

EXTRACTION OIL & GAS

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

**ORIGINAL WELLBORE
PROPOSAL #1**

Anticollision Report

27 March, 2017



Anticollision Report



Company:	EXTRACTION OIL & GAS	Local Co-ordinate Reference:	Well LEONARD 6N
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 6N	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	12,211.5	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	5,252.0	5,117.5	803.4	688.9	7.015	CC, ES
ABDN VERT BERNARD E TEETS B6 - Wellbore #1 - De	5,300.0	5,135.0	804.0	689.0	6.994	SF
ABDN VERT BERNARD E TEETS B9 - Wellbore #1 - De	5,246.6	5,157.2	988.8	870.0	8.326	CC, ES
ABDN VERT BERNARD E TEETS B9 - Wellbore #1 - De	5,300.0	5,173.0	989.5	870.3	8.305	SF
EXIST HZ TROUDT #2 - Wellbore #1 - Wellbore #1	6,959.5	18,091.0	1,683.4	1,487.0	8.570	ES, SF
EXIST HZ TROUDT #2 - Wellbore #1 - Wellbore #1	7,377.1	18,091.0	1,584.2	1,525.1	26.772	CC
EXIST HZ TROUDT 1 - Wellbore #1 - Wellbore #1	6,959.5	17,860.0	1,536.8	1,341.8	7.878	ES, SF
EXIST HZ TROUDT 1 - Wellbore #1 - Wellbore #1	7,417.0	17,860.0	1,455.4	1,416.2	37.133	CC
EXIST VERT BERNARD E TEETS #2 - Wellbore #1 - De	6,959.5	6,852.0	1,019.2	864.3	6.579	CC, ES, SF
EXIST VERT ELKHORN COMPANY B2 - Wellbore #1 - I	600.0	591.0	1,573.2	1,560.5	124.004	CC
EXIST VERT ELKHORN COMPANY B2 - Wellbore #1 - I	700.0	691.0	1,574.3	1,559.4	105.611	ES
EXIST VERT ELKHORN COMPANY B2 - Wellbore #1 - I	8,600.0	7,451.0	2,055.2	1,870.6	11.136	SF
EXIST VERT ELKHORN COMPANY B5 - Wellbore #1 - I	10,865.6	5,210.0	2,969.2	2,838.1	22.648	CC
EXIST VERT ELKHORN COMPANY B5 - Wellbore #1 - I	10,900.0	5,210.0	2,969.4	2,837.7	22.540	ES
EXIST VERT ELKHORN COMPANY B5 - Wellbore #1 - I	12,100.0	5,210.0	3,215.6	3,061.5	20.866	SF
EXIST VERT ELKHORN COMPANY B7 - Wellbore #1 - I	600.0	624.0	2,096.0	2,083.0	160.914	CC
EXIST VERT ELKHORN COMPANY B7 - Wellbore #1 - I	700.0	724.0	2,097.7	2,082.5	137.647	ES
EXIST VERT ELKHORN COMPANY B7 - Wellbore #1 - I	5,400.0	5,230.0	2,814.0	2,691.6	22.998	SF
EXIST VERT ELKHORN COMPANY B9 - Wellbore #1 - I	12,196.8	5,216.0	3,017.4	2,857.1	18.818	CC
EXIST VERT ELKHORN COMPANY B9 - Wellbore #1 - I	12,211.5	5,216.0	3,017.4	2,856.8	18.785	ES, SF
EXIST VERT HORST 44-21 - Wellbore #1 - Design #1	11,887.0	5,220.0	2,382.2	2,297.5	28.104	CC
EXIST VERT HORST 44-21 - Wellbore #1 - Design #1	11,900.0	5,220.0	2,382.3	2,297.4	28.057	ES
EXIST VERT HORST 44-21 - Wellbore #1 - Design #1	12,211.5	5,220.0	2,404.2	2,315.9	27.210	SF
EXIST VERT JOHN HORST 43-21 - Wellbore #1 - Desig	12,008.5	5,240.0	2,322.0	2,255.9	35.125	CC, ES
EXIST VERT JOHN HORST 43-21 - Wellbore #1 - Desig	12,211.5	5,240.0	2,330.9	2,262.9	34.296	SF
