

EXTRACTION OIL & GAS

**WELD COUNTY, COLORADO (NAD 83)
NW SW SEC. 21 T2N R67W 6th P.M.
LEONARD 10N**

**ORIGINAL WELLBORE
PROPOSAL #1**

Anticollision Report

28 March, 2017



Anticollision Report



Company:	EXTRACTION OIL & GAS	Local Co-ordinate Reference:	Well LEONARD 10N
Project:	WELD COUNTY, COLORADO (NAD 83)	TVD Reference:	KB-EST @ 5020.0usft (Original Well Elev)
Reference Site:	NW SW SEC. 21 T2N R67W 6th P.M.	MD Reference:	KB-EST @ 5020.0usft (Original Well Elev)
Site Error:	0.0 usft	North Reference:	True
Reference Well:	LEONARD 10N	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	ORIGINAL WELLBORE	Database:	EDM 5000.1 Single User Db
Reference Design:	PROPOSAL #1	Offset TVD Reference:	Offset Datum

Reference	PROPOSAL #1		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	MD + Stations Interval 100.0usft	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 10,000.0 us	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma	Casing Method:	Not applied

Survey Tool Program	Date	22/11/2016		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.0	12,286.8	PROPOSAL #1 (ORIGINAL WELLBORE)	MWD	MWD - Standard

Summary						
Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
NW SW SEC. 21 T2N R67W 6th P.M.						
ABDN VERT BERNARD E TEETS B6 - Wellbore #1 - De	1,774.2	1,680.6	1,196.7	1,157.0	30.149	CC
ABDN VERT BERNARD E TEETS B6 - Wellbore #1 - De	2,300.0	2,191.6	1,203.1	1,150.5	22.885	ES
ABDN VERT BERNARD E TEETS B6 - Wellbore #1 - De	5,300.0	5,106.9	1,457.2	1,334.5	11.873	SF
ABDN VERT BERNARD E TEETS B9 - Wellbore #1 - De	5,406.6	5,173.0	731.9	607.7	5.892	CC, ES, SF
EXIST HZ TROUDT #2 - Wellbore #1 - Wellbore #1	7,053.9	18,091.0	917.6	724.8	4.759	SF
EXIST HZ TROUDT #2 - Wellbore #1 - Wellbore #1	7,450.0	18,091.0	722.2	599.7	5.898	ES
EXIST HZ TROUDT #2 - Wellbore #1 - Wellbore #1	7,467.8	18,091.0	721.8	601.6	6.006	CC
EXIST HZ TROUDT 1 - Wellbore #1 - Wellbore #1	7,053.9	17,860.0	666.0	463.4	3.288	SF
EXIST HZ TROUDT 1 - Wellbore #1 - Wellbore #1	7,500.0	17,860.0	451.2	399.3	8.691	ES
EXIST HZ TROUDT 1 - Wellbore #1 - Wellbore #1	7,505.1	17,860.0	451.2	399.4	8.719	CC
EXIST VERT BERNARD E TEETS #2 - Wellbore #1 - De	4,035.2	3,904.8	1,401.1	1,305.5	14.661	CC
EXIST VERT BERNARD E TEETS #2 - Wellbore #1 - De	4,600.0	4,453.7	1,407.4	1,298.0	12.868	ES
EXIST VERT BERNARD E TEETS #2 - Wellbore #1 - De	7,100.0	6,898.1	1,535.3	1,368.4	9.196	SF
EXIST VERT ELKHORN COMPANY B2 - Wellbore #1 - I	200.0	191.0	1,684.4	1,680.8	469.134	CC
EXIST VERT ELKHORN COMPANY B2 - Wellbore #1 - I	300.0	291.0	1,686.0	1,680.1	286.248	ES
EXIST VERT ELKHORN COMPANY B2 - Wellbore #1 - I	9,500.0	7,451.0	3,297.3	3,092.3	16.087	SF
EXIST VERT ELKHORN COMPANY B5 - Wellbore #1 - I	200.0	225.0	3,380.7	3,376.7	849.816	CC
EXIST VERT ELKHORN COMPANY B5 - Wellbore #1 - I	300.0	325.0	3,382.1	3,375.8	541.017	ES
EXIST VERT ELKHORN COMPANY B5 - Wellbore #1 - I	12,286.8	5,210.0	3,942.2	3,755.1	21.069	SF
EXIST VERT ELKHORN COMPANY B7 - Wellbore #1 - I	200.0	224.0	2,180.1	2,176.1	549.573	CC
EXIST VERT ELKHORN COMPANY B7 - Wellbore #1 - I	300.0	324.0	2,181.8	2,175.6	349.615	ES
EXIST VERT ELKHORN COMPANY B7 - Wellbore #1 - I	11,900.0	5,230.0	4,531.0	4,350.0	25.045	SF
EXIST VERT ELKHORN COMPANY B9 - Wellbore #1 - I	12,280.0	5,216.0	3,771.4	3,581.9	19.901	CC
EXIST VERT ELKHORN COMPANY B9 - Wellbore #1 - I	12,286.8	5,216.0	3,771.4	3,581.8	19.885	ES, SF
EXIST VERT HORST 44-21 - Wellbore #1 - Design #1	5,700.0	5,220.0	4,509.0	4,381.9	35.484	SF
EXIST VERT HORST 44-21 - Wellbore #1 - Design #1	11,970.7	5,220.0	2,273.0	2,222.6	45.069	CC
EXIST VERT HORST 44-21 - Wellbore #1 - Design #1	12,000.0	5,220.0	2,273.2	2,222.6	44.870	ES
EXIST VERT JOHN HORST 43-21 - Wellbore #1 - Desig	12,092.0	5,240.0	2,725.8	2,593.6	20.617	CC
EXIST VERT JOHN HORST 43-21 - Wellbore #1 - Desig	12,100.0	5,240.0	2,725.8	2,593.5	20.596	ES
EXIST VERT JOHN HORST 43-21 - Wellbore #1 - Desig	12,286.8	5,240.0	2,732.8	2,597.3	20.177	SF
EXIST VERT LEONARD 13-21 - Wellbore #1 - Design #1	200.0	191.0	335.1	333.7	239.824	CC
EXIST VERT LEONARD 13-21 - Wellbore #1 - Design #1	300.0	291.0	336.9	333.1	88.801	ES
EXIST VERT LEONARD 13-21 - Wellbore #1 - Design #1	5,300.0	5,159.9	1,456.5	1,343.8	12.927	SF
EXIST VERT LEONARD 14-21 - Wellbore #1 - Design #1	4,338.5	4,232.6	579.6	477.3	5.663	CC
EXIST VERT LEONARD 14-21 - Wellbore #1 - Design #1	4,600.0	4,486.7	582.9	474.2	5.363	ES
EXIST VERT LEONARD 14-21 - Wellbore #1 - Design #1	5,300.0	5,146.0	622.7	498.5	5.012	SF
EXIST VERT LEONARD 23-21 - Wellbore #1 - Design #1	200.0	221.0	1,507.0	1,505.4	937.875	CC

