

Results of Directional Survey

API number:	30-025-41253			
OGRID:		Operator:	DEVON ENERGY PRODUCTION COMPANY, LP	
		Property:	THISTLE UNIT	# 48H

surface	ULSTR:	N	34	T	23S	R	33E
				280	FSL	2561	FWL

BH Loc	ULSTR:	C	34	T	23S	R	33E
16233	MD	11222.6	TVD	276	FNL	2035	FWL
				5004	FSL		

Top Perf/OH	ULSTR:	N	34	T	23S	R	33E
11658	MD	11242.0	TVD	437	FSL	2241	FWL

Bot Perf/OH	ULSTR:	C	34	T	23S	R	33E
16060	MD	11230.4	TVD	449	FNL	2042	FWL
				4831	FSL		

	MD	N/S	E/W	VD
	11587	85.73	-316.75	11245.25
TOP PERFS/OH	11658	156.58	-319.83	11241.99
	11681	179.53	-320.83	11240.94
	16022	4513.19	-517.08	11232.66
BOT PERFS/OH	16060	4551.09	-518.61	11230.41
	16116	4606.95	-520.86	11227.10

NEXT TO LAST	16116	4606.95	-520.86	11227.10
LAST READING	16233	4723.74	-526.02	11222.60
TD	16233	4723.74	-526.02	11222.60

Surface Location	280	FS	2561	FW
Projected BHL	5004	FS	2035	FW
Location of				
Top Perfs/OH	437	FS	2241	FW
Bottom Perfs/OH	4831	FS	2042	FW

SUMMARY of Subsurface Locations

Surface Location	N-34-23S-33E	280	FS	2561	FW	Vert. Depth
Top Perfs/OH	N-34-23S-33E	437	FS	2241	FW	11241.99
Bottom Perfs/OH	C-34-23S-33E	4831	FS	2042	FW	11230.41
Projected TD	C-34-23S-33E	5004	FS	2035	FW	11222.60

JUL 01 2014

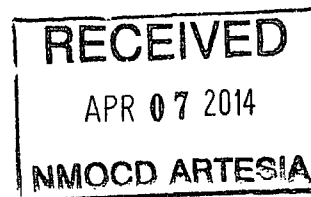


A GYRO TECHNOLOGIES INC. COMPANY

P.O. Box 261021
Corpus Christi, Texas 78426
(361) 767-0602 • (800) 606-GYRO • Fax (361) 767-0612

December 6, 2013

Devon Energy Production Co., L. P.
333 West Sheridan Ave
Oklahoma City, Oklahoma 73102-5010



HOBBS OCD

MAY 01 2014

Attn: Patti Riechers

Re: Thistle Unit No. 048H

RECEIVED

Please find enclosed a copy of the survey from 0.00' to 5133.00' 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,

Keith Havelka
Operations

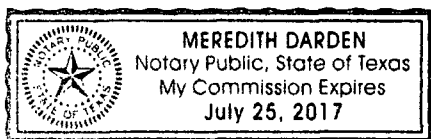
STATE OF TEXAS §

§

COUNTY OF NUECES §

This instrument was acknowledged before me on the 6th day of December A.D., 2013, by Keith Havelka.

Meredith Darden
Notary Public, State of Texas





Company: DEVON ENERGY
Lease/Well: THISTLE UNIT/NO. 048H
Location: SEC.34-T23S-R33E
Rig Name: H&P 416
State/County: NEW MEXICO/LEA
Latitude: 32.25, Longitude: -103.56
GRID North is 0.41 Degrees East of True North
VS-Azi: 357.58 Degrees



HOBBS OCD

DRILLOG MS GYRO SURVEY CALCULATIONS

Filename: msgyro_run01-01.ut
Minimum Curvature Method
Report Date/Time: 12/5/2013 / 14:30

MAY 01 2014

RECEIVED

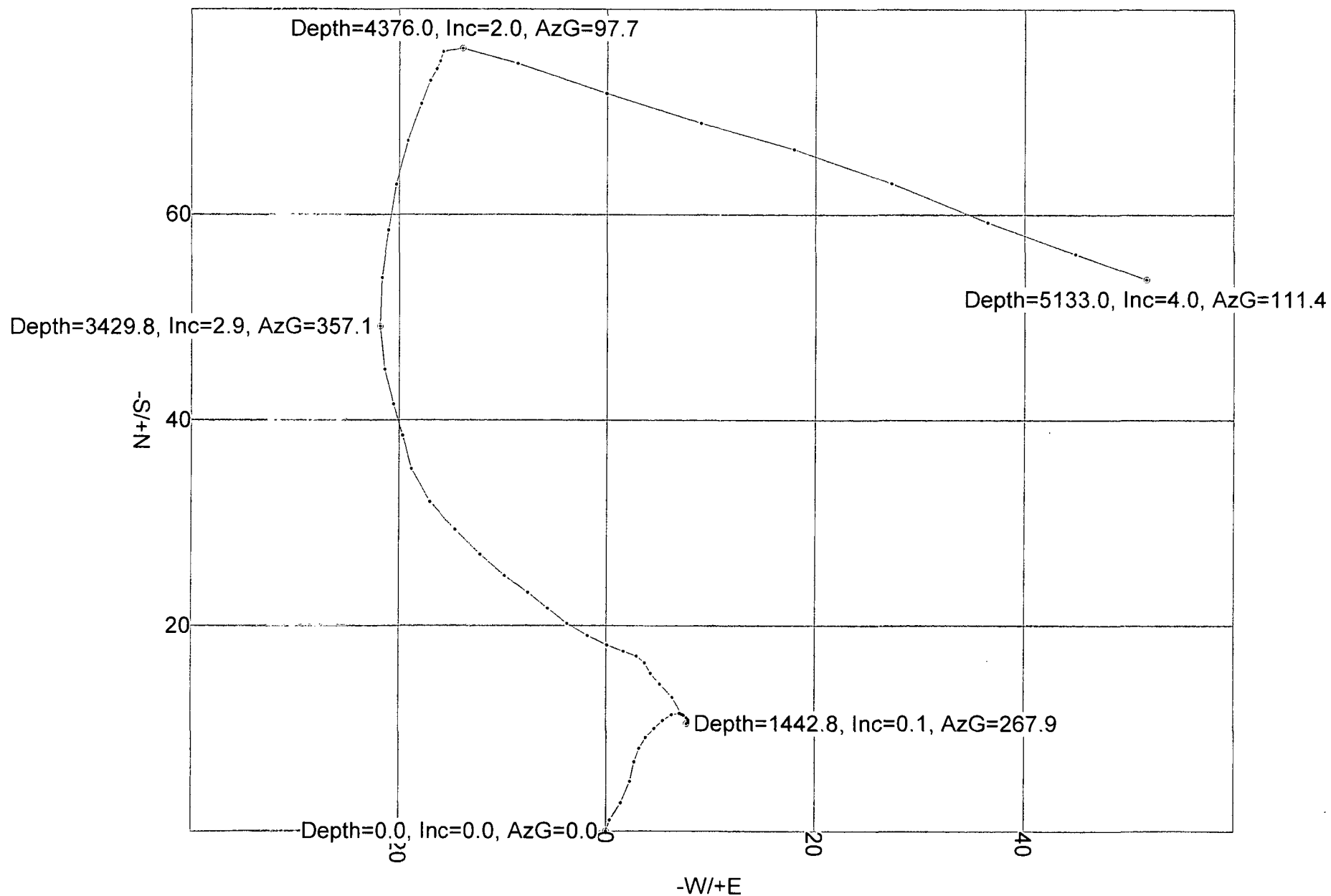
Vaughn Energy Services
Corpus Christi, TX
800-606-4976
Surveyor: Jeremy Rounsavall
Thistle Unit 48H / API 30-025-41253

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	****
141.23	0.94	18.73	141.22	1.09	0.37	1.08	1.16	18.73	0.66
232.80	1.56	40.05	232.77	2.76	1.41	2.70	3.10	27.15	0.84
324.37	1.42	3.41	324.31	4.84	2.29	4.74	5.36	25.25	1.03
415.94	1.02	23.22	415.86	6.73	2.68	6.61	7.24	21.69	0.62
507.51	0.72	16.23	507.42	8.03	3.16	7.89	8.63	21.47	0.35
598.50	0.84	41.19	598.40	9.09	3.76	8.92	9.84	22.48	0.39
689.49	0.75	48.72	689.38	9.99	4.65	9.78	11.02	24.97	0.15
780.48	0.63	43.26	780.37	10.75	5.45	10.51	12.05	26.87	0.15
875.10	0.65	68.66	874.98	11.33	6.31	11.05	12.96	29.10	0.30
969.72	0.31	101.16	969.60	11.47	7.05	11.17	13.47	31.58	0.45
1064.34	0.27	132.23	1064.22	11.28	7.47	10.95	13.52	33.51	0.17
1158.96	0.19	133.94	1158.84	11.02	7.75	10.68	13.47	35.11	0.08
1253.58	0.15	146.53	1253.46	10.80	7.93	10.46	13.40	36.27	0.06
1348.20	0.17	211.65	1348.08	10.58	7.92	10.24	13.22	36.82	0.18
1442.82	0.13	267.86	1442.70	10.46	7.74	10.13	13.01	36.50	0.15
1537.44	1.16	340.25	1537.31	11.36	7.31	11.04	13.51	32.75	1.19
1632.06	1.21	321.24	1631.91	13.04	6.36	12.76	14.51	25.99	0.42
1726.68	0.92	310.62	1726.51	14.32	5.16	14.09	15.22	19.80	0.37
1821.30	0.77	330.69	1821.12	15.36	4.27	15.17	15.95	15.52	0.35

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
1915.92	0.64	330.05	1915.74	16.38	3.69	16.20	16.79	12.71	0.14
2010.54	0.69	292.70	2010.35	17.05	2.91	16.91	17.30	9.67	0.45
2105.16	0.92	288.24	2104.96	17.51	1.66	17.42	17.59	5.42	0.25
2199.78	1.12	293.72	2199.57	18.12	0.10	18.10	18.12	0.31	0.23
2294.40	1.39	298.62	2294.16	19.04	-1.75	19.09	19.12	354.74	0.31
2389.02	1.40	304.34	2388.75	20.24	-3.72	20.38	20.58	349.60	0.15
2483.64	1.47	311.91	2483.35	21.70	-5.57	21.92	22.41	345.59	0.21
2578.26	1.52	307.03	2577.93	23.27	-7.48	23.56	24.44	342.18	0.14
2672.88	1.81	305.67	2672.51	24.90	-9.70	25.28	26.72	338.72	0.31
2767.50	1.99	316.26	2767.08	26.96	-12.05	27.44	29.53	335.92	0.42
2862.12	2.16	314.13	2861.64	29.38	-14.46	29.97	32.75	333.80	0.19
2956.74	2.31	319.80	2956.19	32.08	-16.97	32.76	36.29	332.12	0.28
3051.36	2.22	341.77	3050.74	35.27	-18.77	36.03	39.95	331.98	0.92
3145.98	1.88	347.81	3145.29	38.53	-19.67	39.32	43.26	332.95	0.43
3240.60	1.99	340.77	3239.86	41.59	-20.54	42.42	46.38	333.72	0.28
3335.22	2.24	349.65	3334.42	44.96	-21.41	45.82	49.80	334.54	0.44
3429.84	2.87	357.06	3428.94	49.15	-21.86	50.03	53.79	336.02	0.75
3524.46	2.85	6.94	3523.44	53.86	-21.70	54.72	58.06	338.05	0.52
3619.08	2.83	9.50	3617.95	58.50	-21.03	59.33	62.16	340.22	0.14
3713.70	2.63	9.75	3712.46	62.94	-20.28	63.74	66.13	342.14	0.21
3808.32	2.68	20.07	3806.98	67.17	-19.15	67.91	69.84	344.09	0.51
3902.94	1.95	19.35	3901.52	70.76	-17.86	71.45	72.98	345.84	0.77
3997.56	1.00	25.30	3996.11	73.02	-16.97	73.68	74.97	346.91	1.02
4092.18	0.56	31.91	4090.72	74.16	-16.38	74.78	75.95	347.55	0.47
4186.80	0.48	18.80	4185.34	74.92	-16.01	75.53	76.62	347.94	0.15
4281.42	0.71	21.12	4279.95	75.85	-15.67	76.44	77.45	348.33	0.25
4376.04	2.02	97.68	4374.55	76.18	-13.80	76.69	77.41	349.73	2.10
4470.66	4.64	109.05	4469.00	74.70	-8.52	74.99	75.19	353.49	2.84
4565.28	6.20	108.92	4563.19	71.80	-0.07	71.73	71.80	359.95	1.65
4659.90	5.37	106.13	4657.33	68.91	9.02	68.47	69.50	7.45	0.93
4754.52	5.92	105.85	4751.49	66.35	17.96	65.53	68.73	15.15	0.58
4849.14	6.09	113.22	4845.60	63.03	27.27	61.83	68.68	23.39	0.83
4943.76	6.01	111.31	4939.69	59.26	36.49	57.66	69.59	31.63	0.23
5038.38	4.75	108.83	5033.89	56.19	44.82	54.25	71.88	38.58	1.35
5133.00	4.01	111.43	5128.23	53.72	51.61	51.49	74.49	43.85	0.82



Vaughn Energy Services
Corpus Christi, TX
800-606-4976
Surveyor: Jeremy Rounsavall
Thistle Unit 48H / API 30-025-41253



VES Survey Date: 11/19/2013



JUN 24 2014

Directional Survey

District DELAWARE BASIN	County LEA	Field Name JOHNSON RANCH	Project Group DELAWARE BASIN REG	State/Province NM
Surface Legal Location SEC34 T23S R33E	API/UWI 3002541253	Latitude (°) 32° 15' 14.436" N	Longitude (°) 103° 33' 37.923" W	Ground Elev... 3,640.40
			KB - GL (ft) 25.00	Orig KB Elev (ft) 3,665.40
				Tubing Head Elevation (ft)

Wellbores

Wellbore Name OH	Parent Wellbore OH	Kick Off Depth (ftKB)	Vertical Section Direction (°) 357.58
Actual Deviation Survey WEATHERFORD MWD, Proposed? No	Definitive? No	Proposed? No	Proposed Deviation Survey

Deviation Survey

Date 11/12/2013		Description FLO DRIFT/ MWD				
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	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
11/13/2...									MS	H&P
11/13/2...	196.00	1.30	13.00						MS	H&P
11/13/2...	273.00	1.20	15.00						MS	H&P
11/13/2...	365.00	1.10	19.00						MS	H&P
11/13/2...	425.00	0.90	20.00						MS	H&P
11/13/2...	547.00	0.50	20.00						MS	H&P
11/13/2...	697.00	0.40	34.00						MS	H&P
11/13/2...	848.00	0.50	45.00						MS	H&P
11/13/2...	913.00	0.20	61.00						MS	H&P
11/13/2...	1,008.00	0.10	104.00						MS	H&P
11/13/2...	1,102.00	0.40	166.00						MS	H&P
11/13/2...	1,196.00	0.40	226.00						MS	H&P
11/13/2...	1,370.00	0.10	268.00						MS	H&P
11/13/2...	1,410.00	0.10	275.00						MS	H&P
11/16/2...	1,507.00	1.10	336.00						MS	H&P
11/16/2...	1,663.00	1.20	321.00						MS	H&P
11/16/2...	1,756.00	0.10	7.00						MS	H&P
11/16/2...	1,844.00	0.60	320.00						MS	H&P
11/16/2...	1,939.00	0.70	302.00						MS	H&P
11/16/2...	2,035.00	0.70	290.00						MS	H&P
11/16/2...	2,132.00	1.00	290.00						MS	H&P
11/16/2...	2,228.00	1.30	299.00						MS	H&P
11/16/2...	2,322.00	1.40	308.00						MS	H&P
11/16/2...	2,417.00	1.30	299.00						MS	H&P
11/16/2...	2,511.00	1.50	303.00						MS	H&P
11/16/2...	2,606.00	1.40	304.00						MS	H&P
11/16/2...	2,711.00	1.90	309.00						MS	H&P
11/16/2...	2,803.00	2.10	318.00						MS	H&P
11/16/2...	2,902.00	2.30	317.00						MS	H&P
11/16/2...	2,998.00	2.20	333.00						MS	H&P
11/16/2...	3,189.00	1.80	342.00						MS	H&P
11/18/2...	3,269.00	1.90	351.00						MS	H&P
11/18/2...	3,319.00	2.20	0.00						MS	H&P
11/18/2...	3,460.00	2.60	3.00						MS	H&P
11/18/2...	3,549.00	2.50	3.00						MS	H&P
11/18/2...	3,644.00	2.40	13.00						MS	H&P
11/18/2...	3,740.00	2.50	14.00						MS	H&P
11/18/2...	3,836.00	2.20	14.00						MS	H&P
11/18/2...	3,932.00	1.80	18.00						MS	H&P
11/18/2...	4,027.00	0.60	24.00						MS	H&P
11/18/2...	4,083.00	0.30	352.00						MS	H&P
11/18/2...	4,179.00	0.50	10.00						MS	H&P
11/18/2...	4,215.00	0.50	29.00						MS	H&P
11/18/2...	4,371.00	2.40	105.00						MS	H&P
11/18/2...	4,467.00	5.30	111.00						MS	H&P
11/19/2...	4,562.00	5.90	105.00						MS	H&P
11/19/2...	4,662.00	5.40	107.00						MS	H&P



Directional Survey

District DELAWARE BASIN	County LEA	Field Name JOHNSON RANCH	Project Group DELAWARE BASIN REG	State/Province NM			
Surface Legal Location SEC34 T23S R33E	API/UWI 3002541253	Latitude (°) 32° 15' 14.436" N	Longitude (°) 103° 33' 37.923" W	Ground Elev... 3,640.40	KB - GL (ft) 25.00	Orig KB Elev (ft) 3,665.40	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
11/19/2...	4,755.00	5.80	118.00						MS	H&P
11/19/2...	4,876.00	6.00	115.00						MS	H&P
11/19/2...	4,972.00	5.90	111.00						MS	H&P
11/19/2...	5,067.00	4.70	110.00						MS	H&P
11/19/2...	5,161.00	4.10	112.00						MS	H&P
11/19/2...	5,227.00	3.60	115.00						MS	H&P



Directional Survey

District DELAWARE BASIN	County LEA	Field Name JOHNSON RANCH	Project Group DELAWARE BASIN REG	State/Province NM			
Surface Legal Location SEC34 T23S R33E	API/UWI 3002541253	Latitude (") 32° 15' 14.436" N	Longitude (") 103° 33' 37.923" W	Ground Elev... 3,640.40	KB - GL (ft) 25.00	Orig KB Elev (ft) 3,665.40	Tubing Head Elevation (ft)

Wellbores

Wellbore Name OH	Parent Wellbore OH	Kick Off Depth (ftKB)	Vertical Section Direction (") 357.58
Actual Deviation Survey WEATHERFORD MWD, Proposed? No	Definitive? No	Proposed? No	Proposed Deviation Survey

Deviation Survey

Date 11/19/2013		Description VES GYRO				
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
11/19/2...	0.00	0.00	0.00						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	141.23	0.94	18.73						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	232.80	1.56	40.05						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	324.37	1.42	3.41						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	415.94	1.02	23.22						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	507.51	0.72	16.23						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	598.50	0.84	41.19						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	689.49	0.75	48.72						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	780.48	0.63	43.26						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	875.10	0.65	68.66						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	969.72	0.31	101.16						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	1,064.34	0.27	132.23						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	1,158.96	0.19	133.94						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	1,253.58	0.15	146.53						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	1,348.20	0.17	211.65						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	1,442.82	0.13	267.86						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	1,537.44	1.16	340.25						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	1,632.06	1.21	321.24						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	1,726.68	0.92	310.62						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	1,821.30	0.77	330.69						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	1,915.92	0.64	330.05						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	2,010.54	0.69	292.70						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	2,105.16	0.92	288.24						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	2,199.78	1.12	293.72						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	2,294.40	1.39	298.62						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	2,389.02	1.40	304.34						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	2,483.64	1.47	311.91						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	2,578.26	1.52	307.03						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	2,672.88	1.81	305.67						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	2,767.50	1.99	316.26						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	2,862.12	2.16	314.13						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	2,956.74	2.31	319.80						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	3,051.36	2.22	341.77						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	3,145.98	1.88	347.81						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	3,240.60	1.99	340.77						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	3,335.22	2.24	349.65						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	3,429.84	2.87	357.06						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	3,524.46	2.85	6.94						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	3,619.08	2.83	9.50						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	3,713.70	2.63	9.75						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	3,808.32	2.68	20.07						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	3,902.94	1.95	19.35						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	3,997.56	1.00	25.30						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	4,092.18	0.56	31.91						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	4,186.80	0.48	18.80						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	4,281.42	0.71	21.12						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	4,376.04	2.02	97.68						GYRO	VAUHGN ENERGY SERVICES



Directional Survey

District	County	Field Name	Project Group	State/Province			
DELAWARE BASIN	LEA	JOHNSON RANCH	DELAWARE BASIN REG	NM			
Surface Legal Location	API/UWI	Latitude (°)	Longitude (°)	Ground Elev...	KB - GL (ft)	Orig KB Elev (ft)	Tubing Head Elevation (ft)
SEC34 T23S R33E	3002541253	32° 15' 14.436" N	103° 33' 37.923" W	3,640.40	25.00	3,665.40	

Survey Data

Date	MD (ftKB)	Incl (°)	Azm (°)	TVD (ftKB)	VS (ft)	N/S (ft)	E/W (ft)	DLS (°/100ft)	Survey Tool	Survey Company
11/19/2...	4,470.66	4.64	109.05						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	4,565.28	6.20	108.92						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	4,659.90	5.37	106.13						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	4,754.52	5.92	105.85						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	4,849.14	6.09	113.22						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	4,943.76	6.01	111.31						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	5,038.38	4.75	108.83						GYRO	VAUHGN ENERGY SERVICES
11/19/2...	5,133.00	4.01	111.43						GYRO	VAUHGN ENERGY SERVICES



THISTLE UNIT 48H

WEST UNRESTRICTED

Directional Survey

District DELAWARE BASIN	County LEA	Field Name JOHNSON RANCH	Project Group DELAWARE BASIN REG	State/Province NM
Surface Legal Location SEC34 T23S R33E	API/UWI 3002541253	Latitude (°) 32° 15' 14.436" N	Longitude (°) 103° 33' 37.923" W	Ground Elev... 3,640.40
			KB - GL (ft) 25.00	Orig KB Elev (ft) 3,665.40
				Tubing Head Elevation (ft)

Wellbores

Wellbore Name OH	Parent Wellbore OH	Kick Off Depth (ftKB)	Vertical Section Direction (°) 357.58
Actual Deviation Survey WEATHERFORD MWD, Proposed? No	Definitive? Yes	Proposed? No	Proposed Deviation Survey

Deviation Survey

Date 11/22/2013		Description WEATHERFORD MWD			
MD Tie In (ftKB) 5,133.00	TVD Tie In (ftKB) 5,128.23	Inclination Tie In (°) 4.01	Azimuth Tie In (°) 111.43	NSTie In (ft) 53.72	EW Tie In (ft) 51.61

Survey Data

Date	MD (ftKB)	Incl (°)	Azm (°)	TVD (ftKB)	VS (ft)	N/S (ft)	E/W (ft)	DLS (°/100ft)	Survey Tool	Survey Company
11/22/2...	5,315.00	3.25	115.43	5,309.86	46.51	49.18	62.19	0.44	MWD	WEATHWERFORD
11/22/2...	5,409.00	3.36	145.92	5,403.71	42.92	45.75	66.14	1.85	MWD	WEATHWERFORD
11/22/2...	5,504.00	4.42	171.23	5,498.50	36.91	39.83	68.26	2.10	MWD	WEATHWERFORD
11/22/2...	5,598.00	5.75	189.28	5,592.14	28.70	31.60	68.05	2.20	MWD	WEATHWERFORD
11/22/2...	5,693.00	6.80	208.58	5,686.58	19.22	21.96	64.60	2.46	MWD	WEATHWERFORD
11/22/2...	5,787.00	7.00	209.90	5,779.89	9.61	12.11	59.08	0.27	MWD	WEATHWERFORD
11/22/2...	5,882.00	6.68	215.60	5,874.22	0.36	2.60	52.98	0.79	MWD	WEATHWERFORD
11/22/2...	5,976.00	6.48	216.95	5,967.60	-8.05	-6.08	46.61	0.27	MWD	WEATHWERFORD
11/22/2...	6,071.00	6.29	217.37	6,062.01	-16.19	-14.50	40.22	0.21	MWD	WEATHWERFORD
11/22/2...	6,166.00	5.70	218.64	6,156.49	-23.75	-22.32	34.12	0.64	MWD	WEATHWERFORD
11/22/2...	6,260.00	5.62	219.03	6,250.03	-30.71	-29.55	28.31	0.09	MWD	WEATHWERFORD
11/22/2...	6,355.00	5.53	219.88	6,344.58	-37.59	-36.67	22.44	0.13	MWD	WEATHWERFORD
11/22/2...	6,449.00	6.59	213.29	6,438.06	-45.32	-44.66	16.58	1.35	MWD	WEATHWERFORD
11/22/2...	6,544.00	6.99	213.56	6,532.39	-54.42	-54.03	10.39	0.42	MWD	WEATHWERFORD
11/22/2...	6,639.00	6.80	214.40	6,626.70	-63.60	-63.49	4.02	0.23	MWD	WEATHWERFORD
11/22/2...	6,733.00	6.50	214.17	6,720.07	-72.33	-72.48	-2.12	0.32	MWD	WEATHWERFORD
11/22/2...	6,828.00	6.15	213.26	6,814.49	-80.78	-81.19	-7.93	0.38	MWD	WEATHWERFORD
11/22/2...	6,923.00	6.05	214.77	6,908.96	-88.90	-89.55	-13.57	0.20	MWD	WEATHWERFORD
11/22/2...	7,017.00	5.93	214.84	7,002.44	-96.71	-97.61	-19.17	0.13	MWD	WEATHWERFORD
11/22/2...	7,112.00	7.15	218.40	7,096.82	-105.09	-106.27	-25.65	1.35	MWD	WEATHWERFORD
11/22/2...	7,206.00	7.36	220.19	7,190.07	-113.95	-115.45	-33.17	0.33	MWD	WEATHWERFORD
11/22/2...	7,301.00	7.15	220.04	7,284.31	-122.79	-124.63	-40.90	0.22	MWD	WEATHWERFORD
11/22/2...	7,396.00	7.04	219.86	7,378.58	-131.46	-133.62	-48.43	0.12	MWD	WEATHWERFORD
11/22/2...	7,491.00	6.76	218.86	7,472.89	-139.97	-142.45	-55.67	0.32	MWD	WEATHWERFORD
11/22/2...	7,585.00	6.74	217.78	7,566.24	-148.34	-151.11	-62.52	0.14	MWD	WEATHWERFORD
11/22/2...	7,680.00	6.61	217.53	7,660.60	-156.79	-159.86	-69.27	0.14	MWD	WEATHWERFORD
11/22/2...	7,775.00	6.14	218.36	7,755.01	-164.83	-168.18	-75.75	0.50	MWD	WEATHWERFORD
11/22/2...	7,869.00	5.84	217.53	7,848.50	-172.30	-175.91	-81.78	0.33	MWD	WEATHWERFORD
11/22/2...	7,963.00	5.83	215.87	7,942.01	-179.71	-183.57	-87.50	0.18	MWD	WEATHWERFORD
11/22/2...	8,058.00	7.29	218.30	8,036.39	-188.07	-192.21	-94.06	1.56	MWD	WEATHWERFORD
11/22/2...	8,153.00	7.44	219.88	8,130.60	-197.19	-201.66	-101.74	0.27	MWD	WEATHWERFORD
11/22/2...	8,247.00	6.99	218.05	8,223.86	-206.04	-210.84	-109.17	0.54	MWD	WEATHWERFORD
11/22/2...	8,342.00	6.58	220.08	8,318.19	-214.45	-219.55	-116.23	0.50	MWD	WEATHWERFORD
11/22/2...	8,436.00	8.03	218.24	8,411.43	-223.40	-228.83	-123.76	1.56	MWD	WEATHWERFORD
11/22/2...	8,530.00	8.30	216.14	8,504.47	-233.69	-239.47	-131.83	0.43	MWD	WEATHWERFORD
11/22/2...	8,625.00	8.10	216.84	8,598.50	-244.23	-250.36	-139.89	0.24	MWD	WEATHWERFORD
11/22/2...	8,719.00	7.76	216.38	8,691.60	-254.30	-260.77	-147.62	0.37	MWD	WEATHWERFORD
11/22/2...	8,813.00	7.09	216.19	8,784.82	-263.78	-270.56	-154.81	0.71	MWD	WEATHWERFORD
11/22/2...	8,907.00	6.85	215.97	8,878.12	-272.71	-279.78	-161.53	0.26	MWD	WEATHWERFORD
11/22/2...	9,002.00	6.35	213.36	8,972.49	-281.41	-288.75	-167.75	0.61	MWD	WEATHWERFORD
11/22/2...	9,096.00	6.55	224.49	9,065.90	-289.29	-296.92	-174.36	1.34	MWD	WEATHWERFORD
11/22/2...	9,196.00	6.48	226.54	9,165.25	-296.89	-304.87	-182.45	0.24	MWD	WEATHWERFORD
11/22/2...	9,285.00	5.82	225.61	9,253.74	-303.21	-311.48	-189.32	0.75	MWD	WEATHWERFORD
11/22/2...	9,379.00	5.11	227.97	9,347.31	-309.07	-317.62	-195.84	0.79	MWD	WEATHWERFORD
11/22/2...	9,473.00	5.54	231.17	9,440.91	-314.43	-323.27	-202.48	0.56	MWD	WEATHWERFORD
11/22/2...	9,568.00	5.20	228.46	9,535.49	-319.87	-329.00	-209.28	0.45	MWD	WEATHWERFORD
11/22/2...	9,662.00	4.41	225.14	9,629.16	-324.99	-334.37	-215.03	0.89	MWD	WEATHWERFORD



THISTLE UNIT 48H

WEST UNRESTRICTED

Directional Survey

District DELAWARE BASIN	County LEA	Field Name JOHNSON RANCH	Project Group DELAWARE BASIN REG	State/Province NM
Surface Legal Location SEC34 T23S R33E	API/UWI 3002541253	Latitude (°) 32° 15' 14.436" N	Longitude (°) 103° 33' 37.923" W	Ground Elev... 3,640.40
			KB - GL (ft) 25.00	Orig KB Elev (ft) 3,665.40
				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
11/22/2...	9,756.00	4.59	223.66	9,722.87	-330.04	-339.64	-220.19	0.23	MWD	WEATHWERFORD
11/22/2...	9,851.00	6.02	214.88	9,817.46	-336.64	-346.48	-225.66	1.73	MWD	WEATHWERFORD
11/22/2...	9,944.00	5.95	214.03	9,909.96	-344.40	-354.47	-231.15	0.12	MWD	WEATHWERFORD
11/22/2...	10,038.00	7.88	212.26	10,003.27	-353.62	-363.96	-237.31	2.07	MWD	WEATHWERFORD
11/22/2...	10,133.00	8.97	214.76	10,097.24	-364.87	-375.55	-245.01	1.21	MWD	WEATHWERFORD
11/22/2...	10,227.00	8.79	212.77	10,190.11	-376.58	-387.61	-253.08	0.38	MWD	WEATHWERFORD
11/22/2...	10,322.00	8.29	213.37	10,284.06	-388.07	-399.44	-260.77	0.53	MWD	WEATHWERFORD
11/22/2...	10,416.00	7.49	214.49	10,377.17	-398.46	-410.14	-267.97	0.87	MWD	WEATHWERFORD
11/22/2...	10,511.00	5.35	223.98	10,471.57	-406.47	-418.44	-274.55	2.51	MWD	WEATHWERFORD
11/22/2...	10,605.00	4.62	223.45	10,565.22	-412.13	-424.34	-280.20	0.78	MWD	WEATHWERFORD
11/22/2...	10,646.00	4.34	223.03	10,606.09	-414.37	-426.67	-282.39	0.69	MWD	WEATHWERFORD
11/22/2...	10,703.00	3.68	218.76	10,662.95	-417.26	-429.67	-285.01	1.27	MWD	WEATHWERFORD
11/22/2...	10,734.00	5.67	252.39	10,693.85	-418.41	-430.91	-287.09	10.67	MWD	WEATHWERFORD
11/22/2...	10,766.00	6.80	281.12	10,725.67	-418.38	-431.03	-290.46	10.24	MWD	WEATHWERFORD
11/22/2...	10,797.00	8.20	300.93	10,756.41	-416.73	-429.54	-294.16	9.42	MWD	WEATHWERFORD
11/22/2...	10,829.00	10.49	311.98	10,787.98	-413.44	-426.41	-298.28	9.06	MWD	WEATHWERFORD
11/22/2...	10,857.00	12.73	318.43	10,815.41	-409.26	-422.40	-302.22	9.23	MWD	WEATHWERFORD
11/22/2...	10,888.00	15.52	327.39	10,845.47	-403.03	-416.35	-306.73	11.41	MWD	WEATHWERFORD
11/22/2...	10,920.00	17.75	334.71	10,876.14	-394.83	-408.33	-311.12	9.55	MWD	WEATHWERFORD
11/22/2...	10,951.00	21.64	343.51	10,905.32	-384.93	-398.57	-314.76	15.75	MWD	WEATHWERFORD
11/22/2...	10,983.00	25.27	350.08	10,934.68	-372.42	-386.18	-317.62	13.97	MWD	WEATHWERFORD
11/22/2...	11,015.00	28.23	354.11	10,963.25	-358.09	-371.92	-319.57	10.84	MWD	WEATHWERFORD
11/22/2...	11,046.00	30.82	353.83	10,990.23	-342.85	-356.73	-321.18	8.37	MWD	WEATHWERFORD
11/22/2...	11,077.00	34.56	355.33	11,016.31	-326.13	-340.06	-322.75	12.34	MWD	WEATHWERFORD
11/22/2...	11,109.00	37.33	355.88	11,042.22	-307.36	-321.34	-324.18	8.71	MWD	WEATHWERFORD
11/22/2...	11,140.00	38.93	357.64	11,066.60	-288.22	-302.23	-325.26	6.24	MWD	WEATHWERFORD
11/22/2...	11,172.00	39.36	0.42	11,091.42	-268.03	-282.03	-325.60	5.65	MWD	WEATHWERFORD
11/22/2...	11,203.00	42.70	0.69	11,114.80	-247.71	-261.69	-325.40	10.79	MWD	WEATHWERFORD
11/22/2...	11,235.00	47.13	0.36	11,137.46	-225.16	-239.10	-325.19	13.86	MWD	WEATHWERFORD
11/22/2...	11,266.00	51.74	0.71	11,157.61	-201.64	-215.56	-324.97	14.90	MWD	WEATHWERFORD
11/22/2...	11,297.00	56.51	1.97	11,175.77	-176.59	-190.45	-324.38	15.74	MWD	WEATHWERFORD
11/22/2...	11,329.00	61.19	0.83	11,192.32	-149.27	-163.08	-323.71	14.94	MWD	WEATHWERFORD
11/22/2...	11,360.00	64.94	1.86	11,206.36	-121.70	-135.46	-323.06	12.45	MWD	WEATHWERFORD
11/22/2...	11,392.00	68.80	2.27	11,218.93	-92.37	-106.06	-322.00	12.12	MWD	WEATHWERFORD
11/22/2...	11,423.00	73.91	2.39	11,228.84	-63.10	-76.72	-320.81	16.49	MWD	WEATHWERFORD
11/22/2...	11,455.00	78.75	2.68	11,236.40	-32.14	-45.66	-319.43	15.15	MWD	WEATHWERFORD
11/22/2...	11,486.00	83.34	2.27	11,241.22	-1.63	-15.08	-318.11	14.86	MWD	WEATHWERFORD
11/22/2...	11,555.00	89.51	0.36	11,245.52	67.05	53.73	-316.53	9.36	MWD	WEATHWERFORD
11/22/2...	11,587.00	91.47	358.85	11,245.25	99.03	85.73	-316.75	7.73	MWD	WEATHWERFORD
11/22/2...	11,681.00	93.78	356.17	11,240.94	192.91	179.53	-320.83	3.76	MWD	WEATHWERFORD
11/22/2...	11,775.00	88.74	355.16	11,238.88	286.81	273.20	-327.93	5.47	MWD	WEATHWERFORD
11/22/2...	11,870.00	89.58	355.46	11,240.27	381.72	367.87	-335.70	0.94	MWD	WEATHWERFORD
11/22/2...	11,964.00	90.77	356.00	11,239.98	475.67	461.61	-342.70	1.39	MWD	WEATHWERFORD
11/22/2...	12,058.00	92.10	355.93	11,237.63	569.60	555.35	-349.31	1.42	MWD	WEATHWERFORD
11/22/2...	12,152.00	91.26	355.68	11,234.87	663.51	649.05	-356.18	0.93	MWD	WEATHWERFORD
11/22/2...	12,247.00	90.07	355.94	11,233.77	758.46	743.79	-363.12	1.28	MWD	WEATHWERFORD
11/22/2...	12,342.00	91.19	356.77	11,232.73	853.43	838.59	-369.16	1.47	MWD	WEATHWERFORD
11/22/2...	12,436.00	91.12	356.65	11,230.83	947.40	932.42	-374.56	0.15	MWD	WEATHWERFORD
11/22/2...	12,531.00	89.58	356.70	11,230.25	1,042.38	1,027.25	-380.07	1.62	MWD	WEATHWERFORD
11/22/2...	12,625.00	90.84	357.16	11,229.91	1,136.37	1,121.11	-385.10	1.43	MWD	WEATHWERFORD
11/22/2...	12,719.00	90.91	357.56	11,228.47	1,230.36	1,215.00	-389.43	0.43	MWD	WEATHWERFORD
11/22/2...	12,813.00	88.81	357.41	11,228.70	1,324.36	1,308.91	-393.55	2.24	MWD	WEATHWERFORD
11/22/2...	12,907.00	89.93	357.51	11,229.73	1,418.35	1,402.81	-397.72	1.20	MWD	WEATHWERFORD
11/22/2...	13,001.00	89.72	356.98	11,230.02	1,512.35	1,496.70	-402.24	0.61	MWD	WEATHWERFORD
11/22/2...	13,095.00	88.60	356.55	11,231.40	1,606.33	1,590.54	-407.54	1.28	MWD	WEATHWERFORD



