

APPROVED

NAME: *John A. Fline*

DATE: *2/10/2016*

Well Operator's Report of Well Work



Where energy meets innovation.

Well Number: 512483

API: 47 - 017 - 06389

Submission: Initial Amended

Notes: **Stimulation Notes:**

Re-perforated stages 1 (1.1), 2 (2.1), 4 (4.1), 10 (10.1), 11 (11.1), 17 (17.1)

Combined stages [1, 1.1, 2, 2.1] / [4, 4.1, 5] / [11, 11.1, 12]

Performed additional injection tests prior to stages 11.1, 12 (two tests)

Weatherford International fractured stages 1 - 11.1

FTS International Services fractured stages 12 - 25

Correction to Production Cement Top (MD)

RECEIVED
Office of Oil and Gas

DEC 21 2015

WV Department of
Environmental Protection

02/12/2016

State of West Virginia
Department of Environmental Protection - Office of Oil and Gas
Well Operator's Report of Well Work

API 47 - 170 - 6389 County DODDRIDGE District WEST UNION
Quad OXFORD 7.50 Pad Name OXF150 Field/Pool Name _____
Farm name HARPER, LUCY E. Well Number 512483
Operator (as registered with the OOG) EQT Production Company
Address 625 Liberty Ave. EQT Plaza, Suite 1700 City Pittsburgh State PA Zip 15222

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey
Top hole Northing 4341579.6 Easting 518026.7
Landing Point of Curve Northing 4341727.8 Easting 517956.4
Bottom Hole Northing 4342667.0 Easting 517496.4

Elevation (ft) 1259 GL Type of Well New Existing Type of Report Interim Final
Permit Type Deviated Horizontal Horizontal 6A Vertical Depth Type Deep Shallow
Type of Operation Convert Deepen Drill Plug Back Redrilling Rework Stimulate
Well Type Brine Disposal CBM Gas Oil Secondary Recovery Solution Mining Storage Other _____
Type of Completion Single Multiple Fluids Produced Brine Gas NGL Oil Other _____
Drilled with Cable Rotary

Drilling Media Surface hole Air Mud Fresh Water Intermediate hole Air Mud Fresh Water Brine
Production hole Air Mud Fresh Water Brine

Mud Type(s) and Additive(s)
SBM 12.2ppg – powdered hydrocarbon resin, calcium carbonate, ground almond hulls, barium sulfate, calcium chloride, lecithin liquid, organophilic clay, polyaminated fatty acid, calcium hydroxide, polyimide surfactant, modified fatty acid, dimer.trimer fatty acid, ground walnut hulls, refined base oil.

Date permit issued 1/17/2014 Date drilling commenced 3/26/2014 Date drilling ceased 5/31/2014
Date completion activities began 8/15/2014 Date completion activities ceased 11/29/2014
Verbal plugging (Y/N) N Date permission granted N/A Granted by N/A

Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug

Freshwater depth(s) ft 155,165,258,294,395,449 Open mine(s) (Y/N) depths N
Salt water depth(s) ft NONE FOUND Void(s) encountered (Y/N) depths N
Coal depth(s) ft 343,644,1479 Cavern(s) encountered (Y/N) depths N
Is coal being mined in area (Y/N) N

Reviewed by:

02/12/2016

API 47-170 - 6389 Farm name HARPER, LUCY E. Well number 512483

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft	Basket Depth(s)	Did cement circulate (Y/N) * Provide details below*
Conductor	24"	20"	40'	New	94lb/ft	N/A	Y
Surface	17-1/2"	13-3/8"	1,034'	New	54.5lb/ft	N/A	Y
Coal							
Intermediate 1	12-3/8"	9-5/8"	2,900'	New	40lb/ft	N/A	Y
Intermediate 2							
Intermediate 3							
Production	8-1/2"	5-1/2"	10,707'	New	20lb/ft	N/A	N
Tubing							
Packer type and depth set							

Comment Details _____

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft ³ /sks)	Volume (ft ²)	Cement Top (MD)	WOC (hrs)
Conductor	Class A	38	15.6	1.18	44.84	0	8
Surface	Class A	815	15.6	1.19	970	0	8
Coal							
Intermediate 1	Class A	1035	15.6	1.19	1222	0	8
Intermediate 2							
Intermediate 3							
Production	Class A/Class H	540/500	14.2/15.2	1.26/1.97	1665	3,444'	72
Tubing							

Drillers TD (ft) 10,707 Loggers TD (ft) N/A
 Deepest formation penetrated Marcellus Plug back to (ft) N/A
 Plug back procedure N/A

Kick off depth (ft) 5,200'

Check all wireline logs run caliper density deviated/directional induction
 neutron resistivity gamma ray temperature sonic

Well cored Yes No Conventional Sidewall Were cuttings collected Yes No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING Conductor- N/A

Surface-Bowspring centralizer on shoe track and every 300' to surface

Intermediate-Bowspring centralizer on shoe track and every 500' to surface

Production- Composite bodied centralizers on every joint from Shoe track up to 4,260'

WAS WELL COMPLETED AS SHOT HOLE Yes No DETAILS _____

WAS WELL COMPLETED OPEN HOLE? Yes No DETAILS _____

WERE TRACERS USED Yes No TYPE OF TRACER(S) USED _____

API 47- 017 - 06389

Farm name HARPER, LUCY E.

Well number 512483

PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)
					See Attachment

Please insert additional pages as applicable.

STIMULATION INFORMATION PER STAGE

Complete a separate record for each stimulation stage.

Stage No.	Stimulations Date	Ave Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/other (units)
								See Attachment

Please insert additional pages as applicable.

API 47- 170 - 6389 Farm name HARPER, LUCY E. Well number 512483

<u>PRODUCING FORMATION(S)</u>	<u>DEPTHS</u>	
Marcellus	6,637.3	TVD 6,930 MD
_____	_____	_____
_____	_____	_____
_____	_____	_____

Please insert additional pages as applicable.

GAS TEST Build up Drawdown Open Flow OIL TEST Flow Pump

SHUT-IN PRESSURE Surface 1,181 psi Bottom Hole NA psi DURATION OF TEST 81 hrs

OPEN FLOW Gas 7,206.7 mcfpd Oil 0 bpd NGL 36.4 bpd Water 909 bpd
GAS MEASURED BY Estimated Orifice Pilot

LITHOLOGY/ FORMATION	TOP	BOTTOM	TOP	BOTTOM	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H ₂ S, ETC)
	DEPTH IN FT NAME TVD	DEPTH IN FT TVD	DEPTH IN FT MD	DEPTH IN FT MD	
	0		0		

Please insert additional pages as applicable.

Drilling Contractor Savanna Drilling
Address 2204 Timberloch Place Suite 230 City Woodlands State TX Zip 77380

Logging Company Vaughn Energy Services
Address P.O. Box 261021 City Corpus Christi State TX Zip 78426

Cementing Company Nabors Completion & Production Services Co.
Address PO BOX 975682 City Dallas State TX Zip 75397-5682

Stimulating Company WFT Int'l (Stages 1 - 11.1) / FTSI Services, LLC (Stages 12 - 25)
Address 2911 Reach Road / 301 East 18th Street City Williamsport/Cisco State PA/TX Zip 17701 / 76437

Please insert additional pages as applicable.