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

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Reference Site:	NW SW SEC. 21 T2N R67W 6th P.M.	MD Reference:	KB-EST @ 5020.0usft (Original Well Elev)
Site Error:	0.0 usft	North Reference:	True
Reference Well:	LEONARD 10N	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	ORIGINAL WELLBORE	Database:	EDM 5000.1 Single User Db
Reference Design:	PROPOSAL #1	Offset TVD Reference:	Offset Datum

Summary						
Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
NW SW SEC. 21 T2N R67W 6th P.M.						
EXIST VERT LEONARD 23-21 - Wellbore #1 - Design #1	300.0	321.0	1,508.0	1,503.9	364.671	ES
EXIST VERT LEONARD 23-21 - Wellbore #1 - Design #1	5,300.0	5,189.9	2,332.6	2,215.0	19.835	SF
EXIST VERT LEONARD 24-21 - Wellbore #1 - Design #1	1,995.3	1,968.5	1,787.7	1,742.9	39.859	CC
EXIST VERT LEONARD 24-21 - Wellbore #1 - Design #1	2,800.0	2,750.5	1,797.8	1,733.2	27.836	ES
EXIST VERT LEONARD 24-21 - Wellbore #1 - Design #1	5,400.0	5,216.0	1,960.7	1,835.1	15.608	SF
EXIST VERT LEONARD 3-21J - Wellbore #1 - Design #1	11,254.8	7,497.0	964.6	713.7	3.845	CC
EXIST VERT LEONARD 3-21J - Wellbore #1 - Design #1	11,300.0	7,497.0	965.6	713.5	3.830	ES
EXIST VERT LEONARD 3-21J - Wellbore #1 - Design #1	11,400.0	7,497.0	975.4	720.6	3.827	SF
EXIST VERT LEONARD 33-21 - Wellbore #1 - Design #1	10,780.1	5,218.0	2,777.6	2,665.1	24.689	CC
EXIST VERT LEONARD 33-21 - Wellbore #1 - Design #1	10,800.0	5,218.0	2,777.7	2,664.9	24.617	ES
EXIST VERT LEONARD 33-21 - Wellbore #1 - Design #1	11,900.0	5,218.0	2,994.9	2,863.5	22.788	SF
EXIST VERT LEONARD 34-21 - Wellbore #1 - Design #1	5,400.0	5,250.0	3,283.1	3,157.1	26.052	SF
EXIST VERT LEONARD 34-21 - Wellbore #1 - Design #1	10,787.6	5,250.0	2,262.9	2,220.3	53.119	CC
EXIST VERT LEONARD 34-21 - Wellbore #1 - Design #1	10,800.0	5,250.0	2,262.9	2,220.2	53.001	ES
EXIST VERT LEONARD 4-21J - Wellbore #1 - Design #1	650.0	656.2	911.1	899.1	75.745	CC
EXIST VERT LEONARD 4-21J - Wellbore #1 - Design #1	8,800.0	7,468.0	917.3	731.8	4.944	ES
EXIST VERT LEONARD 4-21J - Wellbore #1 - Design #1	8,900.0	7,468.0	923.7	735.8	4.916	SF
EXIST VERT LEONARD 43-21 - Wellbore #1 - Design #1	11,284.1	7,494.0	822.8	571.2	3.270	CC
EXIST VERT LEONARD 43-21 - Wellbore #1 - Design #1	11,300.0	7,494.0	823.0	570.9	3.265	ES
EXIST VERT LEONARD 43-21 - Wellbore #1 - Design #1	11,400.0	7,494.0	831.0	576.1	3.261	SF
LEONARD 11N - ORIGINAL WELLBORE - PROPOSAL	100.0	100.0	28.1	27.9	148.600	CC, ES
LEONARD 11N - ORIGINAL WELLBORE - PROPOSAL	12,286.8	12,351.5	339.9	77.4	1.295	Level 3, SF
LEONARD 1C - ORIGINAL WELLBORE - PROPOSAL #	100.0	96.0	251.8	251.6	1,360.693	CC, ES
LEONARD 1C - ORIGINAL WELLBORE - PROPOSAL #	12,286.8	12,481.9	2,224.7	1,962.0	8.470	SF
LEONARD 2N - ORIGINAL WELLBORE - PROPOSAL #	200.0	197.0	223.7	223.1	354.180	CC, ES
LEONARD 2N - ORIGINAL WELLBORE - PROPOSAL #	12,286.8	12,219.6	2,040.4	1,776.3	7.726	SF
LEONARD 3N - ORIGINAL WELLBORE - PROPOSAL #	200.0	198.0	196.0	195.4	309.242	CC, ES
LEONARD 3N - ORIGINAL WELLBORE - PROPOSAL #	12,286.8	12,200.4	1,700.1	1,435.8	6.431	SF
LEONARD 4N - ORIGINAL WELLBORE - PROPOSAL #	200.0	199.0	168.0	167.3	264.043	CC, ES
LEONARD 4N - ORIGINAL WELLBORE - PROPOSAL #	12,286.8	12,194.9	1,360.3	1,096.2	5.152	SF
LEONARD 5C - ORIGINAL WELLBORE - PROPOSAL #	200.0	199.0	139.9	139.3	219.942	CC, ES
LEONARD 5C - ORIGINAL WELLBORE - PROPOSAL #	12,286.8	12,447.9	1,216.3	957.1	4.692	SF
LEONARD 6N - ORIGINAL WELLBORE - PROPOSAL #	200.0	200.0	111.8	111.2	175.216	CC, ES
LEONARD 6N - ORIGINAL WELLBORE - PROPOSAL #	12,286.8	12,203.2	1,020.4	756.9	3.873	SF
LEONARD 7N - ORIGINAL WELLBORE - PROPOSAL #	200.0	200.0	83.8	83.2	131.271	CC, ES
LEONARD 7N - ORIGINAL WELLBORE - PROPOSAL #	12,286.8	12,221.6	680.1	416.9	2.584	SF
LEONARD 8N - ORIGINAL WELLBORE - PROPOSAL #	200.0	200.0	55.7	55.1	87.320	CC, ES
LEONARD 8N - ORIGINAL WELLBORE - PROPOSAL #	12,286.8	12,244.9	340.2	77.5	1.295	Level 3, SF
LEONARD 9C - ORIGINAL WELLBORE - PROPOSAL #	200.0	200.0	27.7	27.0	43.375	CC, ES
LEONARD 9C - ORIGINAL WELLBORE - PROPOSAL #	12,286.8	12,506.4	302.4	137.8	1.837	SF

Offset Design												Offset Site Error:	0.0 usft
NW SW SEC. 21 T2N R67W 6th P.M. - ABDN VERT BERNARD E TEETS B6 - Wellbore #1 - Design #1												Offset Well Error:	0.0 usft
Survey Program: 0-INC													
Reference		Offset		Semi Major Axis		Distance							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	-79.57	223.0	-1,211.2	1,233.1				
100.0	100.0	38.0	38.0	0.1	0.2	-79.57	223.0	-1,211.2	1,231.6	1,231.3	0.31	4,013.145	
200.0	200.0	138.0	138.0	0.3	1.5	-79.57	223.0	-1,211.2	1,231.6	1,229.8	1.81	679.590	
300.0	300.0	238.0	238.0	0.5	3.8	76.41	223.0	-1,211.2	1,231.2	1,226.8	4.33	284.455	
400.0	399.8	337.8	337.8	0.7	5.9	76.67	223.0	-1,211.2	1,229.9	1,223.4	6.60	186.389	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation