



Directional Survey

Well Name: BLACK MAMBA 15 STATE COM 7H

HOBBS OCD
JAN 2 2016
NM 016

Sub-Division DELAWARE BASIN EAST		Region BASIN EAST		Field Name JOHNSON RANCH		County LEA		State/Province NM 016					
Surface Legal Location SEC10 T23S R33E		API/UWI 3002542623		Latitude (°) 32° 18' 47.733" N		Longitude (°) 103° 33' 15.501" W		Orig KB Elevation (ft) 3,679.50		Ground Elev MSL (ft) 3,652.50		KB - GL (ft) 27.00	
Wellbores													
Wellbore Name OH		Parent Wellbore OH			SAP Well ID 38686			Vertical Section Direction (°) 182.88					
Kick Offs & Key Depths													
Date 8/12/2015				Type KICK OFF				Top Depth (ftKB) 10,702.0					
Actual Deviation Survey EXTREAM SURVEY, Proposed? No				Definitive? Yes		Proposed? No		Proposed Deviation Survey EXTREAM SURVEY, Proposed? No					
Deviation Survey													
Date 7/29/2015		Description EXTREAM SURVEY											
MD Tie In (ftKB) 0.00		TVD Tie In (ftKB) 0.00		Inclination Tie In (°) 0.00		Azimuth Tie In (°) 0.00		NSTie In (ft) 0.00		EWTie In (ft) 0.00			
Survey Data													
Date	MD (ftKB)	Incl (°)	Azm (°)	TVD (ftKB)	VS (ft)	N/S (ft)	E/W (ft)	DLS (°/100ft)	Survey Tool	Survey Company			
8/3/2015	40.23	1.19	305.19	40.23	-0.22	0.24	-0.34	2.96	MWD	X-EXTREME			
7/29/2015	273.00	0.31	5.99	272.98	-2.14	2.26	-2.25	0.46	MWD	X-EXTREME			
7/29/2015	335.00	0.31	35.80	334.98	-2.45	2.56	-2.14	0.26	MWD	X-EXTREME			
7/29/2015	398.00	0.49	26.59	397.97	-2.84	2.94	-1.92	0.30	MWD	X-EXTREME			
7/29/2015	461.00	0.40	34.21	460.97	-3.28	3.36	-1.67	0.17	MWD	X-EXTREME			
7/29/2015	525.00	0.62	27.91	524.97	-3.78	3.86	-1.38	0.35	MWD	X-EXTREME			
7/30/2015	587.00	0.62	34.30	586.97	-4.37	4.43	-1.04	0.11	MWD	X-EXTREME			
7/30/2015	649.00	0.49	15.00	648.96	-4.92	4.96	-0.78	0.36	MWD	X-EXTREME			
7/30/2015	710.00	0.62	35.62	709.96	-5.45	5.48	-0.52	0.39	MWD	X-EXTREME			
7/30/2015	774.00	0.49	15.31	773.96	-6.01	6.03	-0.25	0.37	MWD	X-EXTREME			
7/30/2015	867.00	0.31	59.81	866.96	-6.53	6.54	0.08	0.37	MWD	X-EXTREME			
7/30/2015	958.00	0.62	10.81	957.95	-7.16	7.15	0.38	0.53	MWD	X-EXTREME			
7/30/2015	1,051.00	0.49	14.82	1,050.95	-8.04	8.02	0.58	0.15	MWD	X-EXTREME			
7/30/2015	1,145.00	0.49	12.62	1,144.95	-8.83	8.80	0.77	0.02	MWD	X-EXTREME			
7/30/2015	1,243.00	0.62	12.79	1,242.94	-9.77	9.73	0.98	0.13	MWD	X-EXTREME			
