

EXTRACTION OIL & GAS

**WELD COUNTY, COLORADO (NAD 83)
NW SW SEC. 21 T2N R67W 6th P.M.
LEONARD 11N**

**ORIGINAL WELLBORE
PROPOSAL #1**

Anticollision Report

28 March, 2017



Anticollision Report



Company:	EXTRACTION OIL & GAS	Local Co-ordinate Reference:	Well LEONARD 11N
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 11N	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	12,351.5	PROPOSAL #1 (ORIGINAL WELLBORE)	MWD	MWD - Standard

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.						
ABDN VERT BERNARD E TEETS B6 - Wellbore #1 - De	1,125.9	1,044.5	1,225.2	1,200.9	50.547	CC
ABDN VERT BERNARD E TEETS B6 - Wellbore #1 - De	1,500.0	1,403.5	1,229.7	1,196.1	36.610	ES
ABDN VERT BERNARD E TEETS B6 - Wellbore #1 - De	5,400.0	5,135.0	1,715.5	1,591.4	13.830	SF
ABDN VERT BERNARD E TEETS B9 - Wellbore #1 - De	5,392.2	5,173.0	763.6	633.0	5.848	CC
ABDN VERT BERNARD E TEETS B9 - Wellbore #1 - De	5,400.0	5,173.0	763.6	633.0	5.846	ES, SF
EXIST HZ TROUDT #2 - Wellbore #1 - Wellbore #1	7,400.0	18,091.0	597.9	413.6	3.245	SF
EXIST HZ TROUDT #2 - Wellbore #1 - Wellbore #1	7,500.0	18,091.0	568.5	398.9	3.350	ES
EXIST HZ TROUDT #2 - Wellbore #1 - Wellbore #1	7,537.7	18,091.0	566.1	403.1	3.472	CC
EXIST HZ TROUDT 1 - Wellbore #1 - Wellbore #1	7,550.0	17,860.0	169.0	35.5	1.266	Level 3, ES, SF
EXIST HZ TROUDT 1 - Wellbore #1 - Wellbore #1	7,574.1	17,860.0	166.9	36.9	1.284	Level 3, CC
EXIST VERT BERNARD E TEETS #2 - Wellbore #1 - De	2,964.2	2,835.7	1,469.0	1,398.4	20.794	CC
EXIST VERT BERNARD E TEETS #2 - Wellbore #1 - De	3,400.0	3,254.0	1,474.1	1,392.6	18.079	ES
EXIST VERT BERNARD E TEETS #2 - Wellbore #1 - De	7,200.0	6,926.8	1,806.5	1,637.4	10.682	SF
EXIST VERT ELKHORN COMPANY B2 - Wellbore #1 - I	100.0	91.0	1,712.2	1,711.1	1,460.120	CC
EXIST VERT ELKHORN COMPANY B2 - Wellbore #1 - I	200.0	191.0	1,713.9	1,710.4	479.421	ES
EXIST VERT ELKHORN COMPANY B2 - Wellbore #1 - I	10,000.0	7,450.9	3,794.6	3,578.3	17.550	SF
EXIST VERT ELKHORN COMPANY B5 - Wellbore #1 - I	100.0	125.0	3,393.6	3,392.2	2,376.140	CC
EXIST VERT ELKHORN COMPANY B5 - Wellbore #1 - I	200.0	225.0	3,395.0	3,391.0	857.026	ES
EXIST VERT ELKHORN COMPANY B5 - Wellbore #1 - I	12,351.5	5,210.0	4,200.0	4,006.6	21.717	SF
EXIST VERT ELKHORN COMPANY B7 - Wellbore #1 - I	100.0	124.0	2,201.5	2,200.0	1,554.080	CC
EXIST VERT ELKHORN COMPANY B7 - Wellbore #1 - I	200.0	224.0	2,203.1	2,199.2	557.609	ES
EXIST VERT ELKHORN COMPANY B7 - Wellbore #1 - I	12,351.5	5,230.0	4,978.1	4,782.5	25.449	SF
EXIST VERT ELKHORN COMPANY B9 - Wellbore #1 - I	12,347.5	5,216.0	4,048.6	3,853.2	20.715	CC
EXIST VERT ELKHORN COMPANY B9 - Wellbore #1 - I	12,351.5	5,216.0	4,048.6	3,853.1	20.705	ES, SF
