

EXTRACTION OIL & GAS

**WELD COUNTY, COLORADO (NAD 83)
NW SW SEC. 21 T2N R67W 6th P.M.
LEONARD 8N**

**ORIGINAL WELLBORE
PROPOSAL #1**

Anticollision Report

28 March, 2017



Anticollision Report



Company:	EXTRACTION OIL & GAS	Local Co-ordinate Reference:	Well LEONARD 8N
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 8N	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	12,247.7	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	2,896.9	2,789.1	1,133.5	1,067.5	17.170	CC
ABDN VERT BERNARD E TEETS B6 - Wellbore #1 - De	3,500.0	3,379.0	1,140.4	1,059.9	14.154	ES
ABDN VERT BERNARD E TEETS B6 - Wellbore #1 - De	5,300.0	5,135.0	1,238.7	1,116.0	10.092	SF
ABDN VERT BERNARD E TEETS B9 - Wellbore #1 - De	5,420.9	5,173.0	777.7	660.0	6.610	CC, ES, SF
EXIST HZ TROUDT #2 - Wellbore #1 - Wellbore #1	7,008.4	18,091.0	1,129.0	928.0	5.619	SF
EXIST HZ TROUDT #2 - Wellbore #1 - Wellbore #1	7,400.0	18,091.0	976.5	886.1	10.796	ES
EXIST HZ TROUDT #2 - Wellbore #1 - Wellbore #1	7,423.6	18,091.0	976.0	887.5	11.027	CC
EXIST HZ TROUDT 1 - Wellbore #1 - Wellbore #1	7,008.4	17,860.0	922.8	721.4	4.580	ES, SF
EXIST HZ TROUDT 1 - Wellbore #1 - Wellbore #1	7,461.8	17,860.0	781.3	740.9	19.351	CC
EXIST VERT BERNARD E TEETS #2 - Wellbore #1 - De	5,547.1	5,408.3	1,283.8	1,153.3	9.832	CC
EXIST VERT BERNARD E TEETS #2 - Wellbore #1 - De	7,050.0	6,893.5	1,298.9	1,134.6	7.903	ES, SF
EXIST VERT ELKHORN COMPANY B2 - Wellbore #1 - I	400.0	391.0	1,628.9	1,620.7	199.056	CC
EXIST VERT ELKHORN COMPANY B2 - Wellbore #1 - I	500.0	491.0	1,630.5	1,620.1	156.632	ES
EXIST VERT ELKHORN COMPANY B2 - Wellbore #1 - I	9,200.0	7,451.0	2,882.4	2,684.4	14.560	SF
EXIST VERT ELKHORN COMPANY B5 - Wellbore #1 - I	400.0	425.0	3,355.0	3,346.5	392.945	CC
EXIST VERT ELKHORN COMPANY B5 - Wellbore #1 - I	11,000.0	5,210.0	3,447.3	3,295.2	22.669	ES
EXIST VERT ELKHORN COMPANY B5 - Wellbore #1 - I	12,247.7	5,210.0	3,697.5	3,518.7	20.687	SF
EXIST VERT ELKHORN COMPANY B7 - Wellbore #1 - I	400.0	424.0	2,137.8	2,129.3	250.690	CC
EXIST VERT ELKHORN COMPANY B7 - Wellbore #1 - I	500.0	524.0	2,139.5	2,128.8	199.029	ES
EXIST VERT ELKHORN COMPANY B7 - Wellbore #1 - I	11,600.0	5,230.0	4,166.5	3,998.8	24.848	SF
EXIST VERT ELKHORN COMPANY B9 - Wellbore #1 - I	12,238.7	5,216.0	3,505.0	3,323.5	19.303	CC
EXIST VERT ELKHORN COMPANY B9 - Wellbore #1 - I	12,247.7	5,216.0	3,505.1	3,323.3	19.282	ES, SF
EXIST VERT HORST 44-21 - Wellbore #1 - Design #1	5,600.0	5,220.0	4,520.1	4,396.4	36.532	SF
EXIST VERT HORST 44-21 - Wellbore #1 - Design #1	11,928.7	5,220.0	2,259.4	2,217.1	53.510	CC, ES
EXIST VERT JOHN HORST 43-21 - Wellbore #1 - Desig	12,050.3	5,240.0	2,553.2	2,440.7	22.689	CC
EXIST VERT JOHN HORST 43-21 - Wellbore #1 - Desig	12,100.0	5,240.0	2,553.7	2,440.5	22.552	ES
EXIST VERT JOHN HORST 43-21 - Wellbore #1 - Desig	12,247.7	5,240.0	2,560.8	2,445.5	22.201	SF
EXIST VERT LEONARD 13-21 - Wellbore #1 - Design #1	400.0	391.0	288.7	282.5	47.032	CC
EXIST VERT LEONARD 13-21 - Wellbore #1 - Design #1	500.0	491.0	290.4	282.0	34.655	ES
EXIST VERT LEONARD 13-21 - Wellbore #1 - Design #1	5,300.0	5,192.7	1,244.0	1,130.8	10.986	SF
EXIST VERT LEONARD 14-21 - Wellbore #1 - Design #1	4,941.0	4,848.5	694.1	578.9	6.025	CC
EXIST VERT LEONARD 14-21 - Wellbore #1 - Design #1	5,200.0	5,101.9	696.2	574.8	5.733	ES
EXIST VERT LEONARD 14-21 - Wellbore #1 - Design #1	5,300.0	5,146.0	700.2	577.4	5.703	SF
EXIST VERT LEONARD 23-21 - Wellbore #1 - Design #1	400.0	421.0	1,498.7	1,492.2	232.121	CC
EXIST VERT LEONARD 23-21 - Wellbore #1 - Design #1	500.0	521.0	1,499.8	1,491.1	172.509	ES
EXIST VERT LEONARD 23-21 - Wellbore #1 - Design #1	5,300.0	5,216.0	2,219.2	2,102.2	18.964	SF
EXIST VERT LEONARD 24-21 - Wellbore #1 - Design #1	1,717.5	1,708.4	1,841.2	1,804.1	49.526	CC

