



THISTLE UNIT 52H

DELAWARE BASIN UNRESTRICTED

Directional Survey

Sub-Division DELAWARE BASIN	County LEA	Field Name JOHNSON RANCH	Region DELAWARE BASIN EAST	State/Province NM		
Surface Legal Location Sec. 28 23S 33E	API/UWI 3002541897	Latitude (°) 32° 16' 56.851" N	Longitude (°) 103° 34' 48.169" W	Ground Elev M. 3,687.70	Orig KB Elev (ft) 3,712.70	Tubing Head Elevation (ft)

Wellbores			
Wellbore Name OH	Parent Wellbore	SAP Well ID 37211	Vertical Section Direction (°) 177.37

Kick Offs & Key Depths

Date	Type	Top Depth (ftKB)
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Actual Deviation Survey GYRO/MWD, Proposed? No	Definitive? No	Proposed? No	Proposed Deviation Survey
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Deviation Survey

Date 10/31/2014		Description GYRO/MWD			
MD Tie In (ftKB)	TVD Tie In (ftKB)	Inclination Tie In (°)	Azimuth Tie In (°)	NSTie In (ft)	EW Tie 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
10/31/2...	125.29	0.78	47.47	125.29	-0.55	0.58	0.63	0.62	GYRO	VAUHG N ENERGY SERVICES
10/31/2...	219.25	0.96	60.70	219.24	-1.31	1.39	1.79	0.29	GYRO	VAUHG N ENERGY SERVICES
10/31/2...	313.21	0.67	51.11	313.19	-1.99	2.12	2.90	0.34	GYRO	VAUHG N ENERGY SERVICES
10/31/2...	407.17	0.92	58.50	407.14	-2.68	2.86	3.97	0.29	GYRO	VAUHG N ENERGY SERVICES
10/31/2...	501.13	0.84	61.43	501.09	-3.34	3.59	5.22	0.10	GYRO	VAUHG N ENERGY SERVICES
10/31/2...	595.09	0.41	59.94	595.04	-3.80	4.08	6.11	0.46	GYRO	VAUHG N ENERGY SERVICES
10/31/2...	689.05	0.32	106.98	689.00	-3.87	4.18	6.66	0.32	GYRO	VAUHG N ENERGY SERVICES
10/31/2...	783.01	0.48	65.83	782.96	-3.92	4.26	7.27	0.34	GYRO	VAUHG N ENERGY SERVICES
10/31/2...	876.97	0.38	67.56	876.91	-4.17	4.54	7.91	0.11	GYRO	VAUHG N ENERGY SERVICES
10/31/2...	970.93	0.23	56.20	970.87	-4.38	4.76	8.36	0.17	GYRO	VAUHG N ENERGY SERVICES
10/31/2...	1,064.89	0.77	287.17	1,064.83	-4.69	5.06	7.91	0.99	GYRO	VAUHG N ENERGY SERVICES
10/31/2...	1,158.85	0.20	325.19	1,158.79	-5.04	5.38	7.22	0.66	GYRO	VAUHG N ENERGY SERVICES
10/31/2...	1,252.81	0.24	333.73	1,252.75	-5.36	5.69	7.03	0.05	GYRO	VAUHG N ENERGY SERVICES
10/31/2...	1,346.77	0.63	326.24	1,346.70	-5.98	6.29	6.66	0.42	GYRO	VAUHG N ENERGY SERVICES
10/31/2...	1,440.73	1.01	304.52	1,440.65	-6.92	7.19	5.69	0.52	GYRO	VAUHG N ENERGY SERVICES
10/31/2...	1,534.69	1.05	307.36	1,534.60	-7.98	8.18	4.32	0.07	GYRO	VAUHG N ENERGY SERVICES
10/31/2...	1,628.65	1.09	299.28	1,628.54	-9.00	9.14	2.86	0.17	GYRO	VAUHG N ENERGY SERVICES
10/31/2...	1,722.61	0.86	310.98	1,722.49	-9.96	10.04	1.55	0.32	GYRO	VAUHG N ENERGY SERVICES
10/31/2...	1,816.57	0.89	309.46	1,816.44	-10.94	10.97	0.45	0.04	GYRO	VAUHG N ENERGY SERVICES
10/31/2...	1,910.53	1.10	292.56	1,910.38	-11.81	11.78	-0.94	0.38	GYRO	VAUHG N ENERGY SERVICES
10/31/2...	2,004.49	1.09	297.37	2,004.33	-12.64	12.54	-2.57	0.10	GYRO	VAUHG N ENERGY SERVICES
10/31/2...	2,098.45	0.93	305.68	2,098.27	-13.56	13.39	-3.98	0.23	GYRO	VAUHG N ENERGY SERVICES
10/31/2...	2,192.41	0.81	286.56	2,192.22	-14.25	14.03	-5.24	0.33	GYRO	VAUHG N ENERGY SERVICES
10/31/2...	2,286.37	1.06	294.86	2,286.17	-14.87	14.58	-6.66	0.30	GYRO	VAUHG N ENERGY SERVICES
10/31/2...	2,380.33	1.04	290.38	2,380.11	-15.61	15.24	-8.25	0.09	GYRO	VAUHG N ENERGY SERVICES
10/31/2...	2,474.29	0.79	301.15	2,474.06	-16.30	15.87	-9.61	0.32	GYRO	VAUHG N ENERGY SERVICES
10/31/2...	2,568.25	0.75	290.10	2,568.01	-16.90	16.42	-10.74	0.16	GYRO	VAUHG N ENERGY SERVICES
10/31/2...	2,662.21	0.96	289.36	2,661.96	-17.43	16.89	-12.06	0.22	GYRO	VAUHG N ENERGY SERVICES
10/31/2...	2,756.17	0.95	291.40	2,755.91	-18.04	17.44	-13.53	0.04	GYRO	VAUHG N ENERGY SERVICES
10/31/2...	2,850.13	0.59	335.04	2,849.86	-18.81	18.16	-14.45	0.71	GYRO	VAUHG N ENERGY SERVICES
10/31/2...	2,944.09	0.51	337.07	2,943.82	-19.65	18.99	-14.82	0.09	GYRO	VAUHG N ENERGY SERVICES
10/31/2...	3,038.05	0.49	6.69	3,037.77	-20.43	19.77	-14.94	0.27	GYRO	VAUHG N ENERGY SERVICES
10/31/2...	3,132.01	0.84	34.05	3,131.73	-21.38	20.74	-14.51	0.49	GYRO	VAUHG N ENERGY SERVICES
10/31/2...	3,225.97	0.83	36.51	3,225.68	-22.46	21.86	-13.72	0.04	GYRO	VAUHG N ENERGY SERVICES
10/31/2...	3,319.93	0.88	33.60	3,319.63	-23.57	23.00	-12.91	0.07	GYRO	VAUHG N ENERGY SERVICES
10/31/2...	3,413.89	1.03	37.07	3,413.57	-24.80	24.28	-12.00	0.17	GYRO	VAUHG N ENERGY SERVICES
10/31/2...	3,507.85	0.91	15.98	3,507.52	-26.16	25.67	-11.29	0.40	GYRO	VAUHG N ENERGY SERVICES
10/31/2...	3,601.81	1.06	26.51	3,601.47	-27.63	27.17	-10.69	0.25	GYRO	VAUHG N ENERGY SERVICES
10/31/2...	3,695.77	0.75	35.21	3,695.41	-28.87	28.45	-9.95	0.36	GYRO	VAUHG N ENERGY SERVICES
10/31/2...	3,789.73	0.46	27.04	3,789.37	-29.69	29.28	-9.43	0.32	GYRO	VAUHG N ENERGY SERVICES
10/31/2...	3,883.69	0.27	2.17	3,883.33	-30.23	29.84	-9.25	0.26	GYRO	VAUHG N ENERGY SERVICES
10/31/2...	3,977.65	0.49	20.20	3,977.28	-30.83	30.44	-9.10	0.26	GYRO	VAUHG N ENERGY SERVICES
10/31/2...	4,071.61	0.90	93.36	4,071.24	-31.12	30.77	-8.22	0.95	GYRO	VAUHG N ENERGY SERVICES
10/31/2...	4,165.57	3.19	106.30	4,165.13	-30.19	30.00	-4.98	2.47	GYRO	VAUHG N ENERGY SERVICES

MAR 17 2015



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10/31/2...	4,259.53	4.77	102.20	4,258.86	-28.35	28.44	1.35	1.71	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	4,353.49	4.35	107.08	4,352.53	-26.14	26.56	8.58	0.61	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	4,447.45	4.50	108.56	4,446.21	-23.61	24.35	15.48	0.20	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	4,541.41	4.62	108.52	4,539.87	-20.91	21.97	22.56	0.13	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	4,635.37	4.66	115.68	4,633.52	-17.74	19.11	29.59	0.62	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	4,729.33	3.83	121.17	4,727.22	-14.18	15.84	35.71	0.98	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	4,823.29	3.19	111.08	4,821.01	-11.38	13.27	40.84	0.94	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	4,917.25	2.89	104.97	4,914.84	-9.62	11.72	45.56	0.47	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	5,011.21	2.82	93.22	5,008.68	-8.66	10.98	50.16	0.63	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	5,105.17	3.09	95.87	5,102.51	-8.05	10.59	54.99	0.32	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	5,199.13	3.08	100.70	5,196.34	-7.10	9.86	59.99	0.28	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	5,293.09	3.01	98.30	5,290.17	-6.05	9.04	64.91	0.15	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	5,387.05	2.98	95.35	5,384.00	-5.24	8.45	69.78	0.17	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	5,481.01	2.89	101.87	5,477.83	-4.31	7.74	74.53	0.37	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	5,574.97	3.10	99.82	5,571.67	-3.17	6.82	79.35	0.25	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	5,668.93	3.14	95.96	5,665.49	-2.24	6.12	84.41	0.23	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	5,762.89	3.18	97.95	5,759.30	-1.37	5.49	89.55	0.12	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	5,856.85	3.19	103.46	5,853.12	-0.17	4.52	94.68	0.33	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	5,950.81	2.99	95.27	5,946.94	0.89	3.69	99.66	0.52	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	6,044.77	2.69	94.44	6,040.79	1.50	3.29	104.30	0.32	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	6,138.73	2.54	87.24	6,134.65	1.77	3.22	108.58	0.38	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	6,232.69	2.53	94.60	6,228.52	2.02	3.15	112.72	0.35	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	6,326.65	2.42	93.73	6,322.39	2.50	2.86	116.77	0.12	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	6,420.61	2.54	85.51	6,416.26	2.66	2.89	120.83	0.40	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	6,514.57	2.55	85.52	6,510.13	2.52	3.22	124.99	0.01	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	6,608.53	2.59	84.26	6,604.00	2.34	3.59	129.18	0.07	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	6,702.49	2.74	89.85	6,697.85	2.32	3.81	133.54	0.32	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	6,796.45	2.85	82.26	6,791.70	2.21	4.13	138.10	0.41	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	6,890.41	2.79	85.73	6,885.55	1.94	4.62	142.70	0.19	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	6,984.37	2.40	72.96	6,979.41	1.38	5.36	146.86	0.74	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	7,078.33	2.44	80.70	7,073.29	0.66	6.26	150.71	0.35	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	7,172.29	2.38	85.78	7,167.17	0.37	6.73	154.63	0.24	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	7,266.25	2.25	86.89	7,261.05	0.30	6.97	158.42	0.15	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	7,360.21	2.48	85.38	7,354.93	0.22	7.24	162.29	0.25	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	7,454.17	2.47	77.68	7,448.80	-0.20	7.83	166.29	0.35	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	7,548.13	2.49	74.23	7,542.67	-1.00	8.82	170.23	0.16	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	7,642.09	2.42	87.46	7,636.55	-1.46	9.46	174.18	0.61	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	7,736.05	2.17	88.34	7,730.43	-1.43	9.60	177.94	0.27	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	7,830.01	2.02	85.02	7,824.33	-1.47	9.80	181.37	0.21	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	7,923.97	2.09	91.22	7,918.23	-1.42	9.91	184.73	0.25	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	8,017.93	2.16	86.93	8,012.13	-1.32	9.96	188.21	0.18	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	8,111.89	2.16	90.74	8,106.02	-1.23	10.04	191.75	0.15	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	8,205.85	1.92	92.39	8,199.92	-0.98	9.95	195.09	0.26	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	8,299.81	1.67	85.19	8,293.83	-0.90	10.00	198.03	0.36	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	8,393.77	1.41	90.70	8,387.76	-0.88	10.10	200.55	0.32	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	8,487.73	1.53	100.42	8,481.69	-0.53	9.86	202.94	0.29	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	8,581.69	1.29	97.77	8,575.62	-0.06	9.49	205.22	0.26	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	8,675.65	1.30	105.02	8,669.56	0.45	9.07	207.30	0.17	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	8,769.61	1.07	107.02	8,763.50	1.07	8.53	209.17	0.25	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	8,863.57	1.25	124.83	8,857.44	1.99	7.69	210.85	0.43	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	8,957.53	0.95	114.28	8,951.38	2.97	6.79	212.40	0.38	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	9,051.49	1.09	119.50	9,045.33	3.79	6.03	213.89	0.18	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	9,145.45	1.17	132.50	9,139.27	4.95	4.94	215.37	0.29	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	9,239.41	0.98	137.47	9,233.21	6.25	3.70	216.62	0.23	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	9,333.37	0.79	164.51	9,327.16	7.49	2.48	217.34	0.48	GYRO	VAUHGN ENERGY SERVICES



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Surface Legal Location Sec. 28 23S 33E	API/UWI 3002541897	Latitude (°) 32° 16' 56.851" N	Longitude (°) 103° 34' 48.169" W	Ground Elev M... 3,687.70
				Orig KB Elev (ft) 3,712.70
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Survey Data

