

BISON EXPLORATION

**ARAPAHOE COUNTY, COLORADO (NAD 83)
SW NW SEC. 14 T5S R64W 6th P.M.
DTH 5-64 14A-13-6**

ORIGINAL WELLBORE

24 July, 2017

Plan: PROPOSAL #1



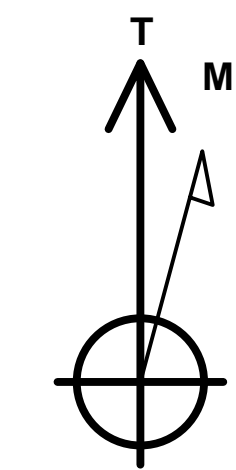
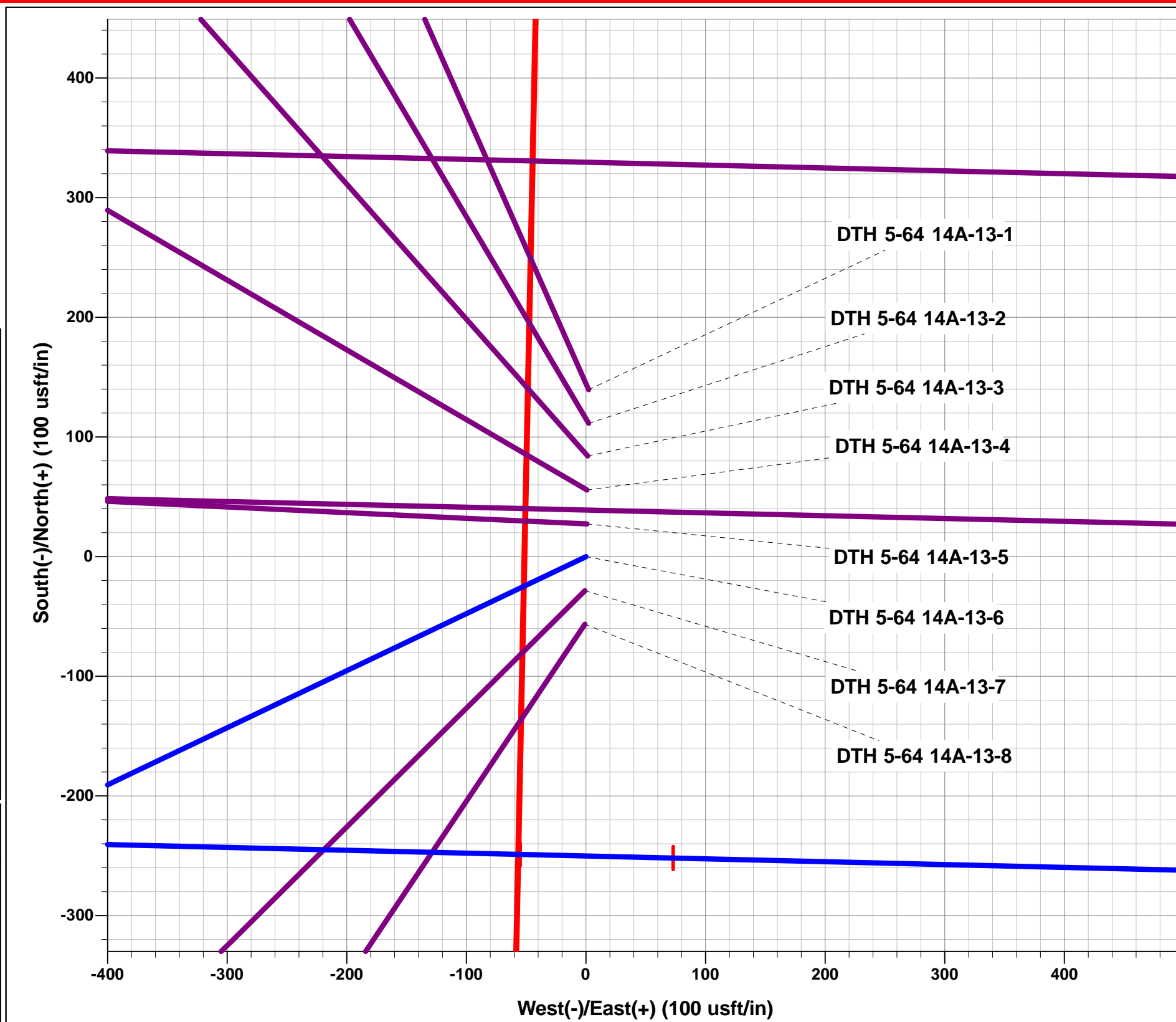
Project: ARAPAHOE COUNTY, COLORADO (NAD 83)
Site: SW NW SEC. 14 T5S R64W 6th P.M.
Well: DTH 5-64 14A-13-6
Wellbore: ORIGINAL WELLBORE
Design: PROPOSAL #1

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: 1660ft FNL & 510ft FWL of Sec 14
300.0	300.0	0.00	0.00	0.0	0.0	0.0	0.0	START NUDGE (2°/100ft BUR)
895.8	900.2	12.00	244.52	-27.0	-56.6	-55.1	62.6	EOB TO 12° INC
2910.4	2959.8	12.00	244.52	-211.2	-443.2	-432.2	491.0	END OF TANGENT
3506.2	3560.0	0.00	0.00	-238.2	-499.8	-487.3	553.7	EOD TO VERTICAL
6991.2	7045.0	0.00	0.00	-238.2	-499.8	-487.3	553.7	KOP (10°/100ft BUR)
7549.7	7816.0	77.10	91.37	-248.8	-54.9	-42.4	998.8	BPI: 1910ft FNL & 460ft FWL of Sec 14
7564.2	7945.0	90.00	91.37	-251.9	73.0	85.5	1126.6	HZ LP: 1910ft FNL & 587.9ft FWL of Sec 14
7564.2	17482.9	90.00	91.37	-479.7	9608.1	9620.1	10664.5	BHL: 1910ft FNL & 460ft FEL of Sec 13

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude
KOP - DTH 5-64 14A-13-6	6991.2	-238.2	-499.8	39.617557	-104.529310
BHL - DTH 5-64 14A-13-6	7564.2	-479.7	9608.1	39.616889	-104.493431
BPI - DTH 5-64 14A-13-6	7549.7	-248.8	-54.9	39.617528	-104.527731
HZ LP - DTH 5-64 14A-13-6	7564.2	-251.9	73.0	39.617519	-104.527277