7/30/2015	1,341.00	0.62	22.49	1,340.93	-10.79	10.74	1.30	0.11	MWD	X-EXTREME			
7/30/2015	1,396.00	0.71	33.11	1,395.93	-11.36	11.30	1.60	0.28	MWD	X-EXTREME			
7/30/2015	1,554.00	0.09	299.78	1,553.93	-12.27	12.18	2.02	0.46	MWD	X-EXTREME			
7/30/2015	1,649.00	0.22	148.39	1,648.93	-12.15	12.06	2.06	0.32	MWD	X-EXTREME			
7/30/2015	1,744.00	0.09	1.61	1,743.93	-12.07	11.98	2.15	0.32	MWD	X-EXTREME			
7/30/2015	1,937.00	0.09	5.48	1,936.93	-12.38	12.28	2.17	0.00	MWD	X-EXTREME			
8/3/2015	2,124.80	0.09	173.48	2,124.73	-12.38	12.28	2.20	0.10	MWD	X-EXTREME			
8/3/2015	2,312.00	0.22	52.42	2,311.93	-12.47	12.36	2.50	0.15	MWD	X-EXTREME			
8/3/2015	2,504.00	0.40	333.88	2,503.92	-13.29	13.18	2.50	0.22	MWD	X-EXTREME			
8/3/2015	2,693.00	0.79	20.29	2,692.91	-15.11	15.00	2.66	0.31	MWD	X-EXTREME			
8/3/2015	2,883.00	0.44	18.18	2,882.90	-17.07	16.92	3.34	0.18	MWD	X-EXTREME			
8/3/2015	3,074.00	0.22	33.30	3,073.90	-18.09	17.92	3.77	0.12	MWD	X-EXTREME			
8/3/2015	3,263.00	0.70	46.70	3,262.89	-19.24	19.02	4.81	0.26	MWD	X-EXTREME			
8/3/2015	3,453.00	1.19	35.58	3,452.87	-21.73	21.42	6.81	0.27	MWD	X-EXTREME			
8/3/2015	3,643.00	2.20	31.01	3,642.78	-26.61	26.15	9.83	0.54	MWD	X-EXTREME			
8/3/2015	3,832.00	1.89	12.60	3,831.66	-32.88	32.30	12.38	0.38	MWD	X-EXTREME			
8/3/2015	3,928.00	1.19	345.62	3,927.63	-35.39	34.81	12.48	1.03	MWD	X-EXTREME			
8/3/2015	4,118.00	0.40	50.07	4,117.61	-37.73	37.15	12.50	0.57	MWD	X-EXTREME			
8/3/2015	4,213.00	1.41	85.81	4,212.60	-38.10	37.45	13.92	1.17	MWD	X-EXTREME			
8/3/2015	4,309.00	1.32	68.02	4,308.57	-38.71	37.95	16.12	0.45	MWD	X-EXTREME			
8/3/2015	4,405.00	1.01	64.02	4,404.55	-39.58	38.73	17.91	0.33	MWD	X-EXTREME			
8/3/2015	4,499.00	1.30	89.02	4,498.53	-40.05	39.11	19.72	0.61	MWD	X-EXTREME			
8/3/2015	4,594.00	1.80	89.20	4,593.50	-40.22	39.15	22.29	0.53	MWD	X-EXTREME			
8/3/2015	4,688.00	2.59	76.98	4,687.43	-40.90	39.65	25.83	0.97	MWD	X-EXTREME			
8/3/2015	4,783.00	2.99	77.29	4,782.32	-42.15	40.68	30.34	0.42	MWD	X-EXTREME			
8/3/2015	4,878.00	3.30	78.60	4,877.17	-43.49	41.76	35.44	0.33	MWD	X-EXTREME			
8/3/2015	4,977.00	2.02	79.00	4,976.06	-44.61	42.66	39.95	1.29	MWD	X-EXTREME			
8/3/2015	5,013.00	1.49	63.18	5,012.05	-45.00	42.99	40.99	1.98	MWD	X-EXTREME			
8/3/2015	5,147.00	0.69	25.24	5,146.02	-46.61	44.51	42.88	0.77	MWD	WEATHERFORD			
8/3/2015	5,179.00	0.70	18.57	5,178.02	-46.97	44.87	43.03	0.25	MWD	WEATHERFORD			
8/3/2015	5,210.00	0.56	344.21	5,209.02	-47.30	45.19	43.05	1.28	MWD	WEATHERFORD			
8/3/2015	5,242.00	0.66	318.49	5,241.02	-47.58	45.48	42.88	0.90	MWD	WEATHERFORD			
8/3/2015	5,273.00	1.05	299.20	5,272.01	-47.83	45.75	42.52	1.55	MWD	WEATHERFORD			
8/3/2015	5,305.00	1.55	291.00	5,304.01	-48.10	46.05	41.86	1.66	MWD	WEATHERFORD			
8/3/2015	5,337.00	1.90	285.79	5,335.99	-48.35	46.35	40.94	1.20	MWD	WEATHERFORD			
8/3/2015	5,368.00	1.99	288.12	5,366.97	-48.61	46.66	39.94	0.39	MWD	WEATHERFORD			
8/3/2015	5,400.00	2.23	284.97	5,398.95	-48.88	46.99	38.81	0.83	MWD	WEATHERFORD			
8/3/2015	5,432.00	2.61	282.78	5,430.92	-49.14	47.31	37.50	1.22	MWD	WEATHERFORD			
8/3/2015	5,463.00	3.04	279.34	5,461.89	-49.35	47.60	36.00	1.49	MWD	WEATHERFORD			
8/3/2015	5,495.00	3.43	279.57	5,493.83	-49.56	47.90	34.21	1.22	MWD	WEATHERFORD			
8/3/2015	5,527.00	3.88	277.49	5,525.77	-49.76	48.20	32.20	1.47	MWD	WEATHERFORD			
8/3/2015	5,558.00	4.42	277.16	5,556.69	-49.93	48.49	29.97	1.74	MWD	WEATHERFORD			
8/3/2015	5,590.00	5.14	274.93	5,588.58	-50.07	48.76	27.32	2.32	MWD	WEATHERFORD			
8/3/2015	5,622.00	5.39	272.88	5,620.44	-50.13	48.96	24.39	0.98	MWD	WEATHERFORD			
8/3/2015	5,653.00	5.34	269.20	5,651.31	-50.03	49.01	21.49	1.12	MWD	WEATHERFORD			
8/3/2015	5,685.00	5.41	267.04	5,683.17	-49.78	48.92	18.50	0.67	MWD	WEATHERFORD			
8/3/2015	5,717.00	5.90	264.64	5,715.01	-49.39	48.68	15.36	1.70	MWD	WEATHERFORD			
8/3/2015	5,748.00	6.36	260.75	5,745.83	-48.81	48.26	12.07	2.00	MWD	WEATHERFORD			
8/3/2015	5,780.00	6.53	259.98	5,777.63	-48.03	47.66	8.53	0.60	MWD	WEATHERFORD			
8/3/2015	5,812.00	6.51	259.11	5,809.42	-47.19	47.00	4.96	0.31	MWD	WEATHERFORD			
8/3/2015	5,843.00	6.50	260.00	5,840.22	-46.38	46.36	1.51	0.33	MWD	WEATHERFORD			

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Sub-Division		Region		Field Name				County		State/Province		
DELAWARE BASIN EAST		BASIN EAST		JOHNSON RANCH				LEA		NM		
Surface Legal Location		API/UWI		Latitude (°)		Longitude (°)		Orig KB Elevation (ft)		Ground Elev MSL (ft)		KB - GL (ft)
SEC10 T23S R33E		3002542623		32° 18' 47.733" N		103° 33' 15.501" W		3,679.50		3,652.50		27.00
Survey Data												
Date	MD (ftKB)	Incl (°)	Azm (°)	TVD (ftKB)	VS (ft)	N/S (ft)	E/W (ft)	DLS (°/100ft)	Survey Tool	Survey Company		
8/3/2015	5,907.00	6.54	260.02	5,903.81	-44.76	45.10	-5.65	0.06	MWD	WEATHERFORD		
8/3/2015	5,970.00	6.56	260.79	5,966.40	-43.21	43.90	-12.74	0.14	MWD	WEATHERFORD		
8/3/2015	6,002.00	6.33	259.91	5,998.20	-42.43	43.30	-16.28	0.78	MWD	WEATHERFORD		
8/3/2015	6,065.00	6.10	259.50	6,060.83	-40.88	42.08	-22.99	0.37	MWD	WEATHERFORD		
8/3/2015	6,097.00	5.99	259.03	6,092.65	-40.08	41.46	-26.30	0.38	MWD	WEATHERFORD		
8/3/2015	6,192.00	5.98	260.47	6,187.13	-37.83	39.69	-36.05	0.16	MWD	WEATHERFORD		
8/3/2015	6,286.00	5.86	260.44	6,280.63	-35.75	38.09	-45.61	0.13	MWD	WEATHERFORD		
8/3/2015	6,381.00	5.86	261.40	6,375.13	-33.74	36.56	-55.18	0.10	MWD	WEATHERFORD		
8/3/2015	6,476.00	5.73	262.04	6,469.65	-31.88	35.17	-64.68	0.15	MWD	WEATHERFORD		
8/3/2015	6,571.00	5.68	262.01	6,564.18	-30.10	33.86	-74.03	0.05	MWD	WEATHERFORD		
8/3/2015	6,666.00	5.99	263.02	6,658.68	-28.37	32.61	-83.60	0.34	MWD	WEATHERFORD		
8/3/2015	6,760.00	6.00	263.43	6,752.17	-26.72	31.45	-93.35	0.05	MWD	WEATHERFORD		
8/3/2015	6,855.00	5.92	262.45	6,846.66	-25.02	30.24	-103.14	0.14	MWD	WEATHERFORD		
8/3/2015	6,950.00	5.82	263.95	6,941.16	-23.38	29.09	-112.79	0.19	MWD	WEATHERFORD		
8/3/2015	7,045.00	5.90	263.53	7,035.66	-21.84	28.03	-122.43	0.10	MWD	WEATHERFORD		
8/3/2015	7,140.00	5.59	259.60	7,130.19	-19.99	26.64	-131.83	0.53	MWD	WEATHERFORD		
8/3/2015	7,235.00	5.55	259.86	7,224.74	-17.89	25.00	-140.91	0.05	MWD	WEATHERFORD		
8/3/2015	7,330.00	5.58	261.09	7,319.29	-15.91	23.47	-149.99	0.13	MWD	WEATHERFORD		
8/3/2015	7,424.00	5.47	261.69	7,412.85	-14.11	22.12	-158.94	0.13	MWD	WEATHERFORD		
8/3/2015	7,519.00	5.29	262.18	7,507.43	-12.41	20.87	-167.76	0.20	MWD	WEATHERFORD		
8/3/2015	7,614.00	4.91	262.32	7,602.06	-10.86	19.73	-176.13	0.40	MWD	WEATHERFORD		
8/3/2015	7,709.00	4.63	261.02	7,696.73	-9.32	18.59	-183.94	0.32	MWD	WEATHERFORD		
8/3/2015	7,804.00	4.90	261.43	7,791.40	-7.73	17.39	-191.74	0.29	MWD	WEATHERFORD		
8/3/2015	7,899.00	4.77	260.25	7,886.06	-6.06	16.11	-199.65	0.17	MWD	WEATHERFORD		
8/3/2015	7,994.00	4.70	261.74	7,980.74	-4.44	14.88	-207.39	0.15	MWD	WEATHERFORD		
8/3/2015	8,089.00	5.41	264.62	8,075.37	-3.05	13.90	-215.70	0.79	MWD	WEATHERFORD		
8/3/2015	8,184.00	5.11	262.94	8,169.97	-1.68	12.96	-224.36	0.35	MWD	WEATHERFORD		
8/3/2015	8,280.00	4.66	264.02	8,265.62	-0.34	12.03	-232.48	0.48	MWD	WEATHERFORD		
8/3/2015	8,374.00	5.07	263.09	8,359.28	0.96	11.14	-240.40	0.44	MWD	WEATHERFORD		
8/3/2015	8,470.00	4.79	261.80	8,454.92	2.45	10.05	-248.58	0.31	MWD	WEATHERFORD		
8/3/2015	8,565.00	5.25	261.65	8,549.56	4.06	8.86	-256.81	0.48	MWD	WEATHERFORD		
8/3/2015	8,659.00	5.47	260.64	8,643.15	5.85	7.50	-265.48	0.25	MWD	WEATHERFORD		
8/3/2015	8,754.00	5.03	257.75	8,737.75	7.89	5.88	-274.02	0.54	MWD	WEATHERFORD		
8/3/2015	8,849.00	5.13	260.99	8,832.38	9.85	4.33	-282.28	0.32	MWD	WEATHERFORD		
8/3/2015	8,944.00	5.77	266.45	8,926.95	11.26	3.37	-291.24	0.87	MWD	WEATHERFORD		
8/3/2015	9,038.00	5.31	268.85	9,020.51	12.10	2.99	-300.31	0.55	MWD	WEATHERFORD		
8/3/2015	9,133.00	5.28	263.54	9,115.10	13.12	2.41	-309.05	0.52	MWD	WEATHERFORD		
8/3/2015	9,228.00	5.30	260.02	9,209.70	14.80	1.16	-317.71	0.34	MWD	WEATHERFORD		
8/3/2015	9,323.00	4.28	260.94	9,304.37	16.51	-0.16	-325.53	1.08	MWD	WEATHERFORD		
8/3/2015	9,418.00	3.26	259.60	9,399.16	17.87	-1.20	-331.69	1.08	MWD	WEATHERFORD		
8/3/2015	9,513.00	2.38	252.61	9,494.04	19.17	-2.28	-336.23	0.99	MWD	WEATHERFORD		
8/3/2015	9,608.00	1.97	252.33	9,588.98	20.43	-3.37	-339.67	0.43	MWD	WEATHERFORD		
8/3/2015	9,702.00	1.83	254.75	9,682.92	21.46	-4.25	-342.66	0.17	MWD	WEATHERFORD		
8/3/2015	9,797.00	1.55	258.66	9,777.88	22.25	-4.90	-345.38	0.32	MWD	WEATHERFORD		
8/3/2015	9,892.00	1.04	291.32	9,872.86	22.29	-4.84	-347.44	0.92	MWD	WEATHERFORD		
8/3/2015	9,987.00	0.63	254.07	9,967.85	22.19	-4.67	-348.75	0.69	MWD	WEATHERFORD		
8/3/2015	10,082.00	0.85	225.39	10,062.84	22.88	-5.31	-349.75	0.45	MWD	WEATHERFORD		
8/3/2015	10,177.00	1.13	237.21	10,157.83	23.94	-6.31	-351.04	0.36	MWD	WEATHERFORD		
8/3/2015	10,258.00	1.64	244.89	10,238.80	24.95	-7.24	-352.76	0.67	MWD	WEATHERFORD		
8/3/2015	10,271.00	1.68	241.18	10,251.80	25.14	-7.41	-353.10	0.88	MWD	WEATHERFORD		
8/3/2015	10,366.00	0.94	259.23	10,346.77	26.05	-8.22	-355.08	0.88	MWD	WEATHERFORD		
8/3/2015	10,460.00	0.43	306.37	10,440.77	26.04	-8.16	-356.13	0.77	MWD	WEATHERFORD		
