	15.59	15.60	2.00	2.00	0.00
1,000.00	8.00	96.67	998.70	3,901.30	-3.24	27.69	27.72	2.00	2.00	0.00
1,100.00	10.00	96.67	1,097.47	3,802.53	-5.05	43.23	43.27	2.00	2.00	0.00
1,200.00	12.00	96.67	1,195.62	3,704.38	-7.27	62.18	62.24	2.00	2.00	0.00
<b>EOB TO 12° INC</b>										
1,200.15	12.00	96.67	1,195.77	3,704.23	-7.27	62.21	62.27	2.00	2.00	0.00
1,300.00	12.00	96.67	1,293.44	3,606.56	-9.68	82.83	82.91	0.00	0.00	0.00
1,400.00	12.00	96.67	1,391.25	3,508.75	-12.09	103.49	103.58	0.00	0.00	0.00
<b>PIERRE SHALE TOP</b>										
1,455.97	12.00	96.67	1,446.00	3,454.00	-13.45	115.05	115.16	0.00	0.00	0.00
1,500.00	12.00	96.67	1,489.06	3,410.94	-14.51	124.15	124.26	0.00	0.00	0.00
1,600.00	12.00	96.67	1,586.88	3,313.12	-16.92	144.80	144.93	0.00	0.00	0.00
1,700.00	12.00	96.67	1,684.69	3,215.31	-19.34	165.46	165.61	0.00	0.00	0.00
1,800.00	12.00	96.67	1,782.51	3,117.49	-21.75	186.11	186.28	0.00	0.00	0.00
1,900.00	12.00	96.67	1,880.32	3,019.68	-24.16	206.77	206.96	0.00	0.00	0.00
2,000.00	12.00	96.67	1,978.13	2,921.87	-26.58	227.42	227.63	0.00	0.00	0.00
2,100.00	12.00	96.67	2,075.95	2,824.05	-28.99	248.08	248.30	0.00	0.00	0.00
2,200.00	12.00	96.67	2,173.76	2,726.24	-31.41	268.74	268.98	0.00	0.00	0.00
2,300.00	12.00	96.67	2,271.57	2,628.43	-33.82	289.39	289.65	0.00	0.00	0.00
2,400.00	12.00	96.67	2,369.39	2,530.61	-36.23	310.05	310.33	0.00	0.00	0.00
2,500.00	12.00	96.67	2,467.20	2,432.80	-38.65	330.70	331.00	0.00	0.00	0.00
2,600.00	12.00	96.67	2,565.01	2,334.99	-41.06	351.36	351.68	0.00	0.00	0.00
2,700.00	12.00	96.67	2,662.83	2,237.17	-43.48	372.01	372.35	0.00	0.00	0.00
2,800.00	12.00	96.67	2,760.64	2,139.36	-45.89	392.67	393.02	0.00	0.00	0.00
2,900.00	12.00	96.67	2,858.46	2,041.54	-48.30	413.33	413.70	0.00	0.00	0.00
3,000.00	12.00	96.67	2,956.27	1,943.73	-50.72	433.98	434.37	0.00	0.00	0.00
3,100.00	12.00	96.67	3,054.08	1,845.92	-53.13	454.64	455.05	0.00	0.00	0.00
3,200.00	12.00	96.67	3,151.90	1,748.10	-55.54	475.29	475.72	0.00	0.00	0.00
<b>RICHARD SNADSTONE</b>										
3,283.94	12.00	96.67	3,234.00	1,666.00	-57.57	492.63	493.07	0.00	0.00	0.00
3,300.00	12.00	96.67	3,249.71	1,650.29	-57.96	495.95	496.40	0.00	0.00	0.00
3,400.00	12.00	96.67	3,347.52	1,552.48	-60.37	516.60	517.07	0.00	0.00	0.00
<b>PARKMAN SANDSTONE</b>										
3,407.64	12.00	96.67	3,355.00	1,545.00	-60.56	518.18	518.65	0.00	0.00	0.00
3,500.00	12.00	96.67	3,445.34	1,454.66	-62.79	537.26	537.74	0.00	0.00	0.00
3,600.00	12.00	96.67	3,543.15	1,356.85	-65.20	557.91	558.42	0.00	0.00	0.00
3,700.00	12.00	96.67	3,640.97	1,259.03	-67.61	578.57	579.09	0.00	0.00	0.00
3,800.00	12.00	96.67	3,738.78	1,161.22	-70.03	599.23	599.77	0.00	0.00	0.00
3,900.00	12.00	96.67	3,836.59	1,063.41	-72.44	619.88	620.44	0.00	0.00	0.00
4,000.00	12.00	96.67	3,934.41	965.59	-74.86	640.54	641.12	0.00	0.00	0.00

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<b>Project:</b>	WELD COUNTY, COLORADO (NAD 83)	<b>MD Reference:</b>	WELL @ 4900.00usft (Original Well Elev)
<b>Site:</b>	NE SW SEC. 31 T9N R59W 6th P.M.	<b>North Reference:</b>	True
<b>Well:</b>	SHULL FED 31-32-9HN	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	ORIGINAL WELLBORE		
<b>Design:</b>	PROPOSAL #1		

Planned Survey										
MD (usft)	Inc (°)	Azi (°)	TVD (usft)	SS (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,100.00	12.00	96.67	4,032.22	867.78	-77.27	661.19	661.79	0.00	0.00	0.00
<b>SUSSEX SANDSTONE</b>										
<b>4,105.91</b>	<b>12.00</b>	<b>96.67</b>	<b>4,038.00</b>	<b>862.00</b>	<b>-77.41</b>	<b>662.41</b>	<b>663.01</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
4,200.00	12.00	96.67	4,130.03	769.97	-79.68	681.85	682.46	0.00	0.00	0.00
4,300.00	12.00	96.67	4,227.85	672.15	-82.10	702.50	703.14	0.00	0.00	0.00
4,400.00	12.00	96.67	4,325.66	574.34	-84.51	723.16	723.81	0.00	0.00	0.00
<b>END OF TANGENT</b>										
<b>4,471.17</b>	<b>12.00</b>	<b>96.67</b>	<b>4,395.27</b>	<b>504.73</b>	<b>-86.23</b>	<b>737.86</b>	<b>738.53</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
4,500.00	11.43	96.67	4,423.50	476.50	-86.91	743.67	744.35	2.00	-2.00	0.00
4,600.00	9.43	96.67	4,521.85	378.15	-89.01	761.65	762.34	2.00	-2.00	0.00
<b>SHANNON SANDSTONE</b>										
<b>4,605.22</b>	<b>9.32</b>	<b>96.67</b>	<b>4,527.00</b>	<b>373.00</b>	<b>-89.11</b>	<b>762.49</b>	<b>763.18</b>	<b>2.00</b>	<b>-2.00</b>	<b>0.00</b>
4,700.00	7.43	96.67	4,620.76	279.24	-90.71	776.20	776.90	2.00	-2.00	0.00
4,800.00	5.43	96.67	4,720.13	179.87	-92.01	787.32	788.03	2.00	-2.00	0.00
4,900.00	3.43	96.67	4,819.83	80.17	-92.91	794.98	795.70	2.00	-2.00	0.00
5,000.00	1.43	96.67	4,919.73	-19.73	-93.40	799.19	799.91	2.00	-2.00	0.00
<b>EOD TO VERTICAL</b>										
<b>5,071.31</b>	<b>0.00</b>	<b>0.00</b>	<b>4,991.04</b>	<b>-91.04</b>	<b>-93.50</b>	<b>800.07</b>	<b>800.79</b>	<b>2.00</b>	<b>-2.00</b>	<b>0.00</b>
5,100.00	0.00	0.00	5,019.73	-119.73	-93.50	800.07	800.79	0.00	0.00	0.00
5,200.00	0.00	0.00	5,119.73	-219.73	-93.50	800.07	800.79	0.00	0.00	0.00
5,300.00	0.00	0.00	5,219.73	-319.73	-93.50	800.07	800.79	0.00	0.00	0.00
5,400.00	0.00	0.00	5,319.73	-419.73	-93.50	800.07	800.79	0.00	0.00	0.00
5,500.00	0.00	0.00	5,419.73	-519.73	-93.50	800.07	800.79	0.00	0.00	0.00
5,600.00	0.00	0.00	5,519.73	-619.73	-93.50	800.07	800.79	0.00	0.00	0.00
<b>KOP (10°/100ft BUR)</b>										
