

MALLARD EXPLORATION

WELD COUNTY, COLORADO (NAD 83)

NW NW SEC. 29 T8N R60W 6th P.M.

SHOVELER FED 29-32-15HC

ORIGINAL WELLBORE

29 August, 2017

Plan: PROPOSAL #1





Project: WELD COUNTY, COLORADO (NAD 83)
Site: NW NW SEC. 29 T8N R60W 6th P.M.
Well: SHOVELER FED 29-32-15HC
Wellbore: ORIGINAL WELLBORE
Design: PROPOSAL #1

ANNOTATIONS										
TVD	MD	Inc	Azi	+N/-S	+E/-W	VSect	Dep	Annotation		
0.0	0.0	0.00	0.00	0.0	0.0	0.0	0.0	SHL: 757ft FNL & 2222ft FWL of Sec 29		
200.0	200.0	0.00	0.00	0.0	0.0	0.0	0.0	START NUDGE (2.5°/100ft BUR)		
1276.9	1321.1	28.03	72.14	82.4	255.8	-24.3	268.8	EOB TO 28.03° INC		
4765.2	5272.8	28.03	72.14	651.9	2023.3	-192.1	2125.7	END OF TANGENT		
5842.1	6393.9	0.00	0.00	734.3	2279.1	-216.4	2394.5	EOD TO VERTICAL		
5942.1	6493.9	0.00	0.00	734.3	2279.1	-216.4	2394.5	KOP (10°/100ft BUR)		
6515.0	7393.8	90.00	181.19	161.5	2267.2	339.8	2967.4	HZ LP: 600ft FNL & 790ft FEL of Sec 29		
6515.0	16773.6	90.00	181.19	-9216.2	2072.3	9446.3	12347.2	BHL: 600ft FSL & 790ft FEL of Sec 32		

