



CONOCOPHILLIPS

**War Hammer 25 Federal COM W3 1H
Lea County, New Mexico
H&P 486**

November 10, 2015

**Prepared By:
Tiffani Mizell**

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Company: ConocoPhillips
Site: War Hammer 25 Federal COM
Well: W3 1H
Project: Lea County, New Mexico (NAD 27)
Rig: H&P 486



Azimuths to Grid North
True North: -0.38°
Magnetic North: 6.79°

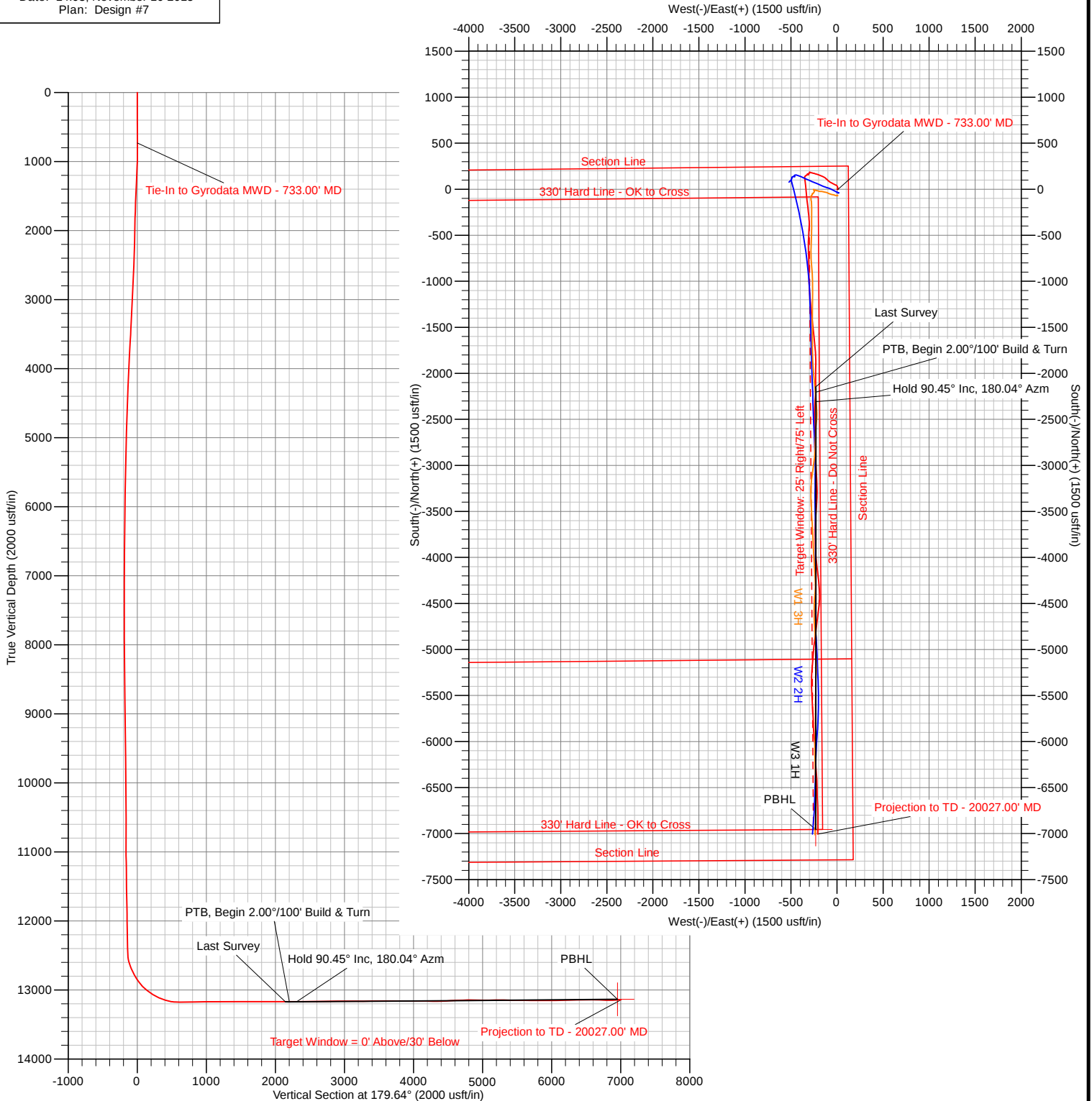
Magnetic Field
Strength: 48218.0snT
Dip Angle: 59.75°
Date: 09/30/2015
Model: USER DEFINED

ANNOTATIONS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Vsect	Departure	Annotation
15155.00	88.60	179.10	13171.23	-2146.04	-229.36	2144.55	0.00	Last Survey
15213.00	88.60	179.10	13172.64	-2204.01	-228.44	2202.53	57.98	PTB, Begin 2.00°/100' Build & Turn
15316.78	90.45	180.04	13173.50	-2307.78	-227.67	2306.30	161.75	Hold 90.45° Inc, 180.04° Azm
19965.57	90.45	180.04	13137.00	-6956.42	-231.01	6954.83	4810.40	PBHL

US State Plane 1927 (Exact solution)
New Mexico East 3001

Created By: CJH
Date: 14:03, November 10 2015
Plan: Design #7





ConocoPhillips

**Lea County, New Mexico (NAD 27)
War Hammer 25 Federal COM
W3 1H**

Wellbore #1

Survey: GyroData MWD

Standard Survey Report

10 November, 2015

Company:	ConocoPhillips	Local Co-ordinate Reference:	Well W3 1H
Project:	Lea County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3164.00usft (H&P 486)
Site:	War Hammer 25 Federal COM	MD Reference:	WELL @ 3164.00usft (H&P 486)
Well:	W3 1H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	EDM 5000.1 Conroe DB

