

Results of Directional Survey

API number:	30-025-41468			
OGRID:		Operator:	DEVON ENERGY PRODUCTION COMPANY, LP	
		Property:	THISTLE UNIT	# 64H

surface	ULSTR:	O	22	T 23S	R 33E
				450 FSL	2150 FEL

BH Loc	ULSTR:	A	22	T 23S	R 33E
15937	MD	11090.3	TVD	318 FNL	688 FEL
				4962 FSL	

Top Perf/OH	ULSTR:	O	22	T 23S	R 33E
11425	MD	11091.7	TVD	466 FSL	691 FEL

Bot Perf/OH	ULSTR:	A	22	T 23S	R 33E
15749	MD	11095.7	TVD	506 FNL	687 FEL
				4774 FSL	

	MD	N/S	E/W	VD
	11395	-10.28	1451.60	11080.03
TOP PERFS/OH	11425	16.34	1459.00	11091.70
	11426	17.23	1459.25	11092.09
	15710	4284.92	1463.64	11096.88
BOT PERFS/OH	15749	4323.90	1463.30	11095.66
	15804	4378.87	1462.82	11093.93

NEXT TO LAST	15882	4456.84	1462.14	11091.68
LAST READING	15937	4511.82	1461.75	11090.34
TD	15937	4511.82	1461.75	11090.34

Surface Location	450	FS	2150	FE
Projected BHL	4962	FS	688	FE
Location of				
Top Perfs/OH	466	FS	691	FE
Bottom Perfs/OH	4774	FS	687	FE

SUMMARY of Subsurface Locations

Surface Location	O-22-23S-33E	450	FS	2150	FE	Vert. Depth
Top Perfs/OH	O-22-23S-33E	466	FS	691	FE	11091.70
Bottom Perfs/OH	A-22-23S-33E	4774	FS	687	FE	11095.66
Projected TD	A-22-23S-33E	4962	FS	688	FE	11090.34

SEP 30 2014



Job Number: SVMO-140389
 Company: Devon Energy
 Lease/Well: Thistle Unit 64H
 Location: Lea County, NM
 Rig Name: H&P #394
 RKB: 25'
 G.L. or M.S.L.: GL

State/Country: New Mexico/USA
 Declination: 6.94°
 Grid: East To Grid North
 File name: Y:\WINSER~1\2014SU~1\DEVONIMO\THISTL~1\64H.SVY
 Date/Time: 31-Mar-14 / 14:45
 Curve Name: Surface - 1322' M.D. (Rate Gyro)

HOBBS OCD
 SEP 22 2014
 RECEIVED

MS Survey

WINSERVE SURVEY CALCULATIONS
 Minimum Curvature Method
 Vertical Section Plane 17.88
 Vertical Section Referenced to Wellhead
 Rectangular Coordinates Referenced to Wellhead

We hereby certify that our survey data from
Surface MD to 1322' MD is, to the best of
 our knowledge a true and accurate account of
 the well bore.
James Gally 3/31/14
 MS Energy Services Date

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	C L O S U R E		Dogleg Severity Deg/100
							Distance FT	Direction Deg	
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
62.00	.23	314.36	62.00	.09	-.09	.06	.12	314.37	.37
156.00	.32	307.04	156.00	.38	-.43	.23	.57	311.02	.10
251.00	.40	307.62	251.00	.74	-.91	.42	1.17	309.16	.08
345.00	.46	311.23	344.99	1.19	-1.45	.69	1.88	309.31	.07
440.00	.54	310.40	439.99	1.73	-2.08	1.01	2.70	309.76	.08
534.00	.65	302.62	533.99	2.30	-2.87	1.31	3.68	308.80	.14
629.00	.72	298.39	628.98	2.88	-3.84	1.56	4.80	306.82	.09
723.00	.75	276.88	722.97	3.23	-4.97	1.55	5.93	303.02	.29
818.00	.93	269.47	817.96	3.30	-6.36	1.19	7.17	297.41	.22

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	C L O S U R E		Dogleg Severity Deg/100
							Distance FT	Direction Deg	
912.00	.89	264.57	911.95	3.22	-7.85	.66	8.49	292.32	.09
1007.00	.88	264.77	1006.94	3.09	-9.31	.08	9.81	288.34	.01
1101.00	.87	263.17	1100.93	2.94	-10.74	-.50	11.14	285.29	.03
1196.00	.88	264.03	1195.92	2.78	-12.18	-1.10	12.49	282.83	.02
1290.00	.82	265.32	1289.91	2.65	-13.57	-1.65	13.83	281.03	.07

