

# **EXTRACTION OIL & GAS**

**WELD COUNTY, COLORADO (NAD 83)  
NW SW SEC. 21 T2N R67W 6th P.M.  
LEONARD 5C**

**ORIGINAL WELLBORE  
PROPOSAL #1**

## **Anticollision Report**

**27 March, 2017**



# Anticollision Report



<b>Company:</b>	EXTRACTION OIL & GAS	<b>Local Co-ordinate Reference:</b>	Well LEONARD 5C
<b>Project:</b>	WELD COUNTY, COLORADO (NAD 83)	<b>TVD Reference:</b>	KB-EST @ 5019.0usft (Original Well Elev)
<b>Reference Site:</b>	NW SW SEC. 21 T2N R67W 6th P.M.	<b>MD Reference:</b>	KB-EST @ 5019.0usft (Original Well Elev)
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	LEONARD 5C	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	ORIGINAL WELLBORE	<b>Database:</b>	EDM 5000.1 Single User Db
<b>Reference Design:</b>	PROPOSAL #1	<b>Offset TVD Reference:</b>	Offset Datum

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

<b>Survey Tool Program</b>	<b>Date</b>	22/11/2016		
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
0.0	12,457.3	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	5,245.6	5,119.3	702.2	586.5	6.067	CC, ES
ABDN VERT BERNARD E TEETS B6 - Wellbore #1 - De	5,300.0	5,135.0	703.3	587.1	6.055	SF
ABDN VERT BERNARD E TEETS B9 - Wellbore #1 - De	5,238.5	5,157.3	1,128.8	1,011.9	9.661	CC, ES
ABDN VERT BERNARD E TEETS B9 - Wellbore #1 - De	5,300.0	5,173.0	1,129.7	1,012.5	9.636	SF
EXIST HZ TROUDT #2 - Wellbore #1 - Wellbore #1	7,202.2	18,091.0	1,749.2	1,553.3	8.929	ES, SF
EXIST HZ TROUDT #2 - Wellbore #1 - Wellbore #1	7,508.5	18,091.0	1,704.6	1,654.8	34.252	CC
EXIST HZ TROUDT 1 - Wellbore #1 - Wellbore #1	7,202.2	17,860.0	1,641.5	1,446.7	8.429	ES, SF
EXIST HZ TROUDT 1 - Wellbore #1 - Wellbore #1	7,475.7	17,860.0	1,619.8	1,572.9	34.533	CC
EXIST VERT BERNARD E TEETS #2 - Wellbore #1 - De	7,202.2	7,103.0	1,011.0	850.0	6.278	CC, ES, SF
EXIST VERT ELKHORN COMPANY B2 - Wellbore #1 - I	700.0	692.0	1,545.3	1,530.4	103.359	CC
EXIST VERT ELKHORN COMPANY B2 - Wellbore #1 - I	800.0	792.0	1,546.2	1,529.0	90.042	ES
EXIST VERT ELKHORN COMPANY B2 - Wellbore #1 - I	8,700.0	7,702.0	1,854.8	1,668.0	9.930	SF
EXIST VERT ELKHORN COMPANY B5 - Wellbore #1 - I	11,110.0	5,210.0	3,066.2	2,948.7	26.086	CC
EXIST VERT ELKHORN COMPANY B5 - Wellbore #1 - I	11,200.0	5,210.0	3,067.6	2,948.5	25.769	ES
EXIST VERT ELKHORN COMPANY B5 - Wellbore #1 - I	12,457.3	5,210.0	3,349.2	3,209.1	23.903	SF
EXIST VERT ELKHORN COMPANY B7 - Wellbore #1 - I	700.0	725.0	2,075.5	2,060.2	135.750	CC
EXIST VERT ELKHORN COMPANY B7 - Wellbore #1 - I	800.0	825.0	2,077.1	2,059.6	118.671	ES
EXIST VERT ELKHORN COMPANY B7 - Wellbore #1 - I	5,400.0	5,230.0	2,698.5	2,577.4	22.283	SF
EXIST VERT ELKHORN COMPANY B9 - Wellbore #1 - I	12,441.1	5,216.0	3,107.0	2,962.3	21.480	CC
EXIST VERT ELKHORN COMPANY B9 - Wellbore #1 - I	12,457.3	5,216.0	3,107.0	2,962.1	21.439	ES, SF
EXIST VERT HORST 44-21 - Wellbore #1 - Design #1	12,131.6	5,220.0	2,675.5	2,585.4	29.708	CC, ES
EXIST VERT HORST 44-21 - Wellbore #1 - Design #1	12,457.3	5,220.0	2,695.2	2,601.4	28.717	SF
EXIST VERT JOHN HORST 43-21 - Wellbore #1 - Desig	5,500.0	5,240.0	4,740.9	4,619.9	39.170	SF
EXIST VERT JOHN HORST 43-21 - Wellbore #1 - Desig	12,253.0	5,240.0	2,541.1	2,488.3	48.118	CC, ES
EXIST VERT LEONARD 13-21 - Wellbore #1 - Design #1	700.0	692.0	227.0	214.1	17.553	CC
EXIST VERT LEONARD 13-21 - Wellbore #1 - Design #1	800.0	792.0	228.7	213.5	15.094	ES
EXIST VERT LEONARD 13-21 - Wellbore #1 - Design #1	5,300.0	5,200.0	882.5	763.4	7.413	SF
EXIST VERT LEONARD 14-21 - Wellbore #1 - Design #1	2,639.1	2,604.5	1,156.6	1,098.0	19.722	CC
EXIST VERT LEONARD 14-21 - Wellbore #1 - Design #1	5,200.0	5,133.8	1,200.4	1,087.5	10.631	ES
EXIST VERT LEONARD 14-21 - Wellbore #1 - Design #1	5,300.0	5,146.0	1,203.6	1,090.3	10.619	SF
EXIST VERT LEONARD 23-21 - Wellbore #1 - Design #1	700.0	722.0	1,490.5	1,477.3	112.582	CC
EXIST VERT LEONARD 23-21 - Wellbore #1 - Design #1	800.0	822.0	1,492.2	1,476.7	96.547	ES
EXIST VERT LEONARD 23-21 - Wellbore #1 - Design #1	5,300.0	5,216.0	2,127.3	2,008.4	17.900	SF
EXIST VERT LEONARD 24-21 - Wellbore #1 - Design #1	700.0	712.0	1,905.6	1,892.5	145.064	CC
EXIST VERT LEONARD 24-21 - Wellbore #1 - Design #1	800.0	812.0	1,906.4	1,891.0	124.126	ES
EXIST VERT LEONARD 24-21 - Wellbore #1 - Design #1	5,300.0	5,216.0	2,286.8	2,170.1	19.606	SF
EXIST VERT LEONARD 3-21J - Wellbore #1 - Design #1	11,416.0	7,747.9	225.5	-31.2	0.878	Level 1, CC, ES, SF

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

# Anticollision Report



<b>Company:</b>	EXTRACTION OIL & GAS	<b>Local Co-ordinate Reference:</b>	Well LEONARD 5C
<b>Project:</b>	WELD COUNTY, COLORADO (NAD 83)	<b>TVD Reference:</b>	KB-EST @ 5019.0usft (Original Well Elev)
<b>Reference Site:</b>	NW SW SEC. 21 T2N R67W 6th P.M.	<b>MD Reference:</b>	KB-EST @ 5019.0usft (Original Well Elev)
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	LEONARD 5C	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	ORIGINAL WELLBORE	<b>Database:</b>	EDM 5000.1 Single User Db
<b>Reference Design:</b>	PROPOSAL #1	<b>Offset TVD Reference:</b>	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 33-21 - Wellbore #1 - Design #1	5,400.0	5,218.0	3,438.6	3,319.9	28.969	SF
EXIST VERT LEONARD 33-21 - Wellbore #1 - Design #1	10,941.2	5,218.0	2,561.0	2,514.8	55.422	CC, ES
EXIST VERT LEONARD 34-21 - Wellbore #1 - Design #1	5,400.0	5,250.0	3,539.6	3,421.6	30.004	SF
EXIST VERT LEONARD 34-21 - Wellbore #1 - Design #1	10,948.7	5,250.0	2,655.4	2,579.9	35.147	CC
EXIST VERT LEONARD 34-21 - Wellbore #1 - Design #1	11,000.0	5,250.0	2,655.9	2,579.8	34.885	ES
EXIST VERT LEONARD 4-21J - Wellbore #1 - Design #1	8,952.0	7,719.0	272.8	82.0	1.430	Level 3, CC, ES, SF
EXIST VERT LEONARD 43-21 - Wellbore #1 - Design #1	11,445.3	7,745.0	367.3	109.7	1.426	Level 3, CC, ES, SF
LEONARD 10N - ORIGINAL WELLBORE - PROPOSAL	166.3	167.3	139.9	139.4	285.967	CC
LEONARD 10N - ORIGINAL WELLBORE - PROPOSAL	200.0	200.0	139.9	139.3	219.173	ES
LEONARD 10N - ORIGINAL WELLBORE - PROPOSAL	12,457.3	12,286.8	1,216.4	956.9	4.688	SF
LEONARD 11N - ORIGINAL WELLBORE - PROPOSAL	0.0	1.0	168.0			
LEONARD 11N - ORIGINAL WELLBORE - PROPOSAL	100.0	100.0	168.0	167.8	889.608	ES
LEONARD 11N - ORIGINAL WELLBORE - PROPOSAL	12,457.3	12,351.5	1,550.5	1,289.5	5.940	SF
LEONARD 1C - ORIGINAL WELLBORE - PROPOSAL #	100.0	97.0	111.9	111.7	601.507	CC, ES
LEONARD 1C - ORIGINAL WELLBORE - PROPOSAL #	12,457.3	12,491.4	1,020.0	754.5	3.841	SF
LEONARD 2N - ORIGINAL WELLBORE - PROPOSAL #	300.0	298.0	83.8	82.7	77.346	CC, ES
LEONARD 2N - ORIGINAL WELLBORE - PROPOSAL #	12,457.3	12,229.2	885.7	629.6	3.459	SF
LEONARD 3N - ORIGINAL WELLBORE - PROPOSAL #	500.0	499.0	56.1	54.1	28.270	CC, ES
