

EXTRACTION OIL & GAS

WELD COUNTY, COLORADO (NAD 83)

NW SW SEC. 21 T2N R67W 6th P.M.

LEONARD 1C

ORIGINAL WELLBORE

27 March, 2017

Plan: PROPOSAL #1

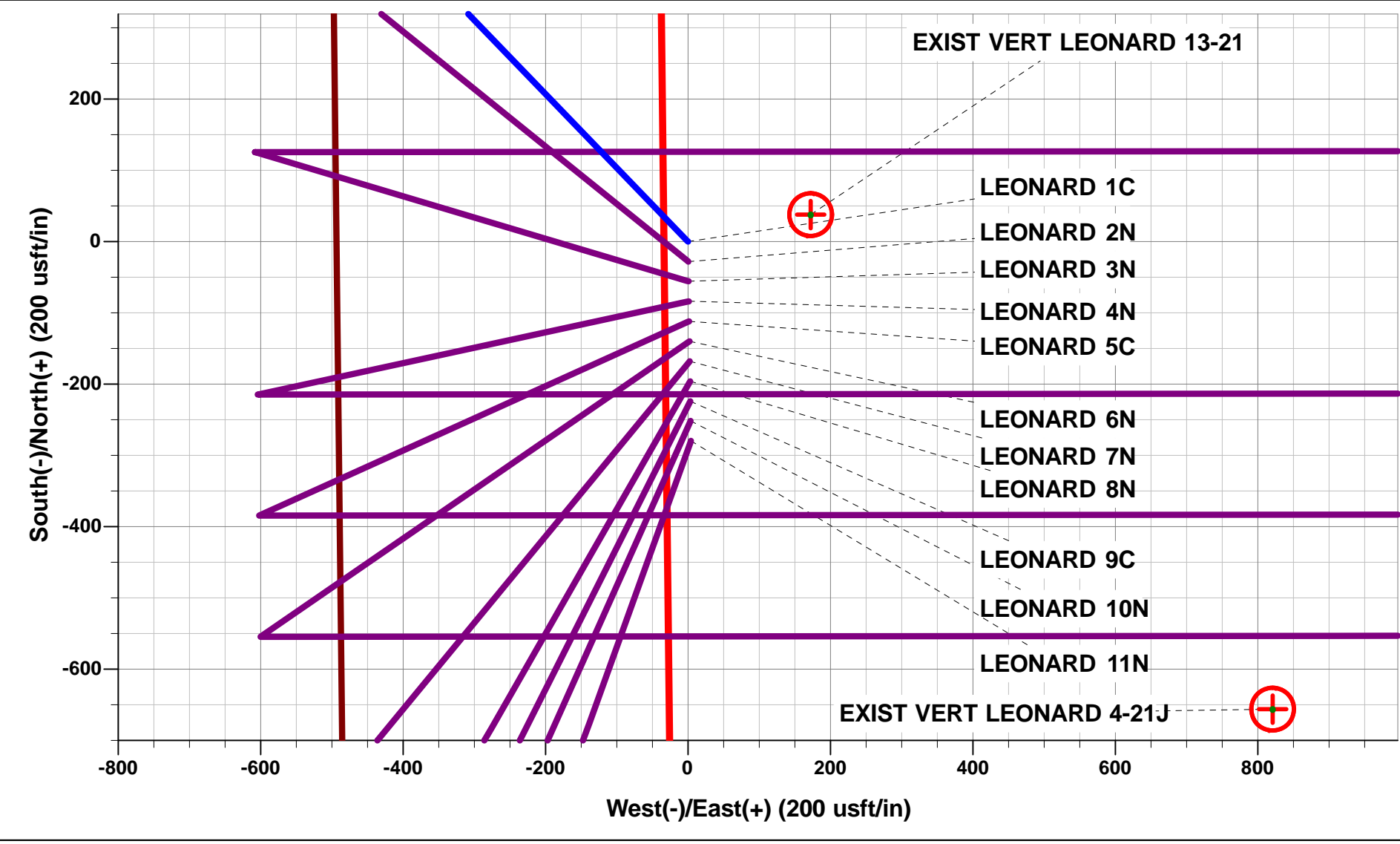




Project: WELD COUNTY, COLORADO (NAD 83)
Site: NW SW SEC. 21 T2N R67W 6th P.M.
Well: LEONARD 1C
Wellbore: ORIGINAL WELLBORE
Design: PROPOSAL #1

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: 1964ft FSL & 494ft FWL of Sec 21	
100.0	100.0	0.00	0.00	0.0	0.0	0.0	0.0	START NUDGE (2°/100ft BUR)	
695.7	700.0	12.00	316.00	45.0	-43.5	-36.4	62.6	EOB TO 12° INC	
4263.3	4347.4	12.00	316.00	590.6	-570.3	-477.9	821.0	END OF TANGENT	
4859.0	4947.5	0.00	0.00	635.6	-613.8	-514.4	883.6	EOD TO VERTICAL	
7137.0	7225.5	0.00	0.00	635.6	-613.8	-514.4	883.6	KOP (10°/100ft BUR)	
7710.0	8125.5	90.00	89.95	636.1	-40.8	52.5	1456.6	HZ LP: 2600ft FSL & 460ft FWL of Sec 21	
7710.0	12499.3	90.00	89.95	639.7	4333.0	4380.0	5830.4	BHL: 2600ft FSL & 460ft FEL of Sec 21	