Last Survey Depth Recorded									
1322.00	.80	266.05	1321.90	2.61	-14.02	-1.82	14.26	280.55	.07



THISTLE UNIT 64H

WEST UNRESTRICTED

Directional Survey

District DELAWARE BASIN	County LEA	Field Name JOHNSON RANCH	Project Group DELAWARE BASIN REG	State/Province NM			
Surface Legal Location SEC22 T23S R33E	API/UWI 3002541468	Latitude (°) 32° 17' 3.025" N	Longitude (°) 103° 33' 31.061" W	Ground Elev... 3,692.70	KB - GL (ft) 25.00	Orig KB Elev (ft) 3,717.70	Tubing Head Elevation (ft)

Wellbores

Wellbore Name OH	Parent Wellbore	SAP Well ID 34797	Kick Off Depth (ftKB)	Vertical Section Direction (°) 17.88
Actual Deviation Survey MS-GYRO SURVEY/LEAM MWD, Proposed? No	Definitive? Yes	Proposed? No	Proposed Deviation Survey	

Deviation Survey

Date 3/28/2014		Description MS-GYRO SURVEY/LEAM MWD			
MD Tie In (ftKB) 0.00	TVD Tie In (ftKB) 0.00	Inclination Tie In (°) 0.00	Azimuth Tie In (°) 0.00	NS Tie In (ft) 0.00	EW Tie 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
3/28/2014	62.00	0.23	314.36	62.00	0.06	0.09	-0.09	0.37	GYRO	MULTI-SHOT
3/28/2014	156.00	0.32	307.04	156.00	0.23	0.38	-0.43	0.10	GYRO	MULTI-SHOT
3/28/2014	251.00	0.40	307.62	251.00	0.42	0.74	-0.91	0.08	GYRO	MULTI-SHOT
3/28/2014	345.00	0.46	311.23	344.99	0.69	1.19	-1.45	0.07	GYRO	MULTI-SHOT
3/28/2014	440.00	0.54	310.40	439.99	1.01	1.73	-2.08	0.08	GYRO	MULTI-SHOT
3/28/2014	534.00	0.65	302.62	533.99	1.31	2.30	-2.87	0.14	GYRO	MULTI-SHOT
3/28/2014	629.00	0.72	298.39	628.98	1.56	2.88	-3.84	0.09	GYRO	MULTI-SHOT
3/28/2014	723.00	0.75	276.88	722.97	1.55	3.23	-4.97	0.29	GYRO	MULTI-SHOT
3/28/2014	818.00	0.93	269.47	817.96	1.19	3.30	-6.36	0.22	GYRO	MULTI-SHOT
3/28/2014	912.00	0.89	264.57	911.95	0.66	3.22	-7.85	0.09	GYRO	MULTI-SHOT
3/28/2014	1,007.00	0.88	264.77	1,006.94	0.08	3.09	-9.31	0.01	GYRO	MULTI-SHOT
3/28/2014	1,101.00	0.87	263.17	1,100.93	-0.50	2.94	-10.74	0.03	GYRO	MULTI-SHOT
3/28/2014	1,196.00	0.88	264.03	1,195.92	-1.10	2.78	-12.18	0.02	GYRO	MULTI-SHOT
3/28/2014	1,290.00	0.82	265.32	1,289.91	-1.65	2.65	-13.57	0.07	GYRO	MULTI-SHOT
3/28/2014	1,322.00	0.80	266.05	1,321.90	-1.82	2.61	-14.02	0.07	GYRO	MULTI-SHOT
3/28/2014	1,514.00	0.40	279.20	1,513.89	-2.42	2.63	-16.02	0.22	MWD	LEAM
3/28/2014	1,546.00	0.70	152.30	1,545.89	-2.57	2.47	-16.04	3.10	MWD	LEAM