<b>5,603.31</b>	<b>0.00</b>	<b>0.00</b>	<b>5,523.04</b>	<b>-623.04</b>	<b>-93.50</b>	<b>800.07</b>	<b>800.79</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
5,700.00	9.67	89.79	5,619.27	-719.27	-93.47	808.21	808.93	10.00	10.00	0.00
5,800.00	19.67	89.79	5,715.88	-815.88	-93.38	833.50	834.22	10.00	10.00	0.00
5,900.00	29.67	89.79	5,806.64	-906.64	-93.22	875.18	875.90	10.00	10.00	0.00
6,000.00	39.67	89.79	5,888.78	-988.78	-93.02	931.99	932.71	10.00	10.00	0.00
<b>SHARON SPRINGS</b>										
<b>6,044.64</b>	<b>44.13</b>	<b>89.79</b>	<b>5,922.00</b>	<b>-1,022.00</b>	<b>-92.91</b>	<b>961.79</b>	<b>962.51</b>	<b>10.00</b>	<b>10.00</b>	<b>0.00</b>
6,100.00	49.67	89.79	5,959.81	-1,059.81	-92.76	1,002.20	1,002.91	10.00	10.00	0.00
<b>NIORARA A CHALK</b>										
<b>6,144.04</b>	<b>54.07</b>	<b>89.79</b>	<b>5,987.00</b>	<b>-1,087.00</b>	<b>-92.63</b>	<b>1,036.84</b>	<b>1,037.54</b>	<b>10.00</b>	<b>10.00</b>	<b>0.00</b>
<b>NIORARA A CHALK BASE</b>										
<b>6,198.87</b>	<b>59.56</b>	<b>89.79</b>	<b>6,017.00</b>	<b>-1,117.00</b>	<b>-92.46</b>	<b>1,082.71</b>	<b>1,083.41</b>	<b>10.00</b>	<b>10.00</b>	<b>0.00</b>
6,200.00	59.67	89.79	6,017.57	-1,117.57	-92.46	1,083.68	1,084.38	10.00	10.00	0.00
<b>NIORARA B1 CHALK TOP</b>										
<b>6,290.70</b>	<b>68.74</b>	<b>89.79</b>	<b>6,057.00</b>	<b>-1,157.00</b>	<b>-92.16</b>	<b>1,165.25</b>	<b>1,165.95</b>	<b>10.00</b>	<b>10.00</b>	<b>0.00</b>
6,300.00	69.67	89.79	6,060.30	-1,160.30	-92.13	1,173.95	1,174.65	10.00	10.00	0.00
<b>NIORARA B1 CHALK BASE</b>										
<b>6,344.03</b>	<b>74.07</b>	<b>89.79</b>	<b>6,074.00</b>	<b>-1,174.00</b>	<b>-91.97</b>	<b>1,215.78</b>	<b>1,216.48</b>	<b>10.00</b>	<b>10.00</b>	<b>0.00</b>
6,400.00	79.67	89.79	6,086.71	-1,186.71	-91.77	1,270.27	1,270.96	10.00	10.00	0.00
<b>NIORARA B2 CHALK TOP</b>										
<b>6,420.33</b>	<b>81.70</b>	<b>89.79</b>	<b>6,090.00</b>	<b>-1,190.00</b>	<b>-91.70</b>	<b>1,290.33</b>	<b>1,291.02</b>	<b>10.00</b>	<b>10.00</b>	<b>0.00</b>
6,500.00	89.67	89.79	6,095.99	-1,195.99	-91.41	1,369.71	1,370.39	10.00	10.00	0.00
<b>HZ LP: 1705ft FSL &amp; 2140ft FEL of Sec 32</b>										
<b>6,503.31</b>	<b>90.00</b>	<b>89.79</b>	<b>6,096.00</b>	<b>-1,196.00</b>	<b>-91.40</b>	<b>1,373.02</b>	<b>1,373.70</b>	<b>10.00</b>	<b>10.00</b>	<b>0.00</b>
6,600.00	90.00	89.79	6,096.00	-1,196.00	-91.04	1,469.71	1,470.39	0.00	0.00	0.00
6,700.00	90.00	89.79	6,096.00	-1,196.00	-90.67	1,569.71	1,570.38	0.00	0.00	0.00
6,800.00	90.00	89.79	6,096.00	-1,196.00	-90.31	1,669.71	1,670.37	0.00	0.00	0.00



# Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well SHULL FED 31-32-9HN