Azimuths to True North
Magnetic North: 8.01°

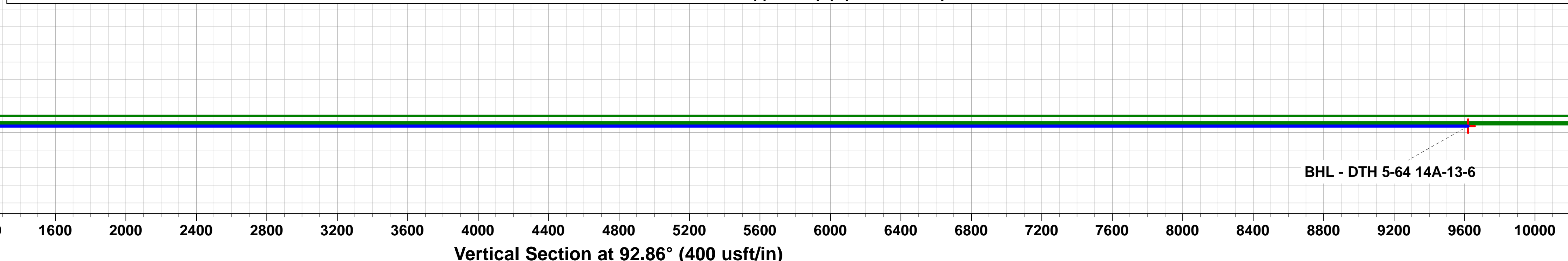
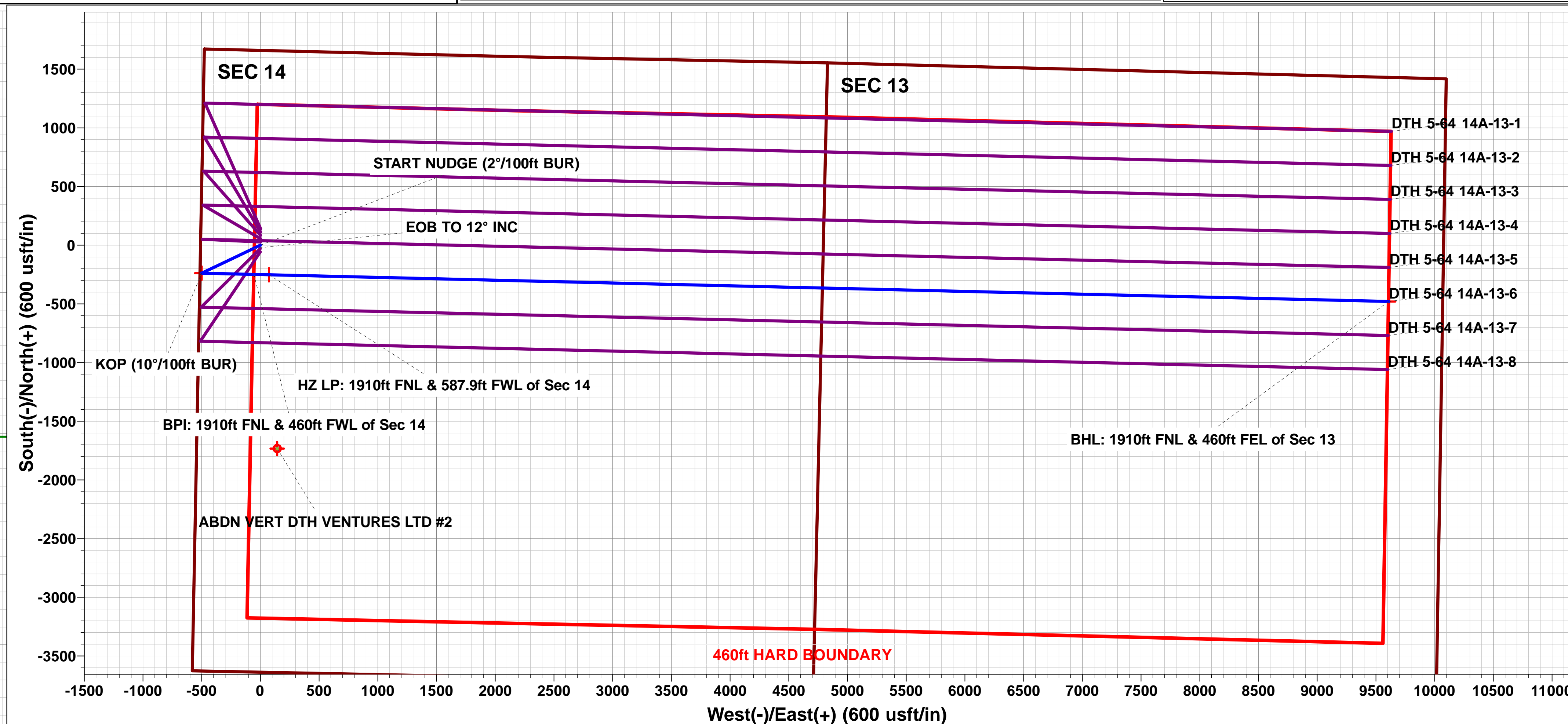
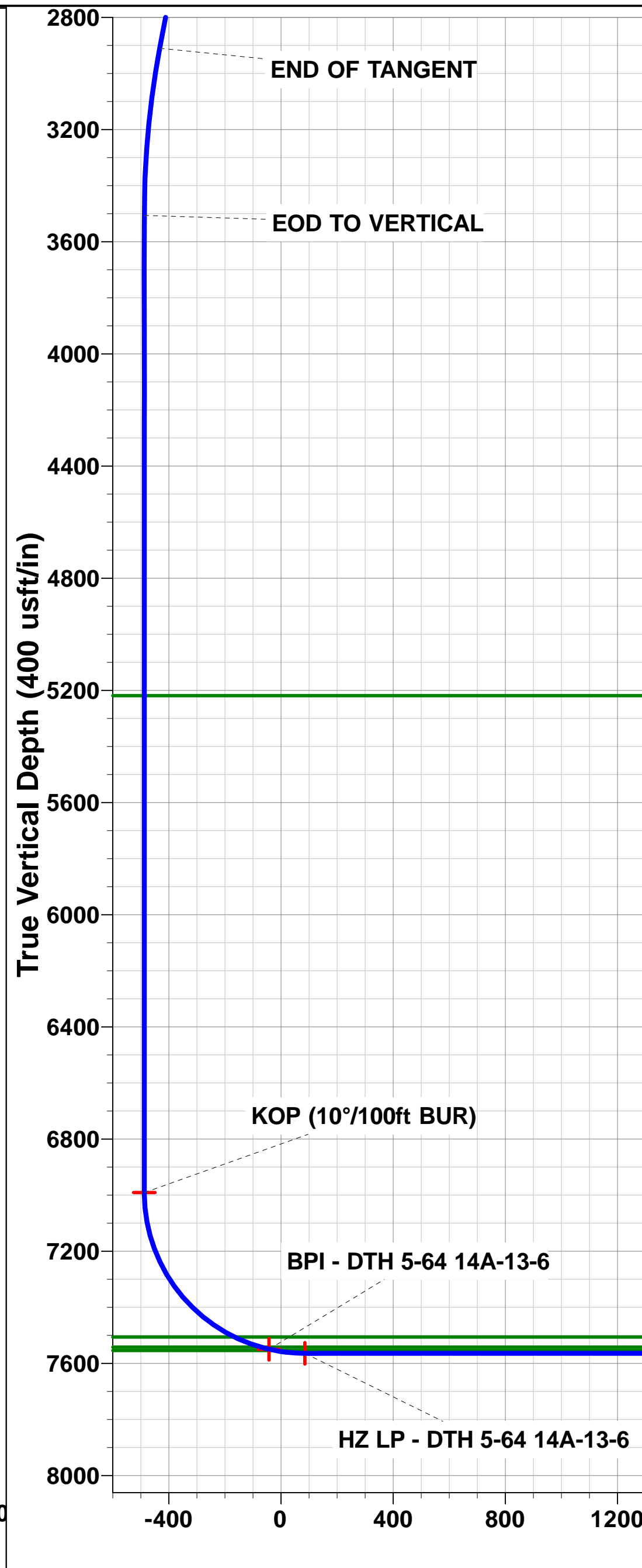