3/28/2014	1,577.00	1.80	141.40	1,576.88	-2.97	1.92	-15.65	3.61	MWD	LEAM
3/28/2014	1,609.00	2.80	132.30	1,608.86	-3.58	1.00	-14.76	3.32	MWD	LEAM
3/28/2014	1,640.00	4.00	125.60	1,639.80	-4.22	-0.13	-13.32	4.07	MWD	LEAM
3/28/2014	1,671.00	4.70	126.50	1,670.71	-4.95	-1.52	-11.42	2.27	MWD	LEAM
3/28/2014	1,703.00	5.10	127.50	1,702.60	-5.85	-3.17	-9.24	1.28	MWD	LEAM
3/28/2014	1,734.00	4.70	134.60	1,733.48	-6.88	-4.90	-7.24	2.34	MWD	LEAM
3/28/2014	1,797.00	6.10	127.40	1,796.20	-9.16	-8.74	-2.74	2.46	MWD	LEAM
3/28/2014	1,892.00	8.60	109.40	1,890.43	-11.04	-14.17	7.97	3.55	MWD	LEAM
3/28/2014	1,955.00	9.70	103.40	1,952.62	-10.75	-16.96	17.58	2.31	MWD	LEAM
3/28/2014	2,017.00	10.10	103.40	2,013.70	-9.91	-19.43	27.95	0.65	MWD	LEAM
3/28/2014	2,080.00	9.90	102.40	2,075.74	-8.97	-21.88	38.61	0.42	MWD	LEAM
3/28/2014	2,206.00	9.60	102.60	2,199.92	-6.96	-26.49	59.44	0.24	MWD	LEAM
3/28/2014	2,269.00	9.50	102.60	2,262.05	-6.00	-28.77	69.64	0.16	MWD	LEAM
3/28/2014	2,333.00	9.60	102.00	2,325.16	-4.97	-31.04	80.02	0.22	MWD	LEAM
3/28/2014	2,396.00	9.70	104.50	2,387.27	-4.12	-33.46	90.29	0.68	MWD	LEAM
3/28/2014	2,458.00	10.10	108.40	2,448.35	-3.86	-36.48	100.51	1.26	MWD	LEAM
3/28/2014	2,521.00	9.90	109.10	2,510.39	-4.03	-40.00	110.87	0.37	MWD	LEAM
3/28/2014	2,584.00	9.80	108.90	2,572.46	-4.24	-43.51	121.06	0.17	MWD	LEAM
3/28/2014	2,647.00	9.60	109.80	2,634.56	-4.51	-47.02	131.07	0.40	MWD	LEAM
3/28/2014	2,710.00	9.80	108.70	2,696.66	-4.76	-50.52	141.10	0.43	MWD	LEAM
3/28/2014	2,773.00	9.40	107.80	2,758.78	-4.83	-53.81	151.07	0.68	MWD	LEAM
3/28/2014	2,836.00	9.60	107.80	2,820.92	-4.82	-56.99	160.97	0.32	MWD	LEAM
3/28/2014	2,931.00	9.20	106.40	2,914.64	-4.61	-61.56	175.80	0.48	MWD	LEAM
3/28/2014	3,025.00	9.00	105.90	3,007.46	-4.16	-65.69	190.08	0.23	MWD	LEAM
3/28/2014	3,120.00	9.10	105.40	3,101.28	-3.58	-69.72	204.47	0.13	MWD	LEAM
3/28/2014	3,214.00	9.30	106.80	3,194.07	-3.11	-73.89	218.91	0.32	MWD	LEAM
3/28/2014	3,309.00	9.80	109.80	3,287.75	-3.24	-78.85	233.86	0.74	MWD	LEAM
3/28/2014	3,403.00	9.70	107.80	3,380.39	-3.50	-83.98	248.93	0.38	MWD	LEAM
3/28/2014	3,498.00	9.60	108.70	3,474.05	-3.60	-88.97	264.05	0.19	MWD	LEAM
3/28/2014	3,593.00	9.40	106.40	3,567.75	-3.51	-93.70	279.00	0.45	MWD	LEAM



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Survey Data

Date	MD (ftKB)	Incl (°)	Azm (°)	TVD (ftKB)	VS (ft)	N/S (ft)	E/W (ft)	DLS (°/100ft)	Survey Tool	Survey Company
3/28/2014	3,687.00	9.00	106.10	3,660.54	-3.09	-97.90	293.43	0.43	MWD	LEAM
3/28/2014	3,782.00	8.70	108.00	3,754.41	-2.87	-102.18	307.40	0.44	MWD	LEAM
3/28/2014	3,877.00	9.40	108.00	3,848.22	-2.90	-106.80	321.61	0.74	MWD	LEAM
3/28/2014	3,971.00	9.00	108.70	3,941.01	-3.02	-111.53	335.88	0.44	MWD	LEAM
3/28/2014	4,065.00	9.10	109.60	4,033.84	-3.35	-116.38	349.84	0.18	MWD	LEAM
3/28/2014	4,160.00	9.00	110.80	4,127.66	-3.95	-121.54	363.87	0.22	MWD	LEAM
3/28/2014	4,254.00	9.30	112.80	4,220.46	-4.98	-127.09	377.74	0.47	MWD	LEAM
3/28/2014	4,349.00	8.30	110.80	4,314.34	-5.99	-132.50	391.23	1.10	MWD	LEAM
3/28/2014	4,443.00	8.40	111.00	4,407.35	-6.71	-137.37	403.98	0.11	MWD	LEAM
3/28/2014	4,537.00	9.40	111.00	4,500.22	-7.50	-142.59	417.56	1.06	MWD	LEAM
3/28/2014	4,632.00	10.20	111.20	4,593.83	-8.41	-148.41	432.64	0.84	MWD	LEAM
3/28/2014	4,726.00	9.50	110.70	4,686.44	-9.27	-154.16	447.66	0.75	MWD	LEAM
3/28/2014	4,821.00	10.00	111.50	4,780.07	-10.18	-159.95	462.67	0.55	MWD	LEAM
3/28/2014	4,915.00	11.30	112.60	4,872.45	-11.45	-166.48	478.76	1.40	MWD	LEAM
3/28/2014	5,009.00	11.50	113.50	4,964.59	-13.13	-173.76	495.86	0.28	MWD	LEAM
3/28/2014	5,104.00	10.70	110.30	5,057.82	-14.43	-180.60	512.82	1.06	MWD	LEAM
3/28/2014	5,198.00	9.90	109.10	5,150.30	-14.97	-186.27	528.64	0.88	MWD	LEAM
3/28/2014	5,293.00	9.00	110.50	5,244.01	-15.48	-191.54	543.31	0.98	MWD	LEAM
3/28/2014	5,388.00	9.40	109.60	5,337.79	-16.05	-196.75	557.58	0.45	MWD	LEAM
3/28/2014	5,482.00	10.20	108.20	5,430.42	-16.33	-201.92	572.72	0.89	MWD	LEAM
3/28/2014	5,577.00	9.90	108.20	5,523.96	-16.42	-207.10	588.47	0.32	MWD	LEAM
3/28/2014	5,671.00	10.10	107.00	5,616.53	-16.34	-212.03	604.03	0.31	MWD	LEAM
3/28/2014	5,766.00	9.70	107.80	5,710.12	-16.20	-216.92	619.62	0.45	MWD	LEAM
3/28/2014	5,861.00	9.70	105.60	5,803.76	-15.87	-221.51	634.94	0.39	MWD	LEAM
3/28/2014	5,955.00	9.60	107.50	5,896.43	-15.51	-226.00	650.05	0.36	MWD	LEAM
3/28/2014	6,050.00	9.70	105.90	5,990.08	-15.18	-230.58	665.30	0.30	MWD	LEAM
3/28/2014	6,239.00	9.30	105.60	6,176.49	-14.02	-239.04	695.32	0.21	MWD	LEAM
3/28/2014	6,333.00	9.00	103.80	6,269.30	-13.19	-242.84	709.78	0.44	MWD	LEAM
3/28/2014	6,428.00	8.80	102.90	6,363.15	-12.03	-246.24	724.08	0.26	MWD	LEAM
3/28/2014	6,522.00	9.60	107.30	6,455.94	-11.33	-250.17	738.57	1.13	MWD	LEAM
3/28/2014	6,617.00	9.80	106.80	6,549.59	-11.10	-254.86	753.87	0.23	MWD	LEAM
3/28/2014	6,712.00	9.90	108.20	6,643.19	-10.99	-259.75	769.37	0.27	MWD	LEAM
3/28/2014	6,806.00	9.80	108.40	6,735.80	-11.11	-264.80	784.64	0.11	MWD	LEAM
3/28/2014	6,901.00	9.70	106.10	6,829.43	-10.93	-269.57	800.00	0.42	MWD	LEAM
3/28/2014	6,995.00	9.80	104.90	6,922.07	-10.27	-273.83	815.34	0.24	MWD	LEAM
3/28/2014	7,090.00	9.90	103.10	7,015.67	-9.17	-277.76	831.10	0.34	MWD	LEAM
3/28/2014	7,184.00	9.80	106.30	7,108.29	-8.28	-281.83	846.65	0.59	MWD	LEAM
3/28/2014	7,279.00	9.80	109.20	7,201.90	-8.24	-286.76	862.05	0.52	MWD	LEAM
3/28/2014	7,374.00	9.80	107.10	7,295.51	-8.32	-291.80	877.41	0.38	MWD	LEAM
3/28/2014	7,468.00	9.90	106.80	7,388.13	-8.06	-296.48	892.79	0.12	MWD	LEAM
3/28/2014	7,563.00	9.70	106.80	7,481.74	-7.75	-301.16	908.27	0.21	MWD	LEAM
3/28/2014	7,657.00	9.80	107.70	7,574.38	-7.58	-305.88	923.48	0.19	MWD	LEAM
3/28/2014	7,752.00	9.80	107.30	7,668.00	-7.47	-310.74	938.90	0.07	MWD	LEAM
3/28/2014	7,847.00	9.10	106.10	7,761.71	-7.15	-315.23	953.83	0.77	MWD	LEAM
3/28/2014	7,941.00	8.70	105.60	7,854.58	-6.64	-319.20	967.82	0.43	MWD	LEAM
3/28/2014	8,036.00	8.70	107.80	7,948.48	-6.34	-323.33	981.58	0.35	MWD	LEAM
3/28/2014	8,131.00	8.50	107.70	8,042.41	-6.31	-327.66	995.11	0.21	MWD	LEAM
3/28/2014	8,225.00	9.10	108.90	8,135.31	-6.42	-332.18	1,008.77	0.67	MWD	LEAM
3/28/2014	8,319.00	8.50	108.20	8,228.20	-6.59	-336.76	1,022.40	0.65	MWD	LEAM
3/28/2014	8,414.00	9.60	105.70	8,322.02	-6.33	-341.10	1,036.69	1.23	MWD	LEAM
3/28/2014	8,508.00	9.50	106.30	8,414.71	-5.82	-345.39	1,051.68	0.15	MWD	LEAM
3/28/2014	8,602.00	9.40	107.00	8,507.44	-5.49	-349.82	1,066.47	0.16	MWD	LEAM
3/28/2014	8,697.00	9.30	108.00	8,601.18	-5.38	-354.46	1,081.19	0.20	MWD	LEAM
3/28/2014	8,791.00	9.10	107.30	8,693.97	-5.33	-359.01	1,095.51	0.24	MWD	LEAM
3/28/2014	8,886.00	8.90	109.20	8,787.80	-5.42	-363.66	1,109.62	0.38	MWD	LEAM