<b>Company:</b>	MALLARD EXPLORATION	<b>TVD Reference:</b>	WELL @ 4900.00usft (Original Well Elev)
<b>Project:</b>	WELD COUNTY, COLORADO (NAD 83)	<b>MD Reference:</b>	WELL @ 4900.00usft (Original Well Elev)
<b>Site:</b>	NE SW SEC. 31 T9N R59W 6th P.M.	<b>North Reference:</b>	True
<b>Well:</b>	SHULL FED 31-32-9HN	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	ORIGINAL WELLBORE		
<b>Design:</b>	PROPOSAL #1		

Planned Survey										
MD (usft)	Inc (°)	Azi (°)	TVD (usft)	SS (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
6,900.00	90.00	89.79	6,096.01	-1,196.01	-89.94	1,769.71	1,770.37	0.00	0.00	0.00
7,000.00	90.00	89.79	6,096.01	-1,196.01	-89.58	1,869.70	1,870.36	0.00	0.00	0.00
7,100.00	90.00	89.79	6,096.01	-1,196.01	-89.21	1,969.70	1,970.35	0.00	0.00	0.00
7,200.00	90.00	89.79	6,096.01	-1,196.01	-88.84	2,069.70	2,070.35	0.00	0.00	0.00
7,300.00	90.00	89.79	6,096.01	-1,196.01	-88.48	2,169.70	2,170.34	0.00	0.00	0.00
7,400.00	90.00	89.79	6,096.01	-1,196.01	-88.11	2,269.70	2,270.33	0.00	0.00	0.00
7,500.00	90.00	89.79	6,096.01	-1,196.01	-87.75	2,369.70	2,370.33	0.00	0.00	0.00
7,600.00	90.00	89.79	6,096.01	-1,196.01	-87.38	2,469.70	2,470.32	0.00	0.00	0.00
7,700.00	90.00	89.79	6,096.02	-1,196.02	-87.02	2,569.70	2,570.31	0.00	0.00	0.00
7,800.00	90.00	89.79	6,096.02	-1,196.02	-86.65	2,669.70	2,670.31	0.00	0.00	0.00
7,900.00	90.00	89.79	6,096.02	-1,196.02	-86.29	2,769.70	2,770.30	0.00	0.00	0.00
8,000.00	90.00	89.79	6,096.02	-1,196.02	-85.92	2,869.70	2,870.29	0.00	0.00	0.00
8,100.00	90.00	89.79	6,096.02	-1,196.02	-85.56	2,969.70	2,970.29	0.00	0.00	0.00
8,200.00	90.00	89.79	6,096.02	-1,196.02	-85.19	3,069.70	3,070.28	0.00	0.00	0.00
8,300.00	90.00	89.79	6,096.02	-1,196.02	-84.83	3,169.70	3,170.27	0.00	0.00	0.00
8,400.00	90.00	89.79	6,096.02	-1,196.02	-84.46	3,269.70	3,270.27	0.00	0.00	0.00
8,500.00	90.00	89.79	6,096.02	-1,196.02	-84.10	3,369.69	3,370.26	0.00	0.00	0.00
8,600.00	90.00	89.79	6,096.02	-1,196.02	-83.74	3,469.69	3,470.25	0.00	0.00	0.00
8,700.00	90.00	89.79	6,096.02	-1,196.02	-83.37	3,569.69	3,570.25	0.00	0.00	0.00
8,800.00	90.00	89.79	6,096.02	-1,196.02	-83.01	3,669.69	3,670.24	0.00	0.00	0.00
8,900.00	90.00	89.79	6,096.02	-1,196.02	-82.65	3,769.69	3,770.23	0.00	0.00	0.00
9,000.00	90.00	89.79	6,096.03	-1,196.03	-82.28	3,869.69	3,870.23	0.00	0.00	0.00
9,100.00	90.00	89.79	6,096.03	-1,196.03	-81.92	3,969.69	3,970.22	0.00	0.00	0.00
9,200.00	90.00	89.79	6,096.03	-1,196.03	-81.56	4,069.69	4,070.21	0.00	0.00	0.00
9,300.00	90.00	89.79	6,096.03	-1,196.03	-81.19	4,169.69	4,170.20	0.00	0.00	0.00
9,400.00	90.00	89.79	6,096.03	-1,196.03	-80.83	4,269.69	4,270.20	0.00	0.00	0.00
