

BISON EXPLORATION

**ARAPAHOE COUNTY, COLORADO (NAD 83)
SW NW SEC. 14 T5S R64W 6th P.M.
DTH 5-64 14A-13-3**

ORIGINAL WELLBORE

26 July, 2017

Plan: PROPOSAL #2



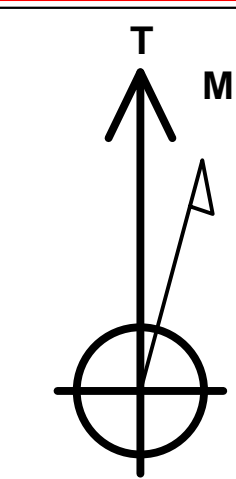
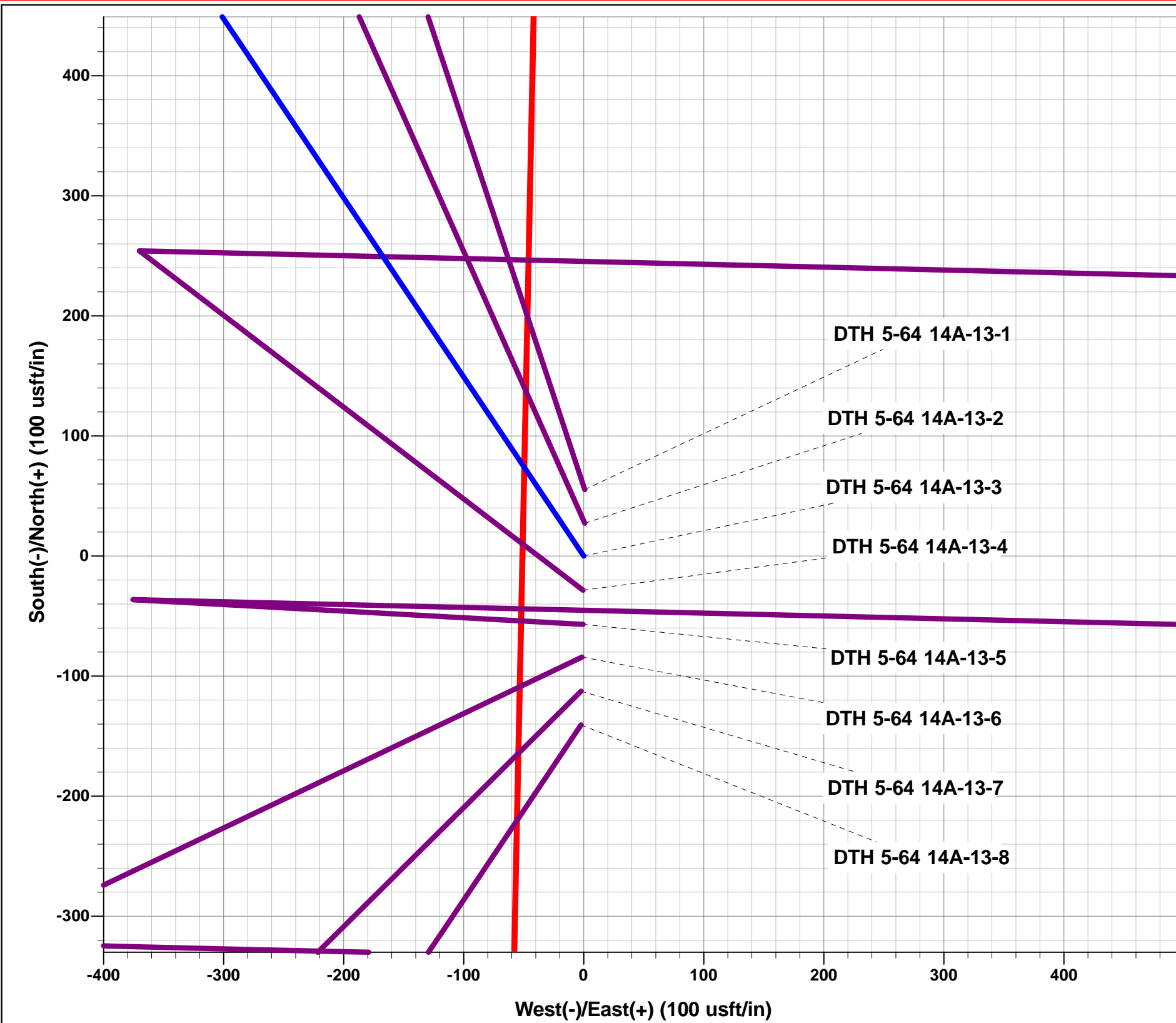
Project: ARAPAHOE COUNTY, COLORADO (NAD 83)
Site: SW NW SEC. 14 T5S R64W 6th P.M.
Well: DTH 5-64 14A-13-3
Wellbore: ORIGINAL WELLBORE
Design: PROPOSAL #2

ANNOTATIONS

TVD	MD	Inc	Azi	+N/-S	+E/-W	VSec	Dep	Annotation
0.0	0.0	0.00	0.00	0.0	0.0	0.0	0.0	SHL: 1576ft 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)
895.5	899.9	12.00	326.16	52.0	-34.8	-33.2	62.6	EOB TO 12° INC
3387.5	3447.5	12.00	326.16	491.9	-329.8	-313.9	592.2	END OF TANGENT
3983.0	4047.4	0.00	326.16	543.9	-364.6	-347.1	654.8	EOD TO VERTICAL
6988.0	7052.4	0.00	0.00	543.9	-364.6	-347.1	654.8	KOP (10°/100ft BUR)
7504.5	7696.0	64.36	91.36	536.2	-39.7	-22.6	979.9	BPI: 1040ft FNL & 460ft FWL of Sec 14
7561.0	7952.4	90.00	91.36	530.3	208.2	225.0	1227.7	HZ LP: 1040ft FNL & 707.9ft FWL of Sec 14
7561.0	17367.4	90.00	91.37	306.3	9620.5	9625.4	10642.7	BHL: 1040ft FNL & 460ft FEL of Sec 13