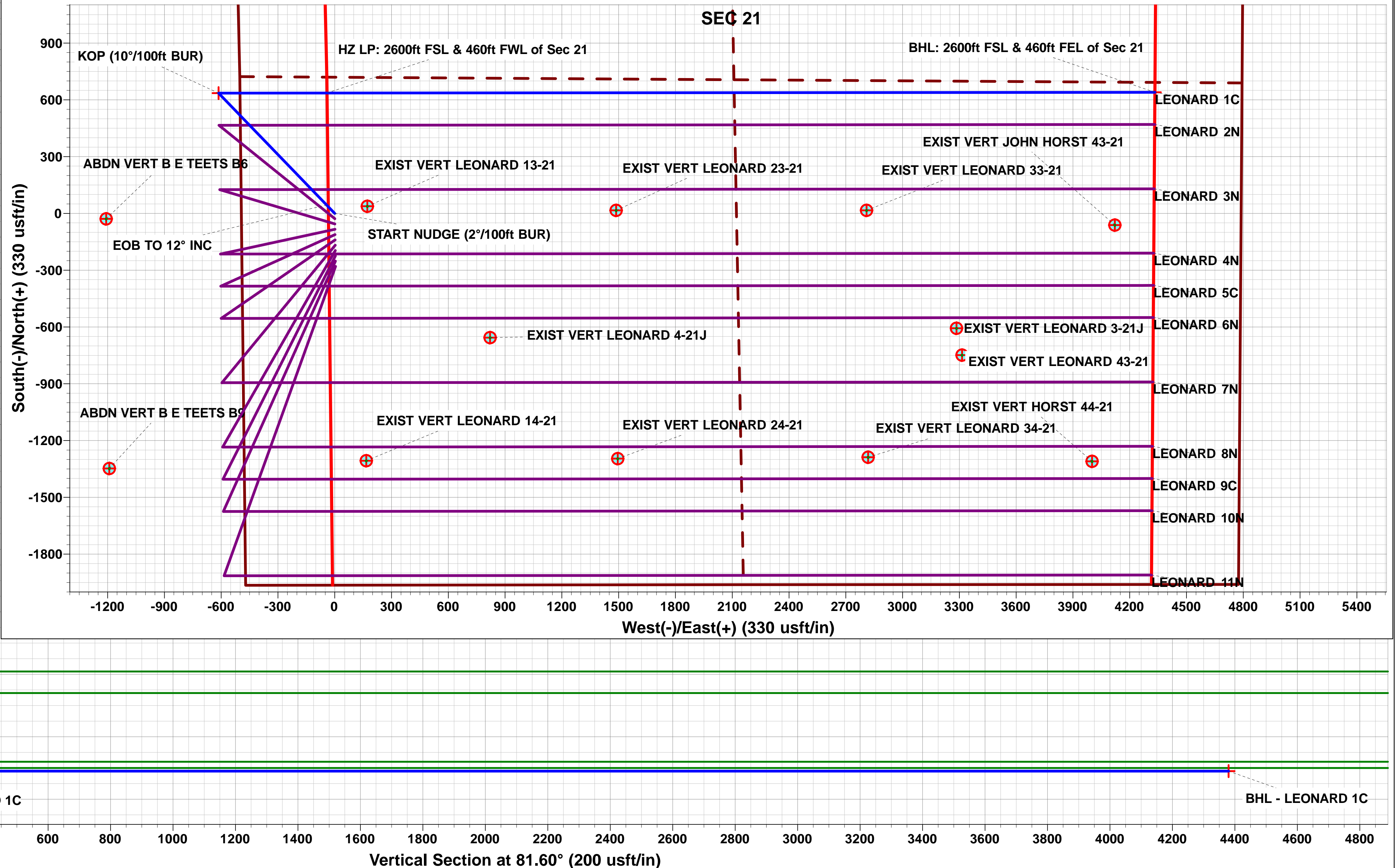
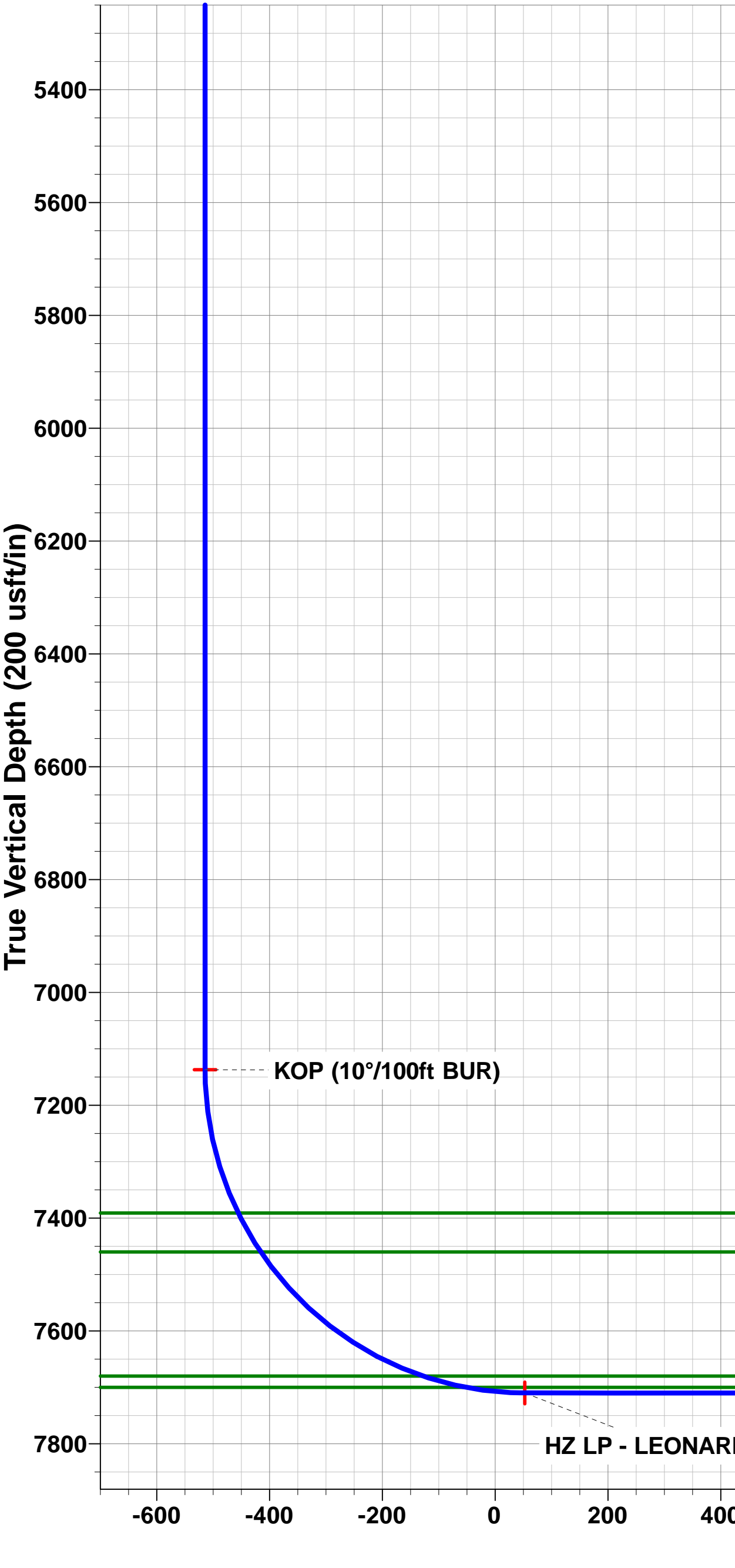
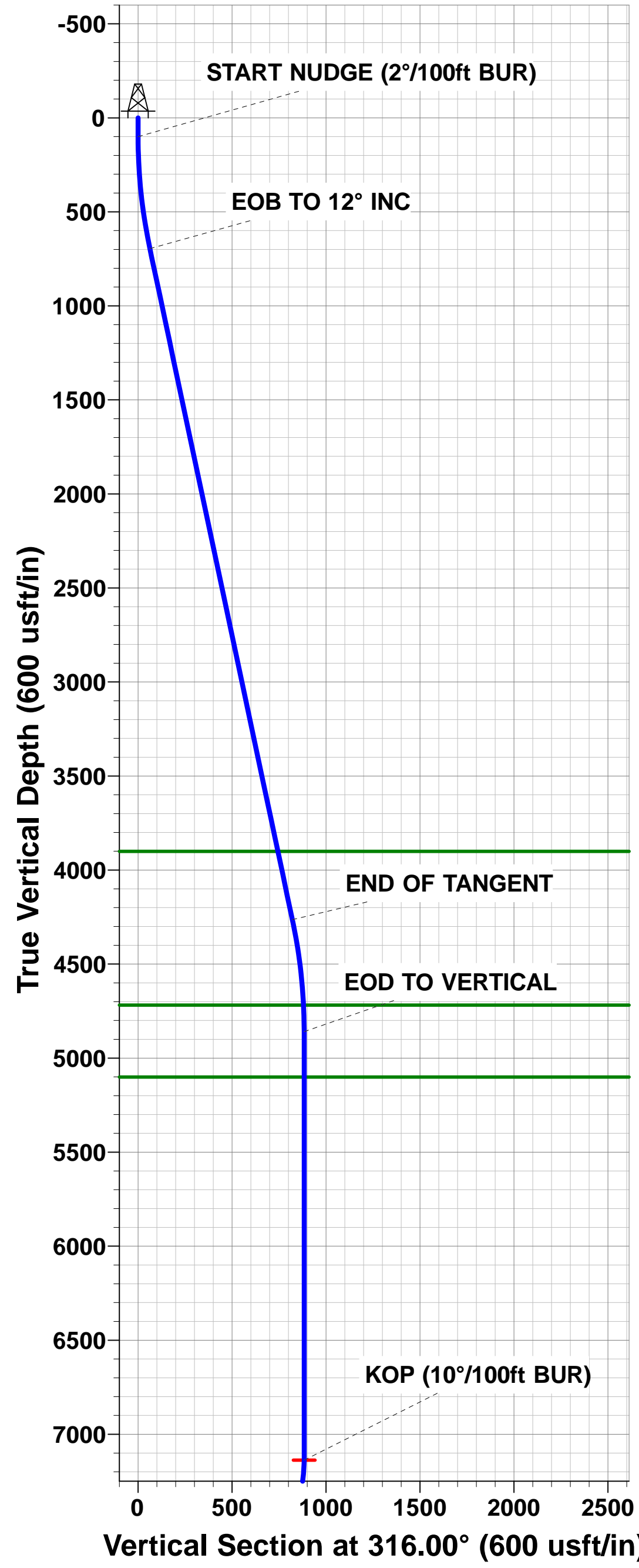
WELLBORE TARGET DETAILS (LAT/LONG)					
Name	TVD	+N/-S	+E/-W	Latitude	Longitude
KOP - LEONARD 1C	7137.0	635.6	-613.8	40.123621	-104.905481
HZ LP - LEONARD 1C	7710.0	636.1	-40.8	40.123622	-104.903432
BHL - LEONARD 1C	7710.0	639.7	4333.0	40.123631	-104.887792