LEONARD 3N - ORIGINAL WELLBORE - PROPOSAL #	12,457.3	12,209.9	567.5	326.3	2.353	SF
LEONARD 4N - ORIGINAL WELLBORE - PROPOSAL #	700.0	700.0	28.1	25.2	9.720	CC, ES
LEONARD 4N - ORIGINAL WELLBORE - PROPOSAL #	12,457.3	12,204.5	302.4	141.1	1.875	SF
LEONARD 6N - ORIGINAL WELLBORE - PROPOSAL #	566.3	567.3	28.1	25.8	12.266	CC
LEONARD 6N - ORIGINAL WELLBORE - PROPOSAL #	600.0	601.0	28.1	25.6	11.506	ES
LEONARD 6N - ORIGINAL WELLBORE - PROPOSAL #	12,457.3	12,211.5	303.0	141.6	1.878	SF
LEONARD 7N - ORIGINAL WELLBORE - PROPOSAL #	466.3	467.3	56.1	54.3	30.529	CC
LEONARD 7N - ORIGINAL WELLBORE - PROPOSAL #	500.0	501.0	56.1	54.1	28.210	ES
LEONARD 7N - ORIGINAL WELLBORE - PROPOSAL #	12,457.3	12,227.1	568.4	328.1	2.365	SF
LEONARD 8N - ORIGINAL WELLBORE - PROPOSAL #	366.3	367.3	84.2	82.8	60.624	CC
LEONARD 8N - ORIGINAL WELLBORE - PROPOSAL #	400.0	400.0	84.2	82.6	54.748	ES
LEONARD 8N - ORIGINAL WELLBORE - PROPOSAL #	12,457.3	12,247.7	886.2	631.5	3.479	SF
LEONARD 9C - ORIGINAL WELLBORE - PROPOSAL #	266.3	267.3	112.2	111.3	119.536	CC
LEONARD 9C - ORIGINAL WELLBORE - PROPOSAL #	300.0	300.0	112.2	111.1	103.155	ES
LEONARD 9C - ORIGINAL WELLBORE - PROPOSAL #	12,457.3	12,507.7	1,020.1	756.1	3.865	SF

<b>Offset Design</b>										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 Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	-86.07	83.1	-1,209.3	1,213.7				
100.0	100.0	39.0	39.0	0.1	0.2	-86.07	83.1	-1,209.3	1,212.1	1,211.8	0.31	3,879.054	
200.0	200.0	139.0	139.0	0.3	1.5	-86.07	83.1	-1,209.3	1,212.1	1,210.3	1.84	659.903	
300.0	300.0	239.0	239.0	0.5	3.8	-86.07	83.1	-1,209.3	1,212.1	1,207.7	4.37	277.250	
400.0	400.0	339.0	339.0	0.8	5.9	-86.07	83.1	-1,209.3	1,212.1	1,205.5	6.66	181.965	
500.0	500.0	439.0	439.0	1.0	7.9	-86.07	83.1	-1,209.3	1,212.1	1,203.2	8.92	135.865	
600.0	600.0	539.0	539.0	1.2	10.0	-86.07	83.1	-1,209.3	1,212.1	1,200.9	11.17	108.502	
700.0	700.0	639.0	639.0	1.4	12.0	-86.07	83.1	-1,209.3	1,212.1	1,198.7	13.42	90.346	
800.0	800.0	739.0	739.0	1.6	14.0	28.28	83.1	-1,209.3	1,210.6	1,195.0	15.63	77.442	
900.0	899.8	838.8	838.8	1.8	16.0	28.44	83.1	-1,209.3	1,206.0	1,188.2	17.81	67.697	
1,000.0	999.5	938.5	938.5	2.1	18.0	28.72	83.1	-1,209.3	1,198.3	1,178.3	19.98	59.983	

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