EXIST VERT LEONARD 13-21 - Wellbore #1 - Design #1	600.0	591.0	246.0	235.3	23.071	CC
EXIST VERT LEONARD 13-21 - Wellbore #1 - Design #1	700.0	691.0	247.7	234.8	19.227	ES
EXIST VERT LEONARD 13-21 - Wellbore #1 - Design #1	5,300.0	5,200.0	973.7	853.6	8.108	SF
EXIST VERT LEONARD 14-21 - Wellbore #1 - Design #1	3,428.0	3,372.9	1,054.1	976.0	13.509	CC
EXIST VERT LEONARD 14-21 - Wellbore #1 - Design #1	5,200.0	5,125.5	1,073.9	961.1	9.520	ES
EXIST VERT LEONARD 14-21 - Wellbore #1 - Design #1	5,300.0	5,146.0	1,076.8	963.4	9.497	SF
EXIST VERT LEONARD 23-21 - Wellbore #1 - Design #1	600.0	621.0	1,492.6	1,481.7	136.029	CC
EXIST VERT LEONARD 23-21 - Wellbore #1 - Design #1	700.0	721.0	1,494.2	1,481.0	113.263	ES
EXIST VERT LEONARD 23-21 - Wellbore #1 - Design #1	5,300.0	5,216.0	2,163.7	2,044.2	18.099	SF
EXIST VERT LEONARD 24-21 - Wellbore #1 - Design #1	600.0	611.0	1,887.9	1,877.0	173.692	CC
EXIST VERT LEONARD 24-21 - Wellbore #1 - Design #1	800.0	810.8	1,890.0	1,874.7	123.512	ES
EXIST VERT LEONARD 24-21 - Wellbore #1 - Design #1	5,300.0	5,216.0	2,222.5	2,105.9	19.054	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 6N
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 6N	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 3-21J - Wellbore #1 - Design #1	11,171.4	7,497.0	55.6	-195.7	0.221	Level 1, CC, ES, SF
EXIST VERT LEONARD 33-21 - Wellbore #1 - Design #1	5,400.0	5,218.0	3,460.2	3,341.0	29.028	SF
EXIST VERT LEONARD 33-21 - Wellbore #1 - Design #1	10,696.7	5,218.0	2,348.6	2,290.2	40.195	CC
EXIST VERT LEONARD 33-21 - Wellbore #1 - Design #1	10,700.0	5,218.0	2,348.6	2,290.1	40.174	ES
EXIST VERT LEONARD 34-21 - Wellbore #1 - Design #1	5,400.0	5,250.0	3,497.8	3,379.8	29.649	SF
EXIST VERT LEONARD 34-21 - Wellbore #1 - Design #1	10,704.0	5,250.0	2,362.7	2,291.9	33.388	CC, ES
EXIST VERT LEONARD 4-21J - Wellbore #1 - Design #1	8,707.5	7,468.0	102.8	-82.5	0.555	Level 1, CC, ES, SF
EXIST VERT LEONARD 43-21 - Wellbore #1 - Design #1	11,200.7	7,494.0	197.4	-54.8	0.783	Level 1, CC, ES, SF
LEONARD 10N - ORIGINAL WELLBORE - PROPOSAL	200.0	200.0	111.8	111.2	175.216	CC, ES
LEONARD 10N - ORIGINAL WELLBORE - PROPOSAL	12,211.5	12,286.8	1,020.4	756.7	3.869	SF
LEONARD 11N - ORIGINAL WELLBORE - PROPOSAL	100.0	100.0	139.9	139.7	740.995	CC, ES
LEONARD 11N - ORIGINAL WELLBORE - PROPOSAL	12,211.5	12,351.5	1,360.3	1,097.1	5.167	SF
LEONARD 1C - ORIGINAL WELLBORE - PROPOSAL #	100.0	96.0	139.9	139.7	756.207	CC, ES
LEONARD 1C - ORIGINAL WELLBORE - PROPOSAL #	12,211.5	12,490.1	1,216.6	957.0	4.687	SF
LEONARD 2N - ORIGINAL WELLBORE - PROPOSAL #	300.0	297.0	111.9	110.8	103.458	CC, ES