FORMATION TOP DETAILS		
TVDPath	MDPath	Formation
3900.0	3976.0	PARKMAN
4718.0	4806.4	SUSSEX
5100.0	5188.5	SHANNON
7391.0	7488.6	NIOBRARA
7460.0	7568.6	NIO B
7680.0	7939.3	FT HAYS
7700.0	8018.3	CODELL

PROPOSED LOCAL COORDINATES:	
SHL: 1964ft FSL & 494ft FWL of Sec 21	
HZ LP: 2600ft FSL & 460ft FWL of Sec 21	
BHL: 2600ft FSL & 460ft FEL of Sec 21	

Azimuths to True North	
Magnetic North: 8.32°	
Magnetic Field	
Strength: 52295.8nT	
Dip Angle: 66.62°	
Date: 22/11/2016	
Model: IGRF2015	



Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well LEONARD 1C
Company:	EXTRACTION OIL & GAS	TVD Reference:	KB-EST @ 5016.0usft (Original Well Elev)
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB-EST @ 5016.0usft (Original Well Elev)
Site:	NW SW SEC. 21 T2N R67W 6th P.M.	North Reference:	True
Well:	LEONARD 1C	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 SW SEC. 21 T2N R67W 6th P.M.		
Site Position:		Northing:	1,287,804.83 usft
From:	Lat/Long	Easting:	3,166,871.56 usft
Position Uncertainty:	0.0 usft	Slot Radius:	1.10000ft
		Latitude:	40.121876
		Longitude:	-104.903286
		Grid Convergence:	0.39 °

Well	LEONARD 1C		
Well Position	+N/-S	0.0 usft	Northing: 1,287,804.83 usft
	+E/-W	0.0 usft	Easting: 3,166,871.56 usft
Position Uncertainty	0.0 usft	Wellhead Elevation:	usft
		Latitude:	40.121876
		Longitude:	-104.903286
		Ground Level:	5,000.0 usft

Wellbore	ORIGINAL WELLBORE				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	22/11/2016	8.32	66.62	52,296

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 (°)
	0.0	0.0	0.0	81.60

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	-5,016.0	0.0	0.0	0.00	0.00	0.00	0.00	
100.0	0.00	0.00	100.0	-4,916.0	0.0	0.0	0.00	0.00	0.00	0.00	
700.0	12.00	316.00	695.7	-4,320.3	45.0	-43.5	2.00	2.00	0.00	316.00	
4,347.4	12.00	316.00	4,263.3	-752.7	590.6	-570.3	0.00	0.00	0.00	0.00	
4,947.5	0.00	0.00	4,859.0	-157.0	635.6	-613.8	2.00	-2.00	0.00	180.00	
7,225.5	0.00	0.00	7,137.0	2,121.0	635.6	-613.8	0.00	0.00	0.00	0.00	KOP - LEONARD 1
8,125.5	90.00	89.95	7,710.0	2,694.0	636.1	-40.8	10.00	10.00	9.99	89.95	HZ LP - LEONARD
12,499.3	90.00	89.95	7,710.0	2,694.0	639.7	4,333.0	0.00	0.00	0.00	-36.46	BHL - LEONARD 1