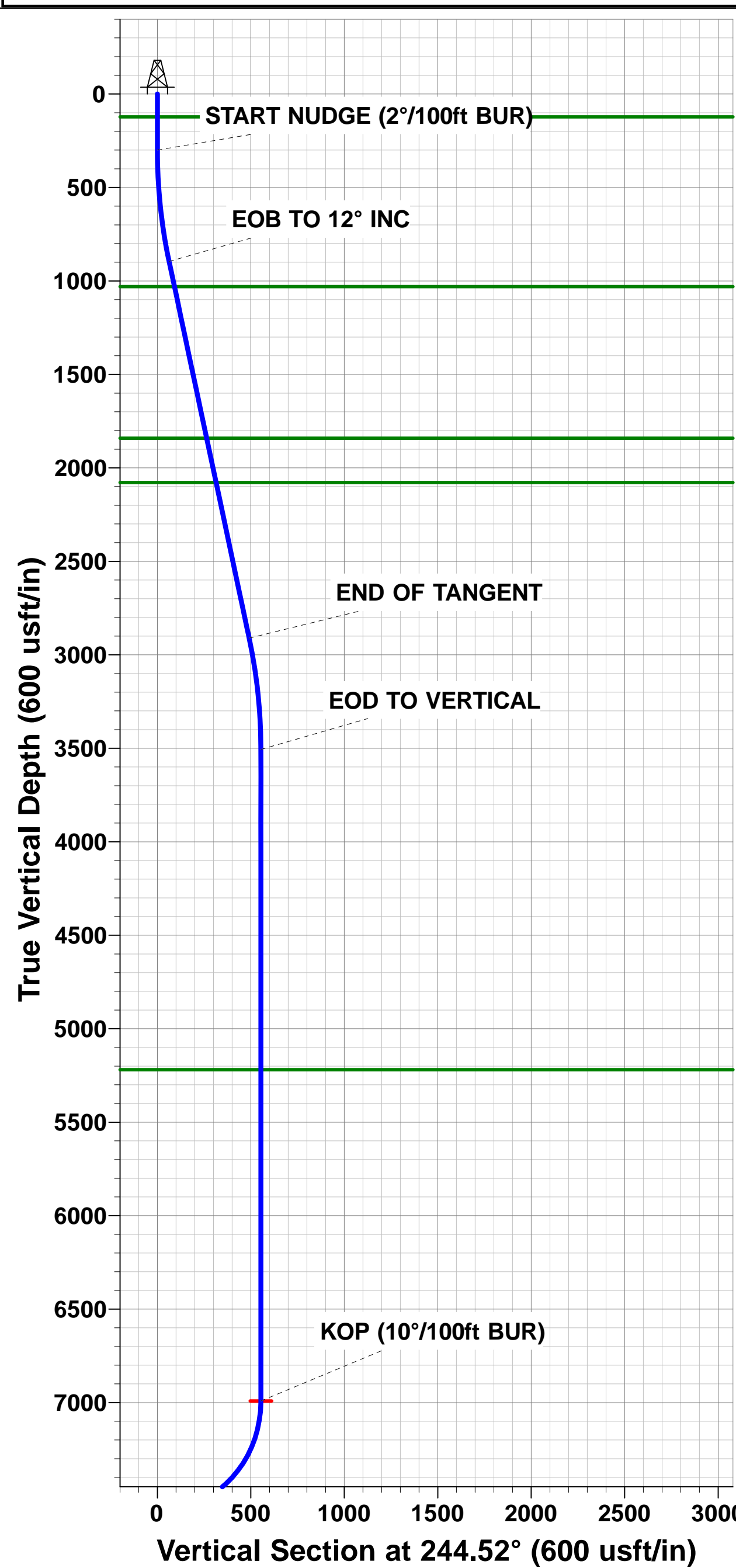
Magnetic Field
Strength: 51987.3snT
Dip Angle: 66.26°
Date: 24/07/2017
Model: IGRF2015