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

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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 8N	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 24-21 - Wellbore #1 - Design #1	2,800.0	2,767.3	1,854.9	1,791.6	29.285	ES
EXIST VERT LEONARD 24-21 - Wellbore #1 - Design #1	5,300.0	5,212.7	1,986.2	1,863.3	16.168	SF
EXIST VERT LEONARD 3-21J - Wellbore #1 - Design #1	11,213.2	7,497.0	624.5	373.9	2.491	CC, ES, SF
EXIST VERT LEONARD 33-21 - Wellbore #1 - Design #1	10,738.5	5,218.0	2,598.2	2,501.5	26.863	CC
EXIST VERT LEONARD 33-21 - Wellbore #1 - Design #1	10,800.0	5,218.0	2,599.0	2,501.3	26.623	ES
EXIST VERT LEONARD 33-21 - Wellbore #1 - Design #1	11,800.0	5,218.0	2,806.7	2,694.4	24.986	SF
EXIST VERT LEONARD 34-21 - Wellbore #1 - Design #1	5,400.0	5,250.0	3,311.1	3,187.7	26.831	SF
EXIST VERT LEONARD 34-21 - Wellbore #1 - Design #1	10,745.8	5,250.0	2,245.7	2,212.5	67.686	CC, ES
EXIST VERT LEONARD 4-21J - Wellbore #1 - Design #1	8,749.1	7,468.0	577.4	392.5	3.122	CC, ES
EXIST VERT LEONARD 4-21J - Wellbore #1 - Design #1	8,800.0	7,468.0	579.7	393.5	3.114	SF
EXIST VERT LEONARD 43-21 - Wellbore #1 - Design #1	11,242.4	7,494.0	482.8	231.4	1.920	CC, ES, SF
LEONARD 10N - ORIGINAL WELLBORE - PROPOSAL	200.0	200.0	55.7	55.1	87.320	CC, ES
LEONARD 10N - ORIGINAL WELLBORE - PROPOSAL	12,247.7	12,286.8	340.3	77.4	1.295	Level 3, SF
LEONARD 11N - ORIGINAL WELLBORE - PROPOSAL	100.0	100.0	83.8	83.6	443.821	CC, ES
LEONARD 11N - ORIGINAL WELLBORE - PROPOSAL	12,247.7	12,351.5	680.2	417.8	2.592	SF
LEONARD 1C - ORIGINAL WELLBORE - PROPOSAL #	100.0	96.0	196.0	195.8	1,059.446	CC, ES
LEONARD 1C - ORIGINAL WELLBORE - PROPOSAL #	12,247.7	12,484.6	1,887.1	1,625.1	7.204	SF
LEONARD 2N - ORIGINAL WELLBORE - PROPOSAL #	300.0	297.0	168.0	166.9	155.355	CC, ES
LEONARD 2N - ORIGINAL WELLBORE - PROPOSAL #	12,247.7	12,222.4	1,700.1	1,436.1	6.438	SF
LEONARD 3N - ORIGINAL WELLBORE - PROPOSAL #	400.0	398.0	140.3	138.7	91.507	CC, ES
LEONARD 3N - ORIGINAL WELLBORE - PROPOSAL #	12,247.7	12,203.2	1,359.9	1,095.5	5.144	SF
LEONARD 4N - ORIGINAL WELLBORE - PROPOSAL #	400.0	399.0	112.2	110.7	73.097	CC, ES
LEONARD 4N - ORIGINAL WELLBORE - PROPOSAL #	12,247.7	12,197.7	1,020.0	756.0	3.864	SF
LEONARD 5C - ORIGINAL WELLBORE - PROPOSAL #	400.0	399.0	84.2	82.6	54.824	CC, ES
LEONARD 5C - ORIGINAL WELLBORE - PROPOSAL #	12,247.7	12,450.6	886.2	631.6	3.481	SF
LEONARD 6N - ORIGINAL WELLBORE - PROPOSAL #	400.0	400.0	56.1	54.6	36.495	CC, ES
LEONARD 6N - ORIGINAL WELLBORE - PROPOSAL #	12,247.7	12,206.0	680.1	416.6	2.581	SF
LEONARD 7N - ORIGINAL WELLBORE - PROPOSAL #	400.0	400.0	28.1	26.5	18.249	CC, ES
LEONARD 7N - ORIGINAL WELLBORE - PROPOSAL #	12,247.7	12,224.4	339.9	76.7	1.291	Level 3, SF
LEONARD 9C - ORIGINAL WELLBORE - PROPOSAL #	300.0	300.0	28.1	27.0	25.786	CC, ES
LEONARD 9C - ORIGINAL WELLBORE - PROPOSAL #	6,200.0	6,192.3	89.9	42.7	1.903	SF