THISTLE UNIT 48H

WEST UNRESTRICTED

Directional Survey

District DELAWARE BASIN	County LEA	Field Name JOHNSON RANCH	Project Group DELAWARE BASIN REG	State/Province NM
Surface Legal Location SEC34 T23S R33E	API/UWI 3002541253	Latitude (°) 32° 15' 14.436" N	Longitude (°) 103° 33' 37.923" W	Ground Elev... 3,640.40
			KB - GL (ft) 25.00	Orig KB Elev (ft) 3,665.40
				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
11/22/2...	13,190.00	89.09	356.76	11,233.31	1,701.29	1,685.35	-413.08	0.56	MWD	WEATHWERFORD
11/22/2...	13,284.00	90.07	357.27	11,234.00	1,795.29	1,779.22	-417.98	1.18	MWD	WEATHWERFORD
11/22/2...	13,379.00	90.07	357.44	11,233.89	1,890.28	1,874.12	-422.36	0.18	MWD	WEATHWERFORD
11/22/2...	13,474.00	88.32	357.52	11,235.22	1,985.27	1,969.02	-426.54	1.84	MWD	WEATHWERFORD
11/22/2...	13,568.00	89.79	358.20	11,236.77	2,079.25	2,062.94	-430.05	1.72	MWD	WEATHWERFORD
11/22/2...	13,662.00	91.12	358.79	11,236.03	2,173.24	2,156.90	-432.52	1.55	MWD	WEATHWERFORD
11/22/2...	13,756.00	90.98	359.14	11,234.30	2,267.19	2,250.87	-434.21	0.40	MWD	WEATHWERFORD
11/22/2...	13,850.00	89.02	357.91	11,234.30	2,361.17	2,344.83	-436.63	2.46	MWD	WEATHWERFORD
11/22/2...	13,945.00	88.11	357.08	11,236.68	2,456.14	2,439.71	-440.78	1.30	MWD	WEATHWERFORD
11/22/2...	14,004.00	87.69	357.01	11,238.84	2,515.10	2,498.59	-443.82	0.72	MWD	WEATHWERFORD
11/22/2...	14,135.00	88.67	356.85	11,243.01	2,646.02	2,629.33	-450.84	0.76	MWD	WEATHWERFORD
11/22/2...	14,229.00	89.23	356.33	11,244.73	2,739.99	2,723.15	-456.43	0.81	MWD	WEATHWERFORD
11/22/2...	14,323.00	90.14	356.50	11,245.24	2,833.97	2,816.96	-462.30	0.98	MWD	WEATHWERFORD
11/22/2...	14,418.00	91.47	357.07	11,243.91	2,928.95	2,911.80	-467.63	1.52	MWD	WEATHWERFORD
11/22/2...	14,512.00	92.66	357.88	11,240.52	3,022.89	3,005.65	-471.77	1.53	MWD	WEATHWERFORD
11/22/2...	14,607.00	91.54	358.39	11,237.04	3,117.82	3,100.53	-474.86	1.30	MWD	WEATHWERFORD
11/22/2...	14,701.00	91.68	358.97	11,234.40	3,211.76	3,194.47	-477.02	0.63	MWD	WEATHWERFORD
11/22/2...	14,795.00	89.58	358.91	11,233.37	3,305.72	3,288.44	-478.76	2.23	MWD	WEATHWERFORD
11/22/2...	14,889.00	91.33	359.21	11,232.62	3,399.69	3,382.42	-480.31	1.89	MWD	WEATHWERFORD
11/22/2...	14,984.00	92.17	358.54	11,229.72	3,494.62	3,477.36	-482.17	1.13	MWD	WEATHWERFORD
11/22/2...	15,078.00	88.04	357.06	11,229.55	3,588.59	3,571.27	-485.78	4.67	MWD	WEATHWERFORD
11/22/2...	15,173.00	83.27	356.61	11,236.74	3,683.28	3,665.82	-491.00	5.04	MWD	WEATHWERFORD
11/22/2...	15,267.00	84.96	356.83	11,246.38	3,776.77	3,759.17	-496.35	1.81	MWD	WEATHWERFORD
11/22/2...	15,361.00	88.32	358.15	11,251.89	3,870.60	3,852.90	-500.46	3.84	MWD	WEATHWERFORD
11/22/2...	15,456.00	89.65	358.46	11,253.57	3,965.57	3,947.84	-503.27	1.44	MWD	WEATHWERFORD
11/22/2...	15,550.00	90.91	358.91	11,253.11	4,059.55	4,041.82	-505.43	1.42	MWD	WEATHWERFORD
11/22/2...	15,645.00	92.38	359.17	11,250.39	4,154.48	4,136.76	-507.02	1.57	MWD	WEATHWERFORD
11/22/2...	15,739.00	92.80	358.81	11,246.14	4,248.35	4,230.65	-508.67	0.59	MWD	WEATHWERFORD
11/22/2...	15,833.00	93.08	358.68	11,241.32	4,342.21	4,324.50	-510.73	0.33	MWD	WEATHWERFORD
11/22/2...	15,928.00	91.82	357.96	11,237.26	4,437.11	4,419.37	-513.51	1.53	MWD	WEATHWERFORD
11/22/2...	16,022.00	93.78	357.69	11,232.66	4,531.00	4,513.19	-517.08	2.10	MWD	WEATHWERFORD
11/22/2...	16,116.00	93.01	357.69	11,227.10	4,624.83	4,606.95	-520.86	0.82	MWD	WEATHWERFORD
11/22/2...	16,233.00	91.40	357.25	11,222.60	4,741.74	4,723.74	-526.02	1.43	BIT	WEATHWERFORD