



Weatherford®

Weatherford International Ltd.

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Colorado Oil & Gas Conservation Commission
1120 Lincoln Street, Suite 801
Denver, Colorado 80203

Date: November 16, 2012

Attention:

Shell Exploration & Production
WOOD GULCH 1-36
MOFFAT COUNTY, CO

Attached to this letter is a copy of the surveys taken by Precision Energy Services, a Weatherford International Ltd. company, MWD equipment on the subject well. The surveys from 149' MD to 3802' MD represent, to the best of our knowledge, a true and accurate survey of the wellbore at the time the survey was run

Tracy Williams
Well Planning Department

Cc: Keith Smelker



Company:	SHELL E&P	Local Co-ordinate Reference:	Well WOOD GULCH 1-36
Project:	MOFFAT COUNTY, CO	TVD Reference:	WELL @ 6581.70ft (Estimated KB)
Site:	WOOD GULCH 1-36	MD Reference:	WELL @ 6581.70ft (Estimated KB)
Well:	WOOD GULCH 1-36	North Reference:	True
Wellbore:	WOOD GULCH 1-36	Survey Calculation Method:	Minimum Curvature
Design:	WOOD GULCH 1-36	Database:	EDM 5000.1 Single User Db

Project	MOFFAT 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		WOOD GULCH 1-36			
Site Position:		Northing:	1,352,633.54 usft	Latitude:	40° 16' 52.330 N
From:	Lat/Long	Easting:	2,396,982.99 usft	Longitude:	107° 39' 41.680 W
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16"	Grid Convergence:	-1.40 °

Well	WOOD GULCH 1-36					
Well Position	+N/-S	0.00 ft	Northing:	1,352,633.54 usft	Latitude:	40° 16' 52.330 N
	+E/-W	0.00 ft	Easting:	2,396,982.99 usft	Longitude:	107° 39' 41.680 W
Position Uncertainty		0.00 ft	Wellhead Elevation:	ft	Ground Level:	6,569.20 ft

Wellbore	WOOD GULCH 1-36				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2011	3/28/2012	10.21	66.41	52,594

Design	WOOD GULCH 1-36				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (ft)		+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.00		0.00	0.00	197.12

Survey Program	Date	8/29/2012			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
149.00	3,856.00	Survey #1 (WOOD GULCH 1-36)	MWD	MWD - Standard	

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	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	
149.00	0.54	219.57	149.00	-0.54	-0.45	0.65	0.36	0.36	0.00	
210.00	1.07	215.68	209.99	-1.23	-0.96	1.45	0.87	0.87	-6.38	
272.00	1.63	222.41	271.97	-2.35	-1.89	2.80	0.94	0.90	10.85	
334.00	2.00	221.79	333.94	-3.80	-3.21	4.58	0.60	0.60	-1.00	
396.00	2.38	219.79	395.90	-5.60	-4.76	6.75	0.63	0.61	-3.23	
457.00	2.69	223.54	456.84	-7.61	-6.55	9.20	0.58	0.51	6.15	
519.00	3.00	221.54	518.76	-9.88	-8.63	11.98	0.52	0.50	-3.23	
559.00	3.31	222.04	558.70	-11.52	-10.10	13.98	0.78	0.78	1.25	
631.00	4.00	226.27	630.55	-14.80	-13.30	18.06	1.03	0.96	5.88	
663.00	4.05	228.10	662.47	-16.33	-14.95	20.00	0.43	0.16	5.72	
695.00	5.25	224.79	694.37	-18.12	-16.82	22.27	3.84	3.75	-10.34	
726.00	6.50	215.79	725.21	-20.55	-18.85	25.19	5.00	4.03	-29.03	



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Well:	WOOD GULCH 1-36	North Reference:	True
Wellbore:	WOOD GULCH 1-36	Survey Calculation Method:	Minimum Curvature
Design:	WOOD GULCH 1-36	Database:	EDM 5000.1 Single User Db

