

MALLARD EXPLORATION

WELD COUNTY, COLORADO (NAD 83)

SW SW SEC. 31 T8N R59W 6th P.M.

MOTTLED SOUTH 6-4HN

ORIGINAL WELLBORE

19 April, 2018

Plan: PROPOSAL #1



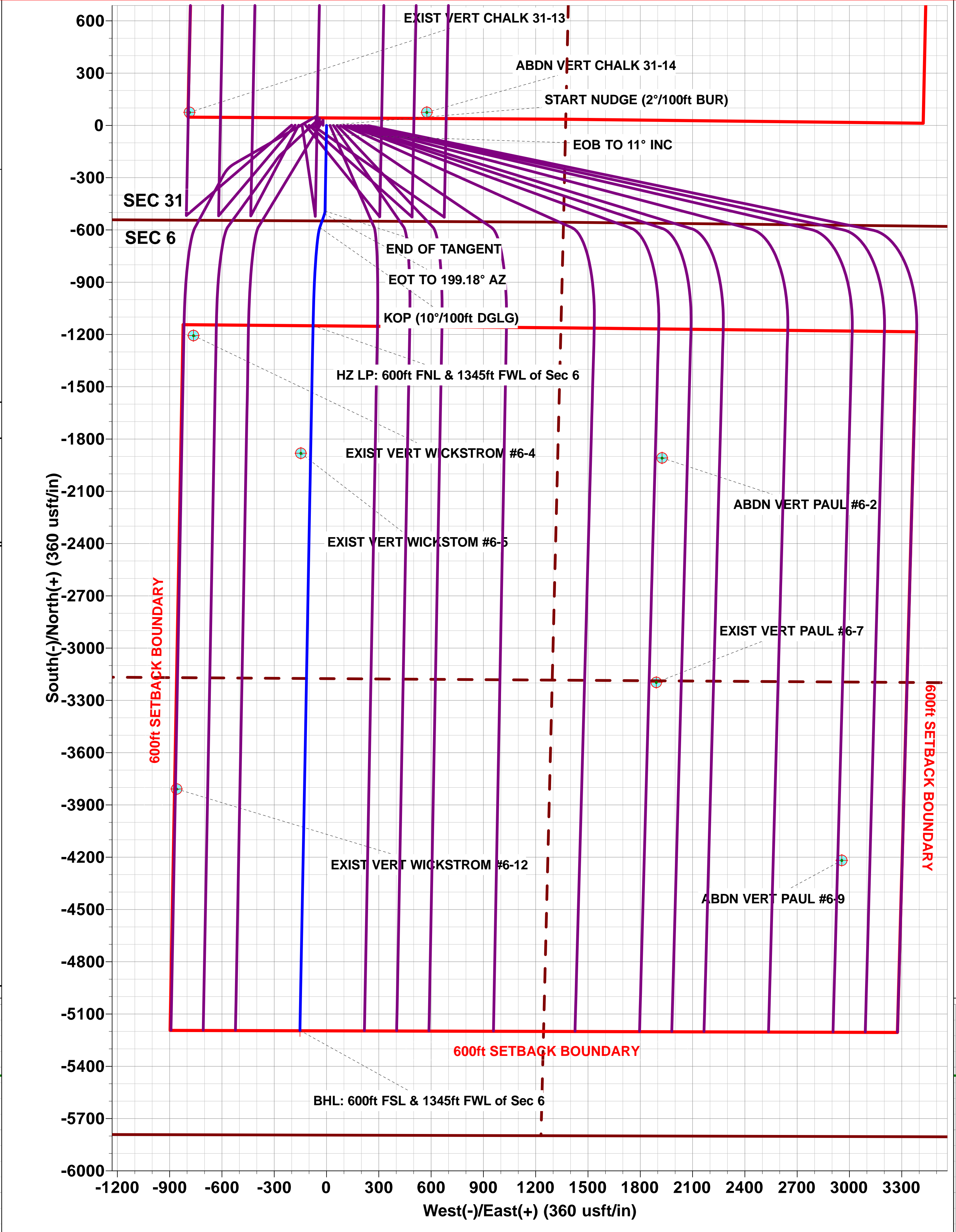
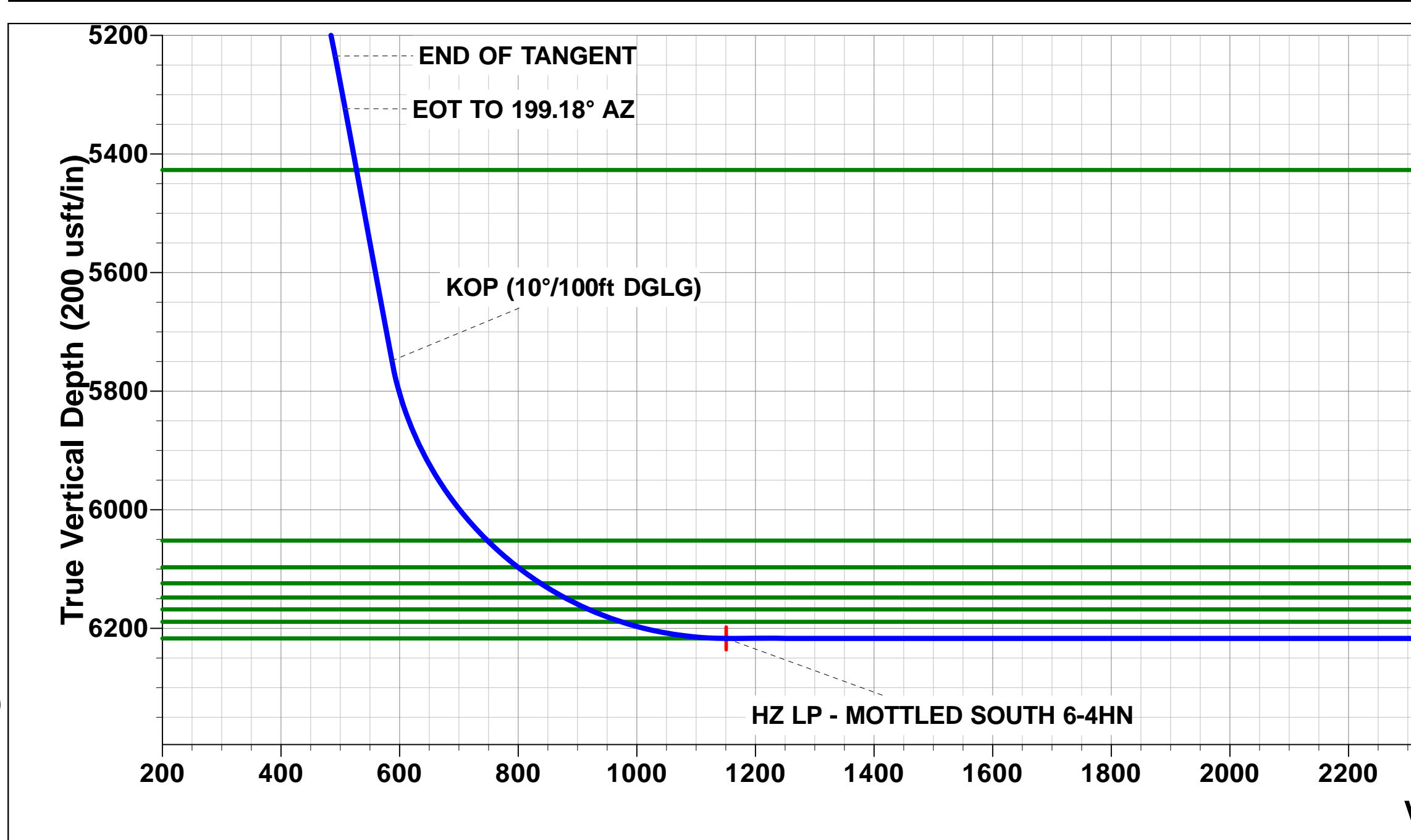
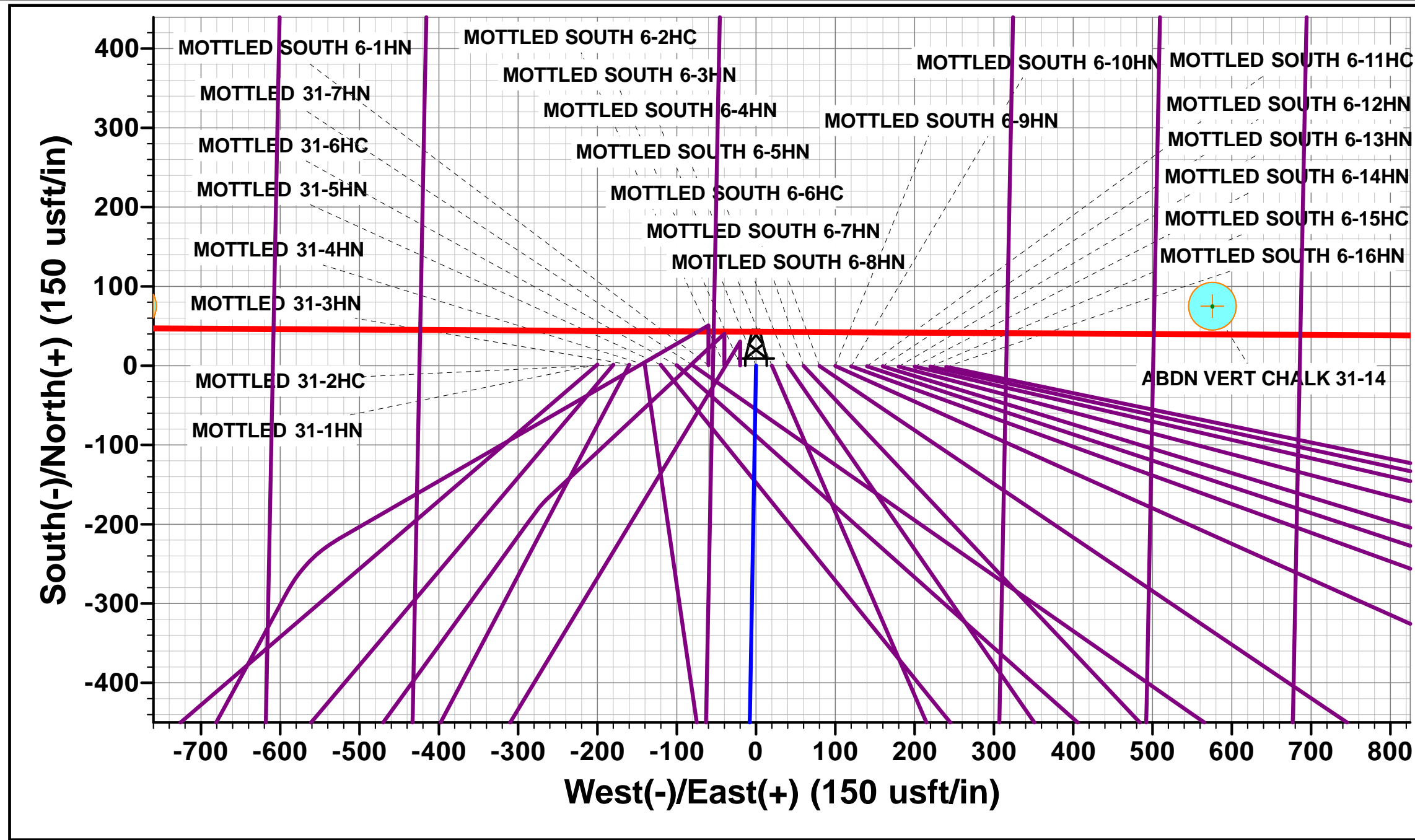
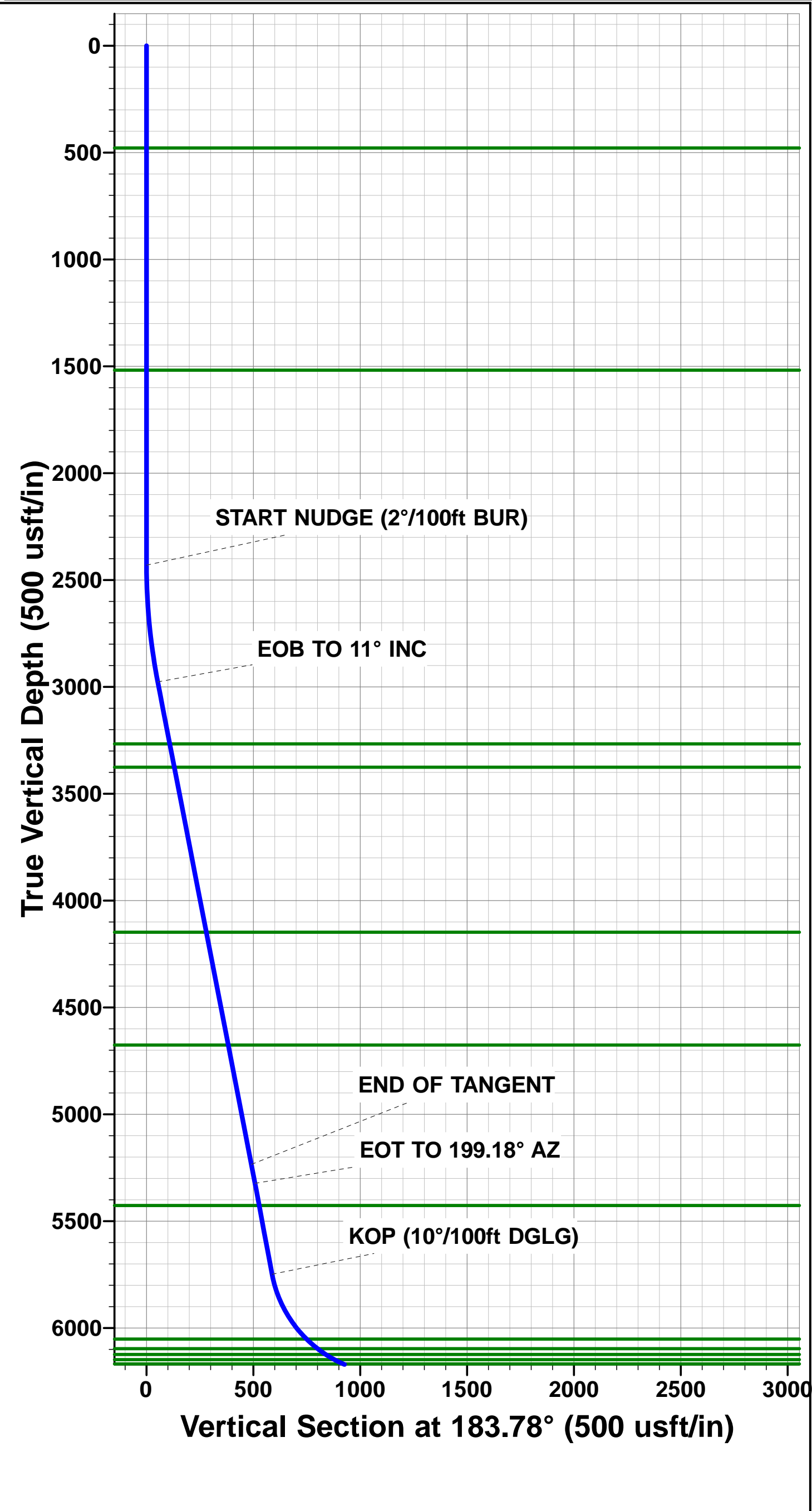


Project: WELD COUNTY, COLORADO (NAD 83)
Site: SW SW SEC. 31 T8N R59W 6th P.M.
Well: MOTTLED SOUTH 6-4HN
Wellbore: ORIGINAL WELLBORE
Design: PROPOSAL #1

ANNOTATIONS									
TVD	MD	Inc	Azi	+N/-S	+E/-W	Vsect	Dep	Annotation	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	SHL: 550ft FSL & 1399ft FWL of Sec 31	
2430.50	2430.50	0.00	0.00	0.00	0.00	0.00	0.00	START NUDGE (2°/100ft BUR)	
2977.13	2980.50	11.00	181.00	-52.63	-0.92	52.63	52.63	EOB TO 11° INC	
5234.87	5280.50	11.00	181.00	-491.42	-8.58	491.46	491.49	END OF TANGENT	
5323.45	5370.71	11.00	199.18	-508.16	-11.56	508.28	508.64	EOT TO 199.18° AZ	
5748.79	5804.01	11.00	199.18	-586.23	-38.72	587.12	591.30	KOP (10°/100ft DGLG)	
6217.00	6599.54	90.00	181.06	-1149.07	-77.47	1150.85	1156.24	HZ LP: 600ft FNL & 1345ft FWL of Sec 6	
6217.00	10645.69	90.00	181.06	-5194.52	-152.46	5196.76	5202.38	BHL: 600ft FSL & 1345ft FWL of Sec 6	

PROPOSED LOCAL COORDINATES:
SHL: 550ft FSL & 1399ft FWL Sec 31
HZ LP: 600ft FNL & 1345ft FWL Sec 6
BHL: 600ft FSL & 1345ft FWL of Sec 6

WELLBORE TARGET DETAILS (LAT/LONG)					
Name	TVD	+N/-S	+E/-W	Latitude	Longitude
HZ LP - MOTTLED SOUTH 6-4HN	6217.00	-1149.07	-77.47	40.609930	-104.025912
BHL - MOTTLED SOUTH 6-4HN	6217.00	-5194.52	-152.46	40.598826	-104.026182



Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well MOTTLED SOUTH 6-4HN
Company:	MALLARD EXPLORATION	TVD Reference:	KB-EST @ 4988.00usft (Original Well Elev)
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB-EST @ 4988.00usft (Original Well Elev)
Site:	SW SW SEC. 31 T8N R59W 6th P.M.	North Reference:	True
Well:	MOTTLED SOUTH 6-4HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #1		

Project	WELD COUNTY, COLORADO (NAD 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		SW SW SEC. 31 T8N R59W 6th P.M.			
Site Position:		Northing:	1,469,589.22 usft	Latitude:	40.613088
From:	Lat/Long	Easting:	3,409,117.03 usft	Longitude:	-104.026353
Position Uncertainty:	0.00 usft	Slot Radius:	1.10000ft	Grid Convergence:	0.95 °

Well	MOTTLED SOUTH 6-4HN					
Well Position	+N/-S	-1.46 usft	Northing:	1,469,591.08 usfi	Latitude:	40.613084
	+E/-W	199.90 usft	Easting:	3,409,316.93 usfi	Longitude:	-104.025633
Position Uncertainty		0.00 usft	Wellhead Elevation:	usfi	Ground Level:	4,968.00 usft

Wellbore	ORIGINAL WELLBORE				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	19/04/2018	7.74	67.11	52,481

Design	PROPOSAL #1			
Audit Notes:				
Version:	Phase:	PROTOTYPE	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	6,217.00	0.00	0.00	181.68

Plan Sections											
MD (usft)	Inc (°)	Azi (°)	Vertical Depth	SS (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	-4,988.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,430.50	0.00	0.00	2,430.50	-2,557.50	0.00	0.00	0.00	0.00	0.00	0.00	
2,980.50	11.00	181.00	2,977.13	-2,010.87	-52.63	-0.92	2.00	2.00	0.00	181.00	
5,280.50	11.00	181.00	5,234.87	246.87	-491.42	-8.58	0.00	0.00	0.00	0.00	
5,370.71	11.00	199.18	5,323.45	335.45	-508.16	-11.56	3.83	0.00	20.16	98.95	
5,804.01	11.00	199.18	5,748.79	760.79	-586.23	-38.72	0.00	0.00	0.00	0.00	
6,599.54	90.00	181.06	6,217.00	1,229.00	-1,149.07	-77.47	10.00	9.93	-2.28	-18.44	HZ LP - MOTTLED
10,645.69	90.00	181.06	6,217.00	1,229.00	-5,194.52	-152.46	0.00	0.00	0.00	0.00	BHL - MOTTLED S

