



Directional Survey

Well Name: BUTTER CUP 36 ST COM 3H

Sub-Division DELAWARE BASIN		Region DELAWARE SLOPE EAST		Field Name MESCALERO ESCARPE		County LEA		State/Province NM					
Surface Legal Location SECTION 35 T18S R34E		API/UWI 3002542367		Latitude (°) 32° 42' 21.757" N		Longitude (°) 103° 31' 21.122" W		Orig KB Elevation (ft) 3,997.00		Ground Elev MSL (ft) 3,972.00		KB - GL (ft) 25.00	
Wellbores													
Wellbore Name OH		Parent Wellbore				SAP Well ID 37909				Vertical Section Direction (°) 89.37			
Kick Offs & Key Depths													
Date 2/15/2015				Type Kick Off				Top Depth (ftKB) 9,970.0					
Actual Deviation Survey GYRO, Proposed? No				Definitive? Yes		Proposed? No		Proposed Deviation Survey					
Deviation Survey													
Date 2/15/2015		Description GYRO											
MD Tie In (ftKB)		TVD Tie In (ftKB)		Inclination Tie In (°)		Azimuth Tie In (°)		NSTie In (ft)		EWTie In (ft)			
Survey Data													
Date	MD (ftKB)	Incl (°)	Azm (°)	TVD (ftKB)	VS (ft)	N/S (ft)	E/W (ft)	DLS (°/100ft)	Survey Tool	Survey Company			
2/16/2015									MWD	VAUHG N ENERGY SERVICES			
2/15/2015	171.38	0.15	8.99	171.38	0.04	0.22	0.04	0.09	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	264.64	0.20	154.68	264.64	0.13	0.20	0.12	0.36	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	357.90	0.29	190.70	357.90	0.15	-0.18	-0.15	0.19	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	451.16	0.27	141.45	451.16	0.24	-0.59	0.24	0.25	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	544.42	0.23	235.47	544.42	0.22	-0.87	0.23	0.39	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	637.68	0.22	275.93	637.68	-0.12	-0.95	-0.11	0.17	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	730.94	0.10	102.43	730.94	-0.22	-0.95	-0.21	0.34	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	824.20	0.14	243.19	824.20	-0.24	-1.02	-0.23	0.24	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	917.46	0.25	268.50	917.46	-0.54	-1.08	-0.53	0.15	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	1,010.72	0.14	288.41	1,010.72	-0.86	-1.05	-0.84	0.14	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	1,103.98	0.32	271.80	1,103.97	-1.22	-1.00	-1.21	0.20	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	1,197.24	0.07	310.22	1,197.23	-1.53	-0.96	-1.52	0.29	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	1,290.50	0.22	268.39	1,290.49	-1.75	-0.93	-1.74	0.19	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	1,383.76	0.08	255.14	1,383.75	-1.99	-0.95	-1.98	0.15	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	1,477.02	0.08	224.63	1,477.01	-2.10	-1.01	-2.09	0.05	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	1,570.28	0.25	148.23	1,570.27	-2.04	-1.23	-2.03	0.26	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	1,663.54	0.61	140.26	1,663.53	-1.62	-1.79	-1.60	0.39	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	1,756.80	0.66	233.64	1,756.79	-1.75	-2.49	-1.72	0.99	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	1,850.06	1.17	234.94	1,850.03	-2.97	-3.35	-2.93	0.55	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	1,943.32	0.42	190.38	1,943.29	-3.82	-4.23	-3.77	0.99	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	2,036.58	0.80	191.84	2,036.54	-4.02	-5.21	-3.97	0.41	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	2,129.84	0.94	132.32	2,129.79	-3.60	-6.36	-3.53	0.94	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	2,223.10	0.72	197.20	2,223.04	-3.22	-7.43	-3.14	0.98	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	2,316.36	0.50	196.68	2,316.30	-3.52	-8.38	-3.43	0.24	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	2,409.62	0.40	182.81	2,409.55	-3.67	-9.10	-3.57	0.16	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	2,502.88	0.40	180.22	2,502.81	-3.69	-9.75	-3.58	0.02	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	2,596.14	0.54	183.46	2,596.07	-3.73	-10.51	-3.61	0.15	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	2,689.40	0.39	157.98	2,689.33	-3.64	-11.25	-3.52	0.27	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	2,782.66	0.61	161.45	2,782.58	-3.37	-12.01	-3.24	0.24	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	2,875.92	0.43	149.86	2,875.84	-3.05	-12.78	-2.91	0.22	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	2,969.18	0.31	199.14	2,969.10	-2.96	-13.33	-2.81	0.35	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	3,062.44	0.31	112.51	3,062.36	-2.81	-13.66	-2.66	0.46	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	3,155.70	0.84	93.54	3,155.61	-1.90	-13.80	-1.75	0.60	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	3,248.96	0.35	44.35	3,248.87	-1.02	-13.64	-0.87	0.71	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	3,342.22	0.65	87.07	3,342.12	-0.29	-13.41	-0.14	0.49	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	3,435.48	0.53	74.83	3,435.38	0.66	-13.27	0.80	0.19	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	3,528.74	0.97	65.61	3,528.63	1.80	-12.83	1.94	0.49	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	3,622.00	0.58	78.48	3,621.88	2.98	-12.41	3.12	0.46	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	3,715.26	0.45	55.54	3,715.14	3.75	-12.11	3.89	0.26	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	3,808.52	0.54	28.13	3,808.39	4.27	-11.51	4.40	0.27	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	3,901.78	0.43	37.70	3,901.65	4.70	-10.85	4.82	0.15	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	3,995.04	0.49	61.19	3,994.91	5.27	-10.38	5.38	0.21	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	4,088.30	0.15	33.12	4,088.17	5.68	-10.08	5.80	0.39	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	4,181.56	0.39	13.61	4,181.43	5.83	-9.67	5.94	0.27	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	4,274.82	0.23	352.66	4,274.68	5.89	-9.18	5.99	0.21	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	4,368.08	0.58	54.79	4,367.94	6.25	-8.72	6.35	0.55	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	4,461.34	0.34	273.53	4,461.20	6.37	-8.43	6.46	0.93	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	4,554.60	0.48	20.22	4,554.46	6.23	-8.05	6.32	0.71	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	4,647.86	0.63	270.20	4,647.72	5.86	-7.68	5.94	0.98	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	4,741.12	0.28	6.16	4,740.97	5.37	-7.45	5.45	0.77	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	4,834.38	0.44	348.15	4,834.23	5.33	-6.88	5.40	0.21	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	4,927.64	0.60	307.08	4,927.49	4.87	-6.23	4.94	0.42	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	5,020.90	0.40	310.83	5,020.75	4.24	-5.72	4.30	0.22	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	5,114.16	0.54	327.04	5,114.00	3.76	-5.14	3.82	0.21	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	5,207.42	0.55	306.79	5,207.26	3.17	-4.50	3.22	0.21	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	5,300.68	0.58	329.81	5,300.51	2.58	-3.83	2.63	0.24	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	5,393.94	0.77	340.41	5,393.77	2.15	-2.83	2.18	0.24	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	5,487.20	0.67	347.51	5,487.02	1.83	-1.71	1.85	0.14	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	5,580.46	0.55	296.35	5,580.27	1.32	-0.98	1.33	0.58	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	5,673.72	0.69	281.51	5,673.53	0.37	-0.67	0.38	0.23	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	5,766.98	0.82	338.17	5,766.78	-0.42	0.07	-0.42	0.78	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	5,860.24	0.49	299.92	5,860.04	-1.00	0.88	-1.01	0.57	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	5,953.50	0.93	349.84	5,953.29	-1.47	1.83	-1.49	0.77	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	6,046.76	1.19	300.45	6,046.54	-2.43	3.06	-2.46	0.98	GYRO	VAUHG N ENERGY SERVICES			
2/15/2015	6,140.02	0.80	343.23	6,139.78	-3.44	4.18	-3.48	0.87	GYRO	VAUHG N ENERGY SERVICES			



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Sub-Division	Region	Field Name		County	State/Province	
DELAWARE BASIN	DELAWARE SLOPE EAST	MESCALERO ESCARPE		LEA	NM	
Surface Legal Location	API/UWI	Latitude (°)	Longitude (°)	Orig KB Elevation (ft)	Ground Elev MSL (ft)	KB - GL (ft)
SECTION 35 T18S R34E	3002542367	32° 42' 21.757" N	103° 31' 21.122" W	3,997.00	3,972.00	25.00

Survey Data

Date	MD (ftKB)	Incl (°)	Azm (°)	TVD (ftKB)	VS (ft)	N/S (ft)	E/W (ft)	DLS (°/100ft)	Survey Tool	Survey Company
2/21/2015	11,196.00	91.30	89.50	10,608.49	853.15	64.55	852.49	1.71	MWD	LEAM DRILLING SYSTEMS
2/21/2015	11,291.00	91.60	90.40	10,606.09	948.11	64.64	947.46	1.00	MWD	LEAM DRILLING SYSTEMS
2/21/2015	11,385.00	90.20	90.40	10,604.61	1,042.08	63.98	1,041.44	1.49	MWD	LEAM DRILLING SYSTEMS
2/21/2015	11,480.00	90.10	90.90	10,604.36	1,137.06	62.90	1,136.44	0.54	MWD	LEAM DRILLING SYSTEMS
2/21/2015	11,574.00	90.50	91.60	10,603.87	1,231.01	60.85	1,230.41	0.86	MWD	LEAM DRILLING SYSTEMS
2/21/2015	11,669.00	90.70	91.60	10,602.88	1,325.93	58.20	1,325.37	0.21	MWD	LEAM DRILLING SYSTEMS
2/21/2015	11,763.00	91.50	91.50	10,601.07	1,419.84	55.66	1,419.32	0.86	MWD	LEAM DRILLING SYSTEMS
2/21/2015	11,857.00	92.40	91.50	10,597.87	1,513.72	53.20	1,513.23	0.96	MWD	LEAM DRILLING SYSTEMS
2/21/2015	11,952.00	91.00	90.70	10,595.05	1,608.63	51.38	1,608.17	1.70	MWD	LEAM DRILLING SYSTEMS
2/21/2015	12,046.00	92.10	89.70	10,592.51	1,702.59	51.05	1,702.13	1.58	MWD	LEAM DRILLING SYSTEMS
2/21/2015	12,141.00	89.30	91.60	10,591.35	1,797.54	49.97	1,797.10	3.56	MWD	LEAM DRILLING SYSTEMS
2/21/2015	12,236.00	90.10	91.60	10,591.85	1,892.47	47.32	1,892.06	0.84	MWD	LEAM DRILLING SYSTEMS
2/21/2015	12,330.00	90.70	91.60	10,591.19	1,986.40	44.69	1,986.02	0.64	MWD	LEAM DRILLING SYSTEMS
2/22/2015	12,424.00	89.30	89.70	10,591.19	2,080.37	43.63	2,080.01	2.51	MWD	LEAM DRILLING SYSTEMS