9,500.00	90.00	89.79	6,096.03	-1,196.03	-80.47	4,369.69	4,370.19	0.00	0.00	0.00
9,600.00	90.00	89.79	6,096.03	-1,196.03	-80.11	4,469.69	4,470.18	0.00	0.00	0.00
9,700.00	90.00	89.79	6,096.03	-1,196.03	-79.75	4,569.69	4,570.18	0.00	0.00	0.00
9,800.00	90.00	89.79	6,096.03	-1,196.03	-79.38	4,669.69	4,670.17	0.00	0.00	0.00
9,900.00	90.00	89.79	6,096.03	-1,196.03	-79.02	4,769.69	4,770.16	0.00	0.00	0.00
10,000.00	90.00	89.79	6,096.03	-1,196.03	-78.66	4,869.68	4,870.16	0.00	0.00	0.00
10,100.00	90.00	89.79	6,096.03	-1,196.03	-78.30	4,969.68	4,970.15	0.00	0.00	0.00
10,200.00	90.00	89.79	6,096.03	-1,196.03	-77.94	5,069.68	5,070.14	0.00	0.00	0.00
10,300.00	90.00	89.79	6,096.03	-1,196.03	-77.58	5,169.68	5,170.14	0.00	0.00	0.00
10,400.00	90.00	89.79	6,096.03	-1,196.03	-77.22	5,269.68	5,270.13	0.00	0.00	0.00
10,500.00	90.00	89.79	6,096.03	-1,196.03	-76.86	5,369.68	5,370.12	0.00	0.00	0.00
10,600.00	90.00	89.79	6,096.03	-1,196.03	-76.50	5,469.68	5,470.12	0.00	0.00	0.00
10,700.00	90.00	89.79	6,096.03	-1,196.03	-76.14	5,569.68	5,570.11	0.00	0.00	0.00
10,800.00	90.00	89.79	6,096.03	-1,196.03	-75.77	5,669.68	5,670.10	0.00	0.00	0.00
10,900.00	90.00	89.79	6,096.03	-1,196.03	-75.42	5,769.68	5,770.10	0.00	0.00	0.00
11,000.00	90.00	89.79	6,096.03	-1,196.03	-75.06	5,869.68	5,870.09	0.00	0.00	0.00
11,100.00	90.00	89.79	6,096.02	-1,196.02	-74.70	5,969.68	5,970.08	0.00	0.00	0.00
11,200.00	90.00	89.79	6,096.02	-1,196.02	-74.34	6,069.68	6,070.08	0.00	0.00	0.00
11,300.00	90.00	89.79	6,096.02	-1,196.02	-73.98	6,169.68	6,170.07	0.00	0.00	0.00
11,400.00	90.00	89.79	6,096.02	-1,196.02	-73.62	6,269.68	6,270.06	0.00	0.00	0.00
11,500.00	90.00	89.79	6,096.02	-1,196.02	-73.26	6,369.67	6,370.06	0.00	0.00	0.00
11,600.00	90.00	89.79	6,096.02	-1,196.02	-72.90	6,469.67	6,470.05	0.00	0.00	0.00
11,700.00	90.00	89.79	6,096.02	-1,196.02	-72.54	6,569.67	6,570.04	0.00	0.00	0.00
11,800.00	90.00	89.79	6,096.02	-1,196.02	-72.18	6,669.67	6,670.04	0.00	0.00	0.00
11,900.00	90.00	89.79	6,096.02	-1,196.02	-71.82	6,769.67	6,770.03	0.00	0.00	0.00
12,000.00	90.00	89.79	6,096.02	-1,196.02	-71.47	6,869.67	6,870.02	0.00	0.00	0.00
12,100.00	90.00	89.79	6,096.02	-1,196.02	-71.11	6,969.67	6,970.02	0.00	0.00	0.00
12,200.00	90.00	89.80	6,096.02	-1,196.02	-70.75	7,069.67	7,070.01	0.00	0.00	0.00

# Planning Report



<b>Database:</b>	EDM 5000.1 Single User Db	<b>Local Co-ordinate Reference:</b>	Well SHULL FED 31-32-9HN
<b>Company:</b>	MALLARD EXPLORATION	<b>TVD Reference:</b>	WELL @ 4900.00usft (Original Well Elev)
<b>Project:</b>	WELD COUNTY, COLORADO (NAD 83)	<b>MD Reference:</b>	WELL @ 4900.00usft (Original Well Elev)