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10/31/2...	9,427.33	0.78	175.21	9,421.11	8.76	1.22	217.56	0.16	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	9,521.29	1.45	190.50	9,515.05	10.56	-0.59	217.40	0.77	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	9,615.25	2.19	202.72	9,608.97	13.34	-3.41	216.49	0.88	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	9,709.21	2.55	198.78	9,702.84	16.91	-7.05	215.12	0.42	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	9,803.17	2.27	192.56	9,796.72	20.65	-10.84	214.05	0.41	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	9,897.13	2.17	183.24	9,890.61	24.22	-14.43	213.54	0.40	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	9,991.09	1.98	183.15	9,984.51	27.60	-17.83	213.35	0.20	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	10,085.05	1.61	189.27	10,078.42	30.51	-20.75	213.05	0.44	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	10,179.01	1.83	213.56	10,172.34	33.01	-23.31	212.01	0.80	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	10,272.97	1.62	222.53	10,266.26	35.16	-25.54	210.28	0.36	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	10,366.93	1.20	233.92	10,360.19	36.64	-27.09	208.59	0.54	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	10,460.89	0.91	185.68	10,454.14	37.92	-28.42	207.72	0.96	GYRO	VAUHGN ENERGY SERVICES
10/31/2...	10,554.85	0.98	194.25	10,548.08	39.42	-29.94	207.45	0.17	GYRO	VAUHGN ENERGY SERVICES
11/1/2014	10,603.00	1.70	134.60	10,596.22	40.34	-30.84	207.85	3.06	MWD	LEAM DRILLING SYSTEMS
10/31/2...	10,622.00	1.90	138.10	10,615.21	40.79	-31.27	208.27	1.20	MWD	LEAM DRILLING SYSTEMS
10/31/2...	10,653.00	2.50	136.10	10,646.19	41.70	-32.14	209.08	1.95	MWD	LEAM DRILLING SYSTEMS
10/31/2...	10,685.00	3.00	132.50	10,678.15	42.82	-33.21	210.18	1.65	MWD	LEAM DRILLING SYSTEMS
10/31/2...	10,716.00	4.80	135.10	10,709.08	44.35	-34.68	211.69	5.83	MWD	LEAM DRILLING SYSTEMS
10/31/2...	10,747.00	7.60	151.10	10,739.90	47.15	-37.39	213.60	10.53	MWD	LEAM DRILLING SYSTEMS
10/31/2...	10,779.00	10.50	158.50	10,771.50	51.81	-41.96	215.69	9.75	MWD	LEAM DRILLING SYSTEMS
11/1/2014	10,810.00	14.00	162.90	10,801.79	58.12	-48.17	217.83	11.68	MWD	LEAM DRILLING SYSTEMS
11/1/2014	10,842.00	17.20	167.30	10,832.61	66.52	-56.49	220.01	10.65	MWD	LEAM DRILLING SYSTEMS
11/1/2014	10,873.00	19.60	170.80	10,862.02	76.20	-66.09	221.85	8.52	MWD	LEAM DRILLING SYSTEMS
11/1/2014	10,905.00	22.20	170.60	10,891.91	87.54	-77.36	223.69	8.13	MWD	LEAM DRILLING SYSTEMS
11/1/2014	10,937.00	25.30	170.40	10,921.20	100.33	-90.07	225.82	9.69	MWD	LEAM DRILLING SYSTEMS
11/1/2014	10,968.00	28.10	172.90	10,948.89	114.19	-103.85	227.83	9.73	MWD	LEAM DRILLING SYSTEMS
11/2/2014	11,000.00	31.00	175.00	10,976.73	129.94	-119.54	229.48	9.62	MWD	LEAM DRILLING SYSTEMS
11/2/2014	11,031.00	34.20	176.10	11,002.84	146.63	-136.19	230.77	10.50	MWD	LEAM DRILLING SYSTEMS
11/2/2014	11,063.00	37.90	176.10	11,028.71	165.46	-154.97	232.05	11.56	MWD	LEAM DRILLING SYSTEMS
11/3/2014	11,094.00	43.20	176.20	11,052.25	185.60	-175.07	233.40	17.10	MWD	LEAM DRILLING SYSTEMS
11/3/2014	11,126.00	48.80	177.30	11,074.47	208.61	-198.05	234.69	17.67	MWD	LEAM DRILLING SYSTEMS
11/3/2014	11,157.00	54.10	178.30	11,093.79	232.84	-222.26	235.62	17.28	MWD	LEAM DRILLING SYSTEMS
11/3/2014	11,189.00	58.70	180.30	11,111.49	259.47	-248.91	235.93	15.29	MWD	LEAM DRILLING SYSTEMS
11/3/2014	11,220.00	62.70	181.30	11,126.66	286.45	-275.93	235.55	13.21	MWD	LEAM DRILLING SYSTEMS
11/3/2014	11,252.00	66.20	181.30	11,140.46	315.25	-304.79	234.89	10.94	MWD	LEAM DRILLING SYSTEMS
11/3/2014	11,283.00	70.10	182.40	11,151.99	343.93	-333.54	233.96	13.00	MWD	LEAM DRILLING SYSTEMS
11/3/2014	11,315.00	74.00	182.70	11,161.86	374.24	-363.95	232.61	12.22	MWD	LEAM DRILLING SYSTEMS
11/3/2014	11,346.00	78.50	184.70	11,169.22	404.16	-393.99	230.66	15.81	MWD	LEAM DRILLING SYSTEMS
11/6/2014	11,354.00	79.10	184.00	11,170.78	411.95	-401.81	230.06	11.40	MWD	LEAM DRILLING SYSTEMS
11/6/2014	11,386.00	82.50	185.50	11,175.89	443.27	-433.29	227.45	11.59	MWD	LEAM DRILLING SYSTEMS
11/6/2014	11,417.00	84.20	186.20	11,179.48	473.72	-463.92	224.31	5.92	MWD	LEAM DRILLING SYSTEMS
11/6/2014	11,448.00	85.80	186.10	11,182.18	504.24	-494.62	221.00	5.17	MWD	LEAM DRILLING SYSTEMS
11/6/2014	11,480.00	87.80	185.40	11,183.97	535.85	-526.41	217.80	6.62	MWD	LEAM DRILLING SYSTEMS
11/6/2014	11,511.00	89.50	184.50	11,184.70	566.57	-557.28	215.12	6.20	MWD	LEAM DRILLING SYSTEMS
11/6/2014	11,543.00	90.10	184.30	11,184.81	598.32	-589.19	212.67	1.98	MWD	LEAM DRILLING SYSTEMS
11/6/2014	11,574.00	90.50	184.30	11,184.65	629.10	-620.10	210.34	1.29	MWD	LEAM DRILLING SYSTEMS
11/6/2014	11,668.00	89.20	183.10	11,184.90	722.52	-713.90	204.28	1.88	MWD	LEAM DRILLING SYSTEMS
11/6/2014	11,763.00	89.50	182.90	11,185.97	817.06	-808.76	199.31	0.38	MWD	LEAM DRILLING SYSTEMS
11/6/2014	11,857.00	89.90	183.30	11,186.47	910.58	-902.62	194.22	0.60	MWD	LEAM DRILLING SYSTEMS
11/6/2014	11,952.00	88.10	182.20	11,188.12	1,005.15	-997.49	189.67	2.22	MWD	LEAM DRILLING SYSTEMS
11/6/2014	12,046.00	88.00	181.70	11,191.32	1,098.79	-1,091.38	186.47	0.54	MWD	LEAM DRILLING SYSTEMS
11/6/2014	12,141.00	89.00	180.80	11,193.81	1,193.54	-1,186.33	184.40	1.42	MWD	LEAM DRILLING SYSTEMS
11/6/2014	12,235.00	89.70	180.60	11,194.88	1,287.37	-1,280.31	183.25	0.77	MWD	LEAM DRILLING SYSTEMS
11/6/2014	12,329.00	89.90	180.80	11,195.20	1,381.21	-1,374.31	182.10	0.30	MWD	LEAM DRILLING SYSTEMS
11/6/2014	12,423.00	90.30	180.60	11,195.04	1,475.05	-1,468.30	180.95	0.48	MWD	LEAM DRILLING SYSTEMS
11/7/2014	12,518.00	90.60	180.80	11,194.29	1,569.89	-1,563.29	179.79	0.38	MWD	LEAM DRILLING SYSTEMS
11/7/2014	12,612.00	89.10	179.90	11,194.54	1,663.76	-1,657.28	179.22	1.86	MWD	LEAM DRILLING SYSTEMS