Planning Report



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Company:	EXTRACTION OIL & GAS	TVD Reference:	KB-EST @ 5016.0usft (Original Well Elev)
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB-EST @ 5016.0usft (Original Well Elev)
Site:	NW SW SEC. 21 T2N R67W 6th P.M.	North Reference:	True
Well:	LEONARD 1C	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: 1964ft FSL & 494ft FWL of Sec 21										
0.0	0.00	0.00	0.0	5,016.00	0.0	0.0	0.0	0.00	0.00	0.00
START NUDGE (2°/100ft BUR)										
100.0	0.00	0.00	100.0	4,916.00	0.0	0.0	0.0	0.00	0.00	0.00
200.0	2.00	316.00	200.0	4,816.02	1.3	-1.2	-1.0	2.00	2.00	0.00
300.0	4.00	316.00	299.8	4,716.16	5.0	-4.8	-4.1	2.00	2.00	0.00
400.0	6.00	316.00	399.5	4,616.55	11.3	-10.9	-9.1	2.00	2.00	0.00
500.0	8.00	316.00	498.7	4,517.30	20.1	-19.4	-16.2	2.00	2.00	0.00
600.0	10.00	316.00	597.5	4,418.53	31.3	-30.2	-25.3	2.00	2.00	0.00
EOB TO 12° INC										
700.0	12.00	316.00	695.7	4,320.35	45.0	-43.5	-36.4	2.00	2.00	0.00
800.0	12.00	316.00	793.4	4,222.56	60.0	-57.9	-48.5	0.00	0.00	0.00
900.0	12.00	316.00	891.3	4,124.75	74.9	-72.4	-60.7	0.00	0.00	0.00
1,000.0	12.00	316.00	989.1	4,026.93	89.9	-86.8	-72.8	0.00	0.00	0.00
1,100.0	12.00	316.00	1,086.9	3,929.12	104.9	-101.3	-84.9	0.00	0.00	0.00
1,200.0	12.00	316.00	1,184.7	3,831.30	119.8	-115.7	-97.0	0.00	0.00	0.00
1,300.0	12.00	316.00	1,282.5	3,733.49	134.8	-130.1	-109.1	0.00	0.00	0.00
1,400.0	12.00	316.00	1,380.3	3,635.68	149.7	-144.6	-121.2	0.00	0.00	0.00
1,500.0	12.00	316.00	1,478.1	3,537.86	164.7	-159.0	-133.3	0.00	0.00	0.00
1,600.0	12.00	316.00	1,576.0	3,440.05	179.6	-173.5	-145.4	0.00	0.00	0.00
1,700.0	12.00	316.00	1,673.8	3,342.23	194.6	-187.9	-157.5	0.00	0.00	0.00
1,800.0	12.00	316.00	1,771.6	3,244.42	209.6	-202.4	-169.6	0.00	0.00	0.00
1,900.0	12.00	316.00	1,869.4	3,146.60	224.5	-216.8	-181.7	0.00	0.00	0.00
2,000.0	12.00	316.00	1,967.2	3,048.79	239.5	-231.3	-193.8	0.00	0.00	0.00
2,100.0	12.00	316.00	2,065.0	2,950.97	254.4	-245.7	-205.9	0.00	0.00	0.00
2,200.0	12.00	316.00	2,162.8	2,853.16	269.4	-260.1	-218.0	0.00	0.00	0.00
2,300.0	12.00	316.00	2,260.7	2,755.34	284.3	-274.6	-230.1	0.00	0.00	0.00
2,400.0	12.00	316.00	2,358.5	2,657.53	299.3	-289.0	-242.2	0.00	0.00	0.00
2,500.0	12.00	316.00	2,456.3	2,559.72	314.3	-303.5	-254.3	0.00	0.00	0.00
2,600.0	12.00	316.00	2,554.1	2,461.90	329.2	-317.9	-266.4	0.00	0.00	0.00
2,700.0	12.00	316.00	2,651.9	2,364.09	344.2	-332.4	-278.5	0.00	0.00	0.00
2,800.0	12.00	316.00	2,749.7	2,266.27	359.1	-346.8	-290.6	0.00	0.00	0.00
2,900.0	12.00	316.00	2,847.5	2,168.46	374.1	-361.2	-302.7	0.00	0.00	0.00
3,000.0	12.00	316.00	2,945.4	2,070.64	389.0	-375.7	-314.8	0.00	0.00	0.00
3,100.0	12.00	316.00	3,043.2	1,972.83	404.0	-390.1	-326.9	0.00	0.00	0.00
3,200.0	12.00	316.00	3,141.0	1,875.01	418.9	-404.6	-339.0	0.00	0.00	0.00
3,300.0	12.00	316.00	3,238.8	1,777.20	433.9	-419.0	-351.2	0.00	0.00	0.00
3,400.0	12.00	316.00	3,336.6	1,679.38	448.9	-433.5	-363.3	0.00	0.00	0.00
3,500.0	12.00	316.00	3,434.4	1,581.57	463.8	-447.9	-375.4	0.00	0.00	0.00
3,600.0	12.00	316.00	3,532.2	1,483.76	478.8	-462.4	-387.5	0.00	0.00	0.00
3,700.0	12.00	316.00	3,630.1	1,385.94	493.7	-476.8	-399.6	0.00	0.00	0.00
3,800.0	12.00	316.00	3,727.9	1,288.13	508.7	-491.2	-411.7	0.00	0.00	0.00
3,900.0	12.00	316.00	3,825.7	1,190.31	523.6	-505.7	-423.8	0.00	0.00	0.00
PARKMAN										
3,976.0	12.00	316.00	3,900.0	1,116.00	535.0	-516.7	-433.0	0.00	0.00	0.00
4,000.0	12.00	316.00	3,923.5	1,092.50	538.6	-520.1	-435.9	0.00	0.00	0.00
4,100.0	12.00	316.00	4,021.3	994.68	553.6	-534.6	-448.0	0.00	0.00	0.00
4,200.0	12.00	316.00	4,119.1	896.87	568.5	-549.0	-460.1	0.00	0.00	0.00
4,300.0	12.00	316.00	4,216.9	799.05	583.5	-563.5	-472.2	0.00	0.00	0.00
END OF TANGENT										
4,347.4	12.00	316.00	4,263.3	752.65	590.6	-570.3	-477.9	0.00	0.00	0.00
4,400.0	10.95	316.00	4,314.9	701.14	598.1	-577.6	-484.0	2.00	-2.00	0.00
4,500.0	8.95	316.00	4,413.3	602.65	610.5	-589.6	-494.1	2.00	-2.00	0.00
4,600.0	6.95	316.00	4,512.4	503.62	620.5	-599.2	-502.1	2.00	-2.00	0.00

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Well:	LEONARD 1C	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)
4,700.0	4.95	316.00	4,611.8	404.16	627.9	-606.4	-508.2	2.00	-2.00	0.00
4,800.0	2.95	316.00	4,711.6	304.40	632.9	-611.2	-512.2	2.00	-2.00	0.00
SUSSEX										
4,806.4	2.82	316.00	4,718.0	298.00	633.1	-611.4	-512.4	2.00	-2.00	0.00
4,900.0	0.95	316.00	4,811.5	204.47	635.3	-613.5	-514.2	2.00	-2.00	0.00
EOD TO VERTICAL										
4,947.5	0.00	0.00	4,859.0	157.00	635.6	-613.8	-514.4	2.00	-2.00	0.00
5,000.0	0.00	0.00	4,911.5	104.47	635.6	-613.8	-514.4	0.00	0.00	0.00
5,100.0	0.00	0.00	5,011.5	4.47	635.6	-613.8	-514.4	0.00	0.00	0.00
SHANNON										
5,188.5	0.00	0.00	5,100.0	-84.00	635.6	-613.8	-514.4	0.00	0.00	0.00
5,200.0	0.00	0.00	5,111.5	-95.53	635.6	-613.8	-514.4	0.00	0.00	0.00
5,300.0	0.00	0.00	5,211.5	-195.53	635.6	-613.8	-514.4	0.00	0.00	0.00
5,400.0	0.00	0.00	5,311.5	-295.53	635.6	-613.8	-514.4	0.00	0.00	0.00
5,500.0	0.00	0.00	5,411.5	-395.53	635.6	-613.8	-514.4	0.00	0.00	0.00
5,600.0	0.00	0.00	5,511.5	-495.53	635.6	-613.8	-514.4	0.00	0.00	0.00
5,700.0	0.00	0.00	5,611.5	-595.53	635.6	-613.8	-514.4	0.00	0.00	0.00
5,800.0	0.00	0.00	5,711.5	-695.53	635.6	-613.8	-514.4	0.00	0.00	0.00
5,900.0	0.00	0.00	5,811.5	-795.53	635.6	-613.8	-514.4	0.00	0.00	0.00
6,000.0	0.00	0.00	5,911.5	-895.53	635.6	-613.8	-514.4	0.00	0.00	0.00
6,100.0	0.00	0.00	6,011.5	-995.53	635.6	-613.8	-514.4	0.00	0.00	0.00
6,200.0	0.00	0.00	6,111.5	-1,095.53	635.6	-613.8	-514.4	0.00	0.00	0.00
6,300.0	0.00	0.00	6,211.5	-1,195.53	635.6	-613.8	-514.4	0.00	0.00	0.00
6,400.0	0.00	0.00	6,311.5	-1,295.53	635.6	-613.8	-514.4	0.00	0.00	0.00
6,500.0	0.00	0.00	6,411.5	-1,395.53	635.6	-613.8	-514.4	0.00	0.00	0.00
6,600.0	0.00	0.00	6,511.5	-1,495.53	635.6	-613.8	-514.4	0.00	0.00	0.00
6,700.0	0.00	0.00	6,611.5	-1,595.53	635.6	-613.8	-514.4	0.00	0.00	0.00
6,800.0	0.00	0.00	6,711.5	-1,695.53	635.6	-613.8	-514.4	0.00	0.00	0.00
6,900.0	0.00	0.00	6,811.5	-1,795.53	635.6	-613.8	-514.4	0.00	0.00	0.00
7,000.0	0.00	0.00	6,911.5	-1,895.53	635.6	-613.8	-514.4	0.00	0.00	0.00
7,100.0	0.00	0.00	7,011.5	-1,995.53	635.6	-613.8	-514.4	0.00	0.00	0.00
7,200.0	0.00	0.00	7,111.5	-2,095.53	635.6	-613.8	-514.4	0.00	0.00	0.00
KOP (10°/100ft BUR)										
7,225.5	0.00	0.00	7,137.0	-2,121.00	635.6	-613.8	-514.4	0.00	0.00	0.00
7,300.0	7.45	89.95	7,211.3	-2,195.32	635.6	-609.0	-509.6	10.00	10.00	0.00
7,400.0	17.45	89.95	7,308.8	-2,292.85	635.6	-587.4	-488.3	10.00	10.00	0.00
NIOBRARA										
7,488.6	26.31	89.95	7,391.0	-2,375.00	635.6	-554.4	-455.6	10.00	10.00	0.00
7,500.0	27.45	89.95	7,401.1	-2,385.15	635.7	-549.3	-450.6	10.00	10.00	0.00
NIO B										
7,568.6	34.31	89.95	7,460.0	-2,444.00	635.7	-514.1	-415.7	10.00	10.00	0.00
7,600.0	37.45	89.95	7,485.4	-2,469.43	635.7	-495.7	-397.5	10.00	10.00	0.00
7,700.0	47.45	89.95	7,559.1	-2,543.12	635.7	-428.3	-330.8	10.00	10.00	0.00
7,800.0	57.45	89.95	7,620.0	-2,603.99	635.8	-349.1	-252.5	10.00	10.00	0.00
7,900.0	67.45	89.95	7,666.2	-2,650.18	635.9	-260.6	-164.9	10.00	10.00	0.00
FT HAYS										
7,939.3	71.38	89.95	7,680.0	-2,664.00	635.9	-223.8	-128.5	10.00	10.00	0.00
8,000.0	77.45	89.95	7,696.3	-2,680.30	636.0	-165.3	-70.7	10.00	10.00	0.00
CODELL										
8,018.3	79.28	89.95	7,700.0	-2,684.00	636.0	-147.4	-52.9	10.00	10.00	0.00
8,100.0	87.45	89.95	7,709.4	-2,693.43	636.0	-66.3	27.3	10.00	10.00	0.00
HZ LP: 2600ft FSL & 460ft FWL of Sec 21										
8,125.5	90.00	89.95	7,710.0	-2,694.00	636.1	-40.8	52.5	10.00	10.00	0.00

Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well LEONARD 1C
Company:	EXTRACTION OIL & GAS	TVD Reference:	KB-EST @ 5016.0usft (Original Well Elev)
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	KB-EST @ 5016.0usft (Original Well Elev)
Site:	NW SW SEC. 21 T2N R67W 6th P.M.	North Reference:	True
Well:	LEONARD 1C	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)
8,200.0	90.00	89.95	7,710.0	-2,694.00	636.1	33.7	126.2	0.00	0.00	0.00
8,300.0	90.00	89.95	7,710.0	-2,694.01	636.2	133.7	225.2	0.00	0.00	0.00
8,400.0	90.00	89.95	7,710.0	-2,694.01	636.3	233.7	324.1	0.00	0.00	0.00
8,500.0	90.00	89.95	7,710.0	-2,694.02	636.4	333.7	423.0	0.00	0.00	0.00
8,600.0	90.00	89.95	7,710.0	-2,694.02	636.4	433.7	522.0	0.00	0.00	0.00
8,700.0	90.00	89.95	7,710.0	-2,694.03	636.5	533.7	620.9	0.00	0.00	0.00
8,800.0	90.00	89.95	7,710.0	-2,694.03	636.6	633.7	719.8	0.00	0.00	0.00
8,900.0	90.00	89.95	7,710.0	-2,694.03	636.7	733.7	818.8	0.00	0.00	0.00
9,000.0	90.00	89.95	7,710.0	-2,694.04	636.8	833.7	917.7	0.00	0.00	0.00
9,100.0	90.00	89.95	7,710.0	-2,694.04	636.8	933.7	1,016.7	0.00	0.00	0.00
9,200.0	90.00	89.95	7,710.0	-2,694.04	636.9	1,033.7	1,115.6	0.00	0.00	0.00
9,300.0	90.00	89.95	7,710.0	-2,694.04	637.0	1,133.7	1,214.5	0.00	0.00	0.00
9,400.0	90.00	89.95	7,710.0	-2,694.05	637.1	1,233.7	1,313.5	0.00	0.00	0.00
9,500.0	90.00	89.95	7,710.0	-2,694.05	637.2	1,333.7	1,412.4	0.00	0.00	0.00
9,600.0	90.00	89.95	7,710.1	-2,694.05	637.3	1,433.7	1,511.4	0.00	0.00	0.00
9,700.0	90.00	89.95	7,710.1	-2,694.05	637.3	1,533.7	1,610.3	0.00	0.00	0.00
9,800.0	90.00	89.95	7,710.1	-2,694.05	637.4	1,633.7	1,709.2	0.00	0.00	0.00
9,900.0	90.00	89.95	7,710.1	-2,694.05	637.5	1,733.7	1,808.2	0.00	0.00	0.00
10,000.0	90.00	89.95	7,710.1	-2,694.06	637.6	1,833.7	1,907.1	0.00	0.00	0.00
10,100.0	90.00	89.95	7,710.1	-2,694.06	637.7	1,933.7	2,006.1	0.00	0.00	0.00
10,200.0	90.00	89.95	7,710.1	-2,694.06	637.7	2,033.7	2,105.0	0.00	0.00	0.00
10,300.0	90.00	89.95	7,710.1	-2,694.06	637.8	2,133.7	2,203.9	0.00	0.00	0.00
10,400.0	90.00	89.95	7,710.1	-2,694.06	637.9	2,233.7	2,302.9	0.00	0.00	0.00
10,500.0	90.00	89.95	7,710.1	-2,694.06	638.0	2,333.7	2,401.8	0.00	0.00	0.00
10,600.0	90.00	89.95	7,710.1	-2,694.06	638.1	2,433.7	2,500.8	0.00	0.00	0.00
10,700.0	90.00	89.95	7,710.1	-2,694.06	638.2	2,533.7	2,599.7	0.00	0.00	0.00