Project	Lea County, New Mexico (NAD 27)		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Well	W3 1H			
Well Position	+N/-S	0.00 usft	Northing:	371,782.47 usft
	+E/-W	0.00 usft	Easting:	721,157.69 usft
Position Uncertainty	0.00 usft		Wellhead Elevation:	0.00 usft
			Latitude:	32° 1' 12.492 N
			Longitude:	103° 37' 11.141 W
			Ground Level:	3,139.00 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	User Defined	09/30/15	7.17	59.75	48,218

Design	Surveys				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	179.64	

Survey Program	Date	11/10/15			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
18.00	733.00	GyroData MWD (Wellbore #1)	MWD - OWSG R1	MWD - OWSG R1	
733.00	4,535.00	MS MWD (Wellbore #1)	MWD + IFR1 - OWSG	MWD + IFR1 - OWSG	
4,658.00	12,158.00	MS MWD (2) (Wellbore #1)	MWD + IFR1 - OWSG	MWD + IFR1 - OWSG	
12,228.00	20,027.00	MS MWD (3) (Wellbore #1)	MWD + IFR1 - OWSG	MWD + IFR1 - OWSG	

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18.00	0.00	0.00	18.00	0.00	0.00	0.00	0.00	0.00	0.00
Added to adjust for KB-18.00'MD									
132.00	0.40	96.80	132.00	-0.05	0.40	0.05	0.35	0.35	0.00
195.00	0.40	107.60	195.00	-0.14	0.82	0.14	0.12	0.00	17.14
256.00	0.70	82.00	255.99	-0.15	1.40	0.16	0.62	0.49	-41.97
318.00	1.10	100.50	317.99	-0.21	2.36	0.22	0.79	0.65	29.84
403.00	1.10	119.70	402.97	-0.76	3.87	0.79	0.43	0.00	22.59
488.00	1.10	117.40	487.96	-1.54	5.30	1.57	0.05	0.00	-2.71
574.00	1.00	102.80	573.94	-2.09	6.76	2.13	0.33	-0.12	-16.98
658.00	0.80	100.50	657.93	-2.36	8.06	2.41	0.24	-0.24	-2.74
733.00	1.00	119.70	732.92	-2.78	9.14	2.83	0.48	0.27	25.60
Final Gyrodata MWD - 733.00' MD									

Company:	ConocoPhillips	Local Co-ordinate Reference:	Well W3 1H
Project:	Lea County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3164.00usft (H&P 486)
Site:	War Hammer 25 Federal COM	MD Reference:	WELL @ 3164.00usft (H&P 486)
Well:	W3 1H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	EDM 5000.1 Conroe DB

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
788.00	1.00	119.70	787.91	-3.25	9.97	3.31	0.00	0.00	0.00	
Projection to Bit - 788.00' MD										

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")	
766.00	765.92	13 3/8"	13-3/8	17-1/2	
4,600.00	4,590.89	10 3/4"	10-3/4	12-1/4	
12,205.00	12,189.83	9 5/8"	9-5/8	12-1/4	

Survey Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
18.00	18.00	0.00	0.00	Added to adjust for KB-18.00'MD	
733.00	732.92	-2.78	9.14	Final Gyrodata MWD - 733.00' MD	
788.00	787.91	-3.25	9.97	Projection to Bit - 788.00' MD	



ConocoPhillips

**Lea County, New Mexico (NAD 27)
War Hammer 25 Federal COM
W3 1H**

Wellbore #1

Survey: MS MWD

Standard Survey Report

10 November, 2015

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Well:	W3 1H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	EDM 5000.1 Conroe DB

Project	Lea County, New Mexico (NAD 27)		
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Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Well	W3 1H			
Well Position	+N/-S	0.00 usft	Northing:	371,782.47 usft
	+E/-W	0.00 usft	Easting:	721,157.69 usft
Position Uncertainty	0.00 usft		Wellhead Elevation:	0.00 usft
			Latitude:	32° 1' 12.492 N
			Longitude:	103° 37' 11.141 W
			Ground Level:	3,139.00 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	User Defined	09/30/15	7.17	59.75	48,218

Design	Surveys				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00		179.64

Survey Program	Date	11/10/15			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
18.00	733.00	GyroData MWD (Wellbore #1)	MWD - OWSG R1	MWD - OWSG R1	
733.00	4,535.00	MS MWD (Wellbore #1)	MWD + IFR1 - OWSG	MWD + IFR1 - OWSG	
4,658.00	12,158.00	MS MWD (2) (Wellbore #1)	MWD + IFR1 - OWSG	MWD + IFR1 - OWSG	
12,228.00	20,027.00	MS MWD (3) (Wellbore #1)	MWD + IFR1 - OWSG	MWD + IFR1 - OWSG	