Offset Design NW SW SEC. 21 T2N R67W 6th P.M. - ABDN VERT BERNARD E TEETS B6 - Wellbore #1 - Design #1											Offset Site Error: 0.0 usft		
Survey Program: 0-INC											Offset Well Error: 0.0 usft		
Reference		Offset		Semi Major Axis			Distance						Warning
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	
0.0	0.0	0.0	0.0	0.0	0.0	-82.13	167.2	-1,210.7	1,223.7				
100.0	100.0	38.0	38.0	0.1	0.2	-82.13	167.2	-1,210.7	1,222.2	1,221.9	0.31	3,982.462	
200.0	200.0	138.0	138.0	0.3	1.5	-82.13	167.2	-1,210.7	1,222.2	1,220.4	1.81	674.394	
300.0	300.0	238.0	238.0	0.5	3.8	-82.13	167.2	-1,210.7	1,222.2	1,217.8	4.35	280.884	
400.0	400.0	338.0	338.0	0.8	5.9	-82.13	167.2	-1,210.7	1,222.2	1,215.5	6.64	184.036	
500.0	500.0	438.0	438.0	1.0	7.9	68.13	167.2	-1,210.7	1,221.5	1,212.6	8.88	137.632	
600.0	599.8	537.8	537.8	1.2	9.9	68.40	167.2	-1,210.7	1,219.6	1,208.5	11.09	109.988	
700.0	699.5	637.5	637.5	1.4	11.9	68.83	167.2	-1,210.7	1,216.4	1,203.1	13.32	91.345	
800.0	798.7	736.7	736.7	1.6	13.9	69.45	167.2	-1,210.7	1,212.0	1,196.4	15.57	77.860	
900.0	897.5	835.5	835.5	2.0	15.9	70.24	167.2	-1,210.7	1,206.6	1,188.7	17.85	67.608	
1,000.0	995.6	933.6	933.6	2.3	17.9	71.21	167.2	-1,210.7	1,200.2	1,180.0	20.16	59.525	
1,100.0	1,093.4	1,031.4	1,031.4	2.7	19.9	72.13	167.2	-1,210.7	1,193.5	1,171.0	22.52	52.988	
1,200.0	1,191.3	1,129.3	1,129.3	3.1	21.9	73.07	167.2	-1,210.7	1,187.1	1,162.2	24.90	47.670	

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