EXTRACTION OIL & GAS

WELD COUNTY, COLORADO (NAD 83)
NW SW SEC. 21 T2N R67W 6th P.M.
LEONARD 9C

ORIGINAL WELLBORE
PROPOSAL #1

Anticollision Report

28 March, 2017

Company:	EXTRACTION OIL & GAS	**Local Co-ordinate Reference:**	Well LEONARD 9C
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 9C	**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	12,507.7	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	2,374.0	2,275.2	1,169.6	1,115.9	21.802	CC
ABDN VERT BERNARD E TEETS B6 - Wellbore #1 - De	3,000.0	2,887.6	1,176.8	1,108.1	17.113	ES
ABDN VERT BERNARD E TEETS B6 - Wellbore #1 - De	5,300.0	5,135.0	1,318.9	1,196.3	10.757	SF
ABDN VERT BERNARD E TEETS B9 - Wellbore #1 - De	5,408.0	5,173.0	786.9	667.3	6.581	CC, ES, SF
EXIST HZ TROUDT #2 - Wellbore #1 - Wellbore #1	7,271.7	18,091.0	849.4	649.8	4.255	ES, SF
EXIST HZ TROUDT #2 - Wellbore #1 - Wellbore #1	7,575.2	18,091.0	754.1	660.2	8.032	CC
EXIST HZ TROUDT 1 - Wellbore #1 - Wellbore #1	7,271.7	17,860.0	655.3	452.4	3.229	ES, SF
EXIST HZ TROUDT 1 - Wellbore #1 - Wellbore #1	7,541.0	17,860.0	599.8	550.4	12.145	CC
EXIST VERT BERNARD E TEETS #2 - Wellbore #1 - De	4,975.6	4,846.8	1,349.7	1,232.6	11.532	CC
EXIST VERT BERNARD E TEETS #2 - Wellbore #1 - De	5,700.0	5,555.3	1,358.1	1,223.6	10.098	ES
EXIST VERT BERNARD E TEETS #2 - Wellbore #1 - De	7,300.0	7,130.3	1,411.0	1,240.0	8.251	SF
EXIST VERT ELKHORN COMPANY B2 - Wellbore #1 - I	300.0	291.0	1,656.8	1,650.9	280.202	CC
EXIST VERT ELKHORN COMPANY B2 - Wellbore #1 - I	400.0	391.0	1,658.4	1,650.3	203.320	ES
EXIST VERT ELKHORN COMPANY B2 - Wellbore #1 - I	9,500.0	7,701.0	3,054.1	2,849.9	14.955	SF
EXIST VERT ELKHORN COMPANY B5 - Wellbore #1 - I	300.0	325.0	3,367.9	3,361.6	536.728	CC
EXIST VERT ELKHORN COMPANY B5 - Wellbore #1 - I	400.0	425.0	3,369.3	3,360.8	395.851	ES
EXIST VERT ELKHORN COMPANY B5 - Wellbore #1 - I	12,507.7	5,210.0	3,972.0	3,796.5	22.629	SF
EXIST VERT ELKHORN COMPANY B7 - Wellbore #1 - I	300.0	324.0	2,159.0	2,152.7	344.669	CC
EXIST VERT ELKHORN COMPANY B7 - Wellbore #1 - I	400.0	424.0	2,160.7	2,152.2	254.189	ES
EXIST VERT ELKHORN COMPANY B7 - Wellbore #1 - I	12,200.0	5,230.0	4,597.9	4,426.1	26.758	SF
EXIST VERT ELKHORN COMPANY B9 - Wellbore #1 - I	12,499.9	5,216.0	3,797.2	3,618.9	21.298	CC
EXIST VERT ELKHORN COMPANY B9 - Wellbore #1 - I	12,507.7	5,216.0	3,797.2	3,618.7	21.278	ES, SF
EXIST VERT HORST 44-21 - Wellbore #1 - Design #1	5,600.0	5,220.0	4,477.9	4,353.6	36.011	SF
EXIST VERT HORST 44-21 - Wellbore #1 - Design #1	12,190.3	5,220.0	2,509.6	2,467.6	59.634	CC
EXIST VERT HORST 44-21 - Wellbore #1 - Design #1	12,200.0	5,220.0	2,509.7	2,467.5	59.536	ES
EXIST VERT JOHN HORST 43-21 - Wellbore #1 - Desig	12,311.7	5,240.0	2,853.6	2,738.9	24.872	CC, ES
EXIST VERT JOHN HORST 43-21 - Wellbore #1 - Desig	12,507.7	5,240.0	2,860.3	2,742.7	24.327	SF
EXIST VERT LEONARD 13-21 - Wellbore #1 - Design #1	300.0	291.0	311.7	307.9	81.695	CC
EXIST VERT LEONARD 13-21 - Wellbore #1 - Design #1	400.0	391.0	313.4	307.3	51.277	ES
EXIST VERT LEONARD 13-21 - Wellbore #1 - Design #1	5,300.0	5,190.1	1,289.5	1,176.2	11.381	SF
EXIST VERT LEONARD 14-21 - Wellbore #1 - Design #1	4,888.7	4,794.8	632.2	518.0	5.534	CC
EXIST VERT LEONARD 14-21 - Wellbore #1 - Design #1	5,200.0	5,099.3	635.6	513.8	5.221	ES
EXIST VERT LEONARD 14-21 - Wellbore #1 - Design #1	5,300.0	5,146.0	640.1	517.0	5.200	SF
EXIST VERT LEONARD 23-21 - Wellbore #1 - Design #1	300.0	321.0	1,502.6	1,498.5	361.379	CC
EXIST VERT LEONARD 23-21 - Wellbore #1 - Design #1	400.0	421.0	1,503.7	1,497.2	233.809	ES
EXIST VERT LEONARD 23-21 - Wellbore #1 - Design #1	5,300.0	5,216.0	2,223.1	2,105.7	18.933	SF
EXIST VERT LEONARD 24-21 - Wellbore #1 - Design #1	1,976.1	1,959.2	1,814.1	1,770.4	41.486	CC