8/3/2015	10,555.00	0.16	124.14	10,535.77	25.91	-8.02	-356.30	0.62	MWD	WEATHERFORD		
8/3/2015	10,631.00	0.64	107.80	10,611.76	26.08	-8.21	-355.81	0.64	MWD	WEATHERFORD		
8/3/2015	10,648.00	0.55	107.91	10,628.76	26.12	-8.27	-355.64	0.53	MWD	WEATHERFORD		
8/3/2015	10,680.00	0.80	108.01	10,660.76	26.22	-8.38	-355.28	0.78	MWD	WEATHERFORD		
8/3/2015	10,712.00	2.50	147.68	10,692.75	26.85	-9.04	-354.70	6.10	MWD	WEATHERFORD		
8/3/2015	10,743.00	6.03	157.54	10,723.66	28.88	-11.12	-353.71	11.59	MWD	WEATHERFORD		
8/3/2015	10,775.00	10.35	161.99	10,755.32	33.08	-15.41	-352.18	13.63	MWD	WEATHERFORD		
8/3/2015	10,807.00	14.52	163.10	10,786.57	39.55	-21.98	-350.13	13.05	MWD	WEATHERFORD		
8/3/2015	10,838.00	18.50	165.03	10,816.28	47.89	-30.45	-347.73	12.96	MWD	WEATHERFORD		
8/3/2015	10,870.00	20.95	167.87	10,846.40	58.25	-40.95	-345.21	8.22	MWD	WEATHERFORD		
8/3/2015	10,901.00	23.41	172.99	10,875.11	69.67	-52.49	-343.30	10.09	MWD	WEATHERFORD		
8/3/2015	10,933.00	25.84	176.93	10,904.20	82.87	-65.76	-342.15	9.16	MWD	WEATHERFORD		
8/3/2015	10,965.00	28.17	178.55	10,932.71	97.34	-80.28	-341.58	7.63	MWD	WEATHERFORD		
8/3/2015	10,996.00	30.34	177.06	10,959.75	112.43	-95.42	-340.99	7.38	MWD	WEATHERFORD		
8/3/2015	11,028.00	32.52	175.53	10,987.06	129.00	-112.07	-339.91	7.25	MWD	WEATHERFORD		
8/3/2015	11,060.00	35.71	175.43	11,013.55	146.80	-129.96	-338.49	9.97	MWD	WEATHERFORD		
8/3/2015	11,091.00	38.73	174.83	11,038.23	165.38	-148.64	-336.90	9.81	MWD	WEATHERFORD		
8/3/2015	11,123.00	42.08	174.84	11,062.59	185.91	-169.29	-335.03	10.47	MWD	WEATHERFORD		
8/3/2015	11,155.00	45.80	174.53	11,085.63	207.88	-191.40	-332.97	11.64	MWD	WEATHERFORD		
8/3/2015	11,171.00	47.43	175.06	11,096.62	219.40	-202.98	-331.92	10.47	MWD	WEATHERFORD		
8/3/2015	11,218.00	51.86	177.38	11,127.05	254.96	-238.70	-329.58	10.15	MWD	WEATHERFORD		
8/3/2015	11,265.00	56.92	180.27	11,154.41	293.06	-276.89	-328.83	11.87	MWD	WEATHERFORD		
8/3/2015	11,313.00	61.17	179.85	11,179.10	334.16	-318.04	-328.87	8.89	MWD	WEATHERFORD		
8/3/2015	11,360.00	65.18	179.54	11,200.30	376.03	-359.97	-328.64	8.55	MWD	WEATHERFORD		
8/3/2015	11,408.00	69.70	179.52	11,218.71	420.27	-404.29	-328.28	9.42	MWD	WEATHERFORD		



Well Name: BLACK MAMBA 15 STATE COM 7H

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