Completed by Brad Maddox Telephone 412-395-7053
Signature *Brad Maddox* Title Director of Drilling Date 12/9/2015

Submittal of Hydraulic Fracturing Chemical Disclosure Information Attach copy of FRACFOCUS Registry

Formation Name	Top MD (ftGL) (ft)	Top TVD (ft)	Btm MD (ftGL) (ft)	Btm TVD (ft)
FRESH WATER ZONE	1	1	449	449
SAND / SHALE	1	1	343	343
COAL	343	343	349	349
SAND / SHALE	349	349	644	644
COAL	644	644	647	647
SAND / SHALE	647	647	1,479.00	1,479.00
COAL	1,479.00	1,479.00	1,485.00	1,485.00
SAND / SHALE	1,485.00	1,485.00	1,593.00	1,593.00
MAXTON	1,593.00	1,593.00	1,662.00	1,661.90
SAND / SHALE	1,662.00	1,661.90	1,774.00	1,773.90
BIG LIME	1,774.00	1,773.90	1,824.00	1,823.90
SAND / SHALE	1,824.00	1,823.90	1,889.00	1,888.90
BIG INJUN	1,889.00	1,888.90	1,911.00	1,910.90
SAND / SHALE	1,911.00	1,910.90	2,058.00	2,057.90
WEIR	2,058.00	2,057.90	2,174.00	2,173.90
SAND / SHALE	2,174.00	2,173.90	2,273.00	2,272.90
GANTZ	2,273.00	2,272.90	2,333.00	2,332.90
SAND / SHALE	2,333.00	2,332.90	2,368.00	2,367.90
FIFTY FOOT	2,368.00	2,367.90	2,417.00	2,416.90
SAND / SHALE	2,417.00	2,416.90	2,465.00	2,464.90
THIRTY FOOT	2,465.00	2,464.90	2,513.00	2,512.90
GORDON	2,513.00	2,512.90	2,613.00	2,612.80
FORTH SAND	2,613.00	2,612.80	2,704.00	2,703.80
SAND / SHALE	2,704.00	2,703.80	2,785.00	2,784.80
BAYARD	2,785.00	2,784.80	2,849.00	2,848.80
SAND / SHALE	2,849.00	2,848.80	3,270.00	3,267.70
WARREN	3,270.00	3,267.70	3,333.00	3,330.30
B-5	3,333.00	3,330.30	3,340.00	3,337.30
SPEECHLEY	3,340.00	3,337.30	3,851.00	3,848.00
BALLTOWN A	3,851.00	3,848.00	4,029.00	4,026.00
BALLTOWN B	4,029.00	4,026.00	4,225.00	4,222.00
BRADFORD	4,225.00	4,222.00	4,482.00	4,478.90
RILEY	4,482.00	4,478.90	4,918.00	4,914.90
BENSON	4,918.00	4,914.90	5,171.00	5,167.90
ALEXANDER	5,171.00	5,167.90	6,131.00	6,059.60
RHINESTREET UPPER	6,131.00	6,059.60	6,269.00	6,196.40
RHINESTREET	6,269.00	6,196.40	6,352.00	6,275.70
SONYEA	6,352.00	6,275.70	6,540.00	6,437.00
MIDDLESEX	6,540.00	6,437.00	6,612.00	6,490.30
GENESSEE	6,612.00	6,490.30	6,707.00	6,551.20
GENESE0	6,707.00	6,551.20	6,808.00	6,601.30
TULLY	6,808.00	6,601.30	6,873.00	6,623.30
HAMILTON	6,873.00	6,623.30	6,930.00	6,637.30
MARCELLUS	6,930.00	6,637.30	10,707.00	6,753.70

02/12/2016

512483 - 47-017-06389-0000 - Perforations

Stage Number	Perforation Date	Top Perf Depth (ftKB)	Bottom Perf Depth (ftKB)	Number of Shots	Formation
1	8/11/2014	10,563.00	10,663.00	40	MARCELLUS
1:1 (Re-Perf)	8/15/2014	10,531.00	10,553.00	24	MARCELLUS
2	8/15/2014	10,411.00	10,521.00	40	MARCELLUS
2:1 (Re-Perf)	8/16/2014	10,416.00	10,491.00	32	MARCELLUS
3	8/16/2014	10,261.00	10,377.00	40	MARCELLUS
4	8/16/2014	10,111.00	10,233.00	40	MARCELLUS
4:1 (Re-Perf)	8/16/2014	10,090.00	10,132.00	32	MARCELLUS
5	8/17/2014	9,961.00	10,078.00	40	MARCELLUS
6	8/17/2014	9,811.00	9,933.00	40	MARCELLUS
7	8/17/2014	9,661.00	9,783.00	40	MARCELLUS
8	8/18/2014	9,511.00	9,629.00	40	MARCELLUS
9	8/18/2014	9,361.00	9,483.00	40	MARCELLUS
10	8/18/2014	9,216.00	9,333.00	40	MARCELLUS
10:1 (Re-Perf)	8/19/2014	9,176.00	9,228.00	40	MARCELLUS
11	8/19/2014	9,025.00	9,147.00	40	MARCELLUS
11:1 (Re-Perf)	8/20/2014	9,024.00	9,084.00	40	MARCELLUS
12	10/28/2014	8,873.00	8,995.00	40	MARCELLUS
13	10/28/2014	8,723.00	8,844.00	40	MARCELLUS
14	11/3/2014	8,573.00	8,695.00	56	MARCELLUS
15	11/25/2014	8,421.00	8,543.00	40	MARCELLUS
16	11/25/2014	8,273.00	8,393.00	40	MARCELLUS
17	11/26/2014	8,123.00	8,245.00	40	MARCELLUS
17:1 (Re-Perf)	11/26/2014	8,128.00	8,179.00	24	MARCELLUS
18	11/27/2014	7,973.00	8,093.00	40	MARCELLUS
19	11/27/2014	7,823.00	7,938.00	40	MARCELLUS
20	11/27/2014	7,673.00	7,793.00	40	MARCELLUS
21	11/27/2014	7,523.00	7,643.00	40	MARCELLUS
22	11/27/2014	7,376.00	7,493.00	40	MARCELLUS
23	11/28/2014	7,223.00	7,343.00	40	MARCELLUS
24	11/28/2014	7,073.00	7,191.00	40	MARCELLUS
25	11/28/2014	6,923.00	7,043.00	40	MARCELLUS