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3/28/2014	8,980.00	8.40	108.90	8,880.73	-5.71	-368.28	1,122.99	0.53	MWD	LEAM
3/28/2014	9,075.00	8.10	110.80	8,974.75	-6.17	-372.90	1,135.81	0.43	MWD	LEAM
3/28/2014	9,169.00	8.00	109.90	9,067.82	-6.74	-377.48	1,148.15	0.17	MWD	LEAM
3/28/2014	9,263.00	7.00	107.50	9,161.01	-6.93	-381.43	1,159.76	1.11	MWD	LEAM
3/28/2014	9,358.00	6.80	107.80	9,255.33	-6.89	-384.89	1,170.64	0.21	MWD	LEAM
3/28/2014	9,452.00	6.10	104.50	9,348.73	-6.58	-387.84	1,180.77	0.84	MWD	LEAM
3/28/2014	9,547.00	5.10	102.60	9,443.28	-5.90	-390.03	1,189.78	1.07	MWD	LEAM
3/28/2014	9,641.00	4.80	108.90	9,536.93	-5.58	-392.21	1,197.58	0.66	MWD	LEAM
3/28/2014	9,735.00	4.10	109.20	9,630.64	-5.73	-394.59	1,204.47	0.75	MWD	LEAM
3/28/2014	9,830.00	3.20	107.80	9,725.45	-5.81	-396.52	1,210.21	0.95	MWD	LEAM
3/28/2014	9,924.00	3.20	112.20	9,819.30	-6.00	-398.31	1,215.13	0.26	MWD	LEAM
3/28/2014	10,034.00	2.30	105.90	9,929.17	-6.16	-400.08	1,220.10	0.86	MWD	LEAM
3/28/2014	10,128.00	1.70	95.00	10,023.12	-5.78	-400.72	1,223.30	0.75	MWD	LEAM
3/28/2014	10,223.00	1.20	110.30	10,118.09	-5.51	-401.18	1,225.64	0.66	MWD	LEAM
3/28/2014	10,317.00	1.30	120.30	10,212.06	-5.78	-402.06	1,227.48	0.25	MWD	LEAM
3/28/2014	10,412.00	1.40	125.10	10,307.04	-6.35	-403.27	1,229.36	0.16	MWD	LEAM
3/28/2014	10,506.00	1.10	125.90	10,401.02	-6.97	-404.46	1,231.03	0.32	MWD	LEAM
3/28/2014	10,574.00	0.70	130.30	10,469.01	-7.33	-405.12	1,231.88	0.60	MWD	LEAM
3/28/2014	10,600.00	0.60	116.50	10,495.01	-7.41	-405.28	1,232.12	0.71	MWD	LEAM
3/28/2014	10,632.00	1.40	75.50	10,527.00	-7.23	-405.26	1,232.65	3.21	MWD	LEAM
3/28/2014	10,663.00	4.70	56.90	10,557.95	-6.04	-404.47	1,234.08	10.98	MWD	LEAM
3/28/2014	10,695.00	8.30	54.90	10,589.74	-3.18	-402.42	1,237.07	11.27	MWD	LEAM
3/28/2014	10,726.00	12.80	55.60	10,620.21	1.33	-399.19	1,241.74	14.52	MWD	LEAM
3/28/2014	10,758.00	16.50	56.70	10,651.17	7.68	-394.70	1,248.46	11.59	MWD	LEAM
3/28/2014	10,789.00	19.80	56.70	10,680.62	15.20	-389.39	1,256.53	10.65	MWD	LEAM
3/28/2014	10,820.00	23.40	55.10	10,709.44	24.19	-382.99	1,265.97	11.77	MWD	LEAM
3/28/2014	10,852.00	27.10	50.50	10,738.38	35.40	-374.71	1,276.81	13.08	MWD	LEAM