Planning Report



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Company:	MALLARD EXPLORATION	TVD Reference:	KB-EST @ 4988.00usft (Original Well Elev)
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB-EST @ 4988.00usft (Original Well Elev)
Site:	SW SW SEC. 31 T8N R59W 6th P.M.	North Reference:	True
Well:	MOTTLED SOUTH 6-4HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	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)
SHL: 550ft FSL & 1399ft FWL of Sec 31										
0.00	0.00	0.00	0.00	4,988.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	4,888.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	4,788.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	4,688.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	4,588.00	0.00	0.00	0.00	0.00	0.00	0.00
Fox Hills Base										
479.00	0.00	0.00	479.00	4,509.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	4,488.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	600.00	4,388.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	4,288.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	4,188.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	4,088.00	0.00	0.00	0.00	0.00	0.00	0.00
1,000.00	0.00	0.00	1,000.00	3,988.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.00	1,100.00	3,888.00	0.00	0.00	0.00	0.00	0.00	0.00
1,200.00	0.00	0.00	1,200.00	3,788.00	0.00	0.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.00	1,300.00	3,688.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	0.00	0.00	1,400.00	3,588.00	0.00	0.00	0.00	0.00	0.00	0.00
1,500.00	0.00	0.00	1,500.00	3,488.00	0.00	0.00	0.00	0.00	0.00	0.00
Pierre Shale Top										
1,518.00	0.00	0.00	1,518.00	3,470.00	0.00	0.00	0.00	0.00	0.00	0.00
1,600.00	0.00	0.00	1,600.00	3,388.00	0.00	0.00	0.00	0.00	0.00	0.00
1,700.00	0.00	0.00	1,700.00	3,288.00	0.00	0.00	0.00	0.00	0.00	0.00
1,800.00	0.00	0.00	1,800.00	3,188.00	0.00	0.00	0.00	0.00	0.00	0.00
1,900.00	0.00	0.00	1,900.00	3,088.00	0.00	0.00	0.00	0.00	0.00	0.00
2,000.00	0.00	0.00	2,000.00	2,988.00	0.00	0.00	0.00	0.00	0.00	0.00
2,100.00	0.00	0.00	2,100.00	2,888.00	0.00	0.00	0.00	0.00	0.00	0.00
2,200.00	0.00	0.00	2,200.00	2,788.00	0.00	0.00	0.00	0.00	0.00	0.00
2,300.00	0.00	0.00	2,300.00	2,688.00	0.00	0.00	0.00	0.00	0.00	0.00
2,400.00	0.00	0.00	2,400.00	2,588.00	0.00	0.00	0.00	0.00	0.00	0.00
START NUDGE (2°/100ft BUR)										
2,430.50	0.00	0.00	2,430.50	2,557.50	0.00	0.00	0.00	0.00	0.00	0.00
2,500.00	1.39	181.00	2,499.99	2,488.01	-0.84	-0.01	0.84	2.00	2.00	0.00
2,600.00	3.39	181.00	2,599.90	2,388.10	-5.01	-0.09	5.01	2.00	2.00	0.00
2,700.00	5.39	181.00	2,699.60	2,288.40	-12.67	-0.22	12.67	2.00	2.00	0.00
2,800.00	7.39	181.00	2,798.98	2,189.02	-23.79	-0.42	23.79	2.00	2.00	0.00
2,900.00	9.39	181.00	2,897.90	2,090.10	-38.38	-0.67	38.38	2.00	2.00	0.00
EOB TO 11° INC										
2,980.50	11.00	181.00	2,977.13	2,010.87	-52.63	-0.92	52.63	2.00	2.00	0.00
3,000.00	11.00	181.00	2,996.27	1,991.73	-56.35	-0.98	56.35	0.00	0.00	0.00
3,100.00	11.00	181.00	3,094.43	1,893.57	-75.42	-1.32	75.43	0.00	0.00	0.00
3,200.00	11.00	181.00	3,192.59	1,795.41	-94.50	-1.65	94.51	0.00	0.00	0.00
Richard Sandstone										
3,275.80	11.00	181.00	3,267.00	1,721.00	-108.96	-1.90	108.97	0.00	0.00	0.00
3,300.00	11.00	181.00	3,290.76	1,697.24	-113.58	-1.98	113.59	0.00	0.00	0.00
Parkman Sandstone										
3,386.84	11.00	181.00	3,376.00	1,612.00	-130.15	-2.27	130.16	0.00	0.00	0.00
3,400.00	11.00	181.00	3,388.92	1,599.08	-132.66	-2.32	132.67	0.00	0.00	0.00
3,500.00	11.00	181.00	3,487.08	1,500.92	-151.74	-2.65	151.75	0.00	0.00	0.00
3,600.00	11.00	181.00	3,585.25	1,402.75	-170.81	-2.98	170.83	0.00	0.00	0.00
3,700.00	11.00	181.00	3,683.41	1,304.59	-189.89	-3.31	189.91	0.00	0.00	0.00
3,800.00	11.00	181.00	3,781.57	1,206.43	-208.97	-3.65	208.99	0.00	0.00	0.00
3,900.00	11.00	181.00	3,879.73	1,108.27	-228.05	-3.98	228.07	0.00	0.00	0.00