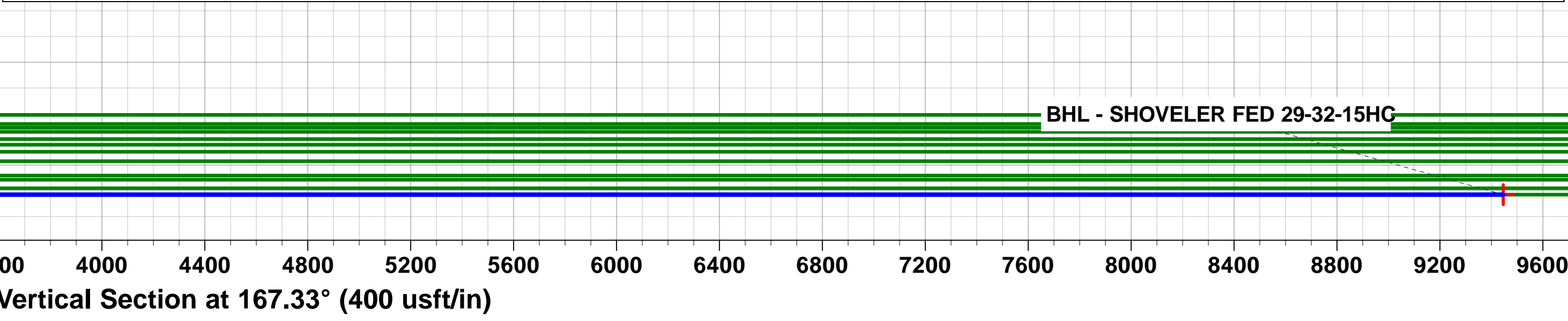
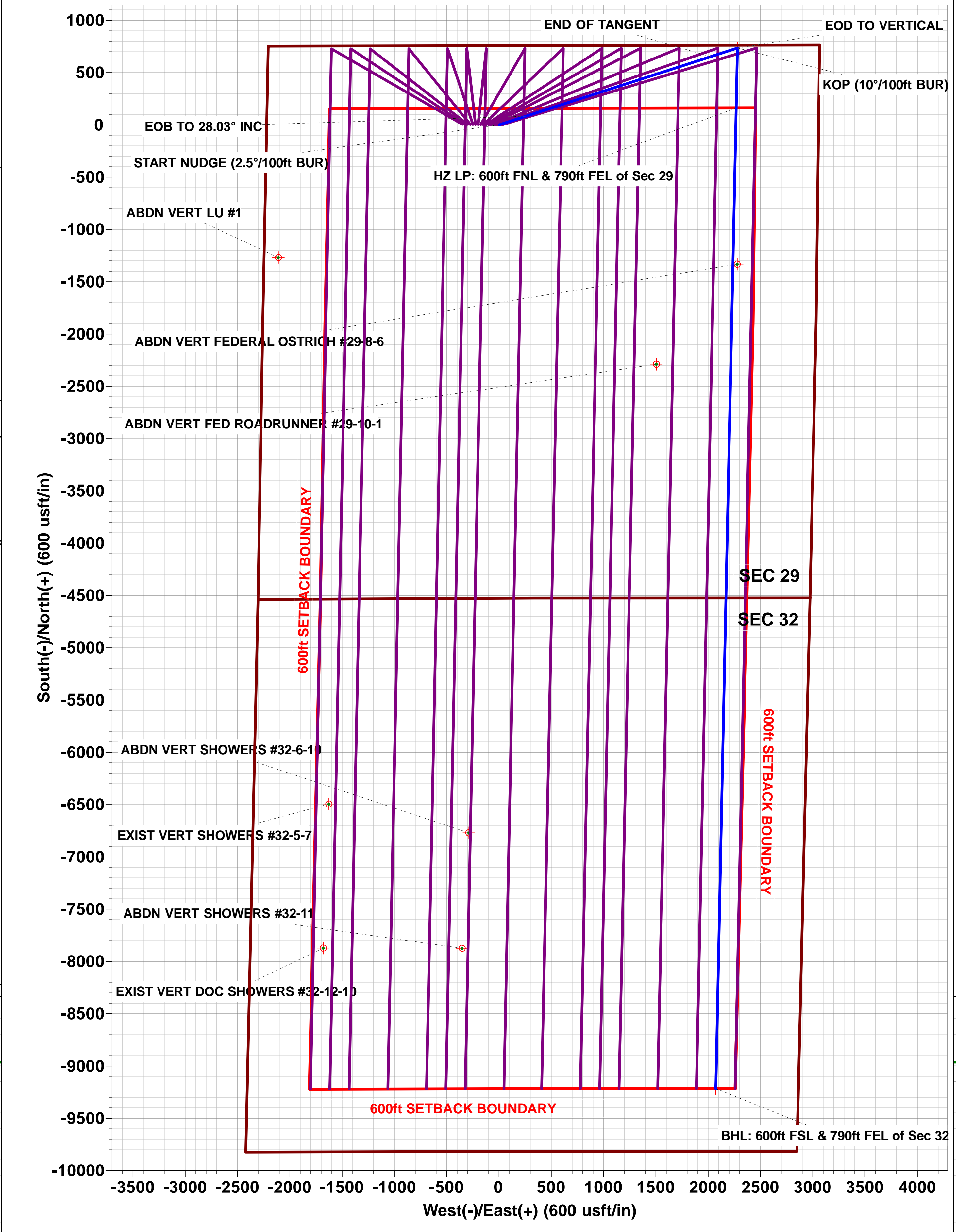
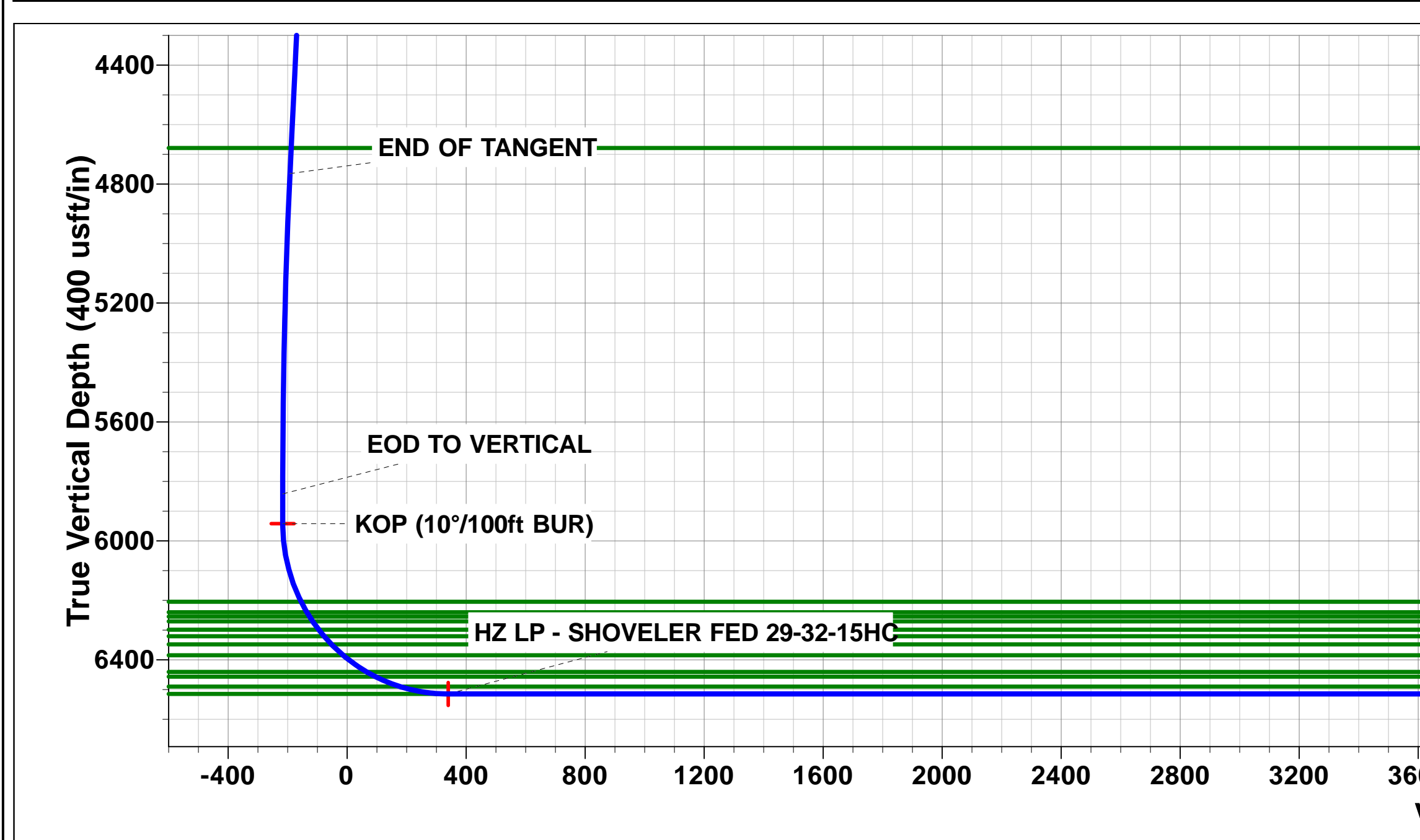