3/28/2014	10,883.00	30.00	44.60	10,765.61	48.27	-364.70	1,287.71	13.04	MWD	LEAM
3/28/2014	10,915.00	32.70	38.90	10,792.94	63.49	-352.27	1,298.76	12.53	MWD	LEAM
3/28/2014	10,946.00	36.30	35.80	10,818.49	80.05	-338.30	1,309.39	12.92	MWD	LEAM
3/28/2014	10,978.00	39.50	32.30	10,843.74	98.92	-322.01	1,320.37	12.04	MWD	LEAM
3/28/2014	11,009.00	42.30	31.20	10,867.17	118.63	-304.75	1,331.04	9.33	MWD	LEAM
3/28/2014	11,041.00	45.30	28.90	10,890.26	140.28	-285.58	1,342.12	10.61	MWD	LEAM
3/28/2014	11,072.00	47.90	26.60	10,911.56	162.46	-265.65	1,352.60	9.97	MWD	LEAM
3/28/2014	11,103.00	50.80	25.60	10,931.75	185.74	-244.53	1,362.94	9.67	MWD	LEAM
3/28/2014	11,135.00	53.50	24.50	10,951.39	210.81	-221.64	1,373.63	8.86	MWD	LEAM
3/28/2014	11,174.00	56.30	22.40	10,973.81	242.56	-192.37	1,386.32	8.42	MWD	LEAM
3/28/2014	11,206.00	57.40	21.40	10,991.31	269.28	-167.51	1,396.31	4.32	MWD	LEAM
3/28/2014	11,237.00	59.30	20.50	11,007.58	295.63	-142.86	1,405.74	6.61	MWD	LEAM
3/28/2014	11,269.00	60.80	19.80	11,023.55	323.34	-116.83	1,415.29	5.06	MWD	LEAM
3/28/2014	11,300.00	62.10	19.80	11,038.37	350.55	-91.21	1,424.52	4.19	MWD	LEAM
3/28/2014	11,332.00	63.30	19.20	11,053.05	378.98	-64.41	1,434.01	4.10	MWD	LEAM
3/28/2014	11,364.00	64.50	18.20	11,067.12	407.71	-37.19	1,443.22	4.68	MWD	LEAM
3/28/2014	11,395.00	66.30	16.40	11,080.03	435.89	-10.28	1,451.60	7.85	MWD	LEAM
3/28/2014	11,426.00	67.90	14.70	11,092.09	464.42	17.23	1,459.25	7.22	MWD	LEAM
3/28/2014	11,458.00	69.50	13.80	11,103.72	494.18	46.12	1,466.59	5.64	MWD	LEAM
3/28/2014	11,489.00	71.10	12.40	11,114.17	523.26	74.55	1,473.20	6.69	MWD	LEAM
3/28/2014	11,521.00	72.50	10.50	11,124.16	553.46	104.34	1,479.23	7.14	MWD	LEAM
3/28/2014	11,552.00	74.20	8.50	11,133.04	582.84	133.63	1,484.13	8.26	MWD	LEAM
3/28/2014	11,584.00	75.80	7.10	11,141.33	613.27	164.25	1,488.33	6.55	MWD	LEAM
3/28/2014	11,615.00	76.90	6.20	11,148.64	642.82	194.17	1,491.81	4.53	MWD	LEAM
3/28/2014	11,647.00	78.30	5.50	11,155.51	673.39	225.26	1,495.00	4.87	MWD	LEAM
3/28/2014	11,678.00	80.20	4.50	11,161.30	703.07	255.60	1,497.65	6.90	MWD	LEAM
3/28/2014	11,710.00	82.00	3.20	11,166.25	733.74	287.14	1,499.77	6.91	MWD	LEAM
3/28/2014	11,741.00	82.80	2.00	11,170.35	763.38	317.84	1,501.17	4.62	MWD	LEAM