Planning Report



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Site:	SW SW SEC. 31 T8N R59W 6th P.M.	North Reference:	True
Well:	MOTTLED SOUTH 6-4HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	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)
4,000.00	11.00	181.00	3,977.90	1,010.10	-247.13	-4.31	247.15	0.00	0.00	0.00
4,100.00	11.00	181.00	4,076.06	911.94	-266.20	-4.65	266.23	0.00	0.00	0.00
Sussex Sandstone										
4,173.29	11.00	181.00	4,148.00	840.00	-280.19	-4.89	280.21	0.00	0.00	0.00
4,200.00	11.00	181.00	4,174.22	813.78	-285.28	-4.98	285.31	0.00	0.00	0.00
4,300.00	11.00	181.00	4,272.38	715.62	-304.36	-5.31	304.39	0.00	0.00	0.00
4,400.00	11.00	181.00	4,370.55	617.45	-323.44	-5.65	323.46	0.00	0.00	0.00
4,500.00	11.00	181.00	4,468.71	519.29	-342.52	-5.98	342.54	0.00	0.00	0.00
4,600.00	11.00	181.00	4,566.87	421.13	-361.59	-6.31	361.62	0.00	0.00	0.00
4,700.00	11.00	181.00	4,665.04	322.96	-380.67	-6.64	380.70	0.00	0.00	0.00
Shannon Sandstone										
4,711.17	11.00	181.00	4,676.00	312.00	-382.80	-6.68	382.83	0.00	0.00	0.00
4,800.00	11.00	181.00	4,763.20	224.80	-399.75	-6.98	399.78	0.00	0.00	0.00
4,900.00	11.00	181.00	4,861.36	126.64	-418.83	-7.31	418.86	0.00	0.00	0.00
5,000.00	11.00	181.00	4,959.52	28.48	-437.91	-7.64	437.94	0.00	0.00	0.00
5,100.00	11.00	181.00	5,057.69	-69.69	-456.98	-7.98	457.02	0.00	0.00	0.00
5,200.00	11.00	181.00	5,155.85	-167.85	-476.06	-8.31	476.10	0.00	0.00	0.00
END OF TANGENT										
5,280.50	11.00	181.00	5,234.87	-246.87	-491.42	-8.58	491.46	0.00	0.00	0.00
5,300.00	10.91	184.90	5,254.01	-266.01	-495.12	-8.77	495.16	3.83	-0.47	20.01
EOT TO 199.18° AZ										
5,370.71	11.00	199.18	5,323.45	-335.45	-508.16	-11.56	508.28	3.83	0.13	20.20
5,400.00	11.00	199.18	5,352.20	-364.20	-513.44	-13.39	513.61	0.00	0.00	0.00
TeePee Buttes										
5,476.20	11.00	199.18	5,427.00	-439.00	-527.17	-18.17	527.47	0.00	0.00	0.00
5,500.00	11.00	199.18	5,450.36	-462.36	-531.45	-19.66	531.80	0.00	0.00	0.00
5,600.00	11.00	199.18	5,548.53	-560.53	-549.47	-25.93	550.00	0.00	0.00	0.00
5,700.00	11.00	199.18	5,646.69	-658.69	-567.49	-32.20	568.19	0.00	0.00	0.00
5,800.00	11.00	199.18	5,744.85	-756.85	-585.51	-38.47	586.39	0.00	0.00	0.00
KOP (10°/100ft DGLG)										
5,804.01	11.00	199.18	5,748.79	-760.79	-586.23	-38.72	587.12	0.00	0.00	0.00
5,900.00	20.33	190.45	5,841.13	-853.13	-611.34	-44.77	612.39	10.00	9.72	-9.10
6,000.00	30.23	187.02	5,931.44	-943.44	-653.51	-51.01	654.73	10.00	9.90	-3.43
6,100.00	40.17	185.17	6,013.06	-1,025.06	-710.76	-57.01	712.13	10.00	9.94	-1.85
Sharon Springs										
6,153.11	45.46	184.47	6,052.00	-1,064.00	-746.71	-60.03	748.15	10.00	9.96	-1.31
6,200.00	50.13	183.96	6,083.49	-1,095.49	-781.35	-62.58	782.85	10.00	9.97	-1.10
Niobrara Top										
6,221.56	52.28	183.74	6,097.00	-1,109.00	-798.11	-63.70	799.64	10.00	9.97	-0.99
Niobrara A Chalk										
6,268.19	56.93	183.32	6,124.00	-1,136.00	-836.05	-66.04	837.62	10.00	9.97	-0.91
6,300.00	60.11	183.05	6,140.61	-1,152.61	-863.13	-67.55	864.74	10.00	9.97	-0.83
Niobrara A Chalk Base										
6,315.18	61.62	182.93	6,148.00	-1,160.00	-876.37	-68.24	877.99	10.00	9.98	-0.79
Niobrara B1 Chalk Top										
6,360.64	66.16	182.59	6,168.00	-1,180.00	-917.13	-70.20	918.79	10.00	9.98	-0.75
6,400.00	70.08	182.32	6,182.67	-1,194.67	-953.61	-71.77	955.31	10.00	9.98	-0.70
Niobrara B1 Chalk Base										
6,419.51	72.03	182.19	6,189.00	-1,201.00	-972.05	-72.49	973.76	10.00	9.98	-0.67
6,500.00	80.06	181.67	6,208.39	-1,220.39	-1,050.06	-75.11	1,051.81	10.00	9.98	-0.64
HZ LP: 600ft FNL & 1345ft FWL of Sec 6 - Niobrara B2 Chalk Top (Target)										
6,599.54	90.00	181.06	6,217.00	-1,229.00	-1,149.07	-77.47	1,150.85	10.00	9.98	-0.61

