

EXTRACTION OIL & GAS

**WELD COUNTY, COLORADO (NAD 83)
NW SW SEC. 21 T2N R67W 6th P.M.
LEONARD 2N**

**ORIGINAL WELLBORE
PROPOSAL #1**

Anticollision Report

27 March, 2017



Anticollision Report



Company:	EXTRACTION OIL & GAS	Local Co-ordinate Reference:	Well LEONARD 2N
Project:	WELD COUNTY, COLORADO (NAD 83)	TVD Reference:	KB @ 5017.0usft (Original Well Elev)
Reference Site:	NW SW SEC. 21 T2N R67W 6th P.M.	MD Reference:	KB @ 5017.0usft (Original Well Elev)
Site Error:	0.0 usft	North Reference:	True
Reference Well:	LEONARD 2N	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	12,236.1	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	5,253.9	5,116.6	774.0	659.2	6.742	CC, ES
ABDN VERT BERNARD E TEETS B6 - Wellbore #1 - De	5,300.0	5,135.0	774.5	659.3	6.719	SF
ABDN VERT BERNARD E TEETS B9 - Wellbore #1 - De	1,078.9	1,056.7	1,775.0	1,753.1	81.154	CC
ABDN VERT BERNARD E TEETS B9 - Wellbore #1 - De	2,100.0	2,055.4	1,787.6	1,741.1	38.460	ES
ABDN VERT BERNARD E TEETS B9 - Wellbore #1 - De	5,300.0	5,173.0	1,903.5	1,788.4	16.542	SF
EXIST HZ TROUDT #2 - Wellbore #1 - Wellbore #1	6,965.2	18,091.0	2,627.3	2,430.4	13.345	ES, SF
EXIST HZ TROUDT #2 - Wellbore #1 - Wellbore #1	7,385.5	18,091.0	2,564.7	2,518.6	55.620	CC
EXIST HZ TROUDT 1 - Wellbore #1 - Wellbore #1	6,965.2	17,860.0	2,521.6	2,324.7	12.807	ES, SF
EXIST HZ TROUDT 1 - Wellbore #1 - Wellbore #1	7,427.4	17,860.0	2,472.5	2,430.6	58.901	CC
EXIST VERT BERNARD E TEETS #2 - Wellbore #1 - De	6,965.2	6,855.0	1,343.8	1,191.0	8.795	CC
EXIST VERT BERNARD E TEETS #2 - Wellbore #1 - De	7,000.0	6,889.7	1,344.6	1,186.3	8.498	ES, SF
EXIST VERT ELKHORN COMPANY B2 - Wellbore #1 - I	8,063.5	7,454.0	959.4	785.5	5.517	CC, ES
EXIST VERT ELKHORN COMPANY B2 - Wellbore #1 - I	8,200.0	7,454.0	969.0	792.7	5.496	SF
EXIST VERT ELKHORN COMPANY B5 - Wellbore #1 - I	10,882.2	5,210.0	2,445.1	2,362.6	29.656	CC
EXIST VERT ELKHORN COMPANY B5 - Wellbore #1 - I	10,900.0	5,210.0	2,445.1	2,362.5	29.581	ES
EXIST VERT ELKHORN COMPANY B5 - Wellbore #1 - I	11,800.0	5,210.0	2,611.6	2,518.2	27.945	SF
EXIST VERT ELKHORN COMPANY B7 - Wellbore #1 - I	300.0	327.0	2,014.8	2,008.5	318.528	CC
EXIST VERT ELKHORN COMPANY B7 - Wellbore #1 - I	899.9	922.5	2,021.0	2,001.0	100.937	ES
EXIST VERT ELKHORN COMPANY B7 - Wellbore #1 - I	5,400.0	5,230.0	2,226.4	2,107.9	18.774	SF
EXIST VERT ELKHORN COMPANY B9 - Wellbore #1 - I	12,213.5	5,216.0	2,466.3	2,360.9	23.411	CC
EXIST VERT ELKHORN COMPANY B9 - Wellbore #1 - I	12,236.1	5,216.0	2,466.4	2,360.7	23.348	ES, SF
EXIST VERT HORST 44-21 - Wellbore #1 - Design #1	11,903.6	5,220.0	2,877.2	2,733.4	20.011	CC
EXIST VERT HORST 44-21 - Wellbore #1 - Design #1	12,000.0	5,220.0	2,878.8	2,733.3	19.784	ES
EXIST VERT HORST 44-21 - Wellbore #1 - Design #1	12,236.1	5,220.0	2,896.3	2,746.5	19.338	SF
EXIST VERT JOHN HORST 43-21 - Wellbore #1 - Desig	12,025.2	5,240.0	2,334.3	2,265.5	33.918	CC, ES
EXIST VERT JOHN HORST 43-21 - Wellbore #1 - Desig	12,236.1	5,240.0	2,343.8	2,273.0	33.106	SF
EXIST VERT LEONARD 13-21 - Wellbore #1 - Design #1	300.0	294.0	183.9	180.1	47.360	CC
EXIST VERT LEONARD 13-21 - Wellbore #1 - Design #1	400.0	394.0	184.8	178.6	29.835	ES
EXIST VERT LEONARD 13-21 - Wellbore #1 - Design #1	5,300.0	5,200.0	893.2	772.6	7.401	SF
EXIST VERT LEONARD 14-21 - Wellbore #1 - Design #1	300.0	301.0	1,289.1	1,285.1	324.674	CC
EXIST VERT LEONARD 14-21 - Wellbore #1 - Design #1	400.0	401.0	1,290.3	1,284.0	205.790	ES
EXIST VERT LEONARD 14-21 - Wellbore #1 - Design #1	5,300.0	5,146.0	1,936.8	1,818.4	16.353	SF
EXIST VERT LEONARD 23-21 - Wellbore #1 - Design #1	300.0	324.0	1,486.8	1,482.6	352.274	CC
EXIST VERT LEONARD 23-21 - Wellbore #1 - Design #1	400.0	424.0	1,488.1	1,481.6	228.525	ES
EXIST VERT LEONARD 23-21 - Wellbore #1 - Design #1	5,300.0	5,216.0	2,146.3	2,026.5	17.907	SF
EXIST VERT LEONARD 24-21 - Wellbore #1 - Design #1	300.0	314.0	1,959.6	1,955.5	476.766	CC
EXIST VERT LEONARD 24-21 - Wellbore #1 - Design #1	400.0	414.0	1,961.3	1,954.9	306.219	ES

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

Anticollision Report



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Project:	WELD COUNTY, COLORADO (NAD 83)	TVD Reference:	KB @ 5017.0usft (Original Well Elev)
Reference Site:	NW SW SEC. 21 T2N R67W 6th P.M.	MD Reference:	KB @ 5017.0usft (Original Well Elev)
Site Error:	0.0 usft	North Reference:	True
Reference Well:	LEONARD 2N	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	5,400.0	5,216.0	2,748.5	2,627.4	22.703	SF
EXIST VERT LEONARD 3-21J - Wellbore #1 - Design #1	11,187.9	7,500.0	1,075.6	823.6	4.268	CC
EXIST VERT LEONARD 3-21J - Wellbore #1 - Design #1	11,200.0	7,500.0	1,075.7	823.3	4.262	ES
EXIST VERT LEONARD 3-21J - Wellbore #1 - Design #1	11,300.0	7,500.0	1,081.5	826.3	4.239	SF
EXIST VERT LEONARD 33-21 - Wellbore #1 - Design #1	5,400.0	5,218.0	3,453.7	3,334.2	28.896	SF
EXIST VERT LEONARD 33-21 - Wellbore #1 - Design #1	10,713.3	5,218.0	2,326.4	2,275.2	45.383	CC, ES
EXIST VERT LEONARD 34-21 - Wellbore #1 - Design #1	10,720.6	5,250.0	2,852.9	2,730.6	23.320	CC
EXIST VERT LEONARD 34-21 - Wellbore #1 - Design #1	10,800.0	5,250.0	2,854.0	2,730.2	23.063	ES
EXIST VERT LEONARD 34-21 - Wellbore #1 - Design #1	11,900.0	5,250.0	3,087.1	2,943.7	21.527	SF
EXIST VERT LEONARD 4-21J - Wellbore #1 - Design #1	300.0	311.0	1,033.1	1,029.0	253.362	CC
EXIST VERT LEONARD 4-21J - Wellbore #1 - Design #1	8,724.0	7,471.0	1,122.8	936.7	6.034	ES
EXIST VERT LEONARD 4-21J - Wellbore #1 - Design #1	8,900.0	7,471.0	1,136.5	946.1	5.969	SF
EXIST VERT LEONARD 43-21 - Wellbore #1 - Design #1	11,217.1	7,497.0	1,217.4	964.6	4.815	CC, ES
EXIST VERT LEONARD 43-21 - Wellbore #1 - Design #1	11,400.0	7,497.0	1,231.0	973.2	4.774	SF
LEONARD 10N - ORIGINAL WELLBORE - PROPOSAL	165.6	168.6	223.7	223.2	455.967	CC
LEONARD 10N - ORIGINAL WELLBORE - PROPOSAL	200.0	200.0	223.7	223.1	350.470	ES
LEONARD 10N - ORIGINAL WELLBORE - PROPOSAL	12,236.1	12,286.8	2,040.5	1,775.9	7.713	SF
LEONARD 11N - ORIGINAL WELLBORE - PROPOSAL	0.0	3.0	251.8			
LEONARD 11N - ORIGINAL WELLBORE - PROPOSAL	100.0	100.0	251.8	251.6	1,333.508	ES
LEONARD 11N - ORIGINAL WELLBORE - PROPOSAL	12,236.1	12,351.5	2,380.4	2,116.3	9.014	SF
LEONARD 1C - ORIGINAL WELLBORE - PROPOSAL #	100.0	99.0	28.1	27.9	149.413	CC, ES
LEONARD 1C - ORIGINAL WELLBORE - PROPOSAL #	12,236.1	12,498.1	303.0	143.8	1.903	SF
LEONARD 3N - ORIGINAL WELLBORE - PROPOSAL #	300.0	301.0	27.7	26.6	25.399	CC, ES
LEONARD 3N - ORIGINAL WELLBORE - PROPOSAL #	12,236.1	12,213.8	340.3	73.9	1.278	Level 3, SF
LEONARD 4N - ORIGINAL WELLBORE - PROPOSAL #	300.0	302.0	55.7	54.7	51.030	CC, ES
LEONARD 4N - ORIGINAL WELLBORE - PROPOSAL #	12,236.1	12,205.7	680.2	414.2	2.558	SF
LEONARD 5C - ORIGINAL WELLBORE - PROPOSAL #	300.0	302.0	83.8	82.7	76.710	CC, ES
LEONARD 5C - ORIGINAL WELLBORE - PROPOSAL #	12,236.1	12,457.3	885.7	629.5	3.457	SF
LEONARD 6N - ORIGINAL WELLBORE - PROPOSAL #	300.0	303.0	111.9	110.8	102.183	CC, ES
LEONARD 6N - ORIGINAL WELLBORE - PROPOSAL #	12,236.1	12,211.5	1,020.1	754.7	3.844	SF
LEONARD 7N - ORIGINAL WELLBORE - PROPOSAL #	300.0	303.0	139.9	138.8	127.810	CC, ES
LEONARD 7N - ORIGINAL WELLBORE - PROPOSAL #	12,236.1	12,227.1	1,360.3	1,095.3	5.133	SF
LEONARD 8N - ORIGINAL WELLBORE - PROPOSAL #	300.0	303.0	168.0	166.9	153.441	CC, ES
LEONARD 8N - ORIGINAL WELLBORE - PROPOSAL #	12,236.1	12,247.7	1,700.2	1,435.8	6.429	SF
LEONARD 9C - ORIGINAL WELLBORE - PROPOSAL #	265.6	268.6	196.0	195.1	208.492	CC
LEONARD 9C - ORIGINAL WELLBORE - PROPOSAL #	300.0	300.0	196.0	194.9	180.199	ES
LEONARD 9C - ORIGINAL WELLBORE - PROPOSAL #	12,236.1	12,507.7	1,886.6	1,624.4	7.196	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)	Offset Wellbore Centre +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	-90.03	-0.7	-1,208.2	1,209.6				
100.0	100.0	41.0	41.0	0.1	0.2	-90.03	-0.7	-1,208.2	1,208.2	1,207.8	0.32	3,732.757	
200.0	200.0	141.0	141.0	0.3	1.6	-90.03	-0.7	-1,208.2	1,208.2	1,206.3	1.89	640.599	
300.0	300.0	241.0	241.0	0.5	3.9	-90.03	-0.7	-1,208.2	1,208.2	1,203.7	4.41	273.738	
400.0	400.0	341.0	341.0	0.8	5.9	-38.97	-0.7	-1,208.2	1,206.8	1,200.1	6.70	180.226	
500.0	499.8	440.8	440.8	1.0	8.0	-39.17	-0.7	-1,208.2	1,202.7	1,193.8	8.94	134.519	
600.0	599.5	540.5	540.5	1.2	10.0	-39.52	-0.7	-1,208.2	1,196.0	1,184.8	11.17	107.084	

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