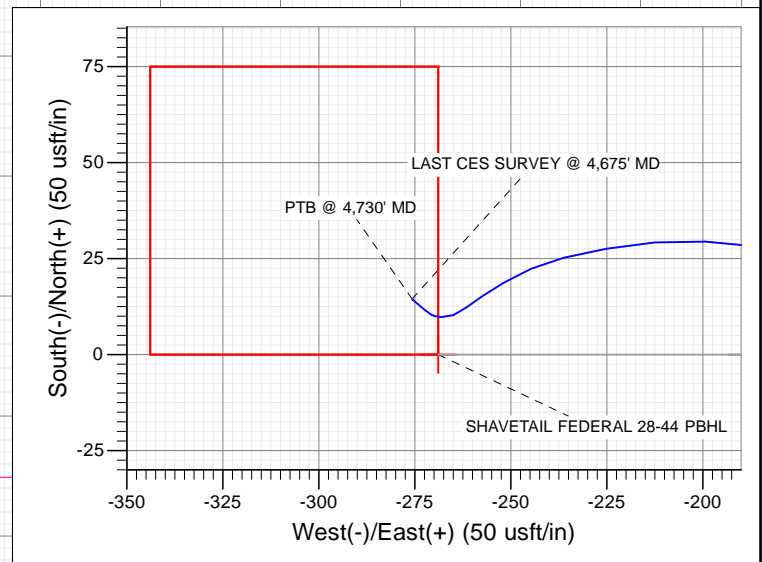
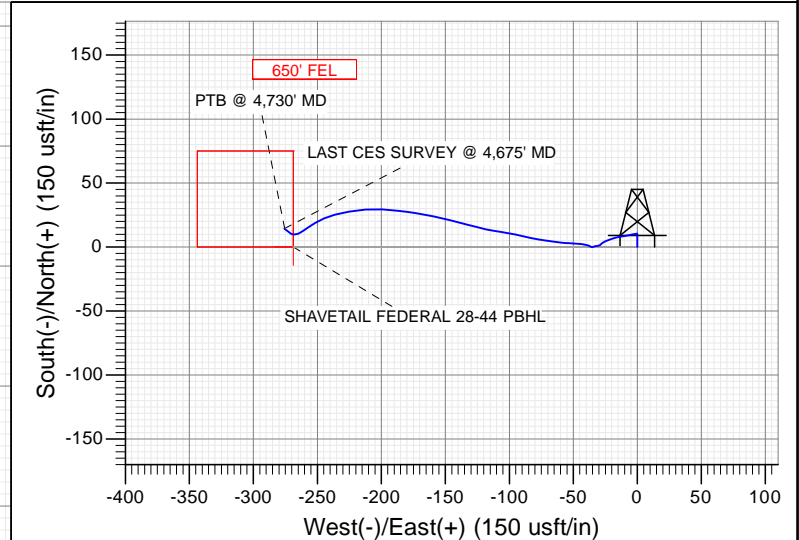
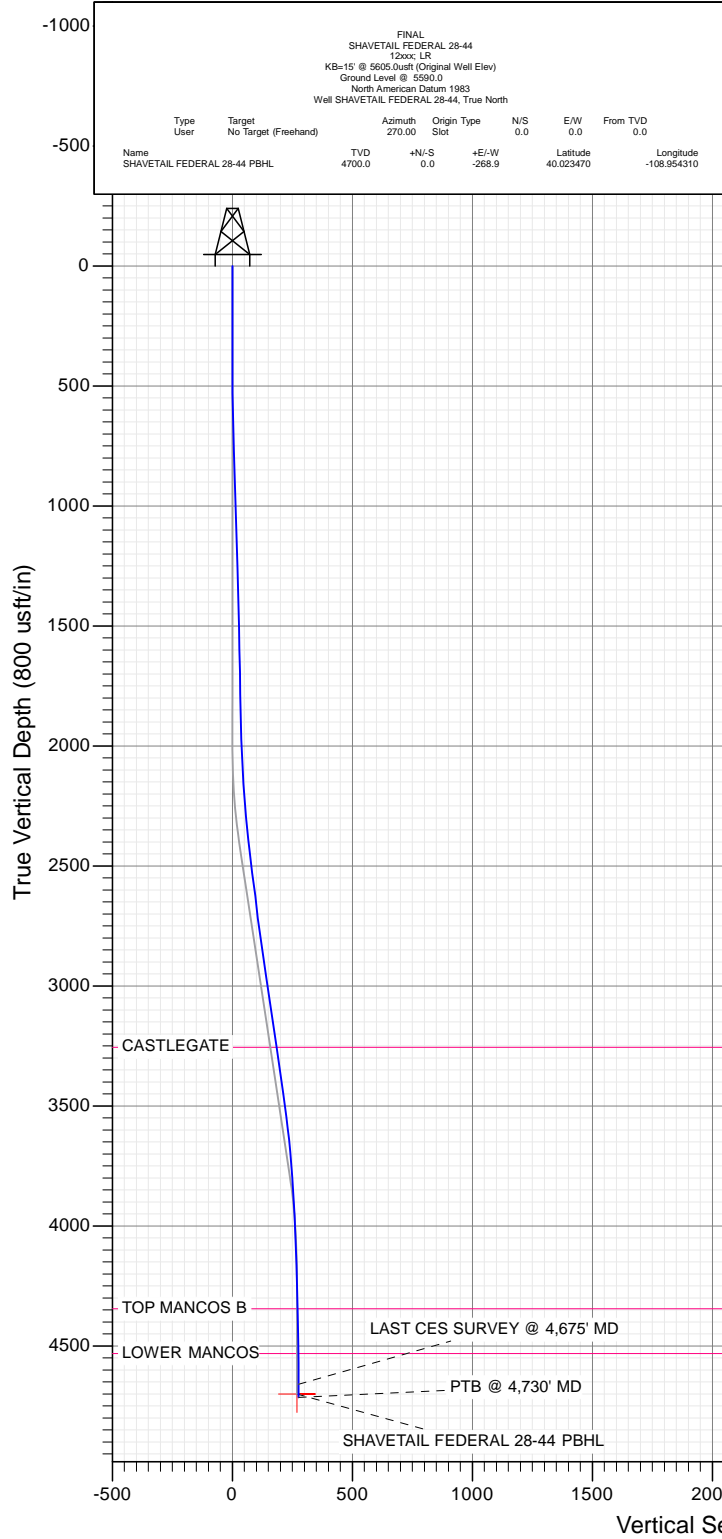




