

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

API 47-017-06572 County DODDRIDGE District WEST UNION
Quad WEST UNION 7.5' Pad Name WEU6 Field/Pool Name _____
Farm name FRANKLIN BUTLER & KEY OIL COMPANY Well Number 513342
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 4,349,015 Easting 521,253
Landing Point of Curve Northing 4,348,242 Easting 520,714
Bottom Hole Northing 4,346,915 Easting 521,093

Elevation (ft) 1260 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)

Water base Mud 13.5 ppg barium sulfate, sodium chloride, xanthan gum, polyanionic cellulose, modified starch, sodium hydroxide, phosphonates and alkyl phosphates, glutaraldehyde solution, calcium hydroxide, partially hydrolyzed polyacrylamide/polyacrylate, potassium chloride, sodium carbonate, ground walnut shells, alcohol and modified fatty acid, ferrochrome lignosulfonate, calcium carbonate, fibrous cellulose

Date permit issued 10/21/2014 Date drilling commenced 10/28/2014 Date drilling ceased 01/10/2015
Date completion activities began 4/20/2015 Date completion activities ceased 4/26/2015
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 being granted.

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Freshwater depth(s) ft 353',465',508',967',1031' Open mine(s) (Y/N) depths _____
Salt water depth(s) ft NONE Void(s) encountered (Y/N) depths N
Coal depth(s) ft 188' Cavern(s) encountered (Y/N) depths N
Is coal being mined in area (Y/N) N

Reviewed by: _____

10/16/2015

API 47- 017 - 06572 Farm name FRANKLIN BUTLER & KEY OIL COMPANY Well number 513342

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	A-500 40LB/FT	NONE	Y
Surface	17.5"	13.375"	1131'	NEW	J-55 54.5LB/FT	282',494'	Y
Coal							
Intermediate 1	12.375"	9.625"	3100'	NEW	A-500 40LB/FT	1197',1535'	Y
Intermediate 2							
Intermediate 3							
Production	8.5"	5.5"	12,741'	NEW	P-110 20LB/FT	NONE	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 ³)	Cement Top (MD)	WOC (hrs)
Conductor	CLASS A	38	15.6	1.18	44.84	0	8
Surface	CLASS A	890	15.6	1.19	1059.1	0	8
Coal							
Intermediate 1	CLASS A	1135	15.6	1.18	1339.3	0	8
Intermediate 2							
Intermediate 3							
Production	CLASS A / CLASS H	1050/655	15.2/15.6	1.07/1.86	2341.8	3500'	72
Tubing							

Drillers TD (ft) 12,741' MD Loggers TD (ft) N/A

Deepest formation penetrated Marcellus Plug back to (ft) 1463'

Plug back procedure DRILLED TO 1823' THEN PLUGGED BACK FOR SIDETRACK. TRIPPED IN OPEN ENDED AND PUMPED 85 BBLs 16.4PPG CLASS H CEMENT WITH 3% CACL. TOP OF CEMENT WAS 1463'.

Kick off depth (ft) 3,458' MD

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- NONE

SURFACE- JOINTS: 1,12,24

INTERMEDIATE- RAN AT LEAST EVERY 500' FEET

Production- Composite bodied centralizers on every joint from TD up to 2,500'

WAS WELL COMPLETED AS SHOT HOLE Yes No DETAILS _____

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WAS WELL COMPLETED OPEN HOLE? Yes No DETAILS _____

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

API 47- 017 - 06572 Farm name FRANKLIN BUTLER & KEY OIL COMPANY Well number 513342

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

Logging Company HOSSCO SERVICES LLC
Address 614 TROTTERS LANE City CHARLESTON State WV Zip 25312

Logging Company _____
Address _____ City _____ State _____ Zip _____

Cementing Company _____
Address _____ City _____ State _____ Zip _____

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Formations

Formation Name	Final Top MD (ftGL) (ft)	Final Top TVD (ft)	Final Btm MD (ftGL) (ft)	Final Btm TVD (ft)
FRESH WATER ZONE	0	0	1,034	1,034
SAND / SHALE	0	0	191	191
COAL	191	191	194	194
SAND / SHALE	194	194	2,307	2,303
BEREA	2,307	2,303	2,575	2,571
GANTZ	2,575	2,571	2,665	2,661
50F	2,665	2,661	2,763	2,759
30F	2,763	2,759	2,830	2,826
GORDON	2,830	2,826	2,899	2,895
4TH	2,899	2,895	3,051	3,047
5TH	3,051	3,047	3,441	3,437
WARREN	3,441	3,437	3,505	3,501
SPEECHLEY	3,505	3,501	4,576	4,368
BRADFORD	4,576	4,368	5,557	5,105
BENSON	5,557	5,105	5,998	5,438
ALEXANDER	5,998	5,438	7,378	6,481
SONYEA	7,378	6,481	7,570	6,622
MIDDLESEX	7,570	6,622	7,658	6,681
GENESSEE	7,658	6,681	7,795	6,760
GENESEO	7,795	6,760	7,852	6,789
TULLY	7,852	6,789	7,910	6,815
HAMILTON	7,910	6,815	7,977	6,843
MARCELLUS	7,977	6,843	12,741	6,886

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513342 - 47-017-06572-0000 - 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)
Initiation Sleeve	4/21/2015	9.70	6561	9104	6018	0	753	0
1	4/21/2015	97.9	8,597	8,828	4,066	295,210	8,650	0
2	4/21/2015	99.1	8,535	8,808	3,615	299,216	8,079	0
3	4/22/2015	98.9	8,439	8,884	4,014	299,863	7,847	0
4	4/22/2015	99.8	8,302	8,708	4,845	300,438	8,229	0
5	4/22/2015	100.2	8,082	8,728	4,848	299,703	8,246	0
6	4/22/2015	100.3	8,120	9,237	5,650	299,765	7,824	0
7	4/23/2015	100.6	8,112	9,361	5,047	300,718	7,592	0
8	4/23/2015	100.2	7,984	8,775	5,115	299,844	7,821	0
9	4/23/2015	100.2	7,888	8,304	4,455	300,936	7,940	0
10	4/23/2015	100.2	8,144	9,086	4,757	303,860	8,283	0
11	4/23/2015	100.8	7,993	8,249	4,525	304,320	7,633	0
12	4/24/2015	100.5	7,979	8,258	4,978	299,864	7,558	0
13	4/24/2015	100.7	8,081	8,679	4,989	299,888	7,570	0
14	4/24/2015	100.3	7,847	8,294	4,267	300,932	7,896	0
15	4/24/2015	94.6	7,982	9,324	3,672	277,380	8,013	0
16	4/24/2015	100.3	8,064	8,665	4,284	304,073	7,592	0
17	4/24/2015	100.7	7,963	8,702	4,886	303,320	7,473	0
18	4/25/2015	100.7	7,873	8,413	4,719	299,050	7,579	0
19	4/25/2015	100.2	7,696	7,991	4,481	299,310	7,705	0
20	4/25/2015	100.4	7,772	8,964	4,882	300,030	7,455	0
21	4/25/2015	99.1	7,956	9,180	5,264	299,100	7,608	0
22	4/26/2015	100.4	7,673	8,048	4,981	299,500	7,648	0
23	4/26/2015	99.2	7,860	8,533	5,116	299,200	7,607	0
24	4/26/2015	100.4	7,539	7,853	5,098	300,436	7,544	0
25	4/26/2015	100.6	7,687	8,419	5,316	302,313	7,448	0
26	4/26/2015	100.6	7,541	8,362	5,182	299,601	7,391	0

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Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	4/20/2015
Job End Date:	4/26/2015
State:	West Virginia
County:	Doddridge
API Number:	47-017-06572-00-00
Operator Name:	EQT Production
Well Name and Number:	513342
Longitude:	-80.75372600
Latitude:	39.29015800
Datum:	NAD83
Federal/Tribal Well:	NO
True Vertical Depth:	6,886
Total Base Water Volume (gal):	8,525,328
Total Base Non Water Volume:	0



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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	Keane Group	Carrier/Base Fluid					
			Water	7732-18-5	100.00000	89.79363	None
Sand (Proppant)	Keane Group	Proppant					
			Silica Substrate	14808-60-7	100.00000	9.82940	None
MC MX 437-5	Multi-Chem	Calcium nitrate solution					
			Calcium nitrate	10124-37-5	60.00000	0.05769	None
Hydrochloric Acid (15%)	Keane Group	Acidizing					
			Hydrochloric Acid	7647-01-0	15.00000	0.02744	None
FFR 730	Keane Group	Friction reducer					
			Oxyalkylated alcohol A	Proprietary	5.00000	0.00357	None
Greenskeeper LF	Keane Group	Solvent					
			Distillates, Petroleum, Hydrotreated Light	64742-47-8	100.00000	0.00293	None
EC6330A	Keane Group	Scale Inhibitor					
			Sodium Phosphate, Tribasic	7601-54-9	5.00000	0.00115	None
AI 600	Keane Group	Corrosion Inhibitor					
			Ethylene Glycol	107-21-1	40.00000	0.00018	None
			N, N-Dimethylformamide	68-12-2	20.00000	0.00009	None
			Cinnamialdehyde	104-55-2	15.00000	0.00007	None

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			2-Butoxyethanol	111-76-2	15.00000	0.00007	None
			Tar bases, quinoline derivs, benzyl chloride-quaternized	72480-70-7	15.00000	0.00007	None
			1-Decanol	112-30-1	5.00000	0.00002	None
			Poly (oxy-1,2-ethanediyl), alpha-(4-nonylphenyl)-omega-hydroxy-branched	127087-87-0	5.00000	0.00002	None
			1-Octanol	111-87-5	2.50000	0.00001	None
			Isopropyl alcohol	67-63-0	2.50000	0.00001	None
			Triethyl Phosphate	78-40-0	2.50000	0.00001	None
LEB-10X	Keane Group	Gel Breaker					
			Ethylene Glycol	107-21-1	30.00000	0.00001	None

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)