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
758.00	8.38	211.41	756.94	-24.01	-21.12	29.16	6.13	5.88	-13.69	
790.00	10.50	208.66	788.50	-28.56	-23.74	34.28	6.77	6.63	-8.59	
821.00	12.31	207.41	818.89	-33.97	-26.61	40.30	5.89	5.84	-4.03	
853.00	14.00	205.16	850.05	-40.50	-29.83	47.49	5.52	5.28	-7.03	
884.00	15.69	203.29	880.01	-47.75	-33.08	55.37	5.67	5.45	-6.03	
916.00	17.63	198.54	910.67	-56.32	-36.34	64.52	7.40	6.06	-14.84	
948.00	19.44	197.29	941.01	-66.00	-39.46	74.69	5.79	5.66	-3.91	
980.00	21.13	197.29	971.02	-76.59	-42.76	85.78	5.28	5.28	0.00	
1,012.00	23.31	196.29	1,000.64	-88.18	-46.25	97.88	6.91	6.81	-3.13	
1,044.00	25.63	195.79	1,029.77	-100.92	-49.91	111.13	7.28	7.25	-1.56	
1,075.00	27.69	195.54	1,057.47	-114.31	-53.66	125.04	6.66	6.65	-0.81	
1,107.00	29.75	195.91	1,085.53	-129.11	-57.83	140.41	6.46	6.44	1.16	
1,138.00	31.56	196.29	1,112.20	-144.29	-62.21	156.21	5.87	5.84	1.23	
1,170.00	33.63	196.79	1,139.16	-160.82	-67.12	173.45	6.52	6.47	1.56	
1,202.00	36.25	196.66	1,165.39	-178.37	-72.40	191.77	8.19	8.19	-0.41	
1,234.00	38.75	197.54	1,190.77	-196.98	-78.13	211.25	7.99	7.81	2.75	
1,266.00	41.63	196.66	1,215.21	-216.72	-84.19	231.90	9.17	9.00	-2.75	
1,297.00	43.94	196.41	1,237.96	-236.90	-90.19	252.96	7.47	7.45	-0.81	
1,329.00	44.19	196.41	1,260.96	-258.25	-96.47	275.21	0.78	0.78	0.00	
1,360.00	44.44	195.16	1,283.14	-279.09	-102.36	296.86	2.93	0.81	-4.03	
1,392.00	44.00	194.66	1,306.07	-300.66	-108.11	319.16	1.75	-1.38	-1.56	
1,423.00	43.81	194.16	1,328.41	-321.48	-113.46	340.63	1.28	-0.61	-1.61	
1,455.00	43.63	193.04	1,351.54	-342.97	-118.66	362.71	2.48	-0.56	-3.50	
1,487.00	43.44	193.04	1,374.73	-364.45	-123.63	384.69	0.59	-0.59	0.00	
1,519.00	43.38	192.29	1,397.98	-385.90	-128.45	406.62	1.62	-0.19	-2.34	
1,552.00	43.06	192.04	1,422.03	-407.99	-133.21	429.13	1.10	-0.97	-0.76	
1,584.00	44.38	193.16	1,445.16	-429.58	-138.04	451.18	4.78	4.13	3.50	
1,615.00	44.75	195.54	1,467.24	-450.65	-143.43	472.90	5.52	1.19	7.68	
1,647.00	46.13	197.54	1,489.70	-472.50	-149.93	495.70	6.20	4.31	6.25	
1,679.00	46.69	197.29	1,511.76	-494.61	-156.86	518.87	1.84	1.75	-0.78	
1,710.00	46.88	197.54	1,532.99	-516.17	-163.63	541.47	0.85	0.61	0.81	
1,742.00	46.75	197.66	1,554.89	-538.41	-170.68	564.80	0.49	-0.41	0.38	
1,837.00	46.38	197.16	1,620.20	-604.24	-191.32	633.78	0.55	-0.39	-0.53	
1,932.00	44.66	198.25	1,686.76	-668.81	-211.93	701.56	1.99	-1.81	1.15	
2,027.00	43.88	197.79	1,754.79	-731.87	-232.44	767.86	0.89	-0.82	-0.48	
2,122.00	43.50	196.66	1,823.48	-794.54	-251.87	833.48	0.91	-0.40	-1.19	
2,217.00	44.00	196.29	1,892.11	-857.54	-270.50	899.17	0.59	0.53	-0.39	
2,312.00	43.88	195.91	1,960.51	-920.87	-288.79	965.08	0.30	-0.13	-0.40	
2,406.00	45.56	196.04	2,027.30	-984.46	-306.99	1,031.21	1.79	1.79	0.14	
2,501.00	45.31	195.66	2,093.97	-1,049.57	-325.48	1,098.87	0.39	-0.26	-0.40	
2,596.00	44.82	195.50	2,161.07	-1,114.35	-343.54	1,166.10	0.53	-0.52	-0.17	
2,693.00	44.31	194.66	2,230.17	-1,180.07	-361.25	1,234.12	0.80	-0.53	-0.87	
2,788.00	44.81	196.16	2,297.87	-1,244.32	-378.96	1,300.75	1.23	0.53	1.58	
2,882.00	43.44	195.41	2,365.34	-1,307.30	-396.77	1,366.17	1.56	-1.46	-0.80	
2,977.00	45.00	195.79	2,433.42	-1,371.11	-414.59	1,432.40	1.67	1.64	0.40	
3,072.00	45.13	196.60	2,500.52	-1,435.69	-433.35	1,499.64	0.62	0.14	0.85	
3,167.00	45.38	196.66	2,567.40	-1,500.34	-452.66	1,567.11	0.27	0.26	0.06	
3,262.00	45.25	197.91	2,634.20	-1,564.83	-472.73	1,634.65	0.95	-0.14	1.32	
3,357.00	45.69	199.04	2,700.82	-1,629.06	-494.19	1,702.36	0.97	0.46	1.19	
3,453.00	45.75	198.79	2,767.85	-1,694.08	-516.47	1,771.05	0.20	0.06	-0.26	
3,548.00	44.56	198.54	2,834.84	-1,757.89	-538.02	1,838.38	1.27	-1.25	-0.26	
3,643.00	44.75	198.16	2,902.42	-1,821.27	-559.04	1,905.14	0.35	0.20	-0.40	
3,738.00	43.81	198.04	2,970.43	-1,884.31	-579.65	1,971.45	0.99	-0.99	-0.13	
LAST SVY										



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Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
3,802.00	43.39	197.43	3,016.78	-1,926.35	-593.10	2,015.58	0.93	-0.66	-0.95	
PROJ SVY										
3,856.00	43.39	197.43	3,056.02	-1,961.74	-604.21	2,052.68	0.00	0.00	0.00	

Survey Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
3,802.00	3,016.78	-1,926.35	-593.10	LAST SVY	
3,856.00	3,056.02	-1,961.74	-604.21	PROJ SVY	

Checked By: _____	Approved By: _____	Date: _____
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