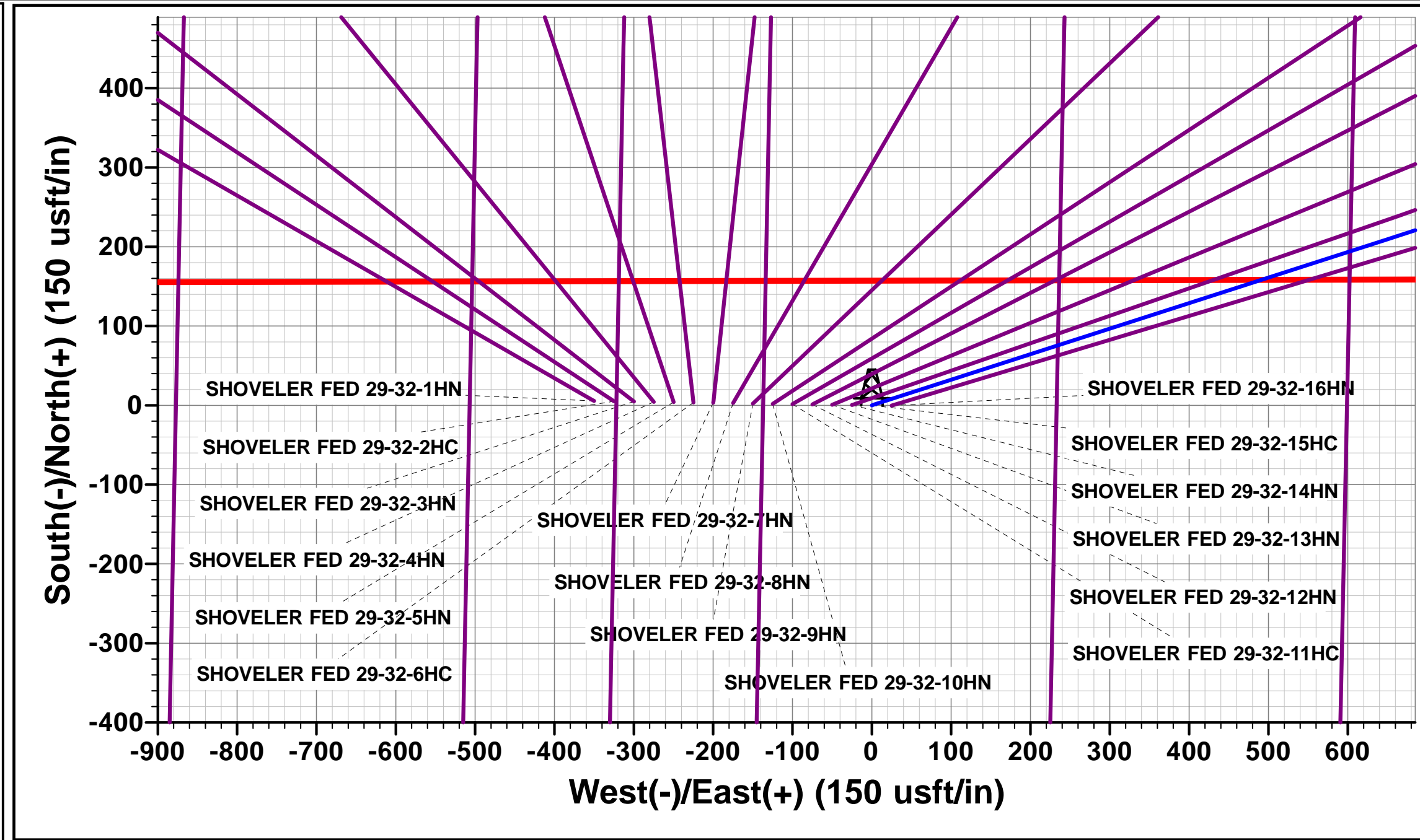
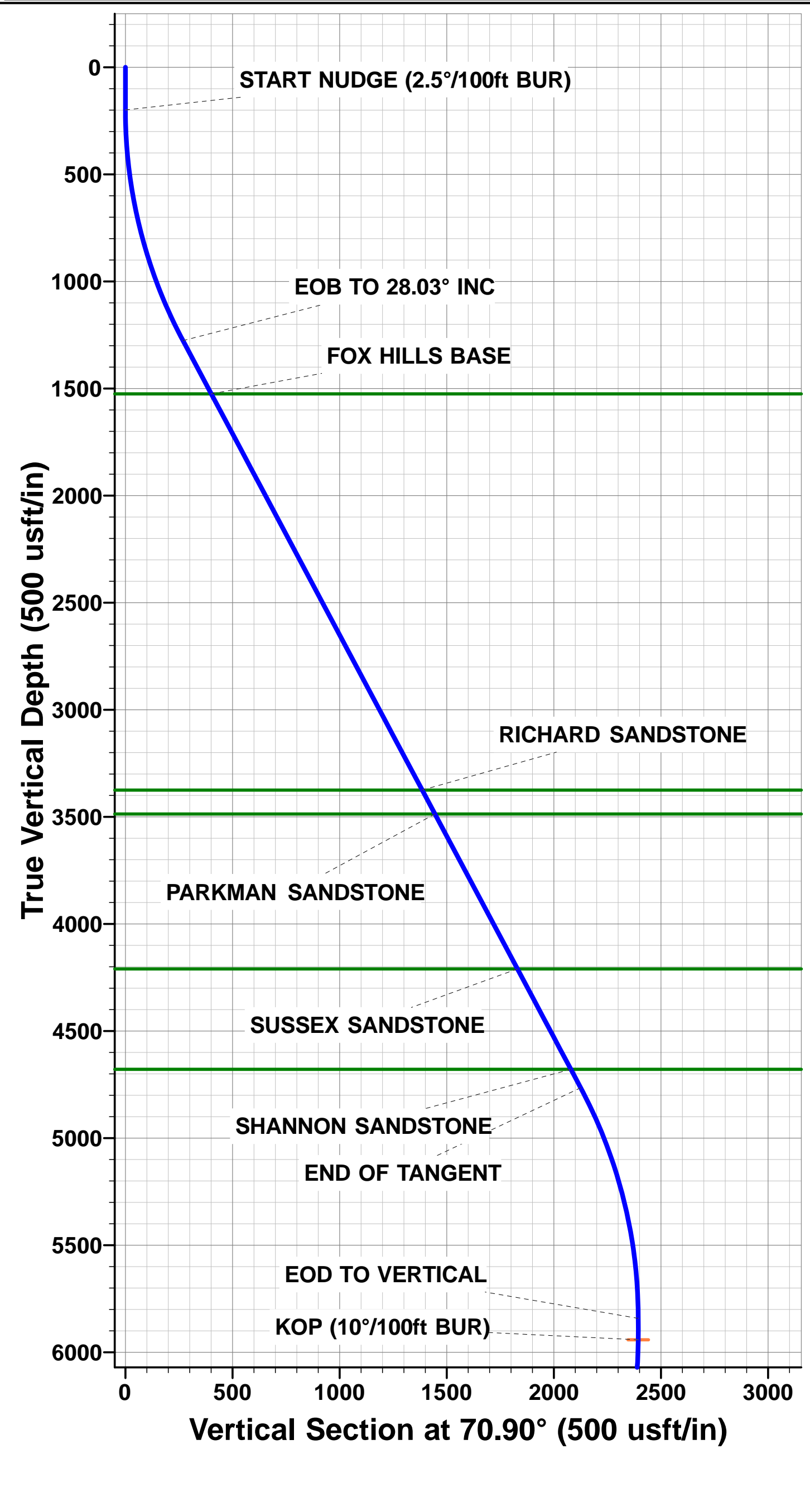
PROPOSED LOCAL COORDINATES:

SHL: 757ft FNL & 2222ft FWL Sec 29

HZ LP: 600ft FNL & 790ft FEL Sec 29

BHL: 600ft FSL & 790ft FEL of Sec 32

WELLBORE TARGET DETAILS (LAT/LONG)					
Name	TVD	+N/-S	+E/-W	Latitude	Longitude
KOP - SHOVELER FED 29-32-15HC	5942.1	734.3	2279.1	40.640452	-104.109160
HZ LP - SHOVELER FED 29-32-15HC	6515.0	161.5	2267.2	40.638880	-104.109203
BHL - SHOVELER FED 29-32-15HC	6515.0	-9216.2	2072.3	40.613140	-104.109908



Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well SHOVELER FED 29-32-15HC
Company:	MALLARD EXPLORATION	TVD Reference:	KB-EST @ 4964.0usft (Original Well Elev)
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB-EST @ 4964.0usft (Original Well Elev)
Site:	NW NW SEC. 29 T8N R60W 6th P.M.	North Reference:	True
Well:	SHOVELER FED 29-32-15HC	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	NW NW SEC. 29 T8N R60W 6th P.M.		
Site Position:		Northing:	1,478,416.23 usft
From:	Lat/Long	Easting:	3,383,356.26 usft
Position Uncertainty:	0.0 usft	Slot Radius:	1.10000 ft
		Latitude:	40.638452
		Longitude:	-104.118633
		Grid Convergence:	0.89 °

Well	SHOVELER FED 29-32-15HC		
Well Position	+N/-S	-5.5 usft	Northing:
	+E/-W	350.0 usft	Easting:
Position Uncertainty		0.0 usft	Wellhead Elevation:
			Latitude:
			Longitude:
			Ground Level:

Wellbore	ORIGINAL WELLBORE				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	29/08/2017	7.86	67.14	52,558

Design	PROPOSAL #1			
Audit Notes:				
Version:	Phase:	PROTOTYPE	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	6,515.0	0.0	0.0	167.33

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
0.0	0.00	0.00	0.0	-4,964.0	0.0	0.0	0.00	0.00	0.00	0.00	
200.0	0.00	0.00	200.0	-4,764.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,321.1	28.03	72.14	1,276.9	-3,687.1	82.4	255.8	2.50	2.50	0.00	72.14	
5,272.8	28.03	72.14	4,765.2	-198.8	651.9	2,023.3	0.00	0.00	0.00	0.00	
6,393.9	0.00	0.00	5,842.1	878.1	734.3	2,279.1	2.50	-2.50	0.00	180.00	
6,493.9	0.00	0.00	5,942.1	978.1	734.3	2,279.1	0.00	0.00	0.00	0.00	KOP - SHOVELER
7,393.8	90.00	181.19	6,515.0	1,551.0	161.5	2,267.2	10.00	10.00	-19.87	181.19	HZ LP - SHOVELER
16,773.6	90.00	181.19	6,515.0	1,551.0	-9,216.2	2,072.3	0.00	0.00	0.00	-131.02	BHL - SHOVELER

Planning Report



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Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB-EST @ 4964.0usft (Original Well Elev)
Site:	NW NW SEC. 29 T8N R60W 6th P.M.	North Reference:	True
Well:	SHOVELER FED 29-32-15HC	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: 757ft FNL & 2222ft FWL of Sec 29										
0.0	0.00	0.00	0.0	4,964.00	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.00	0.00	100.0	4,864.00	0.0	0.0	0.0	0.00	0.00	0.00
START NUDGE (2.5°/100ft BUR)										
200.0	0.00	0.00	200.0	4,764.00	0.0	0.0	0.0	0.00	0.00	0.00
300.0	2.50	72.14	300.0	4,664.03	0.7	2.1	-0.2	2.50	2.50	0.00
400.0	5.00	72.14	399.7	4,564.25	2.7	8.3	-0.8	2.50	2.50	0.00
500.0	7.50	72.14	499.1	4,464.86	6.0	18.7	-1.8	2.50	2.50	0.00
600.0	10.00	72.14	598.0	4,366.03	10.7	33.1	-3.1	2.50	2.50	0.00
700.0	12.50	72.14	696.0	4,267.96	16.7	51.7	-4.9	2.50	2.50	0.00
800.0	15.00	72.14	793.2	4,170.83	23.9	74.3	-7.1	2.50	2.50	0.00
900.0	17.50	72.14	889.2	4,074.83	32.5	101.0	-9.6	2.50	2.50	0.00
1,000.0	20.00	72.14	983.9	3,980.15	42.4	131.6	-12.5	2.50	2.50	0.00
1,100.0	22.50	72.14	1,077.0	3,886.95	53.5	166.0	-15.8	2.50	2.50	0.00
1,200.0	25.00	72.14	1,168.6	3,795.43	65.8	204.4	-19.4	2.50	2.50	0.00
1,300.0	27.50	72.14	1,258.2	3,705.75	79.4	246.5	-23.4	2.50	2.50	0.00
EOB TO 28.03° INC										
1,321.1	28.03	72.14	1,276.9	3,687.07	82.4	255.8	-24.3	2.50	2.50	0.00
1,400.0	28.03	72.14	1,346.6	3,617.43	93.8	291.1	-27.6	0.00	0.00	0.00
1,500.0	28.03	72.14	1,434.8	3,529.16	108.2	335.8	-31.9	0.00	0.00	0.00
1,600.0	28.03	72.14	1,523.1	3,440.89	122.6	380.6	-36.1	0.00	0.00	0.00
FOX HILLS BASE										
1,602.1	28.03	72.14	1,525.0	3,439.00	122.9	381.5	-36.2	0.00	0.00	0.00
1,700.0	28.03	72.14	1,611.4	3,352.62	137.0	425.3	-40.4	0.00	0.00	0.00
1,800.0	28.03	72.14	1,699.7	3,264.34	151.4	470.0	-44.6	0.00	0.00	0.00
1,900.0	28.03	72.14	1,787.9	3,176.07	165.8	514.7	-48.9	0.00	0.00	0.00
2,000.0	28.03	72.14	1,876.2	3,087.80	180.3	559.5	-53.1	0.00	0.00	0.00
2,100.0	28.03	72.14	1,964.5	2,999.53	194.7	604.2	-57.4	0.00	0.00	0.00
2,200.0	28.03	72.14	2,052.7	2,911.26	209.1	648.9	-61.6	0.00	0.00	0.00
2,300.0	28.03	72.14	2,141.0	2,822.98	223.5	693.7	-65.9	0.00	0.00	0.00
2,400.0	28.03	72.14	2,229.3	2,734.71	237.9	738.4	-70.1	0.00	0.00	0.00
2,500.0	28.03	72.14	2,317.6	2,646.44	252.3	783.1	-74.4	0.00	0.00	0.00
2,600.0	28.03	72.14	2,405.8	2,558.17	266.7	827.8	-78.6	0.00	0.00	0.00
2,700.0	28.03	72.14	2,494.1	2,469.90	281.1	872.6	-82.9	0.00	0.00	0.00
2,800.0	28.03	72.14	2,582.4	2,381.62	295.5	917.3	-87.1	0.00	0.00	0.00
2,900.0	28.03	72.14	2,670.6	2,293.35	309.9	962.0	-91.4	0.00	0.00	0.00
3,000.0	28.03	72.14	2,758.9	2,205.08	324.4	1,006.7	-95.6	0.00	0.00	0.00
3,100.0	28.03	72.14	2,847.2	2,116.81	338.8	1,051.5	-99.9	0.00	0.00	0.00
3,200.0	28.03	72.14	2,935.5	2,028.54	353.2	1,096.2	-104.1	0.00	0.00	0.00
3,300.0	28.03	72.14	3,023.7	1,940.26	367.6	1,140.9	-108.3	0.00	0.00	0.00
3,400.0	28.03	72.14	3,112.0	1,851.99	382.0	1,185.6	-112.6	0.00	0.00	0.00
3,500.0	28.03	72.14	3,200.3	1,763.72	396.4	1,230.4	-116.8	0.00	0.00	0.00
3,600.0	28.03	72.14	3,288.6	1,675.45	410.8	1,275.1	-121.1	0.00	0.00	0.00
RICHARD SANDSTONE										
3,697.9	28.03	72.14	3,375.0	1,589.00	424.9	1,318.9	-125.2	0.00	0.00	0.00
3,700.0	28.03	72.14	3,376.8	1,587.18	425.2	1,319.8	-125.3	0.00	0.00	0.00
3,800.0	28.03	72.14	3,465.1	1,498.90	439.6	1,364.5	-129.6	0.00	0.00	0.00
PARKMAN SANDSTONE										
3,824.8	28.03	72.14	3,487.0	1,477.00	443.2	1,375.6	-130.6	0.00	0.00	0.00
3,900.0	28.03	72.14	3,553.4	1,410.63	454.0	1,409.3	-133.8	0.00	0.00	0.00
4,000.0	28.03	72.14	3,641.6	1,322.36	468.5	1,454.0	-138.1	0.00	0.00	0.00
4,100.0	28.03	72.14	3,729.9	1,234.09	482.9	1,498.7	-142.3	0.00	0.00	0.00
4,200.0	28.03	72.14	3,818.2	1,145.82	497.3	1,543.4	-146.6	0.00	0.00	0.00