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
733.00	1.00	119.70	732.92	-2.78	9.14	2.83	0.00	0.00	0.00	
Tie-In to Gyrodata MWD - 733.00' MD										
887.00	0.40	122.90	886.91	-3.73	10.76	3.80	0.39	-0.39	2.08	
979.00	1.50	357.50	978.90	-2.70	10.97	2.77	1.92	1.20	-136.30	
1,071.00	3.00	354.20	1,070.83	0.89	10.68	-0.83	1.64	1.63	-3.59	
1,163.00	2.50	354.70	1,162.72	5.29	10.25	-5.22	0.54	-0.54	0.54	
1,254.00	2.60	349.30	1,253.63	9.29	9.68	-9.23	0.29	0.11	-5.93	
1,349.00	2.50	346.80	1,348.54	13.43	8.81	-13.37	0.16	-0.11	-2.63	
1,443.00	2.30	347.20	1,442.45	17.26	7.92	-17.21	0.21	-0.21	0.43	
1,538.00	2.30	339.90	1,537.38	20.91	6.85	-20.87	0.31	0.00	-7.68	
1,633.00	2.10	341.10	1,632.31	24.35	5.63	-24.31	0.22	-0.21	1.26	
1,727.00	1.80	336.80	1,726.25	27.33	4.49	-27.30	0.35	-0.32	-4.57	
1,822.00	1.80	334.70	1,821.21	30.05	3.26	-30.03	0.07	0.00	-2.21	

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Site:	War Hammer 25 Federal COM	MD Reference:	WELL @ 3164.00usft (H&P 486)
Well:	W3 1H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	EDM 5000.1 Conroe DB

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
1,917.00	1.60	339.00	1,916.16	32.64	2.15	-32.63	0.25	-0.21	4.53	
2,011.00	1.50	336.00	2,010.13	34.99	1.18	-34.98	0.14	-0.11	-3.19	
2,106.00	1.50	334.70	2,105.10	37.25	0.14	-37.25	0.04	0.00	-1.37	
2,201.00	2.00	310.90	2,200.05	39.46	-1.64	-39.47	0.92	0.53	-25.05	
2,295.00	2.20	306.10	2,293.99	41.60	-4.34	-41.62	0.28	0.21	-5.11	
2,389.00	3.60	293.00	2,387.87	43.81	-8.51	-43.86	1.64	1.49	-13.94	
2,484.00	5.80	293.60	2,482.54	46.90	-15.66	-47.00	2.32	2.32	0.63	
2,578.00	6.50	296.70	2,576.00	51.19	-24.77	-51.35	0.82	0.74	3.30	
2,672.00	6.10	296.00	2,669.44	55.77	-34.01	-55.98	0.43	-0.43	-0.74	
2,766.00	5.90	298.30	2,762.92	60.25	-42.75	-60.52	0.33	-0.21	2.45	
2,860.00	5.70	299.40	2,856.44	64.83	-51.07	-65.15	0.24	-0.21	1.17	
2,955.00	5.30	296.50	2,951.00	69.11	-59.11	-69.48	0.51	-0.42	-3.05	
3,049.00	5.30	298.10	3,044.60	73.09	-66.82	-73.51	0.16	0.00	1.70	
3,144.00	5.10	299.60	3,139.21	77.24	-74.36	-77.71	0.25	-0.21	1.58	
3,238.00	4.60	301.20	3,232.87	81.26	-81.22	-81.77	0.55	-0.53	1.70	
3,332.00	4.70	308.10	3,326.56	85.59	-87.48	-86.14	0.60	0.11	7.34	
3,426.00	4.40	311.90	3,420.27	90.37	-93.19	-90.96	0.45	-0.32	4.04	
3,520.00	4.20	317.30	3,514.00	95.31	-98.21	-95.92	0.48	-0.21	5.74	
3,615.00	3.90	321.70	3,608.77	100.40	-102.57	-101.04	0.45	-0.32	4.63	
3,709.00	4.70	310.90	3,702.50	105.43	-107.46	-106.10	1.21	0.85	-11.49	
3,803.00	5.10	308.60	3,796.16	110.56	-113.64	-111.27	0.47	0.43	-2.45	
3,896.00	4.70	311.00	3,888.82	115.64	-119.74	-116.39	0.48	-0.43	2.58	
3,990.00	4.50	310.70	3,982.52	120.57	-125.45	-121.36	0.21	-0.21	-0.32	
4,085.00	4.20	307.60	4,077.24	125.12	-131.03	-125.94	0.40	-0.32	-3.26	
4,179.00	4.30	305.20	4,170.98	129.25	-136.64	-130.11	0.22	0.11	-2.55	
4,274.00	4.30	296.90	4,265.72	132.92	-142.72	-133.81	0.65	0.00	-8.74	
4,368.00	4.10	290.90	4,359.46	135.71	-149.00	-136.65	0.51	-0.21	-6.38	
4,463.00	3.80	291.80	4,454.24	138.09	-155.10	-139.06	0.32	-0.32	0.95	
4,535.00	4.10	290.30	4,526.07	139.87	-159.73	-140.87	0.44	0.42	-2.08	

Casing Points						
Measured Depth (usft)	Vertical Depth (usft)	Name			Casing Diameter (")	Hole Diameter (")
766.00	765.92	13 3/8"			13-3/8	17-1/2
4,600.00	4,590.89	10 3/4"			10-3/4	12-1/4
12,205.00	12,189.83	9 5/8"			9-5/8	12-1/4

Company:	ConocoPhillips	Local Co-ordinate Reference:	Well W3 1H
Project:	Lea County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3164.00usft (H&P 486)
Site:	War Hammer 25 Federal COM	MD Reference:	WELL @ 3164.00usft (H&P 486)
Well:	W3 1H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	EDM 5000.1 Conroe DB

Survey Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
733.00	732.92	-2.78	9.14	Tie-In to Gyrodata MWD - 733.00' MD



ConocoPhillips

**Lea County, New Mexico (NAD 27)
War Hammer 25 Federal COM
W3 1H**

Wellbore #1

Survey: MS MWD (2)

Standard Survey Report

10 November, 2015

Company:	ConocoPhillips	Local Co-ordinate Reference:	Well W3 1H
Project:	Lea County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3164.00usft (H&P 486)
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Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
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Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft
			Latitude:	32° 1' 12.492 N
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Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	User Defined	09/30/15	7.17	59.75	48,218

Design	Surveys				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	179.64	

Survey Program	Date	11/10/15			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
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12,228.00	20,027.00	MS MWD (3) (Wellbore #1)	MWD + IFR1 - OWSG	MWD + IFR1 - OWSG	

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
4,535.00	4.10	290.30	4,526.07	139.87	-159.73	-140.87	0.00	0.00	0.00	
4,658.00	4.80	298.60	4,648.70	143.86	-168.37	-144.92	0.77	0.57	6.75	
4,753.00	5.10	293.40	4,743.34	147.44	-175.74	-148.54	0.57	0.32	-5.47	
4,847.00	5.30	291.60	4,836.96	150.70	-183.61	-151.85	0.27	0.21	-1.91	
4,941.00	4.80	289.80	4,930.59	153.63	-191.34	-154.83	0.56	-0.53	-1.91	
5,035.00	4.90	289.10	5,024.26	156.27	-198.84	-157.52	0.12	0.11	-0.74	
5,129.00	5.20	290.10	5,117.89	159.05	-206.63	-160.35	0.33	0.32	1.06	
5,224.00	4.40	286.50	5,212.56	161.57	-214.17	-162.91	0.90	-0.84	-3.79	
5,318.00	4.40	287.30	5,306.28	163.66	-221.07	-165.05	0.07	0.00	0.85	
5,412.00	4.70	288.10	5,399.98	165.93	-228.17	-167.36	0.33	0.32	0.85	
5,506.00	4.30	286.10	5,493.69	168.10	-235.22	-169.58	0.46	-0.43	-2.13	
5,601.00	4.00	285.90	5,588.44	170.00	-241.83	-171.52	0.32	-0.32	-0.21	
5,695.00	3.60	284.40	5,682.24	171.63	-247.84	-173.19	0.44	-0.43	-1.60	

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Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
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5,790.00	3.30	283.60	5,777.07	173.02	-253.39	-174.61	0.32	-0.32	-0.84	
5,884.00	3.00	282.40	5,870.92	174.18	-258.42	-175.80	0.33	-0.32	-1.28	
5,979.00	2.80	283.80	5,965.80	175.27	-263.10	-176.92	0.22	-0.21	1.47	
6,073.00	2.70	285.10	6,059.69	176.39	-267.47	-178.07	0.13	-0.11	1.38	
6,167.00	2.40	284.50	6,153.60	177.46	-271.51	-179.16	0.32	-0.32	-0.64	
6,262.00	2.10	282.20	6,248.53	178.33	-275.14	-180.05	0.33	-0.32	-2.42	
6,356.00	2.00	283.30	6,342.47	179.07	-278.42	-180.82	0.11	-0.11	1.17	
6,451.00	1.60	280.10	6,437.42	179.68	-281.33	-181.45	0.43	-0.42	-3.37	
6,545.00	1.50	278.20	6,531.38	180.09	-283.84	-181.87	0.12	-0.11	-2.02	
6,640.00	1.00	272.70	6,626.36	180.31	-285.90	-182.10	0.54	-0.53	-5.79	
6,734.00	1.20	271.30	6,720.34	180.37	-287.71	-182.17	0.21	0.21	-1.49	
6,828.00	1.00	298.10	6,814.33	180.78	-289.41	-182.59	0.58	-0.21	28.51	
6,923.00	1.10	322.70	6,909.31	181.89	-290.70	-183.71	0.48	0.11	25.89	
7,017.00	0.90	321.40	7,003.30	183.19	-291.71	-185.01	0.21	-0.21	-1.38	
7,112.00	0.70	315.40	7,098.29	184.18	-292.58	-186.02	0.23	-0.21	-6.32	
7,206.00	0.80	308.30	7,192.28	185.00	-293.50	-186.84	0.15	0.11	-7.55	
7,300.00	0.80	294.70	7,286.27	185.68	-294.61	-187.53	0.20	0.00	-14.47	
7,395.00	0.70	278.10	7,381.26	186.04	-295.78	-187.89	0.25	-0.11	-17.47	
7,489.00	0.80	267.20	7,475.26	186.09	-297.01	-187.95	0.18	0.11	-11.60	
7,584.00	0.30	280.00	7,570.25	186.10	-297.92	-187.97	0.54	-0.53	13.47	
7,678.00	0.40	293.20	7,664.25	186.27	-298.46	-188.14	0.14	0.11	14.04	
7,773.00	0.20	231.20	7,759.25	186.30	-298.89	-188.17	0.37	-0.21	-65.26	
7,867.00	0.20	199.00	7,853.25	186.04	-299.08	-187.91	0.12	0.00	-34.26	
7,961.00	0.40	179.30	7,947.25	185.55	-299.12	-187.43	0.24	0.21	-20.96	
8,056.00	0.50	182.90	8,042.24	184.81	-299.14	-186.68	0.11	0.11	3.79	
8,151.00	0.60	175.90	8,137.24	183.90	-299.13	-185.77	0.13	0.11	-7.37	
8,245.00	0.70	177.10	8,231.23	182.83	-299.06	-184.71	0.11	0.11	1.28	
8,340.00	0.80	174.50	8,326.22	181.59	-298.97	-183.47	0.11	0.11	-2.74	
8,435.00	0.70	181.30	8,421.22	180.35	-298.92	-182.23	0.14	-0.11	7.16	
8,529.00	0.90	200.40	8,515.21	179.09	-299.19	-180.96	0.35	0.21	20.32	
8,624.00	0.90	192.80	8,610.20	177.66	-299.61	-179.54	0.13	0.00	-8.00	
8,718.00	1.20	200.40	8,704.18	176.02	-300.12	-177.90	0.35	0.32	8.09	
8,813.00	1.00	193.60	8,799.16	174.28	-300.66	-176.17	0.25	-0.21	-7.16	
8,907.00	0.80	247.90	8,893.15	173.24	-301.46	-175.13	0.89	-0.21	57.77	
9,002.00	0.70	232.40	8,988.14	172.63	-302.54	-174.53	0.24	-0.11	-16.32	
9,096.00	1.10	235.90	9,082.13	171.78	-303.74	-173.68	0.43	0.43	3.72	
9,191.00	1.50	231.70	9,177.11	170.50	-305.47	-172.41	0.43	0.42	-4.42	
9,286.00	1.30	232.00	9,272.08	169.06	-307.30	-170.99	0.21	-0.21	0.32	
9,380.00	1.60	267.30	9,366.05	168.34	-309.45	-170.28	0.98	0.32	37.55	
9,475.00	1.80	264.80	9,461.01	168.15	-312.26	-170.10	0.22	0.21	-2.63	
9,569.00	1.90	265.20	9,554.96	167.88	-315.28	-169.86	0.11	0.11	0.43	
9,663.00	2.10	251.00	9,648.90	167.19	-318.46	-169.19	0.57	0.21	-15.11	
9,746.00	2.10	227.00	9,731.85	165.66	-321.01	-167.67	1.05	0.00	-28.92	

Company:	ConocoPhillips	Local Co-ordinate Reference:	Well W3 1H
Project:	Lea County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3164.00usft (H&P 486)
Site:	War Hammer 25 Federal COM	MD Reference:	WELL @ 3164.00usft (H&P 486)
Well:	W3 1H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	EDM 5000.1 Conroe DB

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
9,841.00	2.10	215.70	9,826.79	163.06	-323.30	-165.09	0.44	0.00	-11.89	
9,936.00	1.10	178.20	9,921.75	160.73	-324.29	-162.77	1.47	-1.05	-39.47	
10,030.00	1.00	131.90	10,015.74	159.28	-323.65	-161.31	0.88	-0.11	-49.26	
10,124.00	2.00	71.50	10,109.71	159.25	-321.48	-161.27	1.85	1.06	-64.26	
10,219.00	1.40	65.10	10,204.67	160.27	-318.86	-162.27	0.66	-0.63	-6.74	
10,289.00	1.70	82.70	10,274.64	160.76	-317.05	-162.75	0.80	0.43	25.14	
10,407.00	2.20	101.00	10,392.57	160.55	-313.09	-162.52	0.67	0.42	15.51	
10,502.00	1.30	111.60	10,487.53	159.81	-310.30	-161.75	1.00	-0.95	11.16	
10,596.00	1.30	173.00	10,581.51	158.36	-309.18	-160.30	1.41	0.00	65.32	
10,691.00	0.50	302.60	10,676.50	157.51	-309.40	-159.45	1.75	-0.84	136.42	
10,785.00	1.40	285.30	10,770.49	158.03	-310.85	-159.98	0.99	0.96	-18.40	
10,879.00	2.00	279.90	10,864.44	158.62	-313.57	-160.59	0.66	0.64	-5.74	
10,974.00	2.50	267.90	10,959.37	158.83	-317.28	-160.82	0.72	0.53	-12.63	
11,036.00	2.50	267.90	11,021.31	158.73	-319.98	-160.74	0.00	0.00	0.00	
11,068.00	2.40	252.10	11,053.28	158.50	-321.32	-160.51	2.13	-0.31	-49.38	
11,162.00	1.70	232.50	11,147.22	157.04	-324.30	-159.08	1.04	-0.74	-20.85	
11,257.00	1.50	252.40	11,242.19	155.81	-326.60	-157.86	0.62	-0.21	20.95	
11,351.00	1.50	217.60	11,336.16	154.46	-328.52	-156.52	0.95	0.00	-37.02	
11,445.00	1.60	236.40	11,430.12	152.76	-330.37	-154.83	0.55	0.11	20.00	
11,540.00	1.80	241.50	11,525.08	151.32	-332.78	-153.40	0.26	0.21	5.37	
11,634.00	1.80	249.80	11,619.04	150.10	-335.46	-152.21	0.28	0.00	8.83	
11,728.00	1.90	245.30	11,712.99	148.94	-338.27	-151.06	0.19	0.11	-4.79	
11,823.00	1.70	235.80	11,807.94	147.49	-340.86	-149.63	0.38	-0.21	-10.00	
11,917.00	1.60	228.50	11,901.90	145.84	-343.00	-147.99	0.25	-0.11	-7.77	
12,011.00	1.40	227.10	11,995.87	144.19	-344.82	-146.35	0.22	-0.21	-1.49	
12,105.00	1.10	214.20	12,089.85	142.66	-346.17	-144.83	0.44	-0.32	-13.72	
12,158.00	1.10	203.30	12,142.84	141.77	-346.66	-143.95	0.39	0.00	-20.57	

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name		Casing Diameter (")	Hole Diameter (")
766.00	765.92	13 3/8"		13-3/8	17-1/2
4,600.00	4,590.89	10 3/4"		10-3/4	12-1/4
12,205.00	12,189.83	9 5/8"		9-5/8	12-1/4