Directional Survey

Sub-Division DELAWARE BASIN	County LEA	Field Name JOHNSON RANCH	Region DELAWARE BASIN EAST	State/Province NM
Surface Legal Location Sec. 28 23S 33E	API/UWI 3002541897	Latitude (°) 32° 16' 56.851" N	Longitude (°) 103° 34' 48.169" W	Ground Elev M... 3,687.70
				Orig KB Elev (ft) 3,712.70
				Tubing Head Elevation (ft)

Survey Data

Date	MD (ftKB)	Incl (°)	Azm (°)	TVD (ftKB)	VS (ft)	N/S (ft)	E/W (ft)	DLS (°/100ft)	Survey Tool	Survey Company
11/7/2014	12,707.00	89.00	180.10	11,196.11	1,758.65	-1,752.27	179.22	0.24	MWD	LEAM DRILLING SYSTEMS
11/7/2014	12,801.00	89.30	180.10	11,197.51	1,852.53	-1,846.26	179.05	0.32	MWD	LEAM DRILLING SYSTEMS
11/7/2014	12,895.00	89.30	179.90	11,198.66	1,946.42	-1,940.25	179.05	0.21	MWD	LEAM DRILLING SYSTEMS
11/7/2014	12,990.00	89.60	180.10	11,199.57	2,041.32	-2,035.25	179.05	0.38	MWD	LEAM DRILLING SYSTEMS
11/7/2014	13,084.00	90.00	180.60	11,199.90	2,135.19	-2,129.24	178.48	0.68	MWD	LEAM DRILLING SYSTEMS
11/7/2014	13,179.00	89.20	179.90	11,200.56	2,230.07	-2,224.24	178.07	1.12	MWD	LEAM DRILLING SYSTEMS
11/7/2014	13,273.00	89.30	179.60	11,201.79	2,323.98	-2,318.23	178.48	0.34	MWD	LEAM DRILLING SYSTEMS
11/7/2014	13,367.00	89.30	179.90	11,202.94	2,417.89	-2,412.22	178.89	0.32	MWD	LEAM DRILLING SYSTEMS
11/7/2014	13,462.00	89.30	180.10	11,204.10	2,512.78	-2,507.22	178.89	0.21	MWD	LEAM DRILLING SYSTEMS
11/7/2014	13,556.00	89.30	180.80	11,205.25	2,606.64	-2,601.20	178.15	0.74	MWD	LEAM DRILLING SYSTEMS
11/8/2014	13,650.00	89.30	180.60	11,206.40	2,700.47	-2,695.19	177.00	0.21	MWD	LEAM DRILLING SYSTEMS
11/8/2014	13,744.00	89.30	180.80	11,207.54	2,794.31	-2,789.18	175.85	0.21	MWD	LEAM DRILLING SYSTEMS
11/8/2014	13,839.00	88.80	180.80	11,209.12	2,889.12	-2,884.15	174.53	0.53	MWD	LEAM DRILLING SYSTEMS
11/8/2014	13,933.00	88.50	180.10	11,211.33	2,982.96	-2,978.12	173.79	0.81	MWD	LEAM DRILLING SYSTEMS
11/8/2014	14,028.00	88.40	179.90	11,213.90	3,077.83	-3,073.09	173.79	0.24	MWD	LEAM DRILLING SYSTEMS
11/8/2014	14,122.00	88.50	179.20	11,216.45	3,171.72	-3,167.05	174.52	0.75	MWD	LEAM DRILLING SYSTEMS
11/8/2014	14,217.00	88.80	179.60	11,218.69	3,266.64	-3,262.02	175.52	0.53	MWD	LEAM DRILLING SYSTEMS
11/8/2014	14,311.00	90.00	179.20	11,219.67	3,360.57	-3,356.01	176.50	1.35	MWD	LEAM DRILLING SYSTEMS
11/8/2014	14,406.00	89.90	179.40	11,219.75	3,455.52	-3,451.00	177.66	0.24	MWD	LEAM DRILLING SYSTEMS
11/8/2014	14,500.00	90.00	179.40	11,219.83	3,549.46	-3,545.00	178.65	0.11	MWD	LEAM DRILLING SYSTEMS
11/8/2014	14,594.00	89.70	179.00	11,220.08	3,643.41	-3,638.99	179.96	0.53	MWD	LEAM DRILLING SYSTEMS
11/8/2014	14,689.00	89.10	179.20	11,221.08	3,738.36	-3,733.97	181.45	0.67	MWD	LEAM DRILLING SYSTEMS
11/8/2014	14,783.00	88.50	178.70	11,223.04	3,832.30	-3,827.93	183.18	0.83	MWD	LEAM DRILLING SYSTEMS
11/8/2014	14,877.00	88.20	178.00	11,225.75	3,926.25	-3,921.85	185.88	0.81	MWD	LEAM DRILLING SYSTEMS
11/9/2014	14,971.00	88.40	178.30	11,228.54	4,020.20	-4,015.76	188.91	0.38	MWD	LEAM DRILLING SYSTEMS
11/9/2014	15,066.00	88.20	177.50	11,231.36	4,115.15	-4,110.66	192.39	0.87	MWD	LEAM DRILLING SYSTEMS
11/9/2014	15,160.00	88.00	176.60	11,234.47	4,209.10	-4,204.48	197.23	0.98	MWD	LEAM DRILLING SYSTEMS
11/9/2014	15,254.00	89.90	176.60	11,236.20	4,303.07	-4,298.29	202.80	2.02	MWD	LEAM DRILLING SYSTEMS
11/9/2014	15,349.00	89.20	177.10	11,236.94	4,398.06	-4,393.15	208.02	0.91	MWD	LEAM DRILLING SYSTEMS
11/9/2014	15,443.00	90.10	178.30	11,237.52	4,492.06	-4,487.07	211.79	1.60	MWD	LEAM DRILLING SYSTEMS
11/9/2014	15,537.00	91.80	178.90	11,235.96	4,586.02	-4,581.02	214.09	1.92	MWD	LEAM DRILLING SYSTEMS
11/9/2014	15,632.00	92.40	179.40	11,232.48	4,680.91	-4,675.95	215.50	0.82	MWD	LEAM DRILLING SYSTEMS
11/9/2014	15,664.00	92.40	179.40	11,231.14	4,712.86	-4,707.92	215.83	0.00	MWD	LEAM DRILLING SYSTEMS
11/9/2014	15,720.00	92.40	179.40	11,228.79	4,768.78	-4,763.86	216.42	0.00	BIT	LEAM DRILLING SYSTEMS



November 6, 2014

HOBBSOCD

MAR 09 2015

RECEIVED

Devon Energy
333 West Sheridan Ave
Oklahoma City, Oklahoma 73102-5010

Attn: David Cook

Re: **Thistle Unit No. 052H**

Please find enclosed a copy of the survey from 0.00' to 10554.85' ran on the above referenced well.

If I can be of any further service please do not hesitate to call me at 800-606-4976.

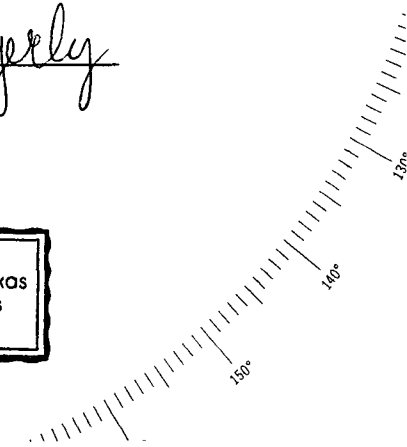
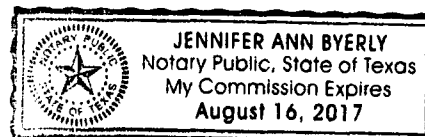
Sincerely,


Deb Salge
Operations

STATE OF TEXAS §
 §
COUNTY OF NUECES §

This instrument was acknowledged before me on the 6 day of November A.D., 2014, by Keith Havelka.


Jennifer Ann Byerly
Notary Public, State of Texas





Company: Devon Energy
Lease/Well: Thistle Unit/No. 052H

Rig Name: HP 394
State/County: New Mexico/Lea
Latitude: 32.28, Longitude: -103.58
GRID North is 0.40 Degrees East of True North
VS-Azi: 0.00 Degrees



Depth Reference : RKB = 25 feet

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: gyro survey.ut
Minimum Curvature Method
Report Date/Time: 11/6/2014 / 16:17

VES Survey International
Midland, Texas
432-563-5444

Surveyor: Adam Askew
Thistle Unit No. 052H / API 30-025-41897

RECEIVED
MAR 09 2015
HOBBS OGD

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	****
125.29	0.78	47.47	125.29	0.57	0.63	0.57	0.85	47.47	0.62
219.25	0.96	60.70	219.24	1.39	1.78	1.39	2.26	52.05	0.29
313.21	0.67	51.11	313.19	2.12	2.90	2.12	3.59	53.80	0.35
407.17	0.92	58.50	407.14	2.86	3.97	2.86	4.89	54.23	0.29
501.13	0.84	61.43	501.09	3.58	5.22	3.58	6.33	55.52	0.10
595.09	0.41	59.94	595.04	4.08	6.11	4.08	7.35	56.27	0.46
689.05	0.32	106.98	689.00	4.17	6.66	4.17	7.86	57.93	0.32
783.01	0.48	65.83	782.96	4.25	7.27	4.25	8.42	59.67	0.34
876.97	0.38	67.56	876.91	4.53	7.91	4.53	9.12	60.20	0.11
970.93	0.23	56.20	970.87	4.75	8.35	4.75	9.61	60.35	0.16
1064.89	0.77	287.17	1064.83	5.05	7.91	5.05	9.38	57.46	0.99
1158.85	0.20	325.19	1158.79	5.37	7.22	5.37	8.99	53.37	0.67
1252.81	0.24	333.73	1252.75	5.67	7.04	5.67	9.04	51.14	0.06
1346.77	0.63	326.24	1346.70	6.28	6.67	6.28	9.16	46.73	0.42
1440.73	1.01	304.52	1440.65	7.17	5.70	7.17	9.16	38.46	0.51
1534.69	1.05	307.36	1534.60	8.17	4.33	8.17	9.24	27.94	0.07
1628.65	1.09	299.28	1628.54	9.13	2.87	9.13	9.57	17.43	0.17
1722.61	0.86	310.98	1722.49	10.03	1.55	10.03	10.15	8.82	0.32

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
1816.57	0.89	309.46	1816.44	10.95	0.46	10.95	10.96	2.42	0.04
1910.53	1.10	292.56	1910.38	11.76	-0.93	11.76	11.79	355.46	0.39
2004.49	1.09	297.37	2004.33	12.52	-2.56	12.52	12.77	348.43	0.10
2098.45	0.93	305.68	2098.27	13.37	-3.98	13.37	13.95	343.44	0.23
2192.41	0.81	286.56	2192.22	14.01	-5.23	14.01	14.95	339.51	0.33
2286.37	1.06	294.86	2286.17	14.56	-6.66	14.56	16.01	335.42	0.30
2380.33	1.04	290.38	2380.11	15.22	-8.24	15.22	17.31	331.57	0.09
2474.29	0.79	301.15	2474.06	15.85	-9.59	15.85	18.52	328.82	0.32
2568.25	0.75	290.10	2568.01	16.39	-10.72	16.39	19.59	326.82	0.16
2662.21	0.96	289.36	2661.96	16.87	-12.04	16.87	20.72	324.48	0.23
2756.17	0.95	291.40	2755.91	17.41	-13.51	17.41	22.04	322.20	0.04
2850.13	0.59	335.04	2849.86	18.14	-14.44	18.14	23.18	321.48	0.70
2944.09	0.51	337.07	2943.82	18.96	-14.80	18.96	24.05	322.02	0.09
3038.05	0.49	6.69	3037.77	19.74	-14.92	19.74	24.74	322.92	0.27
3132.01	0.84	34.05	3131.73	20.70	-14.49	20.70	25.27	325.02	0.49
3225.97	0.83	36.51	3225.68	21.82	-13.69	21.82	25.76	327.90	0.04
3319.93	0.88	33.60	3319.63	22.97	-12.89	22.97	26.34	330.71	0.07
3413.89	1.03	37.07	3413.57	24.25	-11.98	24.25	27.05	333.72	0.17
3507.85	0.91	15.98	3507.52	25.65	-11.26	25.65	28.01	336.30	0.40
3601.81	1.06	26.51	3601.47	27.15	-10.66	27.15	29.17	338.55	0.25
3695.77	0.75	35.21	3695.41	28.43	-9.92	28.43	30.11	340.77	0.36
3789.73	0.46	27.04	3789.37	29.28	-9.39	29.28	30.75	342.22	0.32
3883.69	0.27	2.17	3883.33	29.84	-9.21	29.84	31.22	342.85	0.26
3977.65	0.49	20.20	3977.28	30.43	-9.06	30.43	31.75	343.42	0.27
4071.61	0.90	93.36	4071.24	30.77	-8.18	30.77	31.84	345.11	0.95
4165.57	3.19	106.30	4165.13	29.99	-4.93	29.99	30.40	350.66	2.46
4259.53	4.77	102.20	4258.86	28.43	1.39	28.43	28.47	2.80	1.71
4353.49	4.35	107.08	4352.53	26.56	8.61	26.56	27.93	17.97	0.61
4447.45	4.50	108.56	4446.21	24.34	15.51	24.34	28.87	32.51	0.21
4541.41	4.62	108.52	4539.87	21.97	22.60	21.97	31.52	45.81	0.13
4635.37	4.66	115.68	4633.52	19.11	29.63	19.11	35.26	57.18	0.62
4729.33	3.83	121.17	4727.22	15.83	35.76	15.83	39.10	66.12	0.98
4823.29	3.19	111.08	4821.01	13.27	40.88	13.27	42.98	72.02	0.94
4917.25	2.89	104.97	4914.83	11.71	45.62	11.71	47.10	75.60	0.47
5011.21	2.82	93.22	5008.68	10.97	50.21	10.97	51.40	77.68	0.63
5105.17	3.09	95.87	5102.51	10.58	55.04	10.58	56.04	79.12	0.33
5199.13	3.08	100.70	5196.34	9.85	60.04	9.85	60.84	80.68	0.28
5293.09	3.01	98.30	5290.17	9.03	64.97	9.03	65.59	82.09	0.15
5387.05	2.98	95.35	5384.00	8.44	69.84	8.44	70.35	83.11	0.17