LEONARD 2N - ORIGINAL WELLBORE - PROPOSAL #	12,211.5	12,228.0	1,020.0	754.9	3.848	SF
LEONARD 3N - ORIGINAL WELLBORE - PROPOSAL #	500.0	498.0	84.2	82.2	42.455	CC, ES
LEONARD 3N - ORIGINAL WELLBORE - PROPOSAL #	12,211.5	12,208.6	679.8	414.4	2.561	SF
LEONARD 4N - ORIGINAL WELLBORE - PROPOSAL #	600.0	599.0	56.1	53.7	23.050	CC, ES
LEONARD 4N - ORIGINAL WELLBORE - PROPOSAL #	12,211.5	12,203.2	339.9	74.8	1.282	Level 3, SF
LEONARD 5C - ORIGINAL WELLBORE - PROPOSAL #	600.0	599.0	28.1	25.6	11.526	CC, ES
LEONARD 5C - ORIGINAL WELLBORE - PROPOSAL #	12,211.5	12,456.1	303.0	141.7	1.878	SF
LEONARD 7N - ORIGINAL WELLBORE - PROPOSAL #	500.0	500.0	28.1	26.1	14.118	CC, ES
LEONARD 7N - ORIGINAL WELLBORE - PROPOSAL #	12,211.5	12,227.1	340.3	76.1	1.288	Level 3, SF
LEONARD 8N - ORIGINAL WELLBORE - PROPOSAL #	400.0	400.0	56.1	54.6	36.495	CC, ES
LEONARD 8N - ORIGINAL WELLBORE - PROPOSAL #	12,211.5	12,247.7	680.2	416.5	2.580	SF
LEONARD 9C - ORIGINAL WELLBORE - PROPOSAL #	300.0	300.0	84.2	83.1	77.362	CC, ES
LEONARD 9C - ORIGINAL WELLBORE - PROPOSAL #	12,211.5	12,507.7	886.3	633.3	3.504	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		Minimum Separation		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	Warning
0.0	0.0	0.0	0.0	0.0	0.0	-84.75	111.1	-1,209.8	1,216.5				
100.0	100.0	38.0	38.0	0.1	0.2	-84.75	111.1	-1,209.8	1,214.9	1,214.6	0.31	3,958.865	
200.0	200.0	138.0	138.0	0.3	1.5	-84.75	111.1	-1,209.8	1,214.9	1,213.1	1.81	670.398	
300.0	300.0	238.0	238.0	0.5	3.8	-84.75	111.1	-1,209.8	1,214.9	1,210.6	4.35	279.220	
400.0	400.0	338.0	338.0	0.8	5.9	-84.75	111.1	-1,209.8	1,214.9	1,208.3	6.64	182.946	
500.0	500.0	438.0	438.0	1.0	7.9	-84.75	111.1	-1,209.8	1,214.9	1,206.0	8.90	136.490	
600.0	600.0	538.0	538.0	1.2	9.9	-84.75	111.1	-1,209.8	1,214.9	1,203.8	11.15	108.950	
700.0	700.0	638.0	638.0	1.4	12.0	39.86	111.1	-1,209.8	1,213.6	1,200.2	13.37	90.769	
800.0	799.8	737.8	737.8	1.6	14.0	40.07	111.1	-1,209.8	1,209.6	1,194.0	15.56	77.732	
900.0	899.5	837.5	837.5	1.8	16.0	40.43	111.1	-1,209.8	1,202.9	1,185.2	17.74	67.792	
1,000.0	998.7	936.7	936.7	2.1	18.0	40.93	111.1	-1,209.8	1,193.6	1,173.7	19.92	59.924	
1,100.0	1,097.5	1,035.5	1,035.5	2.4	20.0	41.58	111.1	-1,209.8	1,181.8	1,159.7	22.09	53.505	
1,200.0	1,195.6	1,133.6	1,133.6	2.7	21.9	42.39	111.1	-1,209.8	1,167.5	1,143.3	24.25	48.136	
1,200.2	1,195.8	1,133.8	1,133.8	2.7	21.9	42.39	111.1	-1,209.8	1,167.5	1,143.2	24.26	48.128	
1,300.0	1,293.4	1,231.4	1,231.4	3.1	23.9	43.08	111.1	-1,209.8	1,152.1	1,125.6	26.52	43.443	
1,400.0	1,391.2	1,329.2	1,329.2	3.5	25.9	43.79	111.1	-1,209.8	1,136.8	1,108.0	28.80	39.467	

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