ConocoPhillips

**Lea County, New Mexico (NAD 27)
War Hammer 25 Federal COM
W3 1H**

Wellbore #1

Survey: MS MWD (3)

Standard Survey Report

10 November, 2015

Company:	ConocoPhillips	Local Co-ordinate Reference:	Well W3 1H
Project:	Lea County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3164.00usft (H&P 486)
Site:	War Hammer 25 Federal COM	MD Reference:	WELL @ 3164.00usft (H&P 486)
Well:	W3 1H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	EDM 5000.1 Conroe DB

Project	Lea County, New Mexico (NAD 27)		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Well	W3 1H				
Well Position	+N/-S	0.00 usft	Northing:	371,782.47 usft	Latitude: 32° 1' 12.492 N
	+E/-W	0.00 usft	Easting:	721,157.69 usft	Longitude: 103° 37' 11.141 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level: 3,139.00 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	User Defined	09/30/15	7.17	59.75	48,218

Design	Surveys				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00		179.64

Survey Program	Date	11/10/15			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
18.00	733.00	GyroData MWD (Wellbore #1)	MWD - OWSG R1	MWD - OWSG R1	
733.00	4,535.00	MS MWD (Wellbore #1)	MWD + IFR1 - OWSG	MWD + IFR1 - OWSG	
4,658.00	12,158.00	MS MWD (2) (Wellbore #1)	MWD + IFR1 - OWSG	MWD + IFR1 - OWSG	
12,228.00	20,027.00	MS MWD (3) (Wellbore #1)	MWD + IFR1 - OWSG	MWD + IFR1 - OWSG	

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
12,158.00	1.10	203.30	12,142.84	141.77	-346.66	-143.95	0.00	0.00	0.00	
12,228.00	1.40	203.80	12,212.82	140.37	-347.27	-142.55	0.43	0.43	0.71	
12,322.00	1.40	214.70	12,306.79	138.38	-348.39	-140.56	0.28	0.00	11.60	
12,417.00	1.60	213.80	12,401.76	136.32	-349.78	-138.51	0.21	0.21	-0.95	
12,511.00	2.60	189.30	12,495.70	133.13	-350.86	-135.33	1.41	1.06	-26.06	
12,542.00	6.40	174.80	12,526.60	130.71	-350.82	-132.91	12.70	12.26	-46.77	
12,574.00	11.30	172.40	12,558.21	125.82	-350.24	-128.02	15.35	15.31	-7.50	
12,605.00	15.30	172.30	12,588.37	118.76	-349.29	-120.95	12.90	12.90	-0.32	
12,637.00	18.20	173.10	12,619.01	109.61	-348.12	-111.79	9.09	9.06	2.50	
12,668.00	20.40	175.50	12,648.26	99.42	-347.12	-101.59	7.54	7.10	7.74	
12,700.00	21.70	176.40	12,678.13	87.95	-346.31	-90.12	4.19	4.06	2.81	
12,731.00	23.50	174.80	12,706.75	76.07	-345.39	-78.24	6.14	5.81	-5.16	
12,763.00	25.40	174.20	12,735.88	62.89	-344.12	-65.05	5.99	5.94	-1.88	

Company:	ConocoPhillips	Local Co-ordinate Reference:	Well W3 1H
Project:	Lea County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3164.00usft (H&P 486)
Site:	War Hammer 25 Federal COM	MD Reference:	WELL @ 3164.00usft (H&P 486)
Well:	W3 1H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	EDM 5000.1 Conroe DB