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude
KOP - DTH 5-64 14A-13-3 (P2)	6988.0	543.9	-364.6	39.619935	-104.528825
BHL - DTH 5-64 14A-13-3 (P2)	7561.0	306.3	9620.5	39.619278	-104.493381
BPI - DTH 5-64 14A-13-3 (P2)	7504.5	536.2	-39.7	39.619914	-104.527672
HZ LP - DTH 5-64 14A-13-3 (P2)	7561.0	530.3	208.2	39.619898	-104.526792



Azimuths to True North
Magnetic North: 8.01°

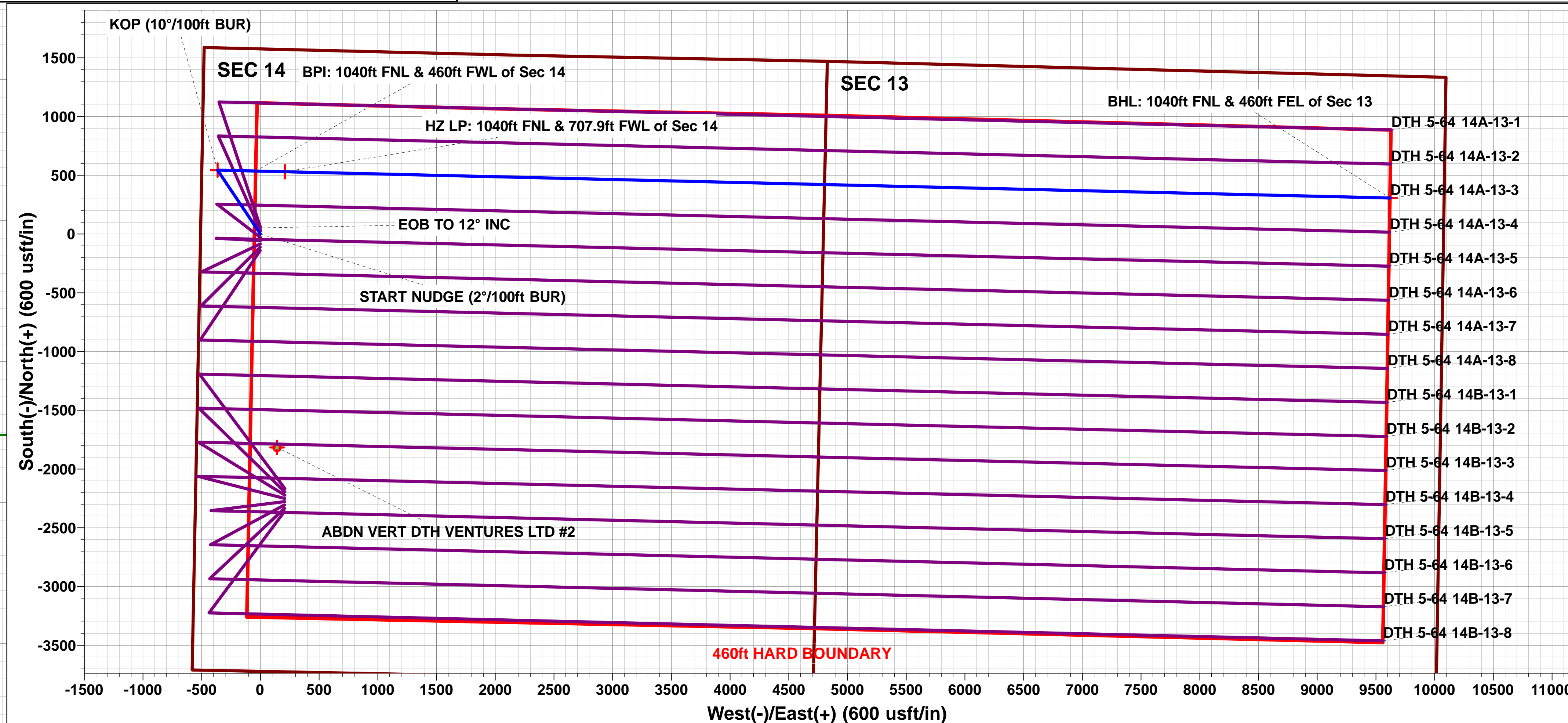
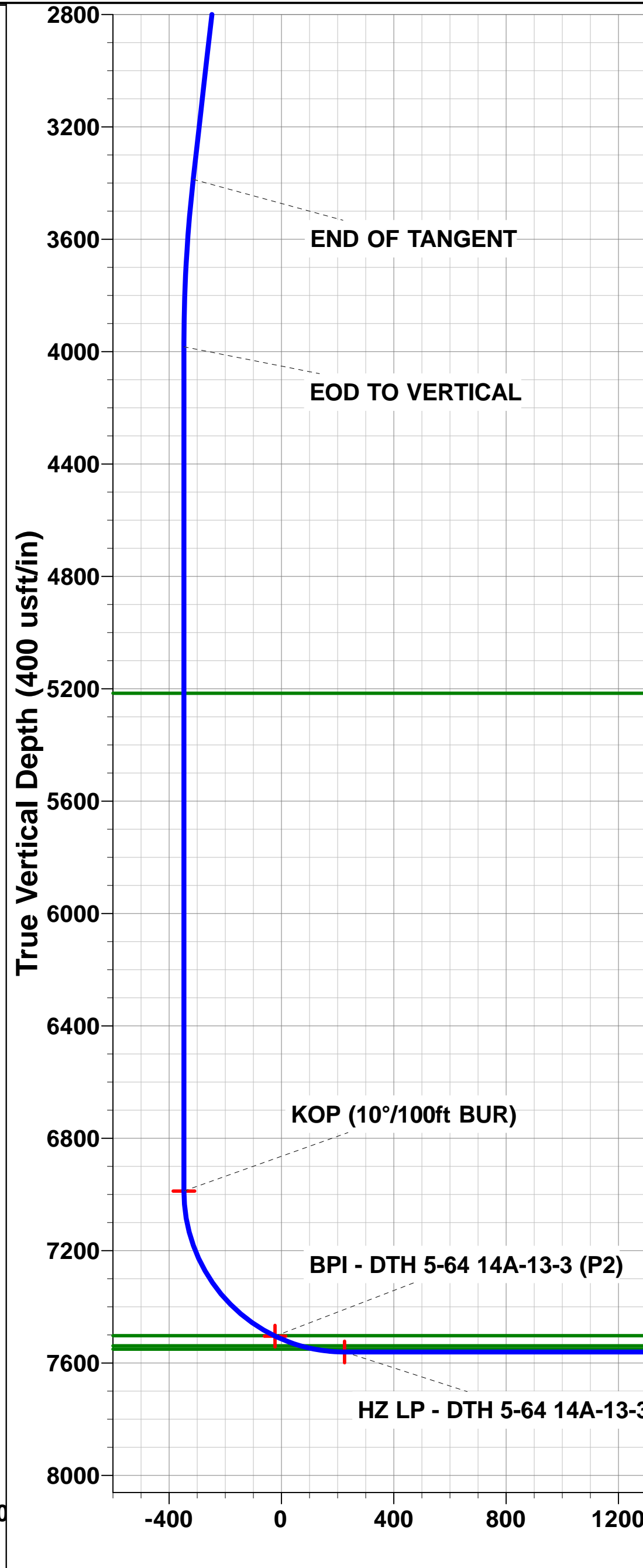
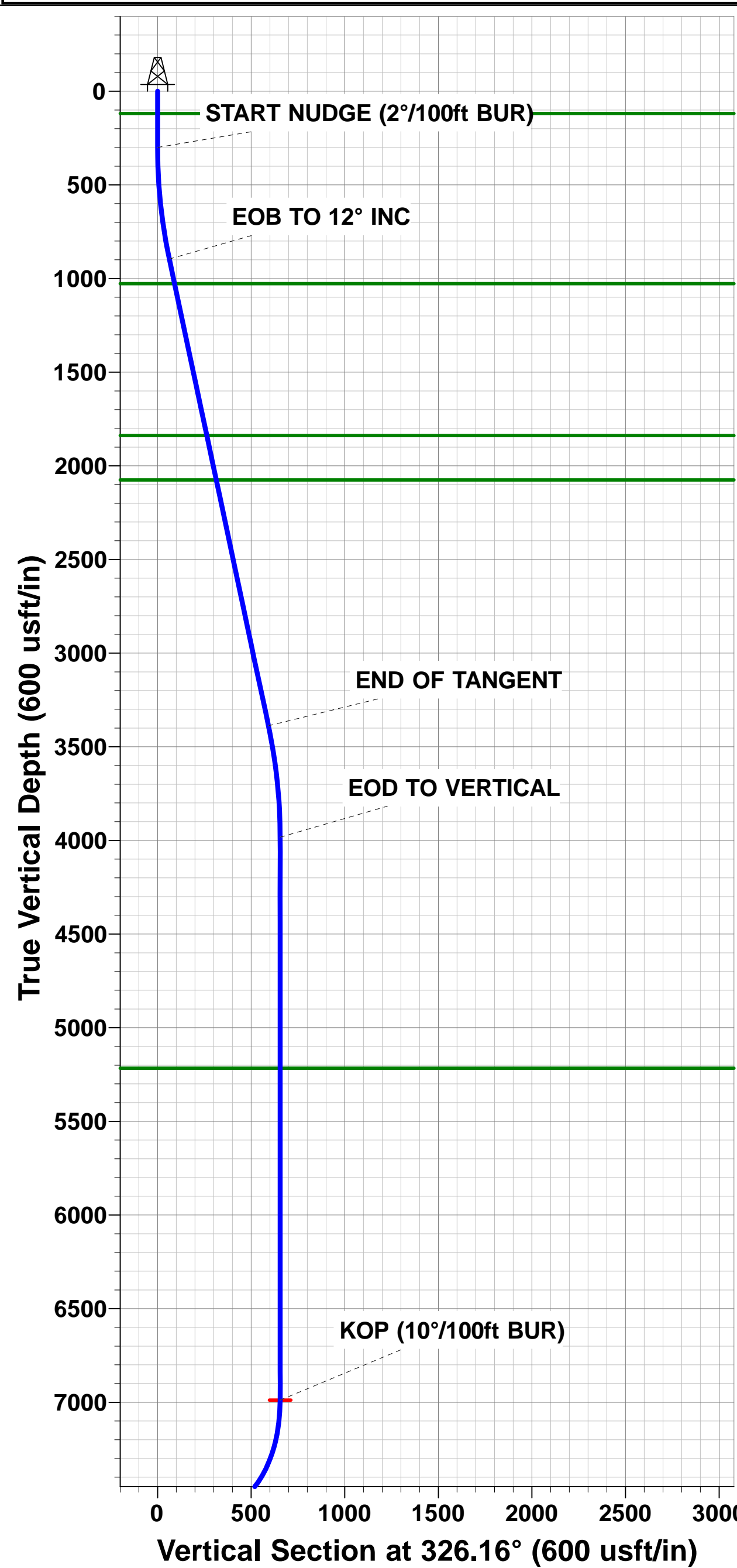
Magnetic Field
Strength: 51987.4snT
Dip Angle: 66.26°
Date: 24/07/2017
Model: IGRF2015

FORMATION TOP DETAILS

TVDPath	MDPath	Formation
119.0	119.0	DENVER
1027.0	1034.3	UPPER ARAPAHOE
1838.0	1863.4	LARAMIE - FOX HILLS
2075.0	2105.7	P SHALE (BASE FOX HILLS)
5216.0	5280.4	SHANNON SANDSTONE MBR
7503.0	7692.5	SHARON SPRINGS SHALE
7539.0	7793.3	NIOBARA FORMATION
7551.0	7845.4	NIOBARA A CHALK

PROPOSED LOCAL COORDINATES:

SHL: 1576ft FNL & 510ft FWL of Sec 14
BEGIN PROD INT: 1040ft FNL & 460ft FWL of Sec 14
HZ LP: 1040ft FNL & 707.9ft FWL of Sec 14
BHL: 1040ft FNL & 460ft FEL of Sec 13



Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well DTH 5-64 14A-13-3
Company:	BISON EXPLORATION	TVD Reference:	KB-EST @ 5954.0usft (Original Well Elev)
Project:	ARAPAHOE COUNTY, COLORADO (NAD 83)	MD Reference:	KB-EST @ 5954.0usft (Original Well Elev)
Site:	SW NW SEC. 14 T5S R64W 6th P.M.	North Reference:	True
Well:	DTH 5-64 14A-13-3	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #2		

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
From:	Lat/Long	Easting:	3,273,948.82 usft
Position Uncertainty:	0.0 usft	Slot Radius:	1.10000ft
		Latitude:	39.618594
		Longitude:	-104.527528
		Grid Convergence:	0.61 °

Well	DTH 5-64 14A-13-3		
Well Position	+N-S	-55.4 usft	Northing:
	+E-W	-0.8 usft	Easting:
Position Uncertainty	0.0 usft	Wellhead Elevation:	usft
		Latitude:	39.618442
		Longitude:	-104.527531
		Ground Level:	5,929.0 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 #2			
Audit Notes:				
Version:	Phase:	PROTOTYPE	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N-S (usft)	+E-W (usft)	Direction (°)
	7,561.0	0.0	0.0	88.18

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	-5,954.0	0.0	0.0	0.00	0.00	0.00	0.00	
300.0	0.00	0.00	300.0	-5,654.0	0.0	0.0	0.00	0.00	0.00	0.00	
899.9	12.00	326.16	895.6	-5,058.4	52.0	-34.9	2.00	2.00	0.00	326.16	
3,447.5	12.00	326.16	3,387.4	-2,566.6	491.9	-329.7	0.00	0.00	0.00	0.00	
4,047.4	0.00	0.00	3,983.0	-1,971.0	543.9	-364.6	2.00	-2.00	0.00	180.00	
7,052.4	0.00	0.00	6,988.0	1,034.0	543.9	-364.6	0.00	0.00	0.00	0.00	KOP - DTH 5-64 14
7,952.4	90.00	91.36	7,561.0	1,607.0	530.3	208.2	10.00	10.00	0.00	91.36	
17,367.4	90.00	91.37	7,561.0	1,607.0	306.3	9,620.5	0.00	0.00	0.00	94.78	BHL - DTH 5-64 14.

Planning Report



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Company:	BISON EXPLORATION	TVD Reference:	KB-EST @ 5954.0usft (Original Well Elev)
Project:	ARAPAHOE COUNTY, COLORADO (NAD 83)	MD Reference:	KB-EST @ 5954.0usft (Original Well Elev)
Site:	SW NW SEC. 14 T5S R64W 6th P.M.	North Reference:	True
Well:	DTH 5-64 14A-13-3	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #2		

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: 1576ft FNL & 510ft FWL of Sec 14										
0.0	0.00	0.00	0.0	5,954.00	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.00	0.00	100.0	5,854.00	0.0	0.0	0.0	0.00	0.00	0.00
DENVER										
119.0	0.00	0.00	119.0	5,835.00	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	5,754.00	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	5,654.00	0.0	0.0	0.0	0.00	0.00	0.00
400.0	2.00	326.16	400.0	5,554.02	1.4	-1.0	-0.9	2.00	2.00	0.00
500.0	4.00	326.16	499.8	5,454.16	5.8	-3.9	-3.7	2.00	2.00	0.00
600.0	6.00	326.16	599.5	5,354.55	13.0	-8.7	-8.3	2.00	2.00	0.00
700.0	8.00	326.16	698.7	5,255.30	23.2	-15.5	-14.8	2.00	2.00	0.00
800.0	10.00	326.16	797.5	5,156.53	36.2	-24.2	-23.1	2.00	2.00	0.00
EOB TO 12° INC										
899.9	12.00	326.16	895.5	5,058.46	52.0	-34.8	-33.2	2.00	2.00	0.00
900.0	12.00	326.16	895.6	5,058.38	52.0	-34.9	-33.2	0.86	0.86	0.00
1,000.0	12.00	326.16	993.4	4,960.56	69.3	-46.4	-44.2	0.00	0.00	0.00
UPPER ARAPAHOE										
1,034.3	12.00	326.16	1,027.0	4,927.00	75.2	-50.4	-48.0	0.00	0.00	0.00
1,100.0	12.00	326.16	1,091.3	4,862.75	86.5	-58.0	-55.2	0.00	0.00	0.00
1,200.0	12.00	326.16	1,189.1	4,764.93	103.8	-69.6	-66.2	0.00	0.00	0.00
1,300.0	12.00	326.16	1,286.9	4,667.12	121.1	-81.2	-77.3	0.00	0.00	0.00
1,400.0	12.00	326.16	1,384.7	4,569.30	138.3	-92.7	-88.3	0.00	0.00	0.00
1,500.0	12.00	326.16	1,482.5	4,471.49	155.6	-104.3	-99.3	0.00	0.00	0.00
1,600.0	12.00	326.16	1,580.3	4,373.67	172.9	-115.9	-110.3	0.00	0.00	0.00
1,700.0	12.00	326.16	1,678.1	4,275.86	190.1	-127.5	-121.3	0.00	0.00	0.00
1,800.0	12.00	326.16	1,776.0	4,178.04	207.4	-139.0	-132.4	0.00	0.00	0.00
LARAMIE - FOX HILLS										
1,863.4	12.00	326.16	1,838.0	4,116.00	218.4	-146.4	-139.4	0.00	0.00	0.00
1,900.0	12.00	326.16	1,873.8	4,080.23	224.7	-150.6	-143.4	0.00	0.00	0.00
2,000.0	12.00	326.16	1,971.6	3,982.41	242.0	-162.2	-154.4	0.00	0.00	0.00
2,100.0	12.00	326.16	2,069.4	3,884.60	259.2	-173.8	-165.4	0.00	0.00	0.00
PIERRE SHALE (BASE FOX HILLS)										
2,105.7	12.00	326.16	2,075.0	3,879.00	260.2	-174.4	-166.1	0.00	0.00	0.00
2,200.0	12.00	326.16	2,167.2	3,786.78	276.5	-185.3	-176.5	0.00	0.00	0.00
2,300.0	12.00	326.16	2,265.0	3,688.97	293.8	-196.9	-187.5	0.00	0.00	0.00
2,400.0	12.00	326.16	2,362.8	3,591.15	311.0	-208.5	-198.5	0.00	0.00	0.00
2,500.0	12.00	326.16	2,460.7	3,493.33	328.3	-220.1	-209.5	0.00	0.00	0.00
2,600.0	12.00	326.16	2,558.5	3,395.52	345.6	-231.6	-220.5	0.00	0.00	0.00
2,700.0	12.00	326.16	2,656.3	3,297.70	362.8	-243.2	-231.6	0.00	0.00	0.00
2,800.0	12.00	326.16	2,754.1	3,199.89	380.1	-254.8	-242.6	0.00	0.00	0.00
2,900.0	12.00	326.16	2,851.9	3,102.07	397.4	-266.4	-253.6	0.00	0.00	0.00
3,000.0	12.00	326.16	2,949.7	3,004.26	414.6	-278.0	-264.6	0.00	0.00	0.00
3,100.0	12.00	326.16	3,047.6	2,906.44	431.9	-289.5	-275.6	0.00	0.00	0.00
3,200.0	12.00	326.16	3,145.4	2,808.63	449.2	-301.1	-286.7	0.00	0.00	0.00
3,300.0	12.00	326.16	3,243.2	2,710.81	466.4	-312.7	-297.7	0.00	0.00	0.00
3,400.0	12.00	326.16	3,341.0	2,613.00	483.7	-324.3	-308.7	0.00	0.00	0.00
END OF TANGENT										
3,447.5	12.00	326.16	3,387.5	2,566.54	491.9	-329.8	-313.9	0.00	0.00	0.00
3,500.0	10.95	326.16	3,438.9	2,515.09	500.6	-335.6	-319.5	2.00	-2.00	0.00
3,600.0	8.95	326.16	3,537.4	2,416.59	514.9	-345.2	-328.6	2.00	-2.00	0.00
3,700.0	6.95	326.16	3,636.4	2,317.56	526.4	-352.9	-336.0	2.00	-2.00	0.00
3,800.0	4.95	326.16	3,735.9	2,218.10	535.0	-358.7	-341.4	2.00	-2.00	0.00

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Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #2		

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)
3,900.0	2.95	326.16	3,835.7	2,118.35	540.8	-362.5	-345.1	2.00	-2.00	0.00
4,000.0	0.95	326.16	3,935.6	2,018.41	543.6	-364.4	-346.9	2.00	-2.00	0.00
EOD TO VERTICAL										
4,047.4	0.00	326.16	3,983.0	1,971.01	543.9	-364.6	-347.1	2.00	-2.00	0.00
4,100.0	0.00	0.00	4,035.6	1,918.41	543.9	-364.6	-347.1	0.00	0.00	0.00
4,200.0	0.00	0.00	4,135.6	1,818.41	543.9	-364.6	-347.1	0.00	0.00	0.00
4,300.0	0.00	0.00	4,235.6	1,718.41	543.9	-364.6	-347.1	0.00	0.00	0.00
4,400.0	0.00	0.00	4,335.6	1,618.41	543.9	-364.6	-347.1	0.00	0.00	0.00
4,500.0	0.00	0.00	4,435.6	1,518.41	543.9	-364.6	-347.1	0.00	0.00	0.00
4,600.0	0.00	0.00	4,535.6	1,418.41	543.9	-364.6	-347.1	0.00	0.00	0.00
4,700.0	0.00	0.00	4,635.6	1,318.41	543.9	-364.6	-347.1	0.00	0.00	0.00
4,800.0	0.00	0.00	4,735.6	1,218.41	543.9	-364.6	-347.1	0.00	0.00	0.00
4,900.0	0.00	0.00	4,835.6	1,118.41	543.9	-364.6	-347.1	0.00	0.00	0.00
5,000.0	0.00	0.00	4,935.6	1,018.41	543.9	-364.6	-347.1	0.00	0.00	0.00
5,100.0	0.00	0.00	5,035.6	918.41	543.9	-364.6	-347.1	0.00	0.00	0.00
5,200.0	0.00	0.00	5,135.6	818.41	543.9	-364.6	-347.1	0.00	0.00	0.00
SHANNON SANDSTONE MBR										
5,280.4	0.00	0.00	5,216.0	738.00	543.9	-364.6	-347.1	0.00	0.00	0.00
5,300.0	0.00	0.00	5,235.6	718.41	543.9	-364.6	-347.1	0.00	0.00	0.00
5,400.0	0.00	0.00	5,335.6	618.41	543.9	-364.6	-347.1	0.00	0.00	0.00
5,500.0	0.00	0.00	5,435.6	518.41	543.9	-364.6	-347.1	0.00	0.00	0.00
5,600.0	0.00	0.00	5,535.6	418.41	543.9	-364.6	-347.1	0.00	0.00	0.00
5,700.0	0.00	0.00	5,635.6	318.41	543.9	-364.6	-347.1	0.00	0.00	0.00
5,800.0	0.00	0.00	5,735.6	218.41	543.9	-364.6	-347.1	0.00	0.00	0.00
5,900.0	0.00	0.00	5,835.6	118.41	543.9	-364.6	-347.1	0.00	0.00	0.00
6,000.0	0.00	0.00	5,935.6	18.41	543.9	-364.6	-347.1	0.00	0.00	0.00
6,100.0	0.00	0.00	6,035.6	-81.59	543.9	-364.6	-347.1	0.00	0.00	0.00
6,200.0	0.00	0.00	6,135.6	-181.59	543.9	-364.6	-347.1	0.00	0.00	0.00
6,300.0	0.00	0.00	6,235.6	-281.59	543.9	-364.6	-347.1	0.00	0.00	0.00
6,400.0	0.00	0.00	6,335.6	-381.59	543.9	-364.6	-347.1	0.00	0.00	0.00
6,500.0	0.00	0.00	6,435.6	-481.59	543.9	-364.6	-347.1	0.00	0.00	0.00
6,600.0	0.00	0.00	6,535.6	-581.59	543.9	-364.6	-347.1	0.00	0.00	0.00
6,700.0	0.00	0.00	6,635.6	-681.59	543.9	-364.6	-347.1	0.00	0.00	0.00
6,800.0	0.00	0.00	6,735.6	-781.59	543.9	-364.6	-347.1	0.00	0.00	0.00
6,900.0	0.00	0.00	6,835.6	-881.59	543.9	-364.6	-347.1	0.00	0.00	0.00
7,000.0	0.00	0.00	6,935.6	-981.59	543.9	-364.6	-347.1	0.00	0.00	0.00
KOP (10°/100ft BUR)										
7,052.4	0.00	0.00	6,988.0	-1,033.99	543.9	-364.6	-347.1	0.00	0.00	0.00
7,100.0	4.76	91.36	7,035.5	-1,081.53	543.9	-362.6	-345.1	10.00	10.00	0.00
7,200.0	14.76	91.36	7,134.0	-1,179.96	543.5	-345.7	-328.2	10.00	10.00	0.00
7,300.0	24.76	91.36	7,228.0	-1,273.95	542.6	-311.9	-294.5	10.00	10.00	0.00
7,400.0	34.76	91.36	7,314.7	-1,360.66	541.5	-262.4	-245.0	10.00	10.00	0.00
7,500.0	44.76	91.36	7,391.4	-1,437.43	540.0	-198.5	-181.2	10.00	10.00	0.00
7,600.0	54.76	91.36	7,456.0	-1,501.95	538.1	-122.3	-105.1	10.00	10.00	0.00
SHARON SPRINGS SHALE										
7,692.5	64.01	91.36	7,503.0	-1,549.00	536.3	-42.8	-25.8	10.00	10.00	0.00
BPI: 1040ft FNL & 460ft FWL of Sec 14										
7,696.0	64.36	91.36	7,504.5	-1,550.53	536.2	-39.7	-22.6	10.00	10.00	0.00
7,700.0	64.76	91.36	7,506.3	-1,552.25	536.1	-36.1	-19.0	10.00	10.00	0.00
NIOBRARA FORMATION										
7,793.3	74.09	91.36	7,539.0	-1,585.00	534.0	51.1	68.1	10.00	10.00	0.00
7,800.0	74.76	91.36	7,540.8	-1,586.81	533.9	57.6	74.6	10.00	10.00	0.00
NIOBRARA A CHALK										

Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well DTH 5-64 14A-13-3
Company:	BISON EXPLORATION	TVD Reference:	KB-EST @ 5954.0usft (Original Well Elev)
Project:	ARAPAHOE COUNTY, COLORADO (NAD 83)	MD Reference:	KB-EST @ 5954.0usft (Original Well Elev)
Site:	SW NW SEC. 14 T5S R64W 6th P.M.	North Reference:	True
Well:	DTH 5-64 14A-13-3	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #2		

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)
7,845.4	79.30	91.36	7,551.0	-1,597.00	532.8	101.9	118.8	10.00	10.00	0.00
7,900.0	84.76	91.36	7,558.6	-1,604.56	531.5	155.9	172.7	10.00	10.00	0.00
HZ LP: 1040ft FNL & 707.9ft FWL of Sec 14										
7,952.4	90.00	91.36	7,561.0	-1,606.96	530.3	208.2	225.0	10.00	10.00	0.00
8,000.0	90.00	91.36	7,561.0	-1,606.96	529.2	255.8	272.5	0.00	0.00	0.00
8,100.0	90.00	91.36	7,561.0	-1,606.96	526.8	355.7	372.3	0.00	0.00	0.00
8,200.0	90.00	91.36	7,561.0	-1,606.96	524.4	455.7	472.2	0.00	0.00	0.00
8,300.0	90.00	91.36	7,561.0	-1,606.96	522.1	555.7	572.0	0.00	0.00	0.00
8,400.0	90.00	91.36	7,561.0	-1,606.96	519.7	655.7	671.9	0.00	0.00	0.00
8,500.0	90.00	91.36	7,561.0	-1,606.96	517.3	755.6	771.7	0.00	0.00	0.00
8,600.0	90.00	91.36	7,561.0	-1,606.96	514.9	855.6	871.6	0.00	0.00	0.00
8,700.0	90.00	91.36	7,561.0	-1,606.96	512.6	955.6	971.4	0.00	0.00	0.00
8,800.0	90.00	91.36	7,561.0	-1,606.96	510.2	1,055.5	1,071.2	0.00	0.00	0.00
8,900.0	90.00	91.36	7,561.0	-1,606.96	507.8	1,155.5	1,171.1	0.00	0.00	0.00
9,000.0	90.00	91.36	7,561.0	-1,606.96	505.4	1,255.5	1,270.9	0.00	0.00	0.00
9,100.0	90.00	91.36	7,561.0	-1,606.96	503.1	1,355.5	1,370.8	0.00	0.00	0.00
9,200.0	90.00	91.36	7,561.0	-1,606.96	500.7	1,455.4	1,470.6	0.00	0.00	0.00
9,300.0	90.00	91.36	7,561.0	-1,606.96	498.3	1,555.4	1,570.5	0.00	0.00	0.00
9,400.0	90.00	91.36	7,561.0	-1,606.96	495.9	1,655.4	1,670.3	0.00	0.00	0.00
9,500.0	90.00	91.36	7,561.0	-1,606.96	493.6	1,755.3	1,770.2	0.00	0.00	0.00
9,600.0	90.00	91.36	7,561.0	-1,606.96	491.2	1,855.3	1,870.0	0.00	0.00	0.00
9,700.0	90.00	91.36	7,561.0	-1,606.96	488.8	1,955.3	1,969.9	0.00	0.00	0.00
9,800.0	90.00	91.36	7,561.0	-1,606.96	486.4	2,055.3	2,069.7	0.00	0.00	0.00
9,900.0	90.00	91.36	7,561.0	-1,606.96	484.1	2,155.2	2,169.5	0.00	0.00	0.00
10,000.0	90.00	91.36	7,561.0	-1,606.96	481.7	2,255.2	2,269.4	0.00	0.00	0.00
10,100.0	90.00	91.36	7,561.0	-1,606.96	479.3	2,355.2	2,369.2	0.00	0.00	0.00
10,200.0	90.00	91.36	7,561.0	-1,606.96	476.9	2,455.2	2,469.1	0.00	0.00	0.00
10,300.0	90.00	91.36	7,561.0	-1,606.96	474.6	2,555.1	2,568.9	0.00	0.00	0.00
10,400.0	90.00	91.36	7,561.0	-1,606.96	472.2	2,655.1	2,668.8	0.00	0.00	0.00
10,500.0	90.00	91.36	7,561.0	-1,606.96	469.8	2,755.1	2,768.6	0.00	0.00	0.00
10,600.0	90.00	91.36	7,561.0	-1,606.96	467.4	2,855.0	2,868.5	0.00	0.00	0.00
10,700.0	90.00	91.36	7,561.0	-1,606.96	465.0	2,955.0	2,968.3	0.00	0.00	0.00
10,800.0	90.00	91.36	7,561.0	-1,606.96	462.7	3,055.0	3,068.2	0.00	0.00	0.00
10,900.0	90.00	91.36	7,561.0	-1,606.96	460.3	3,155.0	3,168.0	0.00	0.00	0.00
11,000.0	90.00	91.36	7,561.0	-1,606.96	457.9	3,254.9	3,267.9	0.00	0.00	0.00
11,100.0	90.00	91.36	7,561.0	-1,606.96	455.5	3,354.9	3,367.7	0.00	0.00	0.00
11,200.0	90.00	91.36	7,561.0	-1,606.96	453.2	3,454.9	3,467.5	0.00	0.00	0.00
11,300.0	90.00	91.36	7,561.0	-1,606.96	450.8	3,554.8	3,567.4	0.00	0.00	0.00
11,400.0	90.00	91.36	7,561.0	-1,606.96	448.4	3,654.8	3,667.2	0.00	0.00	0.00
11,500.0	90.00	91.36	7,561.0	-1,606.96	446.0	3,754.8	3,767.1	0.00	0.00	0.00
11,600.0	90.00	91.36	7,561.0	-1,606.96	443.7	3,854.8	3,866.9	0.00	0.00	0.00
11,700.0	90.00	91.36	7,561.0	-1,606.96	441.3	3,954.7	3,966.8	0.00	0.00	0.00
11,800.0	90.00	91.36	7,561.0	-1,606.96	438.9	4,054.7	4,066.6	0.00	0.00	0.00
11,900.0	90.00	91.36	7,561.0	-1,606.97	436.5	4,154.7	4,166.5	0.00	0.00	0.00
12,000.0	90.00	91.36	7,561.0	-1,606.97	434.1	4,254.6	4,266.3	0.00	0.00	0.00
12,100.0	90.00	91.36	7,561.0	-1,606.97	431.8	4,354.6	4,366.1	0.00	0.00	0.00
12,200.0	90.00	91.36	7,561.0	-1,606.97	429.4	4,454.6	4,466.0	0.00	0.00	0.00
12,300.0	90.00	91.36	7,561.0	-1,606.97	427.0	4,554.6	4,565.8	0.00	0.00	0.00
12,400.0	90.00	91.36	7,561.0	-1,606.97	424.6	4,654.5	4,665.7	0.00	0.00	0.00
12,500.0	90.00	91.36	7,561.0	-1,606.97	422.3	4,754.5	4,765.5	0.00	0.00	0.00
12,600.0	90.00	91.36	7,561.0	-1,606.97	419.9	4,854.5	4,865.4	0.00	0.00	0.00
12,700.0	90.00	91.36	7,561.0	-1,606.97	417.5	4,954.4	4,965.2	0.00	0.00	0.00
12,800.0	90.00	91.36	7,561.0	-1,606.97	415.1	5,054.4	5,065.1	0.00	0.00	0.00
12,900.0	90.00	91.36	7,561.0	-1,606.97	412.7	5,154.4	5,164.9	0.00	0.00	0.00

Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well DTH 5-64 14A-13-3
Company:	BISON EXPLORATION	TVD Reference:	KB-EST @ 5954.0usft (Original Well Elev)
Project:	ARAPAHOE COUNTY, COLORADO (NAD 83)	MD Reference:	KB-EST @ 5954.0usft (Original Well Elev)
Site:	SW NW SEC. 14 T5S R64W 6th P.M.	North Reference:	True
Well:	DTH 5-64 14A-13-3	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #2		

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	91.36	7,561.0	-1,606.97	410.4	5,254.4	5,264.8	0.00	0.00	0.00
13,100.0	90.00	91.36	7,561.0	-1,606.97	408.0	5,354.3	5,364.6	0.00	0.00	0.00
13,200.0	90.00	91.36	7,561.0	-1,606.97	405.6	5,454.3	5,464.4	0.00	0.00	0.00
13,300.0	90.00	91.36	7,561.0	-1,606.97	403.2	5,554.3	5,564.3	0.00	0.00	0.00
13,400.0	90.00	91.36	7,561.0	-1,606.97	400.8	5,654.2	5,664.1	0.00	0.00	0.00
13,500.0	90.00	91.36	7,561.0	-1,606.97	398.5	5,754.2	5,764.0	0.00	0.00	0.00
13,600.0	90.00	91.36	7,561.0	-1,606.97	396.1	5,854.2	5,863.8	0.00	0.00	0.00
13,700.0	90.00	91.36	7,561.0	-1,606.97	393.7	5,954.2	5,963.7	0.00	0.00	0.00
13,800.0	90.00	91.36	7,561.0	-1,606.97	391.3	6,054.1	6,063.5	0.00	0.00	0.00
13,900.0	90.00	91.36	7,561.0	-1,606.97	388.9	6,154.1	6,163.4	0.00	0.00	0.00
14,000.0	90.00	91.36	7,561.0	-1,606.98	386.6	6,254.1	6,263.2	0.00	0.00	0.00
14,100.0	90.00	91.36	7,561.0	-1,606.98	384.2	6,354.0	6,363.1	0.00	0.00	0.00
14,200.0	90.00	91.36	7,561.0	-1,606.98	381.8	6,454.0	6,462.9	0.00	0.00	0.00
14,300.0	90.00	91.36	7,561.0	-1,606.98	379.4	6,554.0	6,562.7	0.00	0.00	0.00
14,400.0	90.00	91.36	7,561.0	-1,606.98	377.0	6,654.0	6,662.6	0.00	0.00	0.00
14,500.0	90.00	91.36	7,561.0	-1,606.98	374.7	6,753.9	6,762.4	0.00	0.00	0.00
14,600.0	90.00	91.36	7,561.0	-1,606.98	372.3	6,853.9	6,862.3	0.00	0.00	0.00
14,700.0	90.00	91.36	7,561.0	-1,606.98	369.9	6,953.9	6,962.1	0.00	0.00	0.00
14,800.0	90.00	91.36	7,561.0	-1,606.98	367.5	7,053.8	7,062.0	0.00	0.00	0.00
14,900.0	90.00	91.36	7,561.0	-1,606.98	365.1	7,153.8	7,161.8	0.00	0.00	0.00
15,000.0	90.00	91.36	7,561.0	-1,606.98	362.7	7,253.8	7,261.7	0.00	0.00	0.00
15,100.0	90.00	91.36	7,561.0	-1,606.98	360.4	7,353.8	7,361.5	0.00	0.00	0.00
15,200.0	90.00	91.36	7,561.0	-1,606.98	358.0	7,453.7	7,461.4	0.00	0.00	0.00
15,300.0	90.00	91.36	7,561.0	-1,606.98	355.6	7,553.7	7,561.2	0.00	0.00	0.00
15,400.0	90.00	91.36	7,561.0	-1,606.98	353.2	7,653.7	7,661.0	0.00	0.00	0.00
15,500.0	90.00	91.36	7,561.0	-1,606.98	350.8	7,753.7	7,760.9	0.00	0.00	0.00
15,600.0	90.00	91.36	7,561.0	-1,606.99	348.5	7,853.6	7,860.7	0.00	0.00	0.00
15,700.0	90.00	91.37	7,561.0	-1,606.99	346.1	7,953.6	7,960.6	0.00	0.00	0.00
15,800.0	90.00	91.37	7,561.0	-1,606.99	343.7	8,053.6	8,060.4	0.00	0.00	0.00
15,900.0	90.00	91.37	7,561.0	-1,606.99	341.3	8,153.5	8,160.3	0.00	0.00	0.00
16,000.0	90.00	91.37	7,561.0	-1,606.99	338.9	8,253.5	8,260.1	0.00	0.00	0.00
16,100.0	90.00	91.37	7,561.0	-1,606.99	336.5	8,353.5	8,360.0	0.00	0.00	0.00
16,200.0	90.00	91.37	7,561.0	-1,606.99	334.2	8,453.5	8,459.8	0.00	0.00	0.00
16,300.0	90.00	91.37	7,561.0	-1,606.99	331.8	8,553.4	8,559.7	0.00	0.00	0.00
16,400.0	90.00	91.37	7,561.0	-1,606.99	329.4	8,653.4	8,659.5	0.00	0.00	0.00
16,500.0	90.00	91.37	7,561.0	-1,606.99	327.0	8,753.4	8,759.3	0.00	0.00	0.00
16,600.0	90.00	91.37	7,561.0	-1,606.99	324.6	8,853.3	8,859.2	0.00	0.00	0.00
16,700.0	90.00	91.37	7,561.0	-1,606.99	322.2	8,953.3	8,959.0	0.00	0.00	0.00
16,800.0	90.00	91.37	7,561.0	-1,607.00	319.9	9,053.3	9,058.9	0.00	0.00	0.00
16,900.0	90.00	91.37	7,561.0	-1,607.00	317.5	9,153.3	9,158.7	0.00	0.00	0.00
17,000.0	90.00	91.37	7,561.0	-1,607.00	315.1	9,253.2	9,258.6	0.00	0.00	0.00
17,100.0	90.00	91.37	7,561.0	-1,607.00	312.7	9,353.2	9,358.4	0.00	0.00	0.00
17,200.0	90.00	91.37	7,561.0	-1,607.00	310.3	9,453.2	9,458.3	0.00	0.00	0.00
17,300.0	90.00	91.37	7,561.0	-1,607.00	307.9	9,553.1	9,558.1	0.00	0.00	0.00
BHL: 1040ft FNL & 460ft FEL of Sec 13										
17,367.4	90.00	91.37	7,561.0	-1,607.00	306.3	9,620.5	9,625.4	0.00	0.00	0.00

Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well DTH 5-64 14A-13-3
Company:	BISON EXPLORATION	TVD Reference:	KB-EST @ 5954.0usft (Original Well Elev)
Project:	ARAPAHOE COUNTY, COLORADO (NAD 83)	MD Reference:	KB-EST @ 5954.0usft (Original Well Elev)
Site:	SW NW SEC. 14 T5S R64W 6th P.M.	North Reference:	True
Well:	DTH 5-64 14A-13-3	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #2		

Formations					
MD (usft)	TVD (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
119.0	119.0	DENVER			
1,034.3	1,027.0	UPPER ARAPAHOE			
1,863.4	1,838.0	LARAMIE - FOX HILLS			
2,105.7	2,075.0	PIERRE SHALE (BASE FOX HILLS)			
5,280.4	5,216.0	SHANNON SANDSTONE MBR			
7,692.5	7,503.0	SHARON SPRINGS SHALE			
7,793.3	7,539.0	NIOBRARA FORMATION			
7,845.4	7,551.0	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: 1576ft FNL & 510ft FWL of Sec 14
300.0	300.0	0.0	0.0	START NUDGE (2°/100ft BUR)
899.9	895.5	52.0	-34.8	EOB TO 12° INC
3,447.5	3,387.5	491.9	-329.8	END OF TANGENT
4,047.4	3,983.0	543.9	-364.6	EOD TO VERTICAL
7,052.4	6,988.0	543.9	-364.6	KOP (10°/100ft BUR)
7,696.0	7,504.5	536.2	-39.7	BPI: 1040ft FNL & 460ft FWL of Sec 14
7,952.4	7,561.0	530.3	208.2	HZ LP: 1040ft FNL & 707.9ft FWL of Sec 14
17,367.4	7,561.0	306.3	9,620.5	BHL: 1040ft FNL & 460ft FEL of Sec 13