

# **EXTRACTION OIL & GAS**

**WELD COUNTY, COLORADO (NAD 83)  
SW SW SEC. 22 T4N R68W 6th P.M.  
HFE 5**

**ORIGINAL WELLBORE  
PROPOSAL #3**

## **Anticollision Report**

**17 January, 2017**



# Anticollision Report



<b>Company:</b>	EXTRACTION OIL & GAS	<b>Local Co-ordinate Reference:</b>	Well HFE 5
<b>Project:</b>	WELD COUNTY, COLORADO (NAD 83)	<b>TVD Reference:</b>	KB-EST @ 4935.0usft
<b>Reference Site:</b>	SW SW SEC. 22 T4N R68W 6th P.M.	<b>MD Reference:</b>	KB-EST @ 4935.0usft
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	HFE 5	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	ORIGINAL WELLBORE	<b>Database:</b>	EDM 5000.1 Single User Db
<b>Reference Design:</b>	PROPOSAL #3	<b>Offset TVD Reference:</b>	Offset Datum

<b>Reference</b>	PROPOSAL #3		
<b>Filter type:</b>	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
<b>Interpolation Method:</b>	MD + Stations Interval 100.0usft	<b>Error Model:</b>	ISCWSA
<b>Depth Range:</b>	Unlimited	<b>Scan Method:</b>	Closest Approach 3D
<b>Results Limited by:</b>	Maximum center-center distance of 10,000.0 us	<b>Error Surface:</b>	Elliptical Conic
<b>Warning Levels Evaluated at:</b>	2.00 Sigma	<b>Casing Method:</b>	Not applied

<b>Survey Tool Program</b>	<b>Date</b> 17/01/2017			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
0.0	12,038.6	PROPOSAL #3 (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
SW SW SEC. 22 T4N R68W 6th P.M.						
ABDN VERT CRESSWELL #2 - Wellbore #1 - Design #1	11,203.3	7,210.0	587.4	334.1	2.320	CC, ES, SF
EXIST DD HFE #14-22 - Wellbore #1 - Wellbore #1	0.0	0.0	191.6			
EXIST DD HFE #14-22 - Wellbore #1 - Wellbore #1	800.0	798.7	193.8	190.5	60.022	ES
EXIST DD HFE #14-22 - Wellbore #1 - Wellbore #1	7,833.1	7,210.9	264.7	221.5	6.122	SF
EXIST DD HFE #22SE - Wellbore #1 - Wellbore #1	11,188.5	7,284.7	393.7	262.6	3.003	CC
EXIST DD HFE #22SE - Wellbore #1 - Wellbore #1	11,200.0	7,284.5	393.9	262.5	2.998	ES, SF
EXIST DD HFE #24-22 - Wellbore #1 - Wellbore #1	1,598.7	1,619.0	130.9	123.7	18.180	CC
EXIST DD HFE #24-22 - Wellbore #1 - Wellbore #1	1,600.0	1,620.2	130.9	123.7	18.161	ES
EXIST DD HFE #24-22 - Wellbore #1 - Wellbore #1	9,151.1	7,346.5	246.0	165.3	3.047	SF
EXIST DD HFE #34-22 - Wellbore #1 - Wellbore #1	10,491.2	7,241.3	257.4	151.6	2.434	CC
EXIST DD HFE #34-22 - Wellbore #1 - Wellbore #1	10,500.0	7,241.3	257.5	151.5	2.430	ES, SF
EXIST DD HFE #44-22 - Wellbore #1 - Wellbore #1	11,833.5	7,480.4	265.7	105.2	1.655	CC, ES, SF
EXIST DD MLD #13-22 - Wellbore #1 - Wellbore #1	0.0	1.0	176.8			
EXIST DD MLD #13-22 - Wellbore #1 - Wellbore #1	200.0	200.0	177.2	176.6	266.560	ES
EXIST DD MLD #13-22 - Wellbore #1 - Wellbore #1	8,500.0	7,110.4	1,308.8	1,253.3	23.570	SF
EXIST DD MLD #23-22 - Wellbore #1 - Wellbore #1	1,257.2	1,269.6	84.1	78.5	15.169	CC, ES
EXIST DD MLD #23-22 - Wellbore #1 - Wellbore #1	9,500.0	7,346.0	1,107.0	1,016.9	12.279	SF
EXIST DD MLD #33-22 - Wellbore #1 - Wellbore #1	10,531.0	7,253.0	1,067.3	959.6	9.906	CC, ES
EXIST DD MLD #33-22 - Wellbore #1 - Wellbore #1	10,800.0	7,253.0	1,100.7	985.7	9.570	SF
EXIST DD MLD #43-22 - Wellbore #1 - Wellbore #1	11,854.5	7,493.8	1,059.3	898.2	6.577	CC
EXIST DD MLD #43-22 - Wellbore #1 - Wellbore #1	11,900.0	7,493.9	1,060.2	897.9	6.532	ES
EXIST DD MLD #43-22 - Wellbore #1 - Wellbore #1	12,038.6	7,494.4	1,075.1	909.0	6.472	SF
HFE 1 - ORIGINAL WELLBORE - PROPOSAL #3	100.0	100.0	111.9	111.7	592.626	CC
HFE 1 - ORIGINAL WELLBORE - PROPOSAL #3	1,600.0	1,600.7	116.5	109.8	17.344	ES
HFE 1 - ORIGINAL WELLBORE - PROPOSAL #3	12,038.6	12,477.3	622.9	437.3	3.355	SF
HFE 2 - ORIGINAL WELLBORE - PROPOSAL #3	1,700.0	1,700.0	84.0	76.6	11.378	CC, ES
HFE 2 - ORIGINAL WELLBORE - PROPOSAL #3	12,038.6	11,976.0	950.6	691.6	3.670	SF
HFE 3 - ORIGINAL WELLBORE - PROPOSAL #3	1,766.3	1,767.3	56.1	48.4	7.302	CC
HFE 3 - ORIGINAL WELLBORE - PROPOSAL #3	1,800.0	1,801.0	56.1	48.3	7.161	ES
HFE 3 - ORIGINAL WELLBORE - PROPOSAL #3	12,038.6	12,093.7	620.0	356.9	2.356	SF
HFE 4 - ORIGINAL WELLBORE - PROPOSAL #3	1,900.0	1,900.0	27.9	19.6	3.370	CC, ES
HFE 4 - ORIGINAL WELLBORE - PROPOSAL #3	12,038.6	11,869.5	366.2	138.5	1.608	SF
HFE 6 - ORIGINAL WELLBORE - PROPOSAL #3	2,000.0	1,999.0	28.2	19.4	3.228	CC, ES
HFE 6 - ORIGINAL WELLBORE - PROPOSAL #3	12,038.6	11,856.3	365.7	137.0	1.599	SF
HFE 7 - ORIGINAL WELLBORE - PROPOSAL #3	2,000.0	1,999.0	56.1	47.4	6.426	CC, ES
HFE 7 - ORIGINAL WELLBORE - PROPOSAL #3	12,038.6	12,071.4	619.9	354.8	2.338	SF
HFE 8 - ORIGINAL WELLBORE - PROPOSAL #3	2,000.0	1,999.0	84.0	75.3	9.622	CC, ES