EXIST VERT HORST 44-21 - Wellbore #1 - Design #1	12,038.0	5,220.0	2,336.6	2,264.3	32.313	CC, ES
EXIST VERT HORST 44-21 - Wellbore #1 - Design #1	12,351.5	5,220.0	2,357.5	2,282.1	31.251	SF
EXIST VERT JOHN HORST 43-21 - Wellbore #1 - Desig	12,159.4	5,240.0	2,927.7	2,779.5	19.754	CC
EXIST VERT JOHN HORST 43-21 - Wellbore #1 - Desig	12,200.0	5,240.0	2,928.0	2,779.0	19.656	ES
EXIST VERT JOHN HORST 43-21 - Wellbore #1 - Desig	12,351.5	5,240.0	2,934.0	2,782.2	19.334	SF
EXIST VERT LEONARD 13-21 - Wellbore #1 - Design #1	100.0	91.0	359.4	359.3	3,807.061	CC, ES
EXIST VERT LEONARD 13-21 - Wellbore #1 - Design #1	5,400.0	5,199.4	1,731.7	1,618.2	15.256	SF
EXIST VERT LEONARD 14-21 - Wellbore #1 - Design #1	3,747.2	3,620.2	500.7	411.1	5.586	CC
EXIST VERT LEONARD 14-21 - Wellbore #1 - Design #1	3,900.0	3,766.8	502.5	409.1	5.380	ES
EXIST VERT LEONARD 14-21 - Wellbore #1 - Design #1	4,500.0	4,342.7	543.5	436.7	5.085	SF
EXIST VERT LEONARD 23-21 - Wellbore #1 - Design #1	100.0	121.0	1,511.7	1,511.5	5,828.766	CC
EXIST VERT LEONARD 23-21 - Wellbore #1 - Design #1	200.0	221.0	1,512.6	1,511.0	951.312	ES
EXIST VERT LEONARD 23-21 - Wellbore #1 - Design #1	5,400.0	5,216.0	2,514.7	2,395.2	21.044	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 11N
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 11N	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	2,108.2	2,060.2	1,746.9	1,698.3	35.944	CC
EXIST VERT LEONARD 24-21 - Wellbore #1 - Design #1	2,700.0	2,628.2	1,754.8	1,691.4	27.672	ES
EXIST VERT LEONARD 24-21 - Wellbore #1 - Design #1	5,400.0	5,216.0	1,976.6	1,848.3	15.414	SF
EXIST VERT LEONARD 3-21J - Wellbore #1 - Design #1	11,322.4	7,496.9	1,304.5	1,054.0	5.207	CC, ES
EXIST VERT LEONARD 3-21J - Wellbore #1 - Design #1	11,500.0	7,497.0	1,316.5	1,061.1	5.155	SF
EXIST VERT LEONARD 33-21 - Wellbore #1 - Design #1	100.0	137.0	2,820.9	2,820.6	9,211.905	CC
EXIST VERT LEONARD 33-21 - Wellbore #1 - Design #1	300.0	336.8	2,823.9	2,819.6	654.030	ES
EXIST VERT LEONARD 33-21 - Wellbore #1 - Design #1	12,200.0	5,218.0	3,277.0	3,126.5	21.771	SF
EXIST VERT LEONARD 34-21 - Wellbore #1 - Design #1	5,500.0	5,250.0	3,305.3	3,175.4	25.459	SF
EXIST VERT LEONARD 34-21 - Wellbore #1 - Design #1	10,855.0	5,250.0	2,329.9	2,267.7	37.417	CC
EXIST VERT LEONARD 34-21 - Wellbore #1 - Design #1	10,900.0	5,250.0	2,330.4	2,267.7	37.156	ES
EXIST VERT LEONARD 4-21J - Wellbore #1 - Design #1	767.2	769.2	895.8	880.8	59.585	CC
EXIST VERT LEONARD 4-21J - Wellbore #1 - Design #1	1,100.0	1,089.6	900.3	877.1	38.696	ES
EXIST VERT LEONARD 4-21J - Wellbore #1 - Design #1	9,100.0	7,467.9	1,280.2	1,089.0	6.696	SF
EXIST VERT LEONARD 43-21 - Wellbore #1 - Design #1	11,351.6	7,493.9	1,162.8	911.5	4.627	CC
EXIST VERT LEONARD 43-21 - Wellbore #1 - Design #1	11,400.0	7,494.0	1,163.8	911.2	4.607	ES
EXIST VERT LEONARD 43-21 - Wellbore #1 - Design #1	11,500.0	7,494.0	1,172.2	916.8	4.590	SF
LEONARD 10N - ORIGINAL WELLBORE - PROPOSAL	100.0	100.0	28.1	27.9	148.600	CC, ES
LEONARD 10N - ORIGINAL WELLBORE - PROPOSAL	12,351.5	12,284.0	339.9	77.5	1.295	Level 3, SF
LEONARD 1C - ORIGINAL WELLBORE - PROPOSAL #	100.0	96.0	279.8	279.6	1,512.324	CC, ES
LEONARD 1C - ORIGINAL WELLBORE - PROPOSAL #	12,351.5	12,479.1	2,562.7	2,300.1	9.760	SF
LEONARD 2N - ORIGINAL WELLBORE - PROPOSAL #	100.0	97.0	251.8	251.6	1,353.719	CC, ES
LEONARD 2N - ORIGINAL WELLBORE - PROPOSAL #	12,351.5	12,216.8	2,380.3	2,116.7	9.032	SF
LEONARD 3N - ORIGINAL WELLBORE - PROPOSAL #	100.0	98.0	224.1	223.9	1,198.754	CC, ES
LEONARD 3N - ORIGINAL WELLBORE - PROPOSAL #	12,351.5	12,197.7	2,040.0	1,776.2	7.733	SF
LEONARD 4N - ORIGINAL WELLBORE - PROPOSAL #	100.0	99.0	196.0	195.8	1,043.385	CC, ES
LEONARD 4N - ORIGINAL WELLBORE - PROPOSAL #	12,351.5	12,192.1	1,700.1	1,436.7	6.453	SF
LEONARD 5C - ORIGINAL WELLBORE - PROPOSAL #	100.0	99.0	168.0	167.8	894.063	CC, ES
LEONARD 5C - ORIGINAL WELLBORE - PROPOSAL #	12,351.5	12,445.1	1,550.5	1,289.8	5.947	SF
LEONARD 6N - ORIGINAL WELLBORE - PROPOSAL #	100.0	100.0	139.9	139.7	740.995	CC, ES
LEONARD 6N - ORIGINAL WELLBORE - PROPOSAL #	12,351.5	12,200.4	1,360.3	1,097.3	5.173	SF
LEONARD 7N - ORIGINAL WELLBORE - PROPOSAL #	100.0	100.0	111.9	111.7	592.418	CC, ES
LEONARD 7N - ORIGINAL WELLBORE - PROPOSAL #	12,351.5	12,218.9	1,020.0	757.3	3.883	SF
LEONARD 8N - ORIGINAL WELLBORE - PROPOSAL #	100.0	100.0	83.8	83.6	443.821	CC, ES
LEONARD 8N - ORIGINAL WELLBORE - PROPOSAL #	12,351.5	12,242.1	680.1	417.9	2.594	SF
LEONARD 9C - ORIGINAL WELLBORE - PROPOSAL #	100.0	100.0	55.7	55.6	295.245	CC, ES
LEONARD 9C - ORIGINAL WELLBORE - PROPOSAL #	12,351.5	12,503.7	568.0	327.6	2.363	SF

Offset Design											
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)
0.0	0.0	0.0	0.0	0.0	0.0	-78.30	251.0	-1,211.8	1,239.1		
100.0	100.0	38.0	38.0	0.1	0.2	-78.30	251.0	-1,211.8	1,237.5	1,237.2	0.31
200.0	200.0	138.0	138.0	0.3	1.5	81.98	251.0	-1,211.8	1,237.3	1,235.5	1.79
300.0	299.8	237.8	237.8	0.5	3.8	82.24	251.0	-1,211.8	1,236.6	1,232.2	4.33
400.0	399.5	337.5	337.5	0.8	5.9	82.66	251.0	-1,211.8	1,235.4	1,228.8	6.65
500.0	498.7	436.7	436.7	1.1	7.9	83.25	251.0	-1,211.8	1,233.9	1,224.9	8.97
600.0	597.5	535.5	535.5	1.4	9.9	83.99	251.0	-1,211.8	1,232.1	1,220.8	11.32
											108.800

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