Company:	EXTRACTION OIL & GAS	**Local Co-ordinate Reference:**	Well LEONARD 9C
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 9C	**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 24-21 - Wellbore #1 - Design #1	3,000.0	2,960.6	1,826.6	1,758.1	26.666	ES
EXIST VERT LEONARD 24-21 - Wellbore #1 - Design #1	5,300.0	5,210.1	1,941.8	1,818.5	15.754	SF
EXIST VERT LEONARD 3-21J - Wellbore #1 - Design #1	11,474.6	7,747.0	794.5	538.8	3.107	CC
EXIST VERT LEONARD 3-21J - Wellbore #1 - Design #1	11,500.0	7,747.0	794.9	538.5	3.100	ES, SF
EXIST VERT LEONARD 33-21 - Wellbore #1 - Design #1	300.0	337.0	2,816.4	2,812.1	649.002	CC
EXIST VERT LEONARD 33-21 - Wellbore #1 - Design #1	11,000.0	5,218.0	2,899.3	2,801.2	29.547	ES
EXIST VERT LEONARD 33-21 - Wellbore #1 - Design #1	12,300.0	5,218.0	3,177.5	3,060.0	27.044	SF
EXIST VERT LEONARD 34-21 - Wellbore #1 - Design #1	5,400.0	5,250.0	3,269.5	3,145.5	26.373	SF
EXIST VERT LEONARD 34-21 - Wellbore #1 - Design #1	11,007.3	5,250.0	2,497.6	2,463.2	72.677	CC, ES
EXIST VERT LEONARD 4-21J - Wellbore #1 - Design #1	9,010.6	7,718.0	747.2	556.9	3.926	CC, ES
EXIST VERT LEONARD 4-21J - Wellbore #1 - Design #1	9,100.0	7,718.0	752.6	560.1	3.911	SF
EXIST VERT LEONARD 43-21 - Wellbore #1 - Design #1	11,503.8	7,744.0	652.8	396.3	2.545	CC, ES, SF
LEONARD 10N - ORIGINAL WELLBORE - PROPOSAL	200.0	200.0	27.7	27.0	43.375	CC, ES
LEONARD 10N - ORIGINAL WELLBORE - PROPOSAL	12,507.7	12,286.8	302.4	137.8	1.837	SF
LEONARD 11N - ORIGINAL WELLBORE - PROPOSAL	100.0	100.0	55.7	55.6	295.245	CC, ES
LEONARD 11N - ORIGINAL WELLBORE - PROPOSAL	12,507.7	12,351.5	568.0	327.5	2.362	SF
LEONARD 1C - ORIGINAL WELLBORE - PROPOSAL #	100.0	96.0	224.1	223.9	1,211.054	CC, ES
LEONARD 1C - ORIGINAL WELLBORE - PROPOSAL #	12,507.7	12,483.1	2,040.0	1,776.0	7.727	SF
LEONARD 2N - ORIGINAL WELLBORE - PROPOSAL #	300.0	297.0	196.0	194.9	181.302	CC, ES
LEONARD 2N - ORIGINAL WELLBORE - PROPOSAL #	12,507.7	12,220.8	1,886.5	1,624.7	7.207	SF
LEONARD 3N - ORIGINAL WELLBORE - PROPOSAL #	300.0	298.0	168.3	167.2	155.369	CC, ES
LEONARD 3N - ORIGINAL WELLBORE - PROPOSAL #	12,507.7	12,201.7	1,550.0	1,289.1	5.942	SF
LEONARD 4N - ORIGINAL WELLBORE - PROPOSAL #	300.0	299.0	140.3	139.2	129.204	CC, ES
LEONARD 4N - ORIGINAL WELLBORE - PROPOSAL #	12,507.7	12,196.1	1,215.9	957.6	4.707	SF
LEONARD 5C - ORIGINAL WELLBORE - PROPOSAL #	300.0	299.0	112.2	111.1	103.365	CC, ES
LEONARD 5C - ORIGINAL WELLBORE - PROPOSAL #	12,507.7	12,449.1	1,020.0	756.3	3.868	SF
LEONARD 6N - ORIGINAL WELLBORE - PROPOSAL #	300.0	300.0	84.2	83.1	77.362	CC, ES
LEONARD 6N - ORIGINAL WELLBORE - PROPOSAL #	12,507.7	12,204.4	886.2	633.5	3.506	SF
LEONARD 7N - ORIGINAL WELLBORE - PROPOSAL #	300.0	300.0	56.1	55.0	51.576	CC, ES
LEONARD 7N - ORIGINAL WELLBORE - PROPOSAL #	12,507.7	12,222.9	568.0	331.0	2.397	SF
LEONARD 8N - ORIGINAL WELLBORE - PROPOSAL #	300.0	300.0	28.1	27.0	25.786	CC, ES
LEONARD 8N - ORIGINAL WELLBORE - PROPOSAL #	6,200.0	6,206.1	90.0	42.7	1.904	SF

Offset Design NW SW SEC. 21 T2N R67W 6th P.M. - ABDN VERT BERNARD E TEETS B6 - Wellbore #1 - Design #1

Survey Program: 0-INC

Offset Site Error: 0.0 usft

Offset Well Error: 0.0 usft

Reference Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis 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	-80.84	195.3	-1,210.9	1,228.2				
100.0	100.0	38.0	38.0	0.1	0.2	-80.84	195.3	-1,210.9	1,226.6	1,226.3	0.31	3,996.896	
200.0	200.0	138.0	138.0	0.3	1.5	-80.84	195.3	-1,210.9	1,226.6	1,224.8	1.81	676.838	
300.0	300.0	238.0	238.0	0.5	3.8	-80.84	195.3	-1,210.9	1,226.6	1,222.2	4.35	281.902	
400.0	400.0	338.0	338.0	0.7	5.9	72.55	195.3	-1,210.9	1,226.1	1,219.5	6.62	185.320	
500.0	499.8	437.8	437.8	0.9	7.9	72.81	195.3	-1,210.9	1,224.5	1,215.7	8.85	138.416	
600.0	599.5	537.5	537.5	1.2	9.9	73.25	195.3	-1,210.9	1,222.0	1,210.9	11.09	110.161	
700.0	698.7	636.7	636.7	1.5	11.9	73.86	195.3	-1,210.9	1,218.5	1,205.1	13.36	91.182	
800.0	797.5	735.5	735.5	1.8	13.9	74.64	195.3	-1,210.9	1,214.2	1,198.5	15.67	77.503	
900.0	895.6	833.6	833.6	2.1	15.9	75.60	195.3	-1,210.9	1,209.2	1,191.2	18.01	67.146	
901.2	896.8	834.8	834.8	2.2	15.9	75.61	195.3	-1,210.9	1,209.1	1,191.1	18.04	67.040	
1,000.0	993.4	931.4	931.4	2.6	17.9	76.54	195.3	-1,210.9	1,204.1	1,183.7	20.39	59.059	

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