10,800.0	90.00	89.95	7,710.1	-2,694.05	638.3	2,633.7	2,698.6	0.00	0.00	0.00
10,900.0	90.00	89.95	7,710.1	-2,694.05	638.3	2,733.7	2,797.6	0.00	0.00	0.00
11,000.0	90.00	89.95	7,710.1	-2,694.05	638.4	2,833.7	2,896.5	0.00	0.00	0.00
11,100.0	90.00	89.95	7,710.0	-2,694.05	638.5	2,933.7	2,995.5	0.00	0.00	0.00
11,200.0	90.00	89.95	7,710.0	-2,694.05	638.6	3,033.7	3,094.4	0.00	0.00	0.00
11,300.0	90.00	89.95	7,710.0	-2,694.05	638.7	3,133.7	3,193.3	0.00	0.00	0.00
11,400.0	90.00	89.95	7,710.0	-2,694.04	638.8	3,233.7	3,292.3	0.00	0.00	0.00
11,500.0	90.00	89.95	7,710.0	-2,694.04	638.8	3,333.7	3,391.2	0.00	0.00	0.00
11,600.0	90.00	89.95	7,710.0	-2,694.04	638.9	3,433.7	3,490.2	0.00	0.00	0.00
11,700.0	90.00	89.95	7,710.0	-2,694.03	639.0	3,533.7	3,589.1	0.00	0.00	0.00
11,800.0	90.00	89.95	7,710.0	-2,694.03	639.1	3,633.7	3,688.0	0.00	0.00	0.00
11,900.0	90.00	89.95	7,710.0	-2,694.03	639.2	3,733.7	3,787.0	0.00	0.00	0.00
12,000.0	90.00	89.95	7,710.0	-2,694.02	639.3	3,833.7	3,885.9	0.00	0.00	0.00
12,100.0	90.00	89.95	7,710.0	-2,694.02	639.4	3,933.7	3,984.9	0.00	0.00	0.00
12,200.0	90.00	89.95	7,710.0	-2,694.01	639.5	4,033.7	4,083.8	0.00	0.00	0.00
12,300.0	90.00	89.95	7,710.0	-2,694.01	639.5	4,133.7	4,182.7	0.00	0.00	0.00
12,400.0	90.00	89.95	7,710.0	-2,694.01	639.6	4,233.7	4,281.7	0.00	0.00	0.00
BHL: 2600ft FSL & 460ft FEL of Sec 21										
12,499.3	90.00	89.95	7,710.0	-2,694.00	639.7	4,333.0	4,380.0	0.00	0.00	0.00

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Site:	NW SW SEC. 21 T2N R67W 6th P.M.	North Reference:	True
Well:	LEONARD 1C	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #1		

Formations					
MD (usft)	TVD (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
3,976.0	3,900.0	PARKMAN			
4,806.4	4,718.0	SUSSEX			
5,188.5	5,100.0	SHANNON			
7,488.6	7,391.0	NIOBRARA			
7,568.6	7,460.0	NIO B			
7,939.3	7,680.0	FT HAYS			
8,018.3	7,700.0	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: 1964ft FSL & 494ft FWL of Sec 21
100.0	100.0	0.0	0.0	START NUDGE (2°/100ft BUR)
700.0	695.7	45.0	-43.5	EOB TO 12° INC
4,347.4	4,263.3	590.6	-570.3	END OF TANGENT
4,947.5	4,859.0	635.6	-613.8	EOD TO VERTICAL
7,225.5	7,137.0	635.6	-613.8	KOP (10°/100ft BUR)
8,125.5	7,710.0	636.1	-40.8	HZ LP: 2600ft FSL & 460ft FWL of Sec 21
12,499.3	7,710.0	639.7	4,333.0	BHL: 2600ft FSL & 460ft FEL of Sec 21