Planning Report



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Company:	MALLARD EXPLORATION	TVD Reference:	KB-EST @ 4988.00usft (Original Well Elev)
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB-EST @ 4988.00usft (Original Well Elev)
Site:	SW SW SEC. 31 T8N R59W 6th P.M.	North Reference:	True
Well:	MOTTLED SOUTH 6-4HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	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)
6,600.00	90.00	181.06	6,217.00	-1,229.00	-1,149.53	-77.47	1,151.31	0.00	0.00	0.00
6,700.00	90.00	181.06	6,217.00	-1,229.00	-1,249.52	-79.33	1,251.31	0.00	0.00	0.00
6,800.00	90.00	181.06	6,217.00	-1,229.00	-1,349.50	-81.18	1,351.30	0.00	0.00	0.00
6,900.00	90.00	181.06	6,217.00	-1,229.00	-1,449.48	-83.03	1,451.29	0.00	0.00	0.00
7,000.00	90.00	181.06	6,217.00	-1,229.00	-1,549.46	-84.89	1,551.29	0.00	0.00	0.00
7,100.00	90.00	181.06	6,217.00	-1,229.00	-1,649.45	-86.74	1,651.28	0.00	0.00	0.00
7,200.00	90.00	181.06	6,217.00	-1,229.00	-1,749.43	-88.59	1,751.28	0.00	0.00	0.00
7,300.00	90.00	181.06	6,217.00	-1,229.00	-1,849.41	-90.45	1,851.27	0.00	0.00	0.00
7,400.00	90.00	181.06	6,217.00	-1,229.00	-1,949.40	-92.30	1,951.26	0.00	0.00	0.00
7,500.00	90.00	181.06	6,217.00	-1,229.00	-2,049.38	-94.15	2,051.26	0.00	0.00	0.00
7,600.00	90.00	181.06	6,217.00	-1,229.00	-2,149.36	-96.01	2,151.25	0.00	0.00	0.00
7,700.00	90.00	181.06	6,217.00	-1,229.00	-2,249.34	-97.86	2,251.25	0.00	0.00	0.00
7,800.00	90.00	181.06	6,217.00	-1,229.00	-2,349.33	-99.72	2,351.24	0.00	0.00	0.00
7,900.00	90.00	181.06	6,217.00	-1,229.00	-2,449.31	-101.57	2,451.24	0.00	0.00	0.00
8,000.00	90.00	181.06	6,217.00	-1,229.00	-2,549.29	-103.42	2,551.23	0.00	0.00	0.00
8,100.00	90.00	181.06	6,217.00	-1,229.00	-2,649.28	-105.28	2,651.22	0.00	0.00	0.00
8,200.00	90.00	181.06	6,217.00	-1,229.00	-2,749.26	-107.13	2,751.22	0.00	0.00	0.00
8,300.00	90.00	181.06	6,217.00	-1,229.00	-2,849.24	-108.98	2,851.21	0.00	0.00	0.00
8,400.00	90.00	181.06	6,217.00	-1,229.00	-2,949.22	-110.84	2,951.21	0.00	0.00	0.00
8,500.00	90.00	181.06	6,217.00	-1,229.00	-3,049.21	-112.69	3,051.20	0.00	0.00	0.00
8,600.00	90.00	181.06	6,217.00	-1,229.00	-3,149.19	-114.54	3,151.19	0.00	0.00	0.00
8,700.00	90.00	181.06	6,217.00	-1,229.00	-3,249.17	-116.40	3,251.19	0.00	0.00	0.00
8,800.00	90.00	181.06	6,217.00	-1,229.00	-3,349.16	-118.25	3,351.18	0.00	0.00	0.00
8,900.00	90.00	181.06	6,217.00	-1,229.00	-3,449.14	-120.10	3,451.18	0.00	0.00	0.00
9,000.00	90.00	181.06	6,217.00	-1,229.00	-3,549.12	-121.96	3,551.17	0.00	0.00	0.00
9,100.00	90.00	181.06	6,217.00	-1,229.00	-3,649.10	-123.81	3,651.17	0.00	0.00	0.00
9,200.00	90.00	181.06	6,217.00	-1,229.00	-3,749.09	-125.66	3,751.16	0.00	0.00	0.00
9,300.00	90.00	181.06	6,217.00	-1,229.00	-3,849.07	-127.52	3,851.15	0.00	0.00	0.00
9,400.00	90.00	181.06	6,217.00	-1,229.00	-3,949.05	-129.37	3,951.15	0.00	0.00	0.00
9,500.00	90.00	181.06	6,217.00	-1,229.00	-4,049.04	-131.22	4,051.14	0.00	0.00	0.00
9,600.00	90.00	181.06	6,217.00	-1,229.00	-4,149.02	-133.08	4,151.14	0.00	0.00	0.00
9,700.00	90.00	181.06	6,217.00	-1,229.00	-4,249.00	-134.93	4,251.13	0.00	0.00	0.00
9,800.00	90.00	181.06	6,217.00	-1,229.00	-4,348.98	-136.78	4,351.12	0.00	0.00	0.00
9,900.00	90.00	181.06	6,217.00	-1,229.00	-4,448.97	-138.64	4,451.12	0.00	0.00	0.00
10,000.00	90.00	181.06	6,217.00	-1,229.00	-4,548.95	-140.49	4,551.11	0.00	0.00	0.00
10,100.00	90.00	181.06	6,217.00	-1,229.00	-4,648.93	-142.34	4,651.11	0.00	0.00	0.00
10,200.00	90.00	181.06	6,217.00	-1,229.00	-4,748.92	-144.20	4,751.10	0.00	0.00	0.00
10,300.00	90.00	181.06	6,217.00	-1,229.00	-4,848.90	-146.05	4,851.10	0.00	0.00	0.00
10,400.00	90.00	181.06	6,217.00	-1,229.00	-4,948.88	-147.90	4,951.09	0.00	0.00	0.00
10,500.00	90.00	181.06	6,217.00	-1,229.00	-5,048.86	-149.76	5,051.08	0.00	0.00	0.00
10,600.00	90.00	181.06	6,217.00	-1,229.00	-5,148.85	-151.61	5,151.08	0.00	0.00	0.00
BHL: 600ft FSL & 1345ft FWL of Sec 6										
10,645.69	90.00	181.06	6,217.00	-1,229.00	-5,194.52	-152.46	5,196.76	0.00	0.00	0.00

Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well MOTTLED SOUTH 6-4HN
Company:	MALLARD EXPLORATION	TVD Reference:	KB-EST @ 4988.00usft (Original Well Elev)
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB-EST @ 4988.00usft (Original Well Elev)
Site:	SW SW SEC. 31 T8N R59W 6th P.M.	North Reference:	True
Well:	MOTTLED SOUTH 6-4HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #1		

Formations

MD (usft)	TVD (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
479.00	479.00	Fox Hills Base			
1,518.00	1,518.00	Pierre Shale Top			
3,275.80	3,267.00	Richard Sandstone			
3,386.84	3,376.00	Parkman Sandstone			
4,173.29	4,148.00	Sussex Sandstone			
4,711.17	4,676.00	Shannon Sandstone			
5,476.20	5,427.00	TeePee Buttes			
6,153.11	6,052.00	Sharon Springs			
6,221.56	6,097.00	Niobrara Top			
6,268.19	6,124.00	Niobrara A Chalk			
6,315.18	6,148.00	Niobrara A Chalk Base			
6,360.64	6,168.00	Niobrara B1 Chalk Top			
6,419.51	6,189.00	Niobrara B1 Chalk Base			
6,599.54	6,217.00	Niobrara B2 Chalk Top (Target)			

Plan Annotations

MD (usft)	TVD (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
0.00	0.00	0.00	0.00	SHL: 550ft FSL & 1399ft FWL of Sec 31
2,430.50	2,430.50	0.00	0.00	START NUDGE (2°/100ft BUR)
2,980.50	2,977.13	-52.63	-0.92	EOB TO 11° INC
5,280.50	5,234.87	-491.42	-8.58	END OF TANGENT
5,370.71	5,323.45	-508.16	-11.56	EOT TO 199.18° AZ
5,804.01	5,748.79	-586.23	-38.72	KOP (10°/100ft DGLG)
6,599.54	6,217.00	-1,149.07	-77.47	HZ LP: 600ft FNL & 1345ft FWL of Sec 6
10,645.69	6,217.00	-5,194.52	-152.46	BHL: 600ft FSL & 1345ft FWL of Sec 6