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

# Anticollision Report



<b>Company:</b>	EXTRACTION OIL & GAS	<b>Local Co-ordinate Reference:</b>	Well HFE 5
<b>Project:</b>	WELD COUNTY, COLORADO (NAD 83)	<b>TVD Reference:</b>	KB-EST @ 4935.0usft
<b>Reference Site:</b>	SW SW SEC. 22 T4N R68W 6th P.M.	<b>MD Reference:</b>	KB-EST @ 4935.0usft
<b>Site Error:</b>	0.0 usft	<b>North Reference:</b>	True
<b>Reference Well:</b>	HFE 5	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0 usft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	ORIGINAL WELLBORE	<b>Database:</b>	EDM 5000.1 Single User Db
<b>Reference Design:</b>	PROPOSAL #3	<b>Offset TVD Reference:</b>	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						
SW SW SEC. 22 T4N R68W 6th P.M.						
HFE 8 - ORIGINAL WELLBORE - PROPOSAL #3	12,038.6	11,958.7	949.9	688.6	3.635	SF
MLD 1 - ORIGINAL WELLBORE - PROPOSAL #1	6,245.0	7,052.5	1,236.8	1,184.4	23.603	CC
MLD 1 - ORIGINAL WELLBORE - PROPOSAL #1	12,038.6	12,506.5	1,281.2	1,026.1	5.022	ES, SF
MLD 12 - ORIGINAL WELLBORE - PROPOSAL #1	6,524.6	7,067.9	1,020.2	968.9	19.880	CC
MLD 12 - ORIGINAL WELLBORE - PROPOSAL #1	12,038.6	12,709.7	1,026.5	762.6	3.889	ES, SF
WILSON RANCH 30C-27HZ - Wellbore #1 - Design #1	7,635.1	16,444.6	984.5	697.9	3.436	CC, ES
WILSON RANCH 30C-27HZ - Wellbore #1 - Design #1	7,646.4	16,444.6	984.6	698.0	3.435	SF