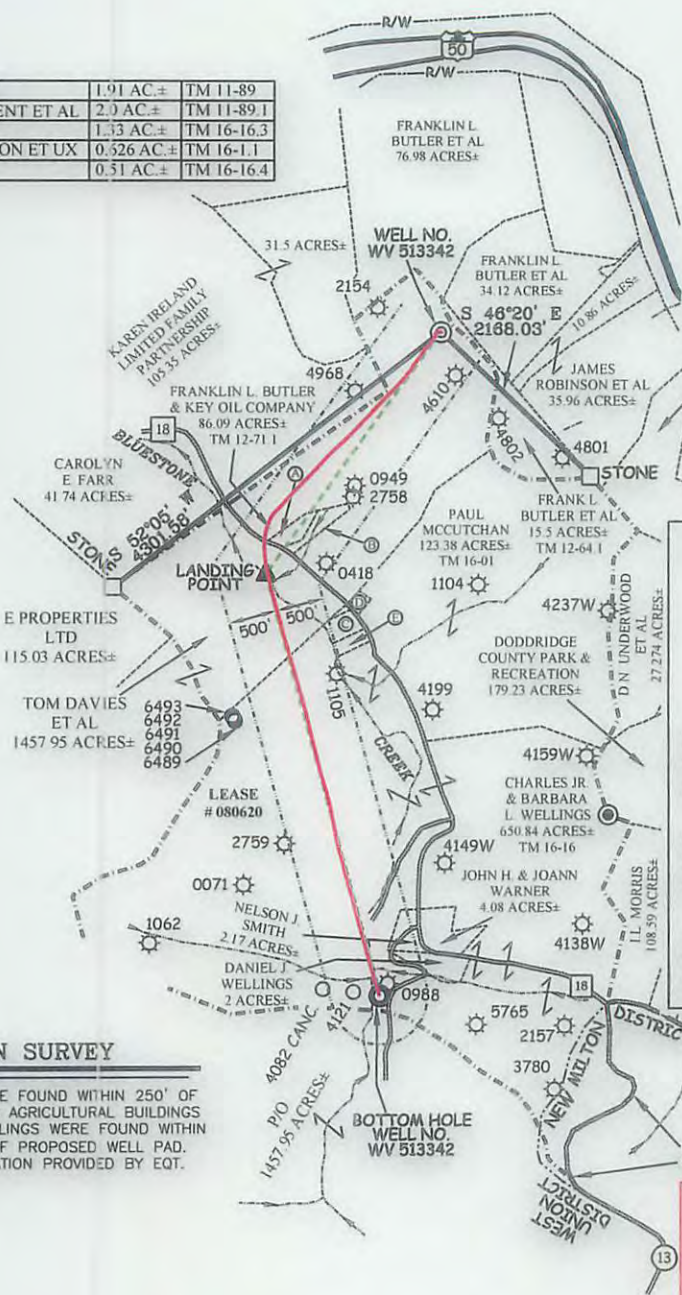
LATITUDE 39° 17' 30"
LONGITUDE 80° 45' 00"

LEGEND:

LEASE LINE	---
SURFACE LINE	---
PROPOSED PATH	---
AS DRILLED PATH	---
OFFSET LINE	---
TIE LINE	---
CREEK	---
ROAD	---
FENCE LINE	---
COUNTY ROUTE	---
STATE ROUTE	---
PROPOSED WELL	○
EXISTING WELL	⊙
PERMITTED WELL	⊙
TAX MAP-PARCEL	00-00

A	PHAME TRENT	1.91 AC±	TM 11-89
B	WILLIAM L. TRENT ET AL	2.0 AC±	TM 11-89.1
C	ACE FUELS	1.13 AC±	TM 16-16.3
D	ALDEN C. SUTTON ET UX	0.526 AC±	TM 16-1.1
E	ACE FUELS	0.51 AC±	TM 16-16.4

NAD'27 GRID NORTH



**EQT PRODUCTION COMPANY
LEWIS MAXWELL LEASE
640 ACRES±
WELL NO. WV 513342**

(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)

NAD'27 S.P.C.(FT)	N. 290,267.6	E. 1,645,159.8
NAD'27 GEO.	LAT-(N) 39.290158	LONG-(W) 80.753726
NAD'83 UTM (M)	N. 4,349,014.8	E. 521,252.9

LANDING POINT

NAD'27 S.P.C.(FT)	N. 287,761.7	E. 1,643,347.8
NAD'27 GEO.	LAT-(N) 39.283209	LONG-(W) 80.760003
NAD'83 UTM (M)	N. 4,348,242.2	E. 520,713.6

BOTTOM HOLE

NAD'27 S.P.C.(FT)	N. 283,386.1	E. 1,644,520.3
NAD'27 GEO.	LAT-(N) 39.271242	LONG-(W) 80.755645
NAD'83 UTM (M)	N. 4,346,915.1	E. 521,093.0

NOTES ON SURVEY

1. NO WATER WELLS WERE FOUND WITHIN 250' OF PROPOSED GAS WELL. NO AGRICULTURAