

EXTRACTION OIL & GAS

**WELD COUNTY, COLORADO (NAD 83)
NW SW SEC. 21 T2N R67W 6th P.M.
LEONARD 3N**

**ORIGINAL WELLBORE
PROPOSAL #1**

Anticollision Report

27 March, 2017



Anticollision Report



Company:	EXTRACTION OIL & GAS	Local Co-ordinate Reference:	Well LEONARD 3N
Project:	WELD COUNTY, COLORADO (NAD 83)	TVD Reference:	KB-EST @ 5018.0usft (Original Well Elev)
Reference Site:	NW SW SEC. 21 T2N R67W 6th P.M.	MD Reference:	KB-EST @ 5018.0usft (Original Well Elev)
Site Error:	0.0 usft	North Reference:	True
Reference Well:	LEONARD 3N	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	12,213.8	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	5,241.9	5,119.5	619.2	501.6	5.268	CC, ES
ABDN VERT BERNARD E TEETS B6 - Wellbore #1 - De	5,300.0	5,135.0	620.6	502.7	5.262	SF
ABDN VERT BERNARD E TEETS B9 - Wellbore #1 - De	5,233.8	5,156.4	1,584.2	1,470.9	13.981	CC, ES
ABDN VERT BERNARD E TEETS B9 - Wellbore #1 - De	5,300.0	5,173.0	1,585.0	1,471.2	13.931	SF
EXIST HZ TROUDT #2 - Wellbore #1 - Wellbore #1	6,949.4	18,091.0	2,305.6	2,110.8	11.836	ES, SF
EXIST HZ TROUDT #2 - Wellbore #1 - Wellbore #1	7,368.7	18,091.0	2,234.1	2,185.4	45.951	CC
EXIST HZ TROUDT 1 - Wellbore #1 - Wellbore #1	6,949.4	17,860.0	2,189.9	1,995.4	11.263	ES, SF
EXIST HZ TROUDT 1 - Wellbore #1 - Wellbore #1	7,410.0	17,860.0	2,133.3	2,092.2	51.926	CC
EXIST VERT BERNARD E TEETS #2 - Wellbore #1 - De	6,949.4	6,854.0	1,148.5	994.3	7.449	CC, ES
EXIST VERT BERNARD E TEETS #2 - Wellbore #1 - De	7,000.0	6,904.6	1,150.4	995.8	7.439	SF
EXIST VERT ELKHORN COMPANY B2 - Wellbore #1 - I	8,044.1	7,453.0	1,299.3	1,125.4	7.473	CC, ES
EXIST VERT ELKHORN COMPANY B2 - Wellbore #1 - I	8,200.0	7,453.0	1,308.6	1,131.9	7.405	SF
EXIST VERT ELKHORN COMPANY B5 - Wellbore #1 - I	10,862.5	5,210.0	2,587.1	2,485.4	25.441	CC
EXIST VERT ELKHORN COMPANY B5 - Wellbore #1 - I	10,900.0	5,210.0	2,587.4	2,485.2	25.309	ES
EXIST VERT ELKHORN COMPANY B5 - Wellbore #1 - I	11,800.0	5,210.0	2,751.7	2,636.4	23.864	SF
EXIST VERT ELKHORN COMPANY B7 - Wellbore #1 - I	500.0	526.0	2,034.7	2,023.9	188.054	CC
EXIST VERT ELKHORN COMPANY B7 - Wellbore #1 - I	600.0	626.0	2,035.5	2,022.4	155.910	ES
EXIST VERT ELKHORN COMPANY B7 - Wellbore #1 - I	5,300.0	5,230.0	2,387.3	2,268.7	20.125	SF
EXIST VERT ELKHORN COMPANY B9 - Wellbore #1 - I	12,193.7	5,216.0	2,619.0	2,491.8	20.580	CC
EXIST VERT ELKHORN COMPANY B9 - Wellbore #1 - I	12,213.8	5,216.0	2,619.1	2,491.5	20.531	ES, SF
EXIST VERT HORST 44-21 - Wellbore #1 - Design #1	11,884.3	5,220.0	2,679.3	2,551.9	21.025	CC
EXIST VERT HORST 44-21 - Wellbore #1 - Design #1	11,900.0	5,220.0	2,679.3	2,551.7	20.984	ES
EXIST VERT HORST 44-21 - Wellbore #1 - Design #1	12,213.8	5,220.0	2,699.5	2,566.8	20.339	SF
EXIST VERT JOHN HORST 43-21 - Wellbore #1 - Desig	5,500.0	5,240.0	4,739.7	4,618.6	39.161	SF
EXIST VERT JOHN HORST 43-21 - Wellbore #1 - Desig	12,005.6	5,240.0	2,280.0	2,233.0	48.518	CC, ES
EXIST VERT LEONARD 13-21 - Wellbore #1 - Design #1	500.0	493.0	195.3	186.9	23.120	CC
EXIST VERT LEONARD 13-21 - Wellbore #1 - Design #1	600.0	593.0	196.6	185.9	18.385	ES
EXIST VERT LEONARD 13-21 - Wellbore #1 - Design #1	5,300.0	5,200.0	785.7	667.1	6.625	SF
EXIST VERT LEONARD 14-21 - Wellbore #1 - Design #1	500.0	500.0	1,261.6	1,253.0	148.043	CC
EXIST VERT LEONARD 14-21 - Wellbore #1 - Design #1	700.0	699.8	1,264.4	1,251.4	97.269	ES
EXIST VERT LEONARD 14-21 - Wellbore #1 - Design #1	5,300.0	5,146.0	1,630.6	1,515.2	14.135	SF
EXIST VERT LEONARD 23-21 - Wellbore #1 - Design #1	500.0	523.0	1,487.6	1,478.8	169.791	CC
EXIST VERT LEONARD 23-21 - Wellbore #1 - Design #1	600.0	623.0	1,489.2	1,478.2	135.400	ES
EXIST VERT LEONARD 23-21 - Wellbore #1 - Design #1	5,300.0	5,216.0	2,098.0	1,979.4	17.698	SF
EXIST VERT LEONARD 24-21 - Wellbore #1 - Design #1	500.0	513.0	1,941.6	1,932.9	224.293	CC
EXIST VERT LEONARD 24-21 - Wellbore #1 - Design #1	600.0	613.0	1,943.2	1,932.3	178.345	ES
EXIST VERT LEONARD 24-21 - Wellbore #1 - Design #1	5,300.0	5,216.0	2,538.4	2,420.0	21.437	SF

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

Anticollision Report



Company:	EXTRACTION OIL & GAS	Local Co-ordinate Reference:	Well LEONARD 3N
Project:	WELD COUNTY, COLORADO (NAD 83)	TVD Reference:	KB-EST @ 5018.0usft (Original Well Elev)
Reference Site:	NW SW SEC. 21 T2N R67W 6th P.M.	MD Reference:	KB-EST @ 5018.0usft (Original Well Elev)
Site Error:	0.0 usft	North Reference:	True
Reference Well:	LEONARD 3N	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 Offset Well - Wellbore - Design	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
NW SW SEC. 21 T2N R67W 6th P.M.						
EXIST VERT LEONARD 3-21J - Wellbore #1 - Design #1	11,168.5	7,499.0	735.5	483.3	2.916	CC
EXIST VERT LEONARD 3-21J - Wellbore #1 - Design #1	11,200.0	7,499.0	736.2	483.1	2.908	ES, SF
EXIST VERT LEONARD 33-21 - Wellbore #1 - Design #1	5,400.0	5,218.0	3,422.9	3,304.4	28.875	SF
EXIST VERT LEONARD 33-21 - Wellbore #1 - Design #1	10,693.8	5,218.0	2,283.8	2,250.0	67.743	CC
EXIST VERT LEONARD 33-21 - Wellbore #1 - Design #1	10,700.0	5,218.0	2,283.8	2,250.0	67.655	ES
EXIST VERT LEONARD 34-21 - Wellbore #1 - Design #1	10,701.2	5,250.0	2,656.2	2,548.1	24.566	CC, ES
EXIST VERT LEONARD 34-21 - Wellbore #1 - Design #1	11,700.0	5,250.0	2,837.7	2,713.8	22.897	SF
EXIST VERT LEONARD 4-21J - Wellbore #1 - Design #1	8,704.6	7,470.0	782.9	596.7	4.204	CC, ES
EXIST VERT LEONARD 4-21J - Wellbore #1 - Design #1	8,800.0	7,470.0	788.7	600.1	4.183	SF
EXIST VERT LEONARD 43-21 - Wellbore #1 - Design #1	11,197.8	7,496.0	877.3	624.2	3.467	CC
EXIST VERT LEONARD 43-21 - Wellbore #1 - Design #1	11,200.0	7,496.0	877.3	624.2	3.466	ES
EXIST VERT LEONARD 43-21 - Wellbore #1 - Design #1	11,300.0	7,496.0	883.2	627.3	3.452	SF
LEONARD 10N - ORIGINAL WELLBORE - PROPOSAL	166.0	168.0	196.0	195.5	400.078	CC
LEONARD 10N - ORIGINAL WELLBORE - PROPOSAL	200.0	200.0	196.0	195.4	307.080	ES
LEONARD 10N - ORIGINAL WELLBORE - PROPOSAL	12,213.8	12,286.8	1,700.2	1,435.5	6.422	SF
LEONARD 11N - ORIGINAL WELLBORE - PROPOSAL	0.0	2.0	224.1			
LEONARD 11N - ORIGINAL WELLBORE - PROPOSAL	100.0	100.0	224.1	223.9	1,186.813	ES
LEONARD 11N - ORIGINAL WELLBORE - PROPOSAL	12,213.8	12,351.5	2,040.1	1,775.8	7.720	SF
LEONARD 1C - ORIGINAL WELLBORE - PROPOSAL #	100.0	98.0	55.8	55.6	298.294	CC, ES
LEONARD 1C - ORIGINAL WELLBORE - PROPOSAL #	12,213.8	12,495.4	568.9	328.9	2.370	SF
LEONARD 2N - ORIGINAL WELLBORE - PROPOSAL #	300.0	299.0	27.7	26.6	25.504	CC, ES
LEONARD 2N - ORIGINAL WELLBORE - PROPOSAL #	12,213.8	12,233.3	340.2	74.0	1.278	Level 3, SF
LEONARD 4N - ORIGINAL WELLBORE - PROPOSAL #	500.0	501.0	28.1	26.1	14.104	CC, ES
LEONARD 4N - ORIGINAL WELLBORE - PROPOSAL #	12,213.8	12,205.7	339.9	73.8	1.277	Level 3, SF
LEONARD 5C - ORIGINAL WELLBORE - PROPOSAL #	500.0	501.0	56.1	54.1	28.206	CC, ES
LEONARD 5C - ORIGINAL WELLBORE - PROPOSAL #	12,213.8	12,457.3	567.6	326.2	2.352	SF
LEONARD 6N - ORIGINAL WELLBORE - PROPOSAL #	500.0	502.0	84.2	82.2	42.263	CC, ES
LEONARD 6N - ORIGINAL WELLBORE - PROPOSAL #	12,213.8	12,211.5	679.8	414.3	2.560	SF
LEONARD 7N - ORIGINAL WELLBORE - PROPOSAL #	466.0	468.0	112.2	110.4	61.035	CC
LEONARD 7N - ORIGINAL WELLBORE - PROPOSAL #	500.0	501.9	112.2	110.2	56.366	ES
LEONARD 7N - ORIGINAL WELLBORE - PROPOSAL #	12,213.8	12,227.1	1,020.1	754.9	3.847	SF
LEONARD 8N - ORIGINAL WELLBORE - PROPOSAL #	366.0	368.0	140.3	138.9	100.988	CC
LEONARD 8N - ORIGINAL WELLBORE - PROPOSAL #	400.0	400.0	140.3	138.7	91.248	ES
LEONARD 8N - ORIGINAL WELLBORE - PROPOSAL #	12,213.8	12,247.7	1,359.9	1,095.3	5.139	SF
LEONARD 9C - ORIGINAL WELLBORE - PROPOSAL #	266.0	268.0	168.3	167.4	179.169	CC
LEONARD 9C - ORIGINAL WELLBORE - PROPOSAL #	300.0	300.0	168.3	167.2	154.738	ES
LEONARD 9C - ORIGINAL WELLBORE - PROPOSAL #	12,213.8	12,507.7	1,550.0	1,288.8	5.934	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	-88.72	27.0	-1,208.4	1,210.2						
100.0	100.0	40.0	40.0	0.1	0.2	-88.72	27.0	-1,208.4	1,208.7	1,208.4	0.32	3,800.205			
200.0	200.0	140.0	140.0	0.3	1.5	-88.72	27.0	-1,208.4	1,208.7	1,206.9	1.86	649.369			
300.0	300.0	240.0	240.0	0.5	3.8	-88.72	27.0	-1,208.4	1,208.7	1,204.3	4.39	275.166			
400.0	400.0	340.0	340.0	0.8	5.9	-88.72	27.0	-1,208.4	1,208.7	1,202.1	6.68	180.902			
500.0	500.0	440.0	440.0	1.0	7.9	-88.72	27.0	-1,208.4	1,208.7	1,199.8	8.94	135.178			
600.0	600.0	540.0	540.0	1.2	10.0	-15.33	27.0	-1,208.4	1,207.0	1,195.9	11.18	107.996			

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