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
12,793.00	27.00	174.20	12,762.79	49.72	-342.78	-51.87	5.33	5.33	0.00
12,825.00	29.00	173.90	12,791.05	34.77	-341.22	-36.92	6.27	6.25	-0.94
12,856.00	31.50	173.20	12,817.82	19.26	-339.46	-21.39	8.14	8.06	-2.26
12,888.00	33.90	172.50	12,844.75	2.11	-337.31	-4.23	7.59	7.50	-2.19
12,919.00	36.00	173.80	12,870.16	-15.52	-335.19	13.42	7.19	6.77	4.19
12,951.00	37.60	175.40	12,895.78	-34.61	-333.39	32.51	5.83	5.00	5.00
12,982.00	39.30	176.20	12,920.06	-53.83	-331.99	51.74	5.71	5.48	2.58
13,014.00	42.90	175.40	12,944.17	-74.81	-330.44	72.73	11.37	11.25	-2.50
13,045.00	46.60	174.80	12,966.18	-96.55	-328.57	94.48	12.01	11.94	-1.94
13,077.00	49.90	173.90	12,987.48	-120.30	-326.22	118.25	10.52	10.31	-2.81
13,108.00	52.50	172.80	13,006.91	-144.29	-323.42	142.26	8.83	8.39	-3.55
13,140.00	53.40	172.50	13,026.19	-169.62	-320.15	167.61	2.91	2.81	-0.94
13,171.00	55.20	172.60	13,044.28	-194.58	-316.88	192.59	5.81	5.81	0.32
13,202.00	57.20	173.10	13,061.52	-220.14	-313.68	218.17	6.59	6.45	1.61
13,234.00	60.30	174.20	13,078.12	-247.33	-310.66	245.37	10.12	9.69	3.44
13,265.00	62.80	174.70	13,092.89	-274.46	-308.02	272.51	8.19	8.06	1.61
13,297.00	63.90	174.30	13,107.24	-302.92	-305.28	301.00	3.61	3.44	-1.25
13,328.00	66.20	175.40	13,120.32	-330.91	-302.76	329.01	8.09	7.42	3.55
13,359.00	69.90	178.50	13,131.91	-359.62	-301.24	357.72	15.11	11.94	10.00
13,391.00	72.60	181.50	13,142.19	-389.91	-301.25	388.01	12.25	8.44	9.38
13,423.00	73.30	183.30	13,151.58	-420.48	-302.53	418.57	5.81	2.19	5.63
13,454.00	75.70	183.00	13,159.86	-450.30	-304.17	448.38	7.80	7.74	-0.97
13,486.00	79.20	183.30	13,166.81	-481.49	-305.89	479.55	10.98	10.94	0.94
13,517.00	82.20	183.70	13,171.82	-512.02	-307.76	510.07	9.76	9.68	1.29
13,548.00	85.60	182.00	13,175.11	-542.80	-309.29	540.84	12.25	10.97	-5.48
13,580.00	88.60	181.30	13,176.73	-574.74	-310.21	572.78	9.63	9.38	-2.19
13,611.00	91.40	180.50	13,176.73	-605.73	-310.69	603.77	9.39	9.03	-2.58
13,643.00	90.00	179.10	13,176.34	-637.73	-310.58	635.77	6.19	-4.38	-4.38
13,737.00	90.00	178.30	13,176.34	-731.70	-308.45	729.75	0.85	0.00	-0.85
13,832.00	91.00	179.10	13,175.51	-826.67	-306.29	824.73	1.35	1.05	0.84
13,926.00	91.50	179.80	13,173.46	-920.65	-305.39	918.71	0.91	0.53	0.74
14,021.00	90.40	177.50	13,171.89	-1,015.60	-303.15	1,013.67	2.68	-1.16	-2.42
14,115.00	90.70	176.10	13,170.99	-1,109.45	-297.91	1,107.55	1.52	0.32	-1.49
14,210.00	90.80	176.30	13,169.74	-1,204.23	-291.61	1,202.37	0.24	0.11	0.21
14,305.00	89.50	173.10	13,169.49	-1,298.81	-282.84	1,297.01	3.64	-1.37	-3.37
14,400.00	89.10	172.60	13,170.65	-1,393.06	-271.02	1,391.33	0.67	-0.42	-0.53
14,494.00	89.80	175.20	13,171.56	-1,486.52	-261.03	1,484.85	2.86	0.74	2.77
14,589.00	90.20	174.60	13,171.56	-1,581.14	-252.58	1,579.52	0.76	0.42	-0.63
14,683.00	90.70	174.00	13,170.82	-1,674.67	-243.25	1,673.11	0.83	0.53	-0.64
14,777.00	90.40	175.70	13,169.92	-1,768.28	-234.81	1,766.77	1.84	-0.32	1.81
14,872.00	89.80	179.00	13,169.75	-1,863.17	-230.42	1,861.68	3.53	-0.63	3.47
14,966.00	91.00	182.70	13,169.09	-1,957.14	-231.81	1,955.64	4.14	1.28	3.94
15,061.00	88.90	177.60	13,169.18	-2,052.10	-232.06	2,050.60	5.81	-2.21	-5.37

Company:	ConocoPhillips	Local Co-ordinate Reference:	Well W3 1H
Project:	Lea County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3164.00usft (H&P 486)
Site:	War Hammer 25 Federal COM	MD Reference:	WELL @ 3164.00usft (H&P 486)
Well:	W3 1H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	EDM 5000.1 Conroe DB