Project: RIO BLANCO COUNTY, CO
 Site: S28-T1N-R103W
 Well: SHAVETAIL FEDERAL 28-44
 Wellbore: OH
 Design: FINAL



T M
 Azimuths to True North
 Magnetic North: 10.30°
 Magnetic Field
 Strength: 52053.1snT
 Dip Angle: 66.30°
 Date: 7/30/2015
 Model: HDGM



WELL DETAILS: SHAVETAIL FEDERAL 28-44

+N/-S	+E/-W	Ground Level:	5590.0
0.0	0.0	1270226.00	2033109.00
		Latitude	Longitude
		40.023470	-108.953350



Survey Report

Company:	Coachman Energy Operating Company, LLC	Local Co-ordinate Reference:	Well SHAVETAIL FEDERAL 28-44
Project:	RIO BLANCO COUNTY, CO	TVD Reference:	KB=15' @ 5605.0usft (Original Well Elev)
Site:	S28-T1N-R103W	MD Reference:	KB=15' @ 5605.0usft (Original Well Elev)
Well:	SHAVETAIL FEDERAL 28-44	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	USA EDM 5000 Multi Users DB

Project	RIO BLANCO COUNTY, CO		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		

Site		S28-T1N-R103W			
Site Position:		Northing:	1,270,226.01 usft	Latitude:	40.023470
From:	Lat/Long	Easting:	2,033,109.00 usft	Longitude:	-108.953350
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-2.23 °

Well		SHAVETAIL FEDERAL 28-44				
Well Position	+N/-S	0.0 usft	Northing:	1,270,226.00 usft	Latitude:	40.023470
	+E/-W	0.0 usft	Easting:	2,033,109.00 usft	Longitude:	-108.953350
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	5,590.0 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	7/30/2015	10.30	66.30	52,053