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
122.2	122.2	DENVER
1030.2	1037.6	UPPER ARAPAHOE
1841.2	1866.7	LARAMIE - FOX HILLS
2078.2	2109.0	P SHALE (BASE FOX HILLS)
5219.2	5273.0	SHANNON SANDSTONE MBR
7506.2	7685.1	SHARON SPRINGS SHALE
7542.2	7785.9	NIOBARA FORMATION
7554.2	7838.0	NIOBARA A CHALK

PROPOSED LOCAL COORDINATES:

SHL: 1660ft FNL & 510ft FWL of Sec 14
BEGIN PROD INT: 1910ft FNL & 460ft FWL of Sec 14
HZ LP: 1910ft FNL & 587.9ft FWL of Sec 14
BHL: 1910ft FNL & 460ft FEL of Sec 13



Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well DTH 5-64 14A-13-6
Company:	BISON EXPLORATION	TVD Reference:	KB-EST @ 5957.2usft (Original Well Elev)
Project:	ARAPAHOE COUNTY, COLORADO (NAD 83)	MD Reference:	KB-EST @ 5957.2usft (Original Well Elev)
Site:	SW NW SEC. 14 T5S R64W 6th P.M.	North Reference:	True
Well:	DTH 5-64 14A-13-6	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #1		

Project	ARAPAHOE COUNTY, COLORADO (NAD 83)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Central Zone		Using geodetic scale factor

Site	SW NW SEC. 14 T5S R64W 6th P.M.				
Site Position:		Northing:	1,651,667.54 usft	Latitude:	39.618594
From:	Lat/Long	Easting:	3,273,948.82 usft	Longitude:	-104.527528
Position Uncertainty:	0.0 usft	Slot Radius:	1.10000ft	Grid Convergence:	0.61 °

Well	DTH 5-64 14A-13-6					
Well Position	+N-S	-139.5 usft	Northing:	1,651,528.01 usft	Latitude:	39.618211
	+E-W	-2.3 usft	Easting:	3,273,948.06 usft	Longitude:	-104.527536
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	5,932.2 usft

Wellbore	ORIGINAL WELLBORE				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	24/07/2017	8.01	66.26	51,987

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 (°)
	7,564.2	0.0	0.0	92.86

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	-5,957.2	0.0	0.0	0.00	0.00	0.00	0.00	
300.0	0.00	0.00	300.0	-5,657.2	0.0	0.0	0.00	0.00	0.00	0.00	
900.2	12.00	244.52	895.8	-5,061.4	-27.0	-56.6	2.00	2.00	0.00	244.52	
2,959.8	12.00	244.52	2,910.4	-3,046.8	-211.2	-443.2	0.00	0.00	0.00	0.00	
3,560.0	0.00	0.00	3,506.2	-2,451.0	-238.2	-499.8	2.00	-2.00	0.00	180.00	
7,045.0	0.00	0.00	6,991.2	1,034.0	-238.2	-499.8	0.00	0.00	0.00	0.00	KOP - DTH 5-64 14
7,945.0	90.00	91.37	7,564.2	1,607.0	-251.9	73.0	10.00	10.00	0.00	91.37	
17,482.9	90.00	91.37	7,564.2	1,607.0	-479.7	9,608.1	0.00	0.00	0.00	-102.22	BHL - DTH 5-64 14.

Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well DTH 5-64 14A-13-6
Company:	BISON EXPLORATION	TVD Reference:	KB-EST @ 5957.2usft (Original Well Elev)
Project:	ARAPAHOE COUNTY, COLORADO (NAD 83)	MD Reference:	KB-EST @ 5957.2usft (Original Well Elev)
Site:	SW NW SEC. 14 T5S R64W 6th P.M.	North Reference:	True
Well:	DTH 5-64 14A-13-6	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: 1660ft FNL & 510ft FWL of Sec 14										
0.0	0.00	0.00	0.0	5,957.20	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.00	0.00	100.0	5,857.20	0.0	0.0	0.0	0.00	0.00	0.00
DENVER										
122.2	0.00	0.00	122.2	5,835.00	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	5,757.20	0.0	0.0	0.0	0.00	0.00	0.00
START NUDGE (2°/100ft BUR)										
300.0	0.00	0.00	300.0	5,657.20	0.0	0.0	0.0	0.00	0.00	0.00
400.0	2.00	244.52	400.0	5,557.22	-0.8	-1.6	-1.5	2.00	2.00	0.00
500.0	4.00	244.52	499.8	5,457.36	-3.0	-6.3	-6.1	2.00	2.00	0.00
600.0	6.00	244.52	599.5	5,357.75	-6.8	-14.2	-13.8	2.00	2.00	0.00
700.0	8.00	244.52	698.7	5,258.50	-12.0	-25.2	-24.5	2.00	2.00	0.00
800.0	10.00	244.52	797.5	5,159.73	-18.7	-39.3	-38.3	2.00	2.00	0.00
900.0	12.00	244.52	895.6	5,061.58	-26.9	-56.5	-55.1	2.00	2.00	0.00
EOB TO 12° INC										
900.2	12.00	244.52	895.8	5,061.36	-27.0	-56.6	-55.1	2.00	2.00	0.00
1,000.0	12.00	244.52	993.4	4,963.76	-35.9	-75.3	-73.4	0.00	0.00	0.00
UPPER ARAPAHOE										
1,037.6	12.00	244.52	1,030.2	4,927.00	-39.2	-82.3	-80.3	0.00	0.00	0.00
1,100.0	12.00	244.52	1,091.2	4,865.95	-44.8	-94.1	-91.7	0.00	0.00	0.00
1,200.0	12.00	244.52	1,189.1	4,768.14	-53.8	-112.8	-110.0	0.00	0.00	0.00
1,300.0	12.00	244.52	1,286.9	4,670.32	-62.7	-131.6	-128.3	0.00	0.00	0.00
1,400.0	12.00	244.52	1,384.7	4,572.51	-71.7	-150.4	-146.6	0.00	0.00	0.00
1,500.0	12.00	244.52	1,482.5	4,474.70	-80.6	-169.2	-164.9	0.00	0.00	0.00
1,600.0	12.00	244.52	1,580.3	4,376.88	-89.6	-187.9	-183.2	0.00	0.00	0.00
1,700.0	12.00	244.52	1,678.1	4,279.07	-98.5	-206.7	-201.5	0.00	0.00	0.00
1,800.0	12.00	244.52	1,775.9	4,181.26	-107.5	-225.5	-219.9	0.00	0.00	0.00
LARAMIE - FOX HILLS										
1,866.7	12.00	244.52	1,841.2	4,116.00	-113.4	-238.0	-232.1	0.00	0.00	0.00
1,900.0	12.00	244.52	1,873.8	4,083.45	-116.4	-244.3	-238.2	0.00	0.00	0.00
2,000.0	12.00	244.52	1,971.6	3,985.63	-125.4	-263.0	-256.5	0.00	0.00	0.00
2,100.0	12.00	244.52	2,069.4	3,887.82	-134.3	-281.8	-274.8	0.00	0.00	0.00
PIERRE SHALE (BASE FOX HILLS)										
2,109.0	12.00	244.52	2,078.2	3,879.00	-135.1	-283.5	-276.4	0.00	0.00	0.00
2,200.0	12.00	244.52	2,167.2	3,790.01	-143.3	-300.6	-293.1	0.00	0.00	0.00
2,300.0	12.00	244.52	2,265.0	3,692.19	-152.2	-319.4	-311.4	0.00	0.00	0.00
2,400.0	12.00	244.52	2,362.8	3,594.38	-161.2	-338.1	-329.7	0.00	0.00	0.00
2,500.0	12.00	244.52	2,460.6	3,496.57	-170.1	-356.9	-348.0	0.00	0.00	0.00
2,600.0	12.00	244.52	2,558.4	3,398.75	-179.1	-375.7	-366.3	0.00	0.00	0.00
2,700.0	12.00	244.52	2,656.3	3,300.94	-188.0	-394.5	-384.6	0.00	0.00	0.00
2,800.0	12.00	244.52	2,754.1	3,203.13	-196.9	-413.2	-402.9	0.00	0.00	0.00
2,900.0	12.00	244.52	2,851.9	3,105.31	-205.9	-432.0	-421.2	0.00	0.00	0.00
END OF TANGENT										
2,959.8	12.00	244.52	2,910.4	3,046.84	-211.2	-443.2	-432.2	0.00	0.00	0.00
3,000.0	11.20	244.52	2,949.8	3,007.44	-214.7	-450.5	-439.3	2.00	-2.00	0.00
3,100.0	9.20	244.52	3,048.2	2,909.03	-222.3	-466.5	-454.9	2.00	-2.00	0.00
3,200.0	7.20	244.52	3,147.1	2,810.06	-228.5	-479.4	-467.4	2.00	-2.00	0.00
3,300.0	5.20	244.52	3,246.6	2,710.65	-233.1	-489.2	-476.9	2.00	-2.00	0.00
3,400.0	3.20	244.52	3,346.3	2,610.92	-236.3	-495.8	-483.4	2.00	-2.00	0.00
3,500.0	1.20	244.52	3,446.2	2,511.00	-237.9	-499.2	-486.7	2.00	-2.00	0.00
EOD TO VERTICAL										
3,560.0	0.00	0.00	3,506.2	2,451.00	-238.2	-499.8	-487.3	2.00	-2.00	0.00
3,600.0	0.00	0.00	3,546.2	2,411.00	-238.2	-499.8	-487.3	0.00	0.00	0.00

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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)
3,700.0	0.00	0.00	3,646.2	2,311.00	-238.2	-499.8	-487.3	0.00	0.00	0.00
3,800.0	0.00	0.00	3,746.2	2,211.00	-238.2	-499.8	-487.3	0.00	0.00	0.00
3,900.0	0.00	0.00	3,846.2	2,111.00	-238.2	-499.8	-487.3	0.00	0.00	0.00
4,000.0	0.00	0.00	3,946.2	2,011.00	-238.2	-499.8	-487.3	0.00	0.00	0.00
4,100.0	0.00	0.00	4,046.2	1,911.00	-238.2	-499.8	-487.3	0.00	0.00	0.00
4,200.0	0.00	0.00	4,146.2	1,811.00	-238.2	-499.8	-487.3	0.00	0.00	0.00
4,300.0	0.00	0.00	4,246.2	1,711.00	-238.2	-499.8	-487.3	0.00	0.00	0.00
4,400.0	0.00	0.00	4,346.2	1,611.00	-238.2	-499.8	-487.3	0.00	0.00	0.00
4,500.0	0.00	0.00	4,446.2	1,511.00	-238.2	-499.8	-487.3	0.00	0.00	0.00
4,600.0	0.00	0.00	4,546.2	1,411.00	-238.2	-499.8	-487.3	0.00	0.00	0.00
4,700.0	0.00	0.00	4,646.2	1,311.00	-238.2	-499.8	-487.3	0.00	0.00	0.00
4,800.0	0.00	0.00	4,746.2	1,211.00	-238.2	-499.8	-487.3	0.00	0.00	0.00
4,900.0	0.00	0.00	4,846.2	1,111.00	-238.2	-499.8	-487.3	0.00	0.00	0.00
5,000.0	0.00	0.00	4,946.2	1,011.00	-238.2	-499.8	-487.3	0.00	0.00	0.00
5,100.0	0.00	0.00	5,046.2	911.00	-238.2	-499.8	-487.3	0.00	0.00	0.00
5,200.0	0.00	0.00	5,146.2	811.00	-238.2	-499.8	-487.3	0.00	0.00	0.00
SHANNON SANDSTONE MBR										
5,273.0	0.00	0.00	5,219.2	738.00	-238.2	-499.8	-487.3	0.00	0.00	0.00
5,300.0	0.00	0.00	5,246.2	711.00	-238.2	-499.8	-487.3	0.00	0.00	0.00
5,400.0	0.00	0.00	5,346.2	611.00	-238.2	-499.8	-487.3	0.00	0.00	0.00
5,500.0	0.00	0.00	5,446.2	511.00	-238.2	-499.8	-487.3	0.00	0.00	0.00
5,600.0	0.00	0.00	5,546.2	411.00	-238.2	-499.8	-487.3	0.00	0.00	0.00
5,700.0	0.00	0.00	5,646.2	311.00	-238.2	-499.8	-487.3	0.00	0.00	0.00
5,800.0	0.00	0.00	5,746.2	211.00	-238.2	-499.8	-487.3	0.00	0.00	0.00
5,900.0	0.00	0.00	5,846.2	111.00	-238.2	-499.8	-487.3	0.00	0.00	0.00
6,000.0	0.00	0.00	5,946.2	11.00	-238.2	-499.8	-487.3	0.00	0.00	0.00
6,100.0	0.00	0.00	6,046.2	-89.00	-238.2	-499.8	-487.3	0.00	0.00	0.00
6,200.0	0.00	0.00	6,146.2	-189.00	-238.2	-499.8	-487.3	0.00	0.00	0.00
6,300.0	0.00	0.00	6,246.2	-289.00	-238.2	-499.8	-487.3	0.00	0.00	0.00
6,400.0	0.00	0.00	6,346.2	-389.00	-238.2	-499.8	-487.3	0.00	0.00	0.00
6,500.0	0.00	0.00	6,446.2	-489.00	-238.2	-499.8	-487.3	0.00	0.00	0.00
6,600.0	0.00	0.00	6,546.2	-589.00	-238.2	-499.8	-487.3	0.00	0.00	0.00
6,700.0	0.00	0.00	6,646.2	-689.00	-238.2	-499.8	-487.3	0.00	0.00	0.00
6,800.0	0.00	0.00	6,746.2	-789.00	-238.2	-499.8	-487.3	0.00	0.00	0.00
6,900.0	0.00	0.00	6,846.2	-889.00	-238.2	-499.8	-487.3	0.00	0.00	0.00
7,000.0	0.00	0.00	6,946.2	-989.00	-238.2	-499.8	-487.3	0.00	0.00	0.00
KOP (10°/100ft BUR)										
7,045.0	0.00	0.00	6,991.2	-1,034.00	-238.2	-499.8	-487.3	0.00	0.00	0.00
7,100.0	5.50	91.37	7,046.1	-1,088.91	-238.3	-497.2	-484.7	10.00	10.00	0.00
7,200.0	15.50	91.37	7,144.3	-1,187.11	-238.7	-479.0	-466.5	10.00	10.00	0.00
7,300.0	25.50	91.37	7,237.9	-1,280.66	-239.5	-444.0	-431.5	10.00	10.00	0.00
7,400.0	35.50	91.37	7,323.9	-1,366.72	-240.7	-393.3	-380.8	10.00	10.00	0.00
7,500.0	45.50	91.37	7,399.9	-1,442.66	-242.3	-328.5	-316.0	10.00	10.00	0.00
7,600.0	55.50	91.37	7,463.4	-1,506.19	-244.1	-251.4	-239.0	10.00	10.00	0.00
SHARON SPRINGS SHALE										
7,685.1	64.01	91.37	7,506.2	-1,549.00	-245.9	-178.0	-165.6	10.00	10.00	0.00
7,700.0	65.50	91.37	7,512.6	-1,555.37	-246.2	-164.5	-152.1	10.00	10.00	0.00
NIORRARA FORMATION										
7,785.9	74.09	91.37	7,542.2	-1,585.00	-248.1	-84.1	-71.6	10.00	10.00	0.00
7,800.0	75.50	91.37	7,545.9	-1,588.71	-248.5	-70.4	-57.9	10.00	10.00	0.00
BPI: 1910ft FNL & 460ft FWL of Sec 14										
7,816.0	77.10	91.37	7,549.7	-1,592.50	-248.8	-54.9	-42.4	10.00	10.00	0.00
NIORRARA A CHALK										

Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well DTH 5-64 14A-13-6
Company:	BISON EXPLORATION	TVD Reference:	KB-EST @ 5957.2usft (Original Well Elev)
Project:	ARAPAHOE COUNTY, COLORADO (NAD 83)	MD Reference:	KB-EST @ 5957.2usft (Original Well Elev)
Site:	SW NW SEC. 14 T5S R64W 6th P.M.	North Reference:	True
Well:	DTH 5-64 14A-13-6	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)
7,838.0	79.30	91.37	7,554.2	-1,597.00	-249.4	-33.3	-20.9	10.00	10.00	0.00
7,900.0	85.50	91.37	7,562.4	-1,605.19	-250.8	28.1	40.5	10.00	10.00	0.00
HZ LP: 1910ft FNL & 587.9ft FWL of Sec 14										
7,945.0	90.00	91.37	7,564.2	-1,606.96	-251.9	73.0	85.5	10.00	10.00	0.00
8,000.0	90.00	91.37	7,564.2	-1,606.96	-253.2	128.0	140.4	0.00	0.00	0.00
8,100.0	90.00	91.37	7,564.2	-1,606.96	-255.6	227.9	240.4	0.00	0.00	0.00
8,200.0	90.00	91.37	7,564.2	-1,606.96	-258.0	327.9	340.4	0.00	0.00	0.00
8,300.0	90.00	91.37	7,564.2	-1,606.96	-260.4	427.9	440.3	0.00	0.00	0.00
8,400.0	90.00	91.37	7,564.2	-1,606.96	-262.8	527.9	540.3	0.00	0.00	0.00
8,500.0	90.00	91.37	7,564.2	-1,606.96	-265.2	627.8	640.3	0.00	0.00	0.00
8,600.0	90.00	91.37	7,564.2	-1,606.96	-267.6	727.8	740.2	0.00	0.00	0.00
8,700.0	90.00	91.37	7,564.2	-1,606.96	-269.9	827.8	840.2	0.00	0.00	0.00
8,800.0	90.00	91.37	7,564.2	-1,606.96	-272.3	927.7	940.2	0.00	0.00	0.00
8,900.0	90.00	91.37	7,564.2	-1,606.96	-274.7	1,027.7	1,040.1	0.00	0.00	0.00
9,000.0	90.00	91.37	7,564.2	-1,606.96	-277.1	1,127.7	1,140.1	0.00	0.00	0.00
9,100.0	90.00	91.37	7,564.2	-1,606.96	-279.5	1,227.7	1,240.1	0.00	0.00	0.00
9,200.0	90.00	91.37	7,564.2	-1,606.96	-281.9	1,327.6	1,340.0	0.00	0.00	0.00
9,300.0	90.00	91.37	7,564.2	-1,606.96	-284.3	1,427.6	1,440.0	0.00	0.00	0.00
9,400.0	90.00	91.37	7,564.2	-1,606.96	-286.7	1,527.6	1,540.0	0.00	0.00	0.00
9,500.0	90.00	91.37	7,564.2	-1,606.96	-289.1	1,627.5	1,639.9	0.00	0.00	0.00
9,600.0	90.00	91.37	7,564.2	-1,606.96	-291.5	1,727.5	1,739.9	0.00	0.00	0.00
9,700.0	90.00	91.37	7,564.2	-1,606.96	-293.9	1,827.5	1,839.9	0.00	0.00	0.00
9,800.0	90.00	91.37	7,564.2	-1,606.96	-296.2	1,927.5	1,939.8	0.00	0.00	0.00
9,900.0	90.00	91.37	7,564.2	-1,606.96	-298.6	2,027.4	2,039.8	0.00	0.00	0.00
10,000.0	90.00	91.37	7,564.2	-1,606.96	-301.0	2,127.4	2,139.8	0.00	0.00	0.00
10,100.0	90.00	91.37	7,564.2	-1,606.96	-303.4	2,227.4	2,239.7	0.00	0.00	0.00
10,200.0	90.00	91.37	7,564.2	-1,606.96	-305.8	2,327.3	2,339.7	0.00	0.00	0.00
10,300.0	90.00	91.37	7,564.2	-1,606.96	-308.2	2,427.3	2,439.7	0.00	0.00	0.00
10,400.0	90.00	91.37	7,564.2	-1,606.96	-310.6	2,527.3	2,539.6	0.00	0.00	0.00
10,500.0	90.00	91.37	7,564.2	-1,606.96	-313.0	2,627.3	2,639.6	0.00	0.00	0.00
10,600.0	90.00	91.37	7,564.2	-1,606.96	-315.4	2,727.2	2,739.6	0.00	0.00	0.00
10,700.0	90.00	91.37	7,564.2	-1,606.96	-317.8	2,827.2	2,839.5	0.00	0.00	0.00
10,800.0	90.00	91.37	7,564.2	-1,606.96	-320.1	2,927.2	2,939.5	0.00	0.00	0.00
10,900.0	90.00	91.37	7,564.2	-1,606.96	-322.5	3,027.1	3,039.5	0.00	0.00	0.00
11,000.0	90.00	91.37	7,564.2	-1,606.96	-324.9	3,127.1	3,139.4	0.00	0.00	0.00
11,100.0	90.00	91.37	7,564.2	-1,606.96	-327.3	3,227.1	3,239.4	0.00	0.00	0.00
11,200.0	90.00	91.37	7,564.2	-1,606.96	-329.7	3,327.1	3,339.4	0.00	0.00	0.00
11,300.0	90.00	91.37	7,564.2	-1,606.96	-332.1	3,427.0	3,439.3	0.00	0.00	0.00
11,400.0	90.00	91.37	7,564.2	-1,606.96	-334.5	3,527.0	3,539.3	0.00	0.00	0.00
11,500.0	90.00	91.37	7,564.2	-1,606.96	-336.9	3,627.0	3,639.3	0.00	0.00	0.00
11,600.0	90.00	91.37	7,564.2	-1,606.96	-339.3	3,726.9	3,739.2	0.00	0.00	0.00
11,700.0	90.00	91.37	7,564.2	-1,606.96	-341.6	3,826.9	3,839.2	0.00	0.00	0.00
11,800.0	90.00	91.37	7,564.2	-1,606.96	-344.0	3,926.9	3,939.2	0.00	0.00	0.00
11,900.0	90.00	91.37	7,564.2	-1,606.97	-346.4	4,026.9	4,039.1	0.00	0.00	0.00
12,000.0	90.00	91.37	7,564.2	-1,606.97	-348.8	4,126.8	4,139.1	0.00	0.00	0.00
12,100.0	90.00	91.37	7,564.2	-1,606.97	-351.2	4,226.8	4,239.1	0.00	0.00	0.00
12,200.0	90.00	91.37	7,564.2	-1,606.97	-353.6	4,326.8	4,339.0	0.00	0.00	0.00
12,300.0	90.00	91.37	7,564.2	-1,606.97	-356.0	4,426.7	4,439.0	0.00	0.00	0.00
12,400.0	90.00	91.37	7,564.2	-1,606.97	-358.4	4,526.7	4,539.0	0.00	0.00	0.00
12,500.0	90.00	91.37	7,564.2	-1,606.97	-360.8	4,626.7	4,638.9	0.00	0.00	0.00
12,600.0	90.00	91.37	7,564.2	-1,606.97	-363.1	4,726.7	4,738.9	0.00	0.00	0.00
12,700.0	90.00	91.37	7,564.2	-1,606.97	-365.5	4,826.6	4,838.9	0.00	0.00	0.00
12,800.0	90.00	91.37	7,564.2	-1,606.97	-367.9	4,926.6	4,938.8	0.00	0.00	0.00
12,900.0	90.00	91.37	7,564.2	-1,606.97	-370.3	5,026.6	5,038.8	0.00	0.00	0.00

Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well DTH 5-64 14A-13-6
Company:	BISON EXPLORATION	TVD Reference:	KB-EST @ 5957.2usft (Original Well Elev)
Project:	ARAPAHOE COUNTY, COLORADO (NAD 83)	MD Reference:	KB-EST @ 5957.2usft (Original Well Elev)
Site:	SW NW SEC. 14 T5S R64W 6th P.M.	North Reference:	True
Well:	DTH 5-64 14A-13-6	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)
13,000.0	90.00	91.37	7,564.2	-1,606.97	-372.7	5,126.5	5,138.8	0.00	0.00	0.00
13,100.0	90.00	91.37	7,564.2	-1,606.97	-375.1	5,226.5	5,238.7	0.00	0.00	0.00
13,200.0	90.00	91.37	7,564.2	-1,606.97	-377.5	5,326.5	5,338.7	0.00	0.00	0.00
13,300.0	90.00	91.37	7,564.2	-1,606.97	-379.9	5,426.5	5,438.7	0.00	0.00	0.00
13,400.0	90.00	91.37	7,564.2	-1,606.97	-382.3	5,526.4	5,538.6	0.00	0.00	0.00
13,500.0	90.00	91.37	7,564.2	-1,606.97	-384.6	5,626.4	5,638.6	0.00	0.00	0.00
13,600.0	90.00	91.37	7,564.2	-1,606.97	-387.0	5,726.4	5,738.6	0.00	0.00	0.00
13,700.0	90.00	91.37	7,564.2	-1,606.97	-389.4	5,826.3	5,838.5	0.00	0.00	0.00
13,800.0	90.00	91.37	7,564.2	-1,606.97	-391.8	5,926.3	5,938.5	0.00	0.00	0.00
13,900.0	90.00	91.37	7,564.2	-1,606.97	-394.2	6,026.3	6,038.5	0.00	0.00	0.00
14,000.0	90.00	91.37	7,564.2	-1,606.97	-396.6	6,126.3	6,138.4	0.00	0.00	0.00
14,100.0	90.00	91.37	7,564.2	-1,606.98	-399.0	6,226.2	6,238.4	0.00	0.00	0.00
14,200.0	90.00	91.37	7,564.2	-1,606.98	-401.4	6,326.2	6,338.3	0.00	0.00	0.00
14,300.0	90.00	91.37	7,564.2	-1,606.98	-403.8	6,426.2	6,438.3	0.00	0.00	0.00
14,400.0	90.00	91.37	7,564.2	-1,606.98	-406.1	6,526.1	6,538.3	0.00	0.00	0.00
14,500.0	90.00	91.37	7,564.2	-1,606.98	-408.5	6,626.1	6,638.2	0.00	0.00	0.00
14,600.0	90.00	91.37	7,564.2	-1,606.98	-410.9	6,726.1	6,738.2	0.00	0.00	0.00
14,700.0	90.00	91.37	7,564.2	-1,606.98	-413.3	6,826.1	6,838.2	0.00	0.00	0.00
14,800.0	90.00	91.37	7,564.2	-1,606.98	-415.7	6,926.0	6,938.1	0.00	0.00	0.00
14,900.0	90.00	91.37	7,564.2	-1,606.98	-418.1	7,026.0	7,038.1	0.00	0.00	0.00
15,000.0	90.00	91.37	7,564.2	-1,606.98	-420.5	7,126.0	7,138.1	0.00	0.00	0.00
15,100.0	90.00	91.37	7,564.2	-1,606.98	-422.9	7,225.9	7,238.0	0.00	0.00	0.00
15,200.0	90.00	91.37	7,564.2	-1,606.98	-425.2	7,325.9	7,338.0	0.00	0.00	0.00
15,300.0	90.00	91.37	7,564.2	-1,606.98	-427.6	7,425.9	7,438.0	0.00	0.00	0.00
15,400.0	90.00	91.37	7,564.2	-1,606.98	-430.0	7,525.9	7,537.9	0.00	0.00	0.00
15,500.0	90.00	91.37	7,564.2	-1,606.98	-432.4	7,625.8	7,637.9	0.00	0.00	0.00
15,600.0	90.00	91.37	7,564.2	-1,606.98	-434.8	7,725.8	7,737.9	0.00	0.00	0.00
15,700.0	90.00	91.37	7,564.2	-1,606.99	-437.2	7,825.8	7,837.8	0.00	0.00	0.00
15,800.0	90.00	91.37	7,564.2	-1,606.99	-439.6	7,925.7	7,937.8	0.00	0.00	0.00
15,900.0	90.00	91.37	7,564.2	-1,606.99	-442.0	8,025.7	8,037.8	0.00	0.00	0.00
16,000.0	90.00	91.37	7,564.2	-1,606.99	-444.3	8,125.7	8,137.7	0.00	0.00	0.00
16,100.0	90.00	91.37	7,564.2	-1,606.99	-446.7	8,225.7	8,237.7	0.00	0.00	0.00
16,200.0	90.00	91.37	7,564.2	-1,606.99	-449.1	8,325.6	8,337.7	0.00	0.00	0.00
16,300.0	90.00	91.37	7,564.2	-1,606.99	-451.5	8,425.6	8,437.6	0.00	0.00	0.00
16,400.0	90.00	91.37	7,564.2	-1,606.99	-453.9	8,525.6	8,537.6	0.00	0.00	0.00
16,500.0	90.00	91.37	7,564.2	-1,606.99	-456.3	8,625.5	8,637.6	0.00	0.00	0.00
16,600.0	90.00	91.37	7,564.2	-1,606.99	-458.7	8,725.5	8,737.5	0.00	0.00	0.00
16,700.0	90.00	91.37	7,564.2	-1,606.99	-461.1	8,825.5	8,837.5	0.00	0.00	0.00
16,800.0	90.00	91.37	7,564.2	-1,606.99	-463.4	8,925.5	8,937.5	0.00	0.00	0.00
16,900.0	90.00	91.37	7,564.2	-1,606.99	-465.8	9,025.4	9,037.4	0.00	0.00	0.00
17,000.0	90.00	91.37	7,564.2	-1,607.00	-468.2	9,125.4	9,137.4	0.00	0.00	0.00
17,100.0	90.00	91.37	7,564.2	-1,607.00	-470.6	9,225.4	9,237.4	0.00	0.00	0.00
17,200.0	90.00	91.37	7,564.2	-1,607.00	-473.0	9,325.3	9,337.3	0.00	0.00	0.00
17,300.0	90.00	91.37	7,564.2	-1,607.00	-475.4	9,425.3	9,437.3	0.00	0.00	0.00
17,400.0	90.00	91.37	7,564.2	-1,607.00	-477.8	9,525.3	9,537.3	0.00	0.00	0.00
BHL: 1910ft FNL & 460ft FEL of Sec 13										
17,482.9	90.00	91.37	7,564.2	-1,607.00	-479.7	9,608.1	9,620.1	0.00	0.00	0.00

Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well DTH 5-64 14A-13-6
Company:	BISON EXPLORATION	TVD Reference:	KB-EST @ 5957.2usft (Original Well Elev)
Project:	ARAPAHOE COUNTY, COLORADO (NAD 83)	MD Reference:	KB-EST @ 5957.2usft (Original Well Elev)
Site:	SW NW SEC. 14 T5S R64W 6th P.M.	North Reference:	True
Well:	DTH 5-64 14A-13-6	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #1		

Formations					
MD (usft)	TVD (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
122.2	122.2	DENVER			
1,037.6	1,030.2	UPPER ARAPAHOE			
1,866.7	1,841.2	LARAMIE - FOX HILLS			
2,109.0	2,078.2	PIERRE SHALE (BASE FOX HILLS)			
5,273.0	5,219.2	SHANNON SANDSTONE MBR			
7,685.1	7,506.2	SHARON SPRINGS SHALE			
7,785.9	7,542.2	NIOBRARA FORMATION			
7,838.0	7,554.2	NIOBRARA A CHALK			

Plan Annotations				
MD (usft)	TVD (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
0.0	0.0	0.0	0.0	SHL: 1660ft FNL & 510ft FWL of Sec 14
300.0	300.0	0.0	0.0	START NUDGE (2°/100ft BUR)
900.2	895.8	-27.0	-56.6	EOB TO 12° INC
2,959.8	2,910.4	-211.2	-443.2	END OF TANGENT
3,560.0	3,506.2	-238.2	-499.8	EOD TO VERTICAL
7,045.0	6,991.2	-238.2	-499.8	KOP (10°/100ft BUR)
7,816.0	7,549.7	-248.8	-54.9	BPI: 1910ft FNL & 460ft FWL of Sec 14
7,945.0	7,564.2	-251.9	73.0	HZ LP: 1910ft FNL & 587.9ft FWL of Sec 14
17,482.9	7,564.2	-479.7	9,608.1	BHL: 1910ft FNL & 460ft FEL of Sec 13