<b>Site:</b>	NE SW SEC. 31 T9N R59W 6th P.M.	<b>North Reference:</b>	True
<b>Well:</b>	SHULL FED 31-32-9HN	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	ORIGINAL WELLBORE		
<b>Design:</b>	PROPOSAL #1		

Planned Survey										
MD (usft)	Inc (°)	Azi (°)	TVD (usft)	SS (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
12,300.00	90.00	89.80	6,096.02	-1,196.02	-70.39	7,169.67	7,170.00	0.00	0.00	0.00
12,400.00	90.00	89.80	6,096.01	-1,196.01	-70.04	7,269.67	7,270.00	0.00	0.00	0.00
12,500.00	90.00	89.80	6,096.01	-1,196.01	-69.68	7,369.67	7,369.99	0.00	0.00	0.00
12,600.00	90.00	89.80	6,096.01	-1,196.01	-69.32	7,469.67	7,469.98	0.00	0.00	0.00
12,700.00	90.00	89.80	6,096.01	-1,196.01	-68.96	7,569.67	7,569.98	0.00	0.00	0.00
12,800.00	90.00	89.80	6,096.01	-1,196.01	-68.61	7,669.67	7,669.97	0.00	0.00	0.00
12,900.00	90.00	89.80	6,096.01	-1,196.01	-68.25	7,769.67	7,769.96	0.00	0.00	0.00
13,000.00	90.00	89.80	6,096.01	-1,196.01	-67.89	7,869.67	7,869.96	0.00	0.00	0.00
13,100.00	90.00	89.80	6,096.01	-1,196.01	-67.54	7,969.66	7,969.95	0.00	0.00	0.00
13,200.00	90.00	89.80	6,096.00	-1,196.00	-67.18	8,069.66	8,069.94	0.00	0.00	0.00
13,300.00	90.00	89.80	6,096.00	-1,196.00	-66.83	8,169.66	8,169.94	0.00	0.00	0.00
13,400.00	90.00	89.80	6,096.00	-1,196.00	-66.47	8,269.66	8,269.93	0.00	0.00	0.00
<b>BHL: 1705ft FSL &amp; 460ft FEL of Sec 32</b>										
<b>13,433.03</b>	<b>90.00</b>	<b>89.80</b>	<b>6,096.00</b>	<b>-1,196.00</b>	<b>-66.35</b>	<b>8,302.69</b>	<b>8,302.96</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>

Formations						
MD (usft)	TVD (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
508.00	508.00	FOX HILLS BASE				
1,455.97	1,446.00	PIERRE SHALE TOP				
3,283.94	3,234.00	RICHARD SNADSTONE				
3,407.64	3,355.00	PARKMAN SANDSTONE				
4,105.91	4,038.00	SUSSEX SANDSTONE				
4,605.22	4,527.00	SHANNON SANDSTONE				
6,044.64	5,922.00	SHARON SPRINGS				
6,144.04	5,987.00	NIOBRARA A CHALK				
6,198.87	6,017.00	NIOBRARA A CHALK BASE				
6,290.70	6,057.00	NIOBRARA B1 CHALK TOP				
6,344.03	6,074.00	NIOBRARA B1 CHALK BASE				
6,420.33	6,090.00	NIOBRARA B2 CHALK TOP				

Plan Annotations				
MD (usft)	TVD (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
0.00	0.00	0.00	0.00	SHL: 1778ft FSL & 1779ft FWL of Sec 31
600.00	600.00	0.00	0.00	START NUDGE (2"/100ft BUR)
1,200.15	1,195.77	-7.27	62.21	EOB TO 12° INC
4,471.17	4,395.27	-86.23	737.86	END OF TANGENT
5,071.31	4,991.04	-93.50	800.07	EOD TO VERTICAL
5,603.31	5,523.04	-93.50	800.07	KOP (10"/100ft BUR)
6,503.31	6,096.00	-91.40	1,373.02	HZ LP: 1705ft FSL & 2140ft FEL of Sec 32
13,433.03	6,096.00	-66.35	8,302.69	BHL: 1705ft FSL & 460ft FEL of Sec 32