Design	FINAL				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.0	0.0	0.0	270.00	

Survey Program	Date	8/26/2015			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
250.0	4,730.0	Survey #1 (OH)	MWD+HDGM	OWSG MWD + HDGM	

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usf)	Build Rate (°/100u)	Formations / Comments	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00		
250.0	0.94	0.00	250.0	2.1	0.0	0.0	0.38	0.38		
530.0	2.19	0.00	529.9	9.7	0.0	0.0	0.45	0.45		
575.0	1.70	258.90	574.9	10.4	-0.7	0.7	6.71	-1.09		
666.0	1.90	260.30	665.8	9.9	-3.5	3.5	0.23	0.22		
758.0	1.80	255.60	757.8	9.3	-6.4	6.4	0.20	-0.11		
853.0	1.70	262.40	852.7	8.7	-9.2	9.2	0.24	-0.11		
944.0	1.80	260.30	943.7	8.3	-12.0	12.0	0.13	0.11		
1,038.0	1.90	261.60	1,037.6	7.8	-15.0	15.0	0.12	0.11		
1,132.0	1.80	249.10	1,131.6	7.1	-17.9	17.9	0.44	-0.11		
1,226.0	1.60	253.50	1,225.5	6.2	-20.5	20.5	0.25	-0.21		
1,320.0	1.60	247.50	1,319.5	5.3	-23.0	23.0	0.18	0.00		
1,412.0	1.60	245.20	1,411.5	4.3	-25.3	25.3	0.07	0.00		

Survey Report

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Site:	S28-T1N-R103W	MD Reference:	KB=15' @ 5605.0usft (Original Well Elev)
Well:	SHAVETAIL FEDERAL 28-44	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	USA EDM 5000 Multi Users DB

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usf)	Build Rate (°/100u)	Formations / Comments
1,504.0	1.50	229.70	1,503.4	3.0	-27.4	27.4	0.47	-0.11	
1,598.0	1.50	231.80	1,597.4	1.4	-29.3	29.3	0.06	0.00	
1,693.0	1.30	276.70	1,692.4	0.8	-31.4	31.4	1.14	-0.21	
1,787.0	0.90	251.70	1,786.4	0.7	-33.1	33.1	0.66	-0.43	
1,879.0	1.10	243.60	1,878.3	0.0	-34.6	34.6	0.27	0.22	
1,970.0	2.10	297.50	1,969.3	0.4	-36.9	36.9	1.87	1.10	
2,065.0	2.90	282.70	2,064.2	1.8	-40.8	40.8	1.08	0.84	
2,158.0	4.50	275.30	2,157.0	2.6	-46.7	46.7	1.79	1.72	
2,251.0	3.90	270.20	2,249.8	3.0	-53.5	53.5	0.76	-0.65	
2,345.0	5.60	277.90	2,343.5	3.6	-61.2	61.2	1.93	1.81	
2,439.0	6.90	277.60	2,436.9	5.0	-71.4	71.4	1.38	1.38	
2,533.0	7.80	282.90	2,530.1	7.1	-83.2	83.2	1.20	0.96	
2,629.0	7.00	281.80	2,625.3	9.8	-95.3	95.3	0.85	-0.83	
2,722.0	6.90	277.70	2,717.6	11.7	-106.3	106.3	0.54	-0.11	
2,815.0	8.10	282.50	2,809.8	13.9	-118.3	118.3	1.45	1.29	
2,910.0	9.20	284.40	2,903.8	17.2	-132.2	132.2	1.20	1.16	
3,002.0	8.90	284.90	2,994.6	20.9	-146.2	146.2	0.34	-0.33	
3,094.0	8.40	281.90	3,085.6	24.1	-159.6	159.6	0.73	-0.54	
3,188.0	8.70	278.30	3,178.5	26.5	-173.4	173.4	0.65	0.32	
3,266.0	7.80	277.02	3,255.7	28.0	-184.5	184.5	1.18	-1.16	CASTLEGATE
3,283.0	7.60	276.70	3,272.6	28.3	-186.7	186.7	1.18	-1.16	
3,376.0	8.00	273.70	3,364.7	29.4	-199.3	199.3	0.61	0.43	
3,468.0	8.50	264.80	3,455.8	29.2	-212.4	212.4	1.49	0.54	
3,560.0	7.60	260.20	3,546.8	27.6	-225.2	225.2	1.20	-0.98	
3,654.0	6.20	255.40	3,640.2	25.2	-236.2	236.2	1.61	-1.49	
3,746.0	4.90	245.80	3,731.7	22.4	-244.6	244.6	1.73	-1.41	
3,840.0	4.90	240.50	3,825.4	18.8	-251.8	251.8	0.48	0.00	
3,933.0	3.40	234.00	3,918.1	15.2	-257.5	257.5	1.69	-1.61	
4,027.0	2.70	235.20	4,012.0	12.3	-261.6	261.6	0.75	-0.74	
4,122.0	2.00	245.90	4,106.9	10.3	-264.9	264.9	0.87	-0.74	
4,214.0	2.20	274.00	4,198.9	9.8	-268.1	268.1	1.13	0.22	
4,308.0	1.10	302.30	4,292.8	10.4	-270.7	270.7	1.42	-1.17	
4,360.0	1.49	307.50	4,344.8	11.1	-271.7	271.7	0.78	0.75	TOP MANCOS B
4,401.0	1.80	310.00	4,385.8	11.8	-272.6	272.6	0.78	0.76	
4,494.0	1.30	309.20	4,478.8	13.4	-274.5	274.5	0.54	-0.54	
4,547.0	0.78	310.59	4,531.8	14.0	-275.2	275.2	0.98	-0.98	LOWER MANCOS
4,586.0	0.40	313.90	4,570.8	14.3	-275.5	275.5	0.98	-0.98	
4,675.0	0.10	112.40	4,659.8	14.5	-275.7	275.7	0.56	-0.34	LAST CES SURVEY @ 4,675' MD
4,730.0	0.10	112.40	4,714.8	14.4	-275.6	275.6	0.00	0.00	PTB @ 4,730' MD

Survey Report

Company:	Coachman Energy Operating Company, LLC	Local Co-ordinate Reference:	Well SHAVETAIL FEDERAL 28-44
Project:	RIO BLANCO COUNTY, CO	TVD Reference:	KB=15' @ 5605.0usft (Original Well Elev)
Site:	S28-T1N-R103W	MD Reference:	KB=15' @ 5605.0usft (Original Well Elev)
Well:	SHAVETAIL FEDERAL 28-44	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	FINAL	Database:	USA EDM 5000 Multi Users DB

Targets									
Target Name									
- hit/miss target	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- Shape	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
SHAVETAIL FEDERAL 2	0.00	0.00	4,700.0	0.0	-268.9	1,270,236.48	2,032,840.35	40.023470	-108.954310
- actual wellpath misses target center by 16.0usft at 4715.3usft MD (4700.0 TVD, 14.5 N, -275.6 E)									
- Polygon									
Point 1			4,700.0	0.0	-75.0	1,270,239.40	2,032,765.40		
Point 2			4,700.0	75.0	-75.0	1,270,314.34	2,032,768.32		
Point 3			4,700.0	75.0	0.0	1,270,311.42	2,032,843.27		
Point 4			4,700.0	0.0	0.0	1,270,236.48	2,032,840.35		

Formations					
Measured Depth	Vertical Depth	Name	Lithology	Dip	Dip Direction
(usft)	(usft)			(°)	(°)
3,266.0	3,255.7	CASTLEGATE		0.00	
4,360.0	4,344.8	TOP MANCOS B		0.00	
4,547.0	4,531.8	LOWER MANCOS		0.00	

Design Annotations					
Measured Depth	Vertical Depth	Local Coordinates			
(usft)	(usft)	+N/-S	+E/-W	Comment	
(usft)	(usft)	(usft)	(usft)		
4,675.0	4,659.8	14.5	-275.7	LAST CES SURVEY @ 4,675' MD	
4,730.0	4,714.8	14.4	-275.6	PTB @ 4,730' MD	

Checked By: _____	Approved By: _____	Date: _____
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