Planning Report



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Site:	NW NW SEC. 29 T8N R60W 6th P.M.	North Reference:	True
Well:	SHOVELER FED 29-32-15HC	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)
4,300.0	28.03	72.14	3,906.5	1,057.54	511.7	1,588.2	-150.8	0.00	0.00	0.00
4,400.0	28.03	72.14	3,994.7	969.27	526.1	1,632.9	-155.1	0.00	0.00	0.00
4,500.0	28.03	72.14	4,083.0	881.00	540.5	1,677.6	-159.3	0.00	0.00	0.00
4,600.0	28.03	72.14	4,171.3	792.73	554.9	1,722.3	-163.6	0.00	0.00	0.00
SUSSEX SANDSTONE										
4,643.9	28.03	72.14	4,210.0	754.00	561.2	1,742.0	-165.4	0.00	0.00	0.00
4,700.0	28.03	72.14	4,259.5	704.46	569.3	1,767.1	-167.8	0.00	0.00	0.00
4,800.0	28.03	72.14	4,347.8	616.18	583.7	1,811.8	-172.1	0.00	0.00	0.00
4,900.0	28.03	72.14	4,436.1	527.91	598.2	1,856.5	-176.3	0.00	0.00	0.00
5,000.0	28.03	72.14	4,524.4	439.64	612.6	1,901.3	-180.5	0.00	0.00	0.00
5,100.0	28.03	72.14	4,612.6	351.37	627.0	1,946.0	-184.8	0.00	0.00	0.00
SHANNON SANDSTONE										
5,175.2	28.03	72.14	4,679.0	285.00	637.8	1,979.6	-188.0	0.00	0.00	0.00
5,200.0	28.03	72.14	4,700.9	263.10	641.4	1,990.7	-189.0	0.00	0.00	0.00
END OF TANGENT										
5,272.8	28.03	72.14	4,765.2	198.83	651.9	2,023.3	-192.1	0.00	0.00	0.00
5,300.0	27.35	72.14	4,789.3	174.75	655.7	2,035.3	-193.3	2.50	-2.50	0.00
5,400.0	24.85	72.14	4,879.0	84.95	669.2	2,077.2	-197.3	2.50	-2.50	0.00
5,500.0	22.35	72.14	4,970.7	-6.68	681.5	2,115.3	-200.9	2.50	-2.50	0.00
5,600.0	19.85	72.14	5,064.0	-99.97	692.6	2,149.5	-204.1	2.50	-2.50	0.00
5,700.0	17.35	72.14	5,158.7	-194.74	702.3	2,179.9	-207.0	2.50	-2.50	0.00
5,800.0	14.85	72.14	5,254.8	-290.81	710.8	2,206.3	-209.5	2.50	-2.50	0.00
5,900.0	12.35	72.14	5,352.0	-388.00	718.0	2,228.6	-211.6	2.50	-2.50	0.00
6,000.0	9.85	72.14	5,450.1	-486.12	723.9	2,247.0	-213.4	2.50	-2.50	0.00
6,100.0	7.35	72.14	5,549.0	-584.99	728.5	2,261.2	-214.7	2.50	-2.50	0.00
6,200.0	4.85	72.14	5,648.4	-684.42	731.8	2,271.3	-215.7	2.50	-2.50	0.00
6,300.0	2.35	72.14	5,748.2	-784.21	733.7	2,277.3	-216.3	2.50	-2.50	0.00
EOD TO VERTICAL										
6,393.9	0.00	0.00	5,842.1	-878.10	734.3	2,279.1	-216.4	2.50	-2.50	0.00
6,400.0	0.00	0.00	5,848.2	-884.18	734.3	2,279.1	-216.4	0.00	0.00	0.00
KOP (10°/100ft BUR)										
6,493.9	0.00	0.00	5,942.1	-978.10	734.3	2,279.1	-216.4	0.00	0.00	0.00
6,500.0	0.61	181.19	5,948.2	-984.18	734.3	2,279.1	-216.4	10.00	10.00	0.00
6,600.0	10.61	181.19	6,047.6	-1,083.58	724.5	2,278.9	-206.9	10.00	10.00	0.00
6,700.0	20.61	181.19	6,143.8	-1,179.77	697.6	2,278.3	-180.8	10.00	10.00	0.00
SHARON SPRINGS										
6,767.0	27.32	181.19	6,205.0	-1,241.00	670.4	2,277.8	-154.4	10.00	10.00	0.00
6,800.0	30.61	181.19	6,233.8	-1,269.83	654.5	2,277.4	-138.9	10.00	10.00	0.00
NIOBRARA A CHALK										
6,807.2	31.33	181.19	6,240.0	-1,276.00	650.8	2,277.4	-135.3	10.00	10.00	0.00
NIOBRARA A CHALK BASE										
6,824.9	33.10	181.19	6,255.0	-1,291.00	641.3	2,277.2	-126.1	10.00	10.00	0.00
NIOBRARA B1 CHALK TOP										
6,844.2	35.04	181.19	6,271.0	-1,307.00	630.5	2,276.9	-115.6	10.00	10.00	0.00
NIOBRARA B1 CHALK BASE										
6,879.2	38.53	181.19	6,299.0	-1,335.00	609.6	2,276.5	-95.3	10.00	10.00	0.00
6,900.0	40.61	181.19	6,315.0	-1,351.02	596.3	2,276.2	-82.5	10.00	10.00	0.00
NIOBRARA B2 CHALK TOP										
6,907.9	41.40	181.19	6,321.0	-1,357.00	591.1	2,276.1	-77.4	10.00	10.00	0.00
NIOBRARA B2 CHALK BASE										
6,945.0	45.11	181.19	6,348.0	-1,384.00	565.7	2,275.6	-52.7	10.00	10.00	0.00
7,000.0	50.61	181.19	6,384.9	-1,420.88	525.0	2,274.7	-13.2	10.00	10.00	0.00

Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well SHOVELER FED 29-32-15HC
Company:	MALLARD EXPLORATION	TVD Reference:	KB-EST @ 4964.0usft (Original Well Elev)
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB-EST @ 4964.0usft (Original Well Elev)
Site:	NW NW SEC. 29 T8N R60W 6th P.M.	North Reference:	True
Well:	SHOVELER FED 29-32-15HC	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)
NIORARA C CHALK TOP										
7,000.2	50.61	181.19	6,385.0	-1,421.00	524.8	2,274.7	-13.0	0.00	0.00	0.00
NIORARA C CHALK BASE										
7,099.4	60.56	181.19	6,441.0	-1,477.00	443.1	2,273.0	66.4	10.02	10.02	0.00
7,100.0	60.61	181.19	6,441.3	-1,477.29	442.6	2,273.0	66.9	10.00	10.00	0.00
NIORARA D CHALK TOP										
7,133.8	64.00	181.19	6,457.0	-1,493.00	412.7	2,272.4	95.9	10.00	10.00	0.00
7,200.0	70.62	181.19	6,482.5	-1,518.52	351.6	2,271.1	155.2	10.00	10.00	0.00
FT. HAYS										
7,224.0	73.01	181.19	6,490.0	-1,526.00	328.9	2,270.7	177.3	10.00	10.00	0.00
7,300.0	80.62	181.19	6,507.3	-1,543.33	254.9	2,269.1	249.1	10.00	10.00	0.00
HZ LP: 600ft FNL & 790ft FEL of Sec 29 - CODELL										
7,393.8	90.00	181.19	6,515.0	-1,551.00	161.5	2,267.2	339.8	10.00	10.00	0.00
7,400.0	90.00	181.19	6,515.0	-1,551.00	155.4	2,267.1	345.8	0.00	0.00	0.00
7,500.0	90.00	181.19	6,515.0	-1,551.00	55.4	2,265.0	442.9	0.00	0.00	0.00
7,600.0	90.00	181.19	6,515.0	-1,550.99	-44.6	2,262.9	539.9	0.00	0.00	0.00
7,700.0	90.00	181.19	6,515.0	-1,550.99	-144.6	2,260.8	637.0	0.00	0.00	0.00
7,800.0	90.00	181.19	6,515.0	-1,550.99	-244.6	2,258.7	734.1	0.00	0.00	0.00
7,900.0	90.00	181.19	6,515.0	-1,550.99	-344.5	2,256.6	831.2	0.00	0.00	0.00
8,000.0	90.00	181.19	6,515.0	-1,550.99	-444.5	2,254.6	928.3	0.00	0.00	0.00
8,100.0	90.00	181.19	6,515.0	-1,550.98	-544.5	2,252.5	1,025.4	0.00	0.00	0.00
8,200.0	90.00	181.19	6,515.0	-1,550.98	-644.5	2,250.4	1,122.5	0.00	0.00	0.00
8,300.0	90.00	181.19	6,515.0	-1,550.98	-744.5	2,248.3	1,219.6	0.00	0.00	0.00
8,400.0	90.00	181.19	6,515.0	-1,550.98	-844.4	2,246.2	1,316.6	0.00	0.00	0.00
8,500.0	90.00	181.19	6,515.0	-1,550.97	-944.4	2,244.2	1,413.7	0.00	0.00	0.00
8,600.0	90.00	181.19	6,515.0	-1,550.97	-1,044.4	2,242.1	1,510.8	0.00	0.00	0.00
8,700.0	90.00	181.19	6,515.0	-1,550.97	-1,144.4	2,240.0	1,607.9	0.00	0.00	0.00
8,800.0	90.00	181.19	6,515.0	-1,550.97	-1,244.3	2,237.9	1,705.0	0.00	0.00	0.00
8,900.0	90.00	181.19	6,515.0	-1,550.97	-1,344.3	2,235.9	1,802.1	0.00	0.00	0.00
9,000.0	90.00	181.19	6,515.0	-1,550.97	-1,444.3	2,233.8	1,899.2	0.00	0.00	0.00
9,100.0	90.00	181.19	6,515.0	-1,550.96	-1,544.3	2,231.7	1,996.2	0.00	0.00	0.00
9,200.0	90.00	181.19	6,515.0	-1,550.96	-1,644.3	2,229.6	2,093.3	0.00	0.00	0.00
9,300.0	90.00	181.19	6,515.0	-1,550.96	-1,744.2	2,227.5	2,190.4	0.00	0.00	0.00
9,400.0	90.00	181.19	6,515.0	-1,550.96	-1,844.2	2,225.5	2,287.5	0.00	0.00	0.00
9,500.0	90.00	181.19	6,515.0	-1,550.96	-1,944.2	2,223.4	2,384.6	0.00	0.00	0.00
9,600.0	90.00	181.19	6,515.0	-1,550.96	-2,044.2	2,221.3	2,481.7	0.00	0.00	0.00
9,700.0	90.00	181.19	6,515.0	-1,550.95	-2,144.2	2,219.2	2,578.8	0.00	0.00	0.00
9,800.0	90.00	181.19	6,515.0	-1,550.95	-2,244.1	2,217.1	2,675.9	0.00	0.00	0.00
9,900.0	90.00	181.19	6,515.0	-1,550.95	-2,344.1	2,215.1	2,772.9	0.00	0.00	0.00
10,000.0	90.00	181.19	6,515.0	-1,550.95	-2,444.1	2,213.0	2,870.0	0.00	0.00	0.00
10,100.0	90.00	181.19	6,514.9	-1,550.95	-2,544.1	2,210.9	2,967.1	0.00	0.00	0.00
10,200.0	90.00	181.19	6,514.9	-1,550.95	-2,644.0	2,208.8	3,064.2	0.00	0.00	0.00
10,300.0	90.00	181.19	6,514.9	-1,550.95	-2,744.0	2,206.7	3,161.3	0.00	0.00	0.00
10,400.0	90.00	181.19	6,514.9	-1,550.95	-2,844.0	2,204.7	3,258.4	0.00	0.00	0.00
10,500.0	90.00	181.19	6,514.9	-1,550.95	-2,944.0	2,202.6	3,355.5	0.00	0.00	0.00
10,600.0	90.00	181.19	6,514.9	-1,550.94	-3,044.0	2,200.5	3,452.5	0.00	0.00	0.00
10,700.0	90.00	181.19	6,514.9	-1,550.94	-3,143.9	2,198.4	3,549.6	0.00	0.00	0.00
10,800.0	90.00	181.19	6,514.9	-1,550.94	-3,243.9	2,196.3	3,646.7	0.00	0.00	0.00
10,900.0	90.00	181.19	6,514.9	-1,550.94	-3,343.9	2,194.3	3,743.8	0.00	0.00	0.00
11,000.0	90.00	181.19	6,514.9	-1,550.94	-3,443.9	2,192.2	3,840.9	0.00	0.00	0.00
11,100.0	90.00	181.19	6,514.9	-1,550.94	-3,543.8	2,190.1	3,938.0	0.00	0.00	0.00
11,200.0	90.00	181.19	6,514.9	-1,550.94	-3,643.8	2,188.0	4,035.1	0.00	0.00	0.00
11,300.0	90.00	181.19	6,514.9	-1,550.94	-3,743.8	2,186.0	4,132.2	0.00	0.00	0.00

Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well SHOVELER FED 29-32-15HC
Company:	MALLARD EXPLORATION	TVD Reference:	KB-EST @ 4964.0usft (Original Well Elev)
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB-EST @ 4964.0usft (Original Well Elev)
Site:	NW NW SEC. 29 T8N R60W 6th P.M.	North Reference:	True
Well:	SHOVELER FED 29-32-15HC	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)
11,400.0	90.00	181.19	6,514.9	-1,550.94	-3,843.8	2,183.9	4,229.2	0.00	0.00	0.00
11,500.0	90.00	181.19	6,514.9	-1,550.94	-3,943.8	2,181.8	4,326.3	0.00	0.00	0.00
11,600.0	90.00	181.19	6,514.9	-1,550.94	-4,043.7	2,179.7	4,423.4	0.00	0.00	0.00
11,700.0	90.00	181.19	6,514.9	-1,550.94	-4,143.7	2,177.6	4,520.5	0.00	0.00	0.00
11,800.0	90.00	181.19	6,514.9	-1,550.94	-4,243.7	2,175.6	4,617.6	0.00	0.00	0.00
11,900.0	90.00	181.19	6,514.9	-1,550.94	-4,343.7	2,173.5	4,714.7	0.00	0.00	0.00
12,000.0	90.00	181.19	6,514.9	-1,550.94	-4,443.7	2,171.4	4,811.8	0.00	0.00	0.00
12,100.0	90.00	181.19	6,514.9	-1,550.94	-4,543.6	2,169.3	4,908.9	0.00	0.00	0.00
12,200.0	90.00	181.19	6,514.9	-1,550.94	-4,643.6	2,167.3	5,005.9	0.00	0.00	0.00
12,300.0	90.00	181.19	6,514.9	-1,550.94	-4,743.6	2,165.2	5,103.0	0.00	0.00	0.00
12,400.0	90.00	181.19	6,514.9	-1,550.94	-4,843.6	2,163.1	5,200.1	0.00	0.00	0.00
12,500.0	90.00	181.19	6,514.9	-1,550.94	-4,943.5	2,161.0	5,297.2	0.00	0.00	0.00
12,600.0	90.00	181.19	6,514.9	-1,550.94	-5,043.5	2,158.9	5,394.3	0.00	0.00	0.00
12,700.0	90.00	181.19	6,514.9	-1,550.94	-5,143.5	2,156.9	5,491.4	0.00	0.00	0.00
12,800.0	90.00	181.19	6,514.9	-1,550.94	-5,243.5	2,154.8	5,588.5	0.00	0.00	0.00
12,900.0	90.00	181.19	6,514.9	-1,550.94	-5,343.5	2,152.7	5,685.6	0.00	0.00	0.00
13,000.0	90.00	181.19	6,514.9	-1,550.94	-5,443.4	2,150.6	5,782.6	0.00	0.00	0.00
13,100.0	90.00	181.19	6,514.9	-1,550.94	-5,543.4	2,148.6	5,879.7	0.00	0.00	0.00
13,200.0	90.00	181.19	6,514.9	-1,550.94	-5,643.4	2,146.5	5,976.8	0.00	0.00	0.00
13,300.0	90.00	181.19	6,514.9	-1,550.94	-5,743.4	2,144.4	6,073.9	0.00	0.00	0.00
13,400.0	90.00	181.19	6,514.9	-1,550.94	-5,843.4	2,142.3	6,171.0	0.00	0.00	0.00
13,500.0	90.00	181.19	6,514.9	-1,550.94	-5,943.3	2,140.3	6,268.1	0.00	0.00	0.00
13,600.0	90.00	181.19	6,514.9	-1,550.95	-6,043.3	2,138.2	6,365.2	0.00	0.00	0.00
13,700.0	90.00	181.19	6,514.9	-1,550.95	-6,143.3	2,136.1	6,462.3	0.00	0.00	0.00
13,800.0	90.00	181.19	6,514.9	-1,550.95	-6,243.3	2,134.0	6,559.3	0.00	0.00	0.00
13,900.0	90.00	181.19	6,514.9	-1,550.95	-6,343.2	2,131.9	6,656.4	0.00	0.00	0.00
14,000.0	90.00	181.19	6,514.9	-1,550.95	-6,443.2	2,129.9	6,753.5	0.00	0.00	0.00
14,100.0	90.00	181.19	6,515.0	-1,550.95	-6,543.2	2,127.8	6,850.6	0.00	0.00	0.00
14,200.0	90.00	181.19	6,515.0	-1,550.95	-6,643.2	2,125.7	6,947.7	0.00	0.00	0.00
14,300.0	90.00	181.19	6,515.0	-1,550.95	-6,743.2	2,123.6	7,044.8	0.00	0.00	0.00
14,400.0	90.00	181.19	6,515.0	-1,550.95	-6,843.1	2,121.6	7,141.9	0.00	0.00	0.00
14,500.0	90.00	181.19	6,515.0	-1,550.96	-6,943.1	2,119.5	7,239.0	0.00	0.00	0.00
14,600.0	90.00	181.19	6,515.0	-1,550.96	-7,043.1	2,117.4	7,336.0	0.00	0.00	0.00
14,700.0	90.00	181.19	6,515.0	-1,550.96	-7,143.1	2,115.3	7,433.1	0.00	0.00	0.00
14,800.0	90.00	181.19	6,515.0	-1,550.96	-7,243.1	2,113.3	7,530.2	0.00	0.00	0.00
14,900.0	90.00	181.19	6,515.0	-1,550.96	-7,343.0	2,111.2	7,627.3	0.00	0.00	0.00
15,000.0	90.00	181.19	6,515.0	-1,550.96	-7,443.0	2,109.1	7,724.4	0.00	0.00	0.00
15,100.0	90.00	181.19	6,515.0	-1,550.96	-7,543.0	2,107.0	7,821.5	0.00	0.00	0.00
15,200.0	90.00	181.19	6,515.0	-1,550.97	-7,643.0	2,105.0	7,918.6	0.00	0.00	0.00
15,300.0	90.00	181.19	6,515.0	-1,550.97	-7,742.9	2,102.9	8,015.7	0.00	0.00	0.00
15,400.0	90.00	181.19	6,515.0	-1,550.97	-7,842.9	2,100.8	8,112.7	0.00	0.00	0.00
15,500.0	90.00	181.19	6,515.0	-1,550.97	-7,942.9	2,098.7	8,209.8	0.00	0.00	0.00
15,600.0	90.00	181.19	6,515.0	-1,550.97	-8,042.9	2,096.7	8,306.9	0.00	0.00	0.00
15,700.0	90.00	181.19	6,515.0	-1,550.98	-8,142.9	2,094.6	8,404.0	0.00	0.00	0.00
15,800.0	90.00	181.19	6,515.0	-1,550.98	-8,242.8	2,092.5	8,501.1	0.00	0.00	0.00
15,900.0	90.00	181.19	6,515.0	-1,550.98	-8,342.8	2,090.4	8,598.2	0.00	0.00	0.00
16,000.0	90.00	181.19	6,515.0	-1,550.98	-8,442.8	2,088.4	8,695.3	0.00	0.00	0.00
16,100.0	90.00	181.19	6,515.0	-1,550.98	-8,542.8	2,086.3	8,792.4	0.00	0.00	0.00
16,200.0	90.00	181.19	6,515.0	-1,550.99	-8,642.7	2,084.2	8,889.4	0.00	0.00	0.00
16,300.0	90.00	181.19	6,515.0	-1,550.99	-8,742.7	2,082.1	8,986.5	0.00	0.00	0.00
16,400.0	90.00	181.19	6,515.0	-1,550.99	-8,842.7	2,080.1	9,083.6	0.00	0.00	0.00
16,500.0	90.00	181.19	6,515.0	-1,550.99	-8,942.7	2,078.0	9,180.7	0.00	0.00	0.00
16,600.0	90.00	181.19	6,515.0	-1,551.00	-9,042.7	2,075.9	9,277.8	0.00	0.00	0.00
16,700.0	90.00	181.19	6,515.0	-1,551.00	-9,142.6	2,073.8	9,374.9	0.00	0.00	0.00

Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well SHOVELER FED 29-32-15HC
Company:	MALLARD EXPLORATION	TVD Reference:	KB-EST @ 4964.0usft (Original Well Elev)
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB-EST @ 4964.0usft (Original Well Elev)
Site:	NW NW SEC. 29 T8N R60W 6th P.M.	North Reference:	True
Well:	SHOVELER FED 29-32-15HC	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)
BHL: 600ft FSL & 790ft FEL of Sec 32										
16,773.6	90.00	181.19	6,515.0	-1,551.00	-9,216.2	2,072.3	9,446.3	0.00	0.00	0.00

Formations

MD (usft)	TVD (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,602.1	1,525.0	FOX HILLS BASE			
3,697.9	3,375.0	RICHARD SANDSTONE			
3,824.8	3,487.0	PARKMAN SANDSTONE			
4,643.9	4,210.0	SUSSEX SANDSTONE			
5,175.2	4,679.0	SHANNON SANDSTONE			
6,767.0	6,205.0	SHARON SPRINGS			
6,807.2	6,240.0	NIOBRARA A CHALK			
6,824.9	6,255.0	NIOBRARA A CHALK BASE			
6,844.2	6,271.0	NIOBRARA B1 CHALK TOP			
6,879.2	6,299.0	NIOBRARA B1 CHALK BASE			
6,907.9	6,321.0	NIOBRARA B2 CHALK TOP			
6,945.0	6,348.0	NIOBRARA B2 CHALK BASE			
7,000.2	6,385.0	NIOBRARA C CHALK TOP			
7,099.4	6,441.0	NIOBRARA C CHALK BASE			
7,133.8	6,457.0	NIOBRARA D CHALK TOP			
7,224.0	6,490.0	FT. HAYS			
7,393.8	6,515.0	CODELL			

Plan Annotations

MD (usft)	TVD (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
0.0	0.0	0.0	0.0	SHL: 757ft FNL & 2222ft FWL of Sec 29
200.0	200.0	0.0	0.0	START NUDGE (2.5°/100ft BUR)
1,321.1	1,276.9	82.4	255.8	EOB TO 28.03° INC
5,272.8	4,765.2	651.9	2,023.3	END OF TANGENT
6,393.9	5,842.1	734.3	2,279.1	EOD TO VERTICAL
6,493.9	5,942.1	734.3	2,279.1	KOP (10°/100ft BUR)
7,393.8	6,515.0	161.5	2,267.2	HZ LP: 600ft FNL & 790ft FEL of Sec 29
16,773.6	6,515.0	-9,216.2	2,072.3	BHL: 600ft FSL & 790ft FEL of Sec 32