Offset Design		SW SW SEC. 22 T4N R68W 6th P.M. - ABDN VERT CRESSWELL #2 - 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							
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	Warning	
0.0	0.0	45.0	45.0	0.0	0.2	81.31	460.7	3,012.7	3,047.7					
100.0	100.0	145.0	145.0	0.1	1.6	81.31	460.7	3,012.7	3,047.7	3,045.9	1.74	1,754.924		
200.0	200.0	245.0	245.0	0.3	3.9	81.31	460.7	3,012.7	3,047.7	3,043.4	4.25	716.513		
300.0	300.0	345.0	345.0	0.5	6.0	81.31	460.7	3,012.7	3,047.7	3,041.1	6.54	466.000		
400.0	400.0	445.0	445.0	0.8	8.0	81.31	460.7	3,012.7	3,047.7	3,038.9	8.80	346.357		
500.0	500.0	545.0	545.0	1.0	10.1	81.31	460.7	3,012.7	3,047.7	3,036.6	11.05	275.843		
600.0	600.0	645.0	645.0	1.2	12.1	81.31	460.7	3,012.7	3,047.7	3,034.4	13.29	229.264		
700.0	700.0	745.0	745.0	1.4	14.1	81.31	460.7	3,012.7	3,047.7	3,032.1	15.54	196.177		
800.0	800.0	845.0	845.0	1.7	16.1	81.31	460.7	3,012.7	3,047.7	3,029.9	17.78	171.451		
900.0	900.0	945.0	945.0	1.9	18.1	81.31	460.7	3,012.7	3,047.7	3,027.7	20.02	152.268		
1,000.0	1,000.0	1,045.0	1,045.0	2.1	20.1	81.31	460.7	3,012.7	3,047.7	3,025.4	22.25	136.950		
1,100.0	1,100.0	1,145.0	1,145.0	2.3	22.1	81.31	460.7	3,012.7	3,047.7	3,023.2	24.49	124.436		
1,200.0	1,200.0	1,245.0	1,245.0	2.6	24.2	81.31	460.7	3,012.7	3,047.7	3,020.9	26.73	114.018		
1,300.0	1,300.0	1,345.0	1,345.0	2.8	26.2	81.31	460.7	3,012.7	3,047.7	3,018.7	28.97	105.212		
1,400.0	1,400.0	1,445.0	1,445.0	3.0	28.2	81.31	460.7	3,012.7	3,047.7	3,016.5	31.20	97.669		
1,500.0	1,500.0	1,545.0	1,545.0	3.2	30.2	81.31	460.7	3,012.7	3,047.7	3,014.2	33.44	91.135		
1,600.0	1,600.0	1,645.0	1,645.0	3.5	32.2	81.31	460.7	3,012.7	3,047.7	3,012.0	35.68	85.422		
1,700.0	1,700.0	1,745.0	1,745.0	3.7	34.2	81.31	460.7	3,012.7	3,047.7	3,009.8	37.91	80.382		
1,800.0	1,800.0	1,845.0	1,845.0	3.9	36.2	81.31	460.7	3,012.7	3,047.7	3,007.5	40.15	75.905		
1,900.0	1,900.0	1,945.0	1,945.0	4.1	38.2	81.31	460.7	3,012.7	3,047.7	3,005.3	42.39	71.900		
2,000.0	2,000.0	2,045.0	2,045.0	4.4	40.3	81.31	460.7	3,012.7	3,047.7	3,003.0	44.62	68.297		
2,100.0	2,100.0	2,145.0	2,145.0	4.6	42.3	-177.38	460.7	3,012.7	3,049.4	3,002.6	46.81	65.138		
2,200.0	2,199.8	2,244.8	2,244.8	4.8	44.3	-177.38	460.7	3,012.7	3,054.6	3,005.7	48.93	62.433		
2,300.0	2,299.5	2,344.5	2,344.5	5.0	46.3	-177.38	460.7	3,012.7	3,063.3	3,012.4	50.97	60.103		
2,400.0	2,398.7	2,443.7	2,443.7	5.2	48.3	-177.38	460.7	3,012.7	3,075.5	3,022.6	52.93	58.105		
2,500.0	2,497.5	2,542.5	2,542.5	5.4	50.3	-177.37	460.7	3,012.7	3,091.2	3,036.3	54.80	56.404		
2,600.0	2,595.6	2,640.6	2,640.6	5.7	52.2	-177.37	460.7	3,012.7	3,110.2	3,053.6	56.58	54.970		
2,700.0	2,693.1	2,738.1	2,738.1	6.0	54.2	-177.37	460.7	3,012.7	3,132.7	3,074.4	58.25	53.779		
2,800.0	2,789.6	2,834.6	2,834.6	6.4	56.1	-177.37	460.7	3,012.7	3,158.5	3,098.7	59.81	52.809		
2,842.5	2,830.4	2,875.4	2,875.4	6.5	57.0	-177.37	460.7	3,012.7	3,170.5	3,110.1	60.44	52.460		
2,900.0	2,885.4	2,930.4	2,930.4	6.8	58.1	-177.38	460.7	3,012.7	3,187.2	3,125.6	61.63	51.715		
3,000.0	2,981.1	3,026.1	3,026.1	7.2	60.0	-177.40	460.7	3,012.7	3,216.2	3,152.4	63.71	50.483		
3,100.0	3,076.9	3,121.9	3,121.9	7.7	61.9	-177.43	460.7	3,012.7	3,245.1	3,179.3	65.79	49.324		
3,200.0	3,172.6	3,217.6	3,217.6	8.2	63.8	-177.45	460.7	3,012.7	3,274.1	3,206.2	67.88	48.233		
3,300.0	3,268.3	3,313.3	3,313.3	8.7	65.8	-177.47	460.7	3,012.7	3,303.0	3,233.1	69.97	47.204		
3,400.0	3,364.0	3,409.0	3,409.0	9.2	67.7	-177.49	460.7	3,012.7	3,332.0	3,259.9	72.07	46.231		

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