THISTLE UNIT 64H

WEST UNRESTRICTED

Directional Survey

District DELAWARE BASIN	County LEA	Field Name JOHNSON RANCH	Project Group DELAWARE BASIN REG	State/Province NM			
Surface Legal Location SEC22 T23S R33E	API/UWI 3002541468	Latitude (°) 32° 17' 3.025" N	Longitude (°) 103° 33' 31.061" W	Ground Elev... 3,692.70	KB - GL (ft) 25.00	Orig KB Elev (ft) 3,717.70	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
3/28/2014	11,773.00	85.70	0.40	11,173.55	793.88	349.67	1,501.83	10.34	MWD	LEAM
3/28/2014	11,804.00	88.60	0.10	11,175.09	823.38	380.63	1,501.97	9.40	MWD	LEAM
3/28/2014	11,836.00	90.20	359.60	11,175.43	853.81	412.62	1,501.88	5.24	MWD	LEAM
3/28/2014	11,931.00	90.70	359.40	11,174.68	943.96	507.62	1,501.05	0.57	MWD	LEAM
3/28/2014	12,025.00	90.30	359.20	11,173.86	1,033.06	601.60	1,499.91	0.48	MWD	LEAM
3/28/2014	12,120.00	91.30	359.20	11,172.54	1,123.04	696.58	1,498.58	1.05	MWD	LEAM
3/28/2014	12,215.00	91.00	359.00	11,170.63	1,212.97	791.55	1,497.09	0.38	MWD	LEAM
3/28/2014	12,309.00	90.80	358.90	11,169.15	1,301.87	885.53	1,495.37	0.24	MWD	LEAM
3/28/2014	12,404.00	91.60	359.90	11,167.16	1,391.95	980.50	1,494.37	1.35	MWD	LEAM
3/28/2014	12,499.00	91.70	0.30	11,164.43	1,482.38	1,075.46	1,494.54	0.43	MWD	LEAM
3/28/2014	12,593.00	92.50	0.60	11,160.98	1,572.00	1,169.39	1,495.27	0.91	MWD	LEAM
3/28/2014	12,688.00	92.00	1.00	11,157.25	1,662.74	1,264.31	1,496.60	0.67	MWD	LEAM
3/28/2014	12,782.00	91.60	0.60	11,154.30	1,752.55	1,358.25	1,497.91	0.60	MWD	LEAM
3/28/2014	12,877.00	92.00	1.00	11,151.32	1,843.31	1,453.20	1,499.24	0.60	MWD	LEAM
3/28/2014	12,971.00	91.10	1.10	11,148.77	1,933.25	1,547.15	1,500.96	0.96	MWD	LEAM
3/28/2014	13,065.00	90.70	1.50	11,147.30	2,023.33	1,641.11	1,503.09	0.60	MWD	LEAM
3/28/2014	13,160.00	90.00	1.00	11,146.72	2,114.36	1,736.08	1,505.16	0.91	MWD	LEAM
3/28/2014	13,254.00	90.80	358.70	11,146.06	2,203.73	1,830.07	1,504.92	2.59	MWD	LEAM
3/28/2014	13,348.00	91.10	358.20	11,144.50	2,292.37	1,924.03	1,502.38	0.62	MWD	LEAM
3/28/2014	13,443.00	90.70	358.50	11,143.01	2,381.89	2,018.97	1,499.64	0.53	MWD	LEAM
3/28/2014	13,537.00	89.90	358.70	11,142.52	2,470.61	2,112.94	1,497.34	0.88	MWD	LEAM
3/28/2014	13,632.00	90.20	358.70	11,142.44	2,560.34	2,207.92	1,495.19	0.32	MWD	LEAM
3/28/2014	13,726.00	90.70	358.70	11,141.70	2,649.12	2,301.89	1,493.06	0.53	MWD	LEAM
3/28/2014	13,820.00	90.70	358.90	11,140.55	2,737.95	2,395.87	1,491.09	0.21	MWD	LEAM
3/28/2014	13,915.00	91.20	358.90	11,138.97	2,827.77	2,490.83	1,489.26	0.53	MWD	LEAM
3/28/2014	14,009.00	90.30	358.30	11,137.74	2,916.49	2,584.80	1,486.97	1.15	MWD	LEAM
3/28/2014	14,104.00	89.90	359.00	11,137.58	3,006.19	2,679.77	1,484.73	0.85	MWD	LEAM
3/28/2014	14,198.00	89.50	359.60	11,138.07	3,095.29	2,773.76	1,483.58	0.77	MWD	LEAM
3/28/2014	14,293.00	89.40	359.40	11,138.98	3,185.44	2,868.75	1,482.75	0.24	MWD	LEAM
3/28/2014	14,388.00	90.90	359.60	11,138.73	3,275.59	2,963.75	1,481.92	1.59	MWD	LEAM
3/28/2014	14,482.00	92.30	359.20	11,136.11	3,364.70	3,057.70	1,480.94	1.55	MWD	LEAM
3/28/2014	14,577.00	92.20	359.40	11,132.38	3,454.68	3,152.62	1,479.78	0.24	MWD	LEAM
3/28/2014	14,671.00	91.80	359.40	11,129.10	3,543.78	3,246.56	1,478.80	0.43	MWD	LEAM
3/28/2014	14,765.00	91.60	359.60	11,126.31	3,632.95	3,340.51	1,477.98	0.30	MWD	LEAM
3/28/2014	14,860.00	91.50	359.20	11,123.74	3,723.02	3,435.47	1,476.98	0.43	MWD	LEAM
3/28/2014	14,954.00	92.00	359.20	11,120.87	3,812.02	3,529.42	1,475.67	0.53	MWD	LEAM
3/28/2014	15,049.00	91.70	359.20	11,117.80	3,901.97	3,624.36	1,474.34	0.32	MWD	LEAM
3/28/2014	15,143.00	91.50	358.70	11,115.18	3,990.85	3,718.31	1,472.62	0.57	MWD	LEAM
3/28/2014	15,238.00	91.70	358.50	11,112.52	4,080.49	3,813.24	1,470.30	0.30	MWD	LEAM
3/28/2014	15,332.00	91.50	358.70	11,109.90	4,169.18	3,907.18	1,468.01	0.30	MWD	LEAM
3/28/2014	15,427.00	91.80	359.20	11,107.16	4,259.01	4,002.12	1,466.27	0.61	MWD	LEAM
3/28/2014	15,521.00	92.30	359.40	11,103.80	4,348.05	4,096.05	1,465.12	0.57	MWD	LEAM
3/28/2014	15,615.00	92.20	359.60	11,100.11	4,437.19	4,189.98	1,464.30	0.24	MWD	LEAM
3/28/2014	15,710.00	91.70	359.60	11,096.88	4,527.34	4,284.92	1,463.64	0.53	MWD	LEAM
3/28/2014	15,804.00	91.90	359.40	11,093.93	4,616.50	4,378.87	1,462.82	0.30	MWD	LEAM
3/28/2014	15,882.00	91.40	359.60	11,091.68	4,690.49	4,456.84	1,462.14	0.69	MWD	LEAM
3/28/2014	15,937.00	91.40	359.60	11,090.34	4,742.70	4,511.82	1,461.75	0.00	BIT	LEAM