512483-47-017-06389-0000 - Stimulated Stages

Stage Number	Stimulation Date	Ave Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/other (units)
1	8/15/2014	31.70	7,574.00	1,473.00	4,081	1,911	3,405	0
1:1 (Re-Perf)	8/15/2014	16.90	7,946.00	NA	5,211	0	1,588	0
2	8/16/2014	44.80	7,253.00	7,237.00	7,035	5,667	8,853	0
2:1 (Re-Perf)	8/16/2014	48.00	8,116.00	8,475.00	6,180	2,020	3,380	0
3	8/16/2014	92.86	7,367.00	6,791.00	3,884	150,251	8,852	0
4	8/17/2014	33.44	7,142.00	7,535.00	4,653	1,905	3,040	0
4:1 (Re-Perf)	8/17/2014	67.40	7,943.00	7,871.00	4,581	13,500	6,044	0
5	8/17/2014	91.30	7,088.00	7,735.00	4,839	360,050	8,193	0
6	8/17/2014	102.30	7,320.00	6,430.00	5,411	250,765	6,510	0
7	8/18/2014	97.51	7,028.00	6,233.00	4,506	250,620	6,400	0
8	8/18/2014	100.00	7,269.00	6,012.00	5,536	238,280	6,132	0
9	8/18/2014	98.60	7,195.00	6,062.00	5,111	250,100	6,371	0
10	8/19/2014	34.28	6,965.00	6,209.00	4,703	1,469	3,479	0
10:1 (Re-Perf)	8/19/2014	86.50	7,873.00	8,122.00	4,824	250,911	9,413	0
11	8/19/2014	45.70	7,713.00	6,845.00	4,499	1,500	1,129	0
Injection Test	8/20/2014	8.90	6,856.00	NA	4,004	0	2,097	0
11:1 (Re-Perf)	8/20/2014	61.10	8,711.00	NA	5,200	22,720	2,029	0
Injection Test	8/21/2014	7.60	6,073.00	NA	5,575	0	2,471	0
Injection Test	10/27/2014	28.00	6,500.00	8,008.00	4,732	0	243	0
12	10/28/2014	99.00	8,086.00	8,538.00	4,356	416,695	13,165	0
13	10/28/2014	96.80	8,196.00	8,732.00	5,116	247,782	7,154	0
14	11/25/2014	90.80	7,614.00	8,224.00	5,071	249,903	6,340	0
15	11/25/2014	93.50	7,284.00	8,302.00	5,073	250,028	6,400	0
16	11/25/2014	88.50	7,219.00	7,906.00	4,713	244,798	6,472	0
17	11/26/2014	76.20	8,287.00	9,334.00	4,759	168,057	11,999	0
17:1 (Re-Perf)	11/27/2014							
18	11/27/2014	98.70	7,257.00	7,545.00	5,192	251,634	6,301	0
19	11/27/2014	97.20	7,292.00	7,718.00	4,944	250,480	6,975	0
20	11/27/2014	96.10	7,135.00	7,299.00	5,347	244,500	7,182	0
21	11/27/2014	99.80	6,845.00	6,933.00	4,996	248,000	6,168	0
22	11/28/2014	96.40	7,105.00	7,299.00	5,671	251,647	6,125	0
23	11/28/2014	99.70	6,950.00	7,401.00	4,835	250,468	6,064	0
24	11/28/2014	99.10	6,891.00	7,604.00	5,034	250,773	6,281	0
25	11/29/2014	99.30	6,784.00	7,248.00	3,975	224,974	6,050	0

Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	8/11/2014
Job End Date:	11/29/2014
State:	West Virginia
County:	Doddridge
API Number:	47-017-06389-00-00
Operator Name:	EQT Production
Well Name and Number:	OXF150 - 512483
Longitude:	-80.79116200
Latitude:	39.22331700
Datum:	NAD83
Federal/Tribal Well:	NO
True Vertical Depth:	6,753
Total Base Water Volume (gal):	8,307,516
Total Base Non Water Volume:	294,673



Hydraulic Fracturing Fluid Composition:

Trade Name	Supplier	Purpose	Ingredients	Chemical Abstract Service Number (CAS #)	Maximum Ingredient Concentration in Additive (% by mass)**	Maximum Ingredient Concentration in HF Fluid (% by mass)**	Comments
Water	FTSI	Carrier					
			Water	7732-18-5	100.00000	48.68450	
Water	Weatherford	Carrier					
			Water	7732-18-5	100.00000	43.47894	
Sand	FTSI	Proppant					
			Crystalline Silica	14808-60-7	100.00000	4.72758	
Sand	Weatherford	Proppant					
			Crystalline Silica	14808-60-7	100.00000	2.39948	
MC MX 437-5	Halliburton	Biocide					
			Calcium Nitrate	10124-37-5	60.00000	0.06556	
Hydrochloric Acid 15%	Weatherford	Acidizing					
			Hydrochloric Acid	7647-01-0	15.00000	0.03148	
Hydrochloric Acid 15%	FTSI	Acidizing					
			Hydrochloric Acid	7647-01-0	15.00000	0.02557	
MX 5-2402	Halliburton	Biocide					
			Sodium Nitrate	7631-99-4	60.00000	0.02471	
WFR-65LA	Weatherford	Friction Reducer					
			Distillates, Petroleum, Hydrotreated Light	64742-47-8	40.00000	0.01773	
			Ammonium acetate	631-61-8	5.00000	0.00222	

FRW-600	FTSI	Friction Reducer				
			Hydrotreated light distillate	64742-47-8	30.00000	0.01286
			Ammonium acetate	631-61-8	6.00000	0.00257
HVG-1	FTSI	Gel				
			Petroleum Distillate	64742-47-8	55.00000	0.00677
			Guar Gum	9000-30-0	50.00000	0.00615
			Surfactant	68439-51-0	2.00000	0.00025
			Clay	14808-60-7	2.00000	0.00025
MX-8	Halliburton	Biocide				
			Bacteria Culture	N/A	100.00000	0.01004
WGA-15L	Weatherford	Gelling Agent				
			Solvent naphtha, petroleum, heavy aliph	64742-96-7	60.00000	0.00992
WPB-584L	Weatherford	Buffer				
			Potassium Carbonate	584-08-7	40.00000	0.00408
			Potassium Hydroxide	1310-58-3	40.00000	0.00408
B-10	FTSI	Buffer Agent				
			Potassium carbonate	584-08-7	48.00000	0.00442
			Potassium hydroxide	1310-58-3	20.00000	0.00184
WSI-685L	Weatherford	Scale Inhibitor				
			Ammonium Chloride	12125-02-9	15.00000	0.00200
			Monoethanolamine Hydrochloride	2002-24-6	15.00000	0.00200
			Methyl Alcohol	67-56-1	2.50000	0.00033
APB-1	FTSI	Gel Breaker				
			Ammonium Persulfate	7727-54-0	95.00000	0.00198
WIC-641L	Weatherford	Iron Control				
			Citric Acid	77-92-9	60.00000	0.00160
CS-500-SI	FTSI	Scale Inhibitor				
			Ethylene Glycol	107-21-1	10.00000	0.00138
WAI-251LC	Weatherford	Acid Inhibitor				
			Ethylene Glycol	107-21-1	40.00000	0.00018
			N,N-Dimethylformamide	68-12-2	20.00000	0.00009
			Tar bases, quinoline derivs, benzyl chloride-quaternized	72480-70-7	15.00000	0.00007
			2-Butoxyethanol	111-76-2	15.00000	0.00007
			Cinnamaldehyde	104-55-2	15.00000	0.00007
			1-Decanol	112-30-1	5.00000	0.00002
			Poly(oxy-1,2-ethaned iyl), alpha-(4-nonylphen yl)-, omega -hyd roxy-, bran ched	127087-87-0	5.00000	0.00002
			Isopropanol	67-63-0	2.50000	0.00001
			Triethyl Phosphate	78-40-0	2.50000	0.00001
			1-Octanol	111-87-5	2.50000	0.00001
CI-150	FTSI	Corrosion Inhibitor				
			Isopropanol	67-63-0	30.00000	0.00007

			Ethylene Glycol	107-21-1	30.00000	0.00007
			Organic amine resin salt	Proprietary	30.00000	0.00007
			Aromatic aldehyde	Proprietary	10.00000	0.00002
			Dimethylformamide	88-12-2	10.00000	0.00002
			Quaternary ammonium compound	Proprietary	10.00000	0.00002
FE-100L	FTSI	Iron Control	Citric Acid	77-92-9	55.00000	0.00023
WBK-133		Breaker	Ammonium Persulfate	7727-54-0	100.00000	0.00006
NE-100	FTSI	Non-Emulsifier	2-Butoxyethanol	111-76-2	10.00000	0.00002
			2-Propanol	67-63-0	10.00000	0.00002
			Dodecylbenzenesulfonic acid	27176-87-0	5.00000	0.00001
Ingredients shown above are subject to 29 CFR 1910.1200(i) and appear on Material Safety Data Sheets (MSDS). Ingredients shown below are Non-MSDS.						

* Total Water Volume sources may include fresh water, produced water, and/or recycled water

** Information is based on the maximum potential for concentration and thus the total may be over 100%

Note: For Field Development Products (products that begin with FDP), MSDS level only information has been provided. Ingredient information for chemicals subject to 29 CFR 1910.1200(i) and Appendix D are obtained from suppliers Material Safety Data Sheets (MSDS)