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
15,155.00	88.60	179.10	13,171.23	-2,146.04	-229.36	2,144.55	1.63	-0.32	1.60
15,249.00	92.40	187.10	13,170.41	-2,239.80	-234.43	2,238.29	9.42	4.04	8.51
15,344.00	89.00	182.20	13,169.24	-2,334.44	-242.13	2,332.87	6.28	-3.58	-5.16
15,438.00	91.00	182.00	13,169.24	-2,428.37	-245.57	2,426.78	2.14	2.13	-0.21
15,532.00	90.10	179.20	13,168.34	-2,522.35	-246.56	2,520.75	3.13	-0.96	-2.98
15,627.00	90.60	177.90	13,167.76	-2,617.32	-244.15	2,615.73	1.47	0.53	-1.37
15,721.00	91.00	178.70	13,166.45	-2,711.27	-241.36	2,709.70	0.95	0.43	0.85
15,816.00	90.60	177.90	13,165.12	-2,806.21	-238.55	2,804.66	0.94	-0.42	-0.84
15,910.00	91.00	178.10	13,163.81	-2,900.15	-235.27	2,898.61	0.48	0.43	0.21
16,004.00	90.20	175.90	13,162.83	-2,994.01	-230.35	2,992.50	2.49	-0.85	-2.34
16,098.00	89.90	176.30	13,162.74	-3,087.79	-223.95	3,086.32	0.53	-0.32	0.43
16,193.00	89.10	176.70	13,163.57	-3,182.61	-218.15	3,181.17	0.94	-0.84	0.42
16,287.00	89.90	180.80	13,164.39	-3,276.56	-216.10	3,275.14	4.44	0.85	4.36
16,382.00	91.10	183.70	13,163.56	-3,371.47	-219.83	3,370.02	3.30	1.26	3.05
16,476.00	91.10	183.50	13,161.76	-3,465.27	-225.73	3,463.78	0.21	0.00	-0.21
16,571.00	90.50	184.00	13,160.43	-3,560.06	-231.95	3,558.53	0.82	-0.63	0.53
16,665.00	90.70	182.30	13,159.45	-3,653.91	-237.11	3,652.34	1.82	0.21	-1.81
16,760.00	88.40	178.70	13,160.20	-3,748.88	-237.94	3,747.31	4.50	-2.42	-3.79
16,854.00	88.70	179.10	13,162.57	-3,842.83	-236.14	3,841.27	0.53	0.32	0.43
16,949.00	91.90	177.60	13,162.08	-3,937.77	-233.40	3,936.23	3.72	3.37	-1.58
17,043.00	88.60	172.10	13,161.67	-4,031.34	-224.97	4,029.85	6.82	-3.51	-5.85
17,138.00	91.30	175.60	13,161.75	-4,125.77	-214.79	4,124.34	4.65	2.84	3.68
17,232.00	88.00	172.30	13,162.32	-4,219.22	-204.89	4,217.85	4.96	-3.51	-3.51
17,296.00	88.10	172.60	13,164.50	-4,282.63	-196.48	4,281.31	0.49	0.16	0.47
17,359.00	90.30	176.30	13,165.38	-4,345.32	-190.39	4,344.03	6.83	3.49	5.87
17,453.00	93.10	181.90	13,162.59	-4,439.22	-188.92	4,437.94	6.66	2.98	5.96
17,547.00	94.60	187.10	13,156.27	-4,532.68	-196.27	4,531.36	5.75	1.60	5.53
17,642.00	92.50	188.10	13,150.39	-4,626.66	-208.81	4,625.25	2.45	-2.21	1.05
17,736.00	89.80	184.90	13,148.51	-4,720.01	-219.44	4,718.54	4.45	-2.87	-3.40
17,830.00	91.60	189.20	13,147.36	-4,813.27	-230.98	4,811.72	4.96	1.91	4.57
17,925.00	87.90	186.40	13,147.77	-4,907.37	-243.87	4,905.74	4.88	-3.89	-2.95
18,019.00	89.50	184.80	13,149.90	-5,000.89	-253.04	4,999.20	2.41	1.70	-1.70
18,113.00	91.30	184.90	13,149.25	-5,094.54	-260.98	5,092.80	1.92	1.91	0.11
18,207.00	91.40	184.40	13,147.03	-5,188.21	-268.60	5,186.42	0.54	0.11	-0.53
18,302.00	89.30	183.90	13,146.45	-5,282.95	-275.47	5,281.12	2.27	-2.21	-0.53
18,396.00	87.40	177.60	13,149.16	-5,376.85	-276.71	5,375.01	7.00	-2.02	-6.70
18,490.00	91.30	179.40	13,150.23	-5,470.79	-274.25	5,468.96	4.57	4.15	1.91
18,585.00	88.00	174.90	13,150.81	-5,565.64	-269.53	5,563.83	5.87	-3.47	-4.74
18,679.00	90.30	177.50	13,152.20	-5,659.40	-263.30	5,657.64	3.69	2.45	2.77
18,773.00	89.30	177.00	13,152.53	-5,753.29	-258.79	5,751.55	1.19	-1.06	-0.53
18,867.00	90.50	179.80	13,152.70	-5,847.25	-256.16	5,845.52	3.24	1.28	2.98
18,962.00	89.10	171.80	13,153.03	-5,941.91	-249.21	5,940.23	8.55	-1.47	-8.42
19,056.00	91.40	177.50	13,152.62	-6,035.46	-240.45	6,033.83	6.54	2.45	6.06
19,151.00	91.30	177.70	13,150.38	-6,130.35	-236.48	6,128.74	0.24	-0.11	0.21

Company:	ConocoPhillips	Local Co-ordinate Reference:	Well W3 1H
Project:	Lea County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3164.00usft (H&P 486)
Site:	War Hammer 25 Federal COM	MD Reference:	WELL @ 3164.00usft (H&P 486)
Well:	W3 1H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	EDM 5000.1 Conroe DB

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
19,245.00	91.30	177.40	13,148.25	-6,224.24	-232.46	6,222.65	0.32	0.00	-0.32
19,339.00	91.00	176.00	13,146.36	-6,318.06	-227.05	6,316.51	1.52	-0.32	-1.49
19,434.00	90.20	174.60	13,145.36	-6,412.73	-219.26	6,411.23	1.70	-0.84	-1.47
19,528.00	92.20	181.10	13,143.39	-6,506.59	-215.74	6,505.11	7.23	2.13	6.91
19,623.00	88.30	177.10	13,142.98	-6,601.54	-214.25	6,600.06	5.88	-4.11	-4.21
19,717.00	88.50	177.70	13,145.60	-6,695.41	-209.98	6,693.95	0.67	0.21	0.64
19,812.00	88.60	178.90	13,148.01	-6,790.33	-207.17	6,788.90	1.27	0.11	1.26
19,906.00	90.60	180.40	13,148.66	-6,884.32	-206.59	6,882.89	2.66	2.13	1.60
19,969.00	92.00	181.10	13,147.24	-6,947.30	-207.42	6,945.86	2.48	2.22	1.11
20,027.00	92.00	181.10	13,145.21	-7,005.25	-208.53	7,003.80	0.00	0.00	0.00
Projection to TD - 20027.00' MD									

Casing Points					
Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")	
766.00	765.92	13 3/8"	13-3/8	17-1/2	
4,600.00	4,590.89	10 3/4"	10-3/4	12-1/4	
12,205.00	12,189.83	9 5/8"	9-5/8	12-1/4	

Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
20,027.00	13,145.21	-7,005.25	-208.53	Projection to TD - 20027.00' MD