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
5481.01	2.89	101.87	5477.83	7.73	74.60	7.73	74.99	84.09	0.37
5574.97	3.10	99.82	5571.66	6.81	79.42	6.81	79.71	85.10	0.25
5668.93	3.14	95.96	5665.49	6.11	84.48	6.11	84.70	85.87	0.23
5762.89	3.18	97.95	5759.30	5.48	89.62	5.48	89.79	86.50	0.13
5856.85	3.19	103.46	5853.12	4.51	94.74	4.51	94.85	87.27	0.33
5950.81	2.99	95.27	5946.94	3.68	99.72	3.68	99.79	87.89	0.51
6044.77	2.69	94.44	6040.79	3.28	104.35	3.28	104.40	88.20	0.32
6138.73	2.54	87.24	6134.65	3.21	108.63	3.21	108.68	88.31	0.38
6232.69	2.53	94.60	6228.52	3.15	112.78	3.15	112.82	88.40	0.35
6326.65	2.42	93.73	6322.39	2.85	116.82	2.85	116.86	88.60	0.12
6420.61	2.54	85.51	6416.26	2.88	120.87	2.88	120.91	88.63	0.40
6514.57	2.55	85.52	6510.13	3.21	125.04	3.21	125.08	88.53	0.01
6608.53	2.59	84.26	6604.00	3.59	129.24	3.59	129.29	88.41	0.07
6702.49	2.74	89.85	6697.85	3.81	133.60	3.81	133.66	88.37	0.32
6796.45	2.85	82.26	6791.70	4.13	138.16	4.13	138.23	88.29	0.41
6890.41	2.79	85.73	6885.55	4.61	142.76	4.61	142.83	88.15	0.19
6984.37	2.40	72.96	6979.41	5.36	146.92	5.36	147.02	87.91	0.74
7078.33	2.44	80.70	7073.29	6.26	150.77	6.26	150.90	87.62	0.35
7172.29	2.38	85.78	7167.17	6.72	154.69	6.72	154.84	87.51	0.24
7266.25	2.25	86.89	7261.05	6.97	158.48	6.97	158.63	87.48	0.15
7360.21	2.48	85.38	7354.93	7.23	162.34	7.23	162.50	87.45	0.25
7454.17	2.47	77.68	7448.80	7.83	166.35	7.83	166.53	87.31	0.35
7548.13	2.49	74.23	7542.67	8.81	170.29	8.81	170.52	87.04	0.16
7642.09	2.42	87.46	7636.55	9.46	174.23	9.46	174.49	86.89	0.61
7736.05	2.17	88.34	7730.43	9.59	177.99	9.59	178.25	86.91	0.26
7830.01	2.02	85.02	7824.33	9.79	181.42	9.79	181.68	86.91	0.21
7923.97	2.09	91.22	7918.23	9.90	184.78	9.90	185.05	86.93	0.25
8017.93	2.16	86.93	8012.13	9.95	188.26	9.95	188.52	86.97	0.18
8111.89	2.16	90.74	8106.02	10.03	191.80	10.03	192.06	87.01	0.15
8205.85	1.92	92.39	8199.92	9.94	195.14	9.94	195.39	87.08	0.26
8299.81	1.67	85.19	8293.83	9.99	198.08	9.99	198.33	87.11	0.36
8393.77	1.41	90.70	8387.76	10.09	200.61	10.09	200.86	87.12	0.32
8487.73	1.53	100.42	8481.69	9.85	203.00	9.85	203.23	87.22	0.30
8581.69	1.29	97.77	8575.62	9.48	205.28	9.48	205.50	87.36	0.27
8675.65	1.30	105.02	8669.56	9.06	207.36	9.06	207.55	87.50	0.17
8769.61	1.07	107.02	8763.50	8.52	209.23	8.52	209.40	87.67	0.25
8863.57	1.25	124.83	8857.44	7.68	210.91	7.68	211.05	87.92	0.43
8957.53	0.95	114.28	8951.38	6.77	212.47	6.77	212.58	88.17	0.39
9051.49	1.09	119.50	9045.32	6.01	213.96	6.01	214.04	88.39	0.18

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
9145.45	1.17	132.50	9139.27	4.92	215.44	4.92	215.50	88.69	0.28
9239.41	0.98	137.47	9233.21	3.69	216.69	3.69	216.72	89.03	0.22
9333.37	0.79	164.51	9327.16	2.47	217.41	2.47	217.42	89.35	0.48
9427.33	0.78	175.21	9421.11	1.21	217.63	1.21	217.63	89.68	0.16
9521.29	1.45	190.50	9515.05	-0.59	217.47	-0.59	217.47	90.16	0.78
9615.25	2.19	202.72	9608.96	-3.42	216.56	-3.42	216.58	90.90	0.89
9709.21	2.55	198.78	9702.84	-7.06	215.19	-7.06	215.30	91.88	0.42
9803.17	2.27	192.56	9796.72	-10.85	214.11	-10.85	214.39	92.90	0.41
9897.13	2.17	183.24	9890.61	-14.44	213.61	-14.44	214.09	93.87	0.40
9991.09	1.98	183.15	9984.51	-17.83	213.42	-17.83	214.16	94.78	0.20
10085.05	1.61	189.27	10078.42	-20.75	213.12	-20.75	214.12	95.56	0.44
10179.01	1.83	213.56	10172.34	-23.30	212.08	-23.30	213.35	96.27	0.80
10272.97	1.62	222.53	10266.26	-25.52	210.35	-25.52	211.89	96.92	0.36
10366.93	1.20	233.92	10360.19	-27.08	208.66	-27.08	210.41	97.40	0.54
10460.89	0.91	185.68	10454.14	-28.41	207.79	-28.41	209.72	97.79	0.96
10554.85	0.98	194.25	10548.08	-29.94	207.51	-29.94	209.66	98.21	0.17



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