2/22/2015	12,519.00	88.40	88.80	10,593.10	2,175.34	44.87	2,174.98	1.34	MWD	LEAM DRILLING SYSTEMS
2/22/2015	12,613.00	89.90	89.50	10,594.49	2,269.33	46.26	2,268.96	1.76	MWD	LEAM DRILLING SYSTEMS
2/22/2015	12,708.00	90.70	89.20	10,594.00	2,364.33	47.34	2,363.95	0.90	MWD	LEAM DRILLING SYSTEMS
2/22/2015	12,802.00	91.40	89.00	10,592.27	2,458.31	48.82	2,457.92	0.77	MWD	LEAM DRILLING SYSTEMS
2/22/2015	12,897.00	92.60	88.80	10,588.96	2,553.25	50.64	2,552.84	1.28	MWD	LEAM DRILLING SYSTEMS
2/22/2015	12,991.00	93.30	88.60	10,584.12	2,647.12	52.77	2,646.70	0.77	MWD	LEAM DRILLING SYSTEMS
2/22/2015	13,085.00	93.20	88.50	10,578.79	2,740.95	55.14	2,740.51	0.15	MWD	LEAM DRILLING SYSTEMS
2/23/2015	13,180.00	92.00	89.30	10,574.48	2,835.85	56.97	2,835.40	1.52	MWD	LEAM DRILLING SYSTEMS
2/23/2015	13,275.00	90.30	89.90	10,572.58	2,930.83	57.63	2,930.37	1.90	MWD	LEAM DRILLING SYSTEMS
2/23/2015	13,369.00	86.80	89.70	10,574.95	3,024.78	57.96	3,024.33	3.73	MWD	LEAM DRILLING SYSTEMS
2/23/2015	13,464.00	86.80	90.00	10,580.26	3,119.63	58.20	3,119.18	0.32	MWD	LEAM DRILLING SYSTEMS
2/23/2015	13,558.00	88.00	89.70	10,584.52	3,213.53	58.45	3,213.08	1.32	MWD	LEAM DRILLING SYSTEMS
2/23/2015	13,652.00	89.30	89.90	10,586.73	3,307.50	58.78	3,307.05	1.40	MWD	LEAM DRILLING SYSTEMS
2/23/2015	13,747.00	89.80	90.00	10,587.48	3,402.49	58.86	3,402.05	0.54	MWD	LEAM DRILLING SYSTEMS
2/23/2015	13,842.00	89.80	90.90	10,587.81	3,497.47	58.12	3,497.04	0.95	MWD	LEAM DRILLING SYSTEMS
2/23/2015	13,936.00	87.50	90.20	10,590.03	3,591.42	57.21	3,591.00	2.56	MWD	LEAM DRILLING SYSTEMS
2/23/2015	14,031.00	86.90	90.60	10,594.67	3,686.29	56.55	3,685.89	0.76	MWD	LEAM DRILLING SYSTEMS
2/24/2015	14,125.00	87.10	91.30	10,599.59	3,780.12	54.99	3,779.75	0.77	MWD	LEAM DRILLING SYSTEMS
2/24/2015	14,219.00	87.10	91.10	10,604.34	3,873.95	53.03	3,873.60	0.21	MWD	LEAM DRILLING SYSTEMS
2/24/2015	14,314.00	87.30	90.70	10,608.98	3,968.81	51.54	3,968.48	0.47	MWD	LEAM DRILLING SYSTEMS
2/24/2015	14,408.00	87.80	89.20	10,613.00	4,062.71	51.62	4,062.39	1.68	MWD	LEAM DRILLING SYSTEMS
2/24/2015	14,503.00	87.30	86.90	10,617.06	4,157.59	54.85	4,157.24	2.48	MWD	LEAM DRILLING SYSTEMS
2/24/2015	14,597.00	88.20	88.30	10,620.75	4,251.47	58.78	4,251.08	1.77	MWD	LEAM DRILLING SYSTEMS
2/24/2015	14,691.00	88.90	89.50	10,623.13	4,345.44	60.59	4,345.03	1.48	MWD	LEAM DRILLING SYSTEMS
2/24/2015	14,786.00	87.90	89.30	10,625.79	4,440.40	61.58	4,439.99	1.07	MWD	LEAM DRILLING SYSTEMS
2/24/2015	14,880.00	88.30	89.70	10,628.90	4,534.35	62.40	4,533.93	0.60	MWD	LEAM DRILLING SYSTEMS
2/24/2015	14,975.00	88.40	90.00	10,631.64	4,629.30	62.65	4,628.89	0.33	MWD	LEAM DRILLING SYSTEMS
2/24/2015	15,069.00	87.80	90.00	10,634.75	4,723.25	62.65	4,722.84	0.64	MWD	LEAM DRILLING SYSTEMS
2/24/2015	15,163.00	87.20	90.40	10,638.85	4,817.15	62.32	4,816.75	0.77	MWD	LEAM DRILLING SYSTEMS
2/25/2015	15,258.00	86.50	91.10	10,644.07	4,911.97	61.08	4,911.60	1.04	MWD	LEAM DRILLING SYSTEMS
2/25/2015	15,352.00	85.20	92.20	10,650.88	5,005.65	58.38	5,005.31	1.81	MWD	LEAM DRILLING SYSTEMS
2/25/2015	15,430.00	85.10	92.20	10,657.47	5,083.28	55.40	5,082.97	0.13	MWD	LEAM DRILLING SYSTEMS
2/25/2015	15,497.00	85.10	92.20	10,663.20	5,149.95	52.83	5,149.68	0.00	BIT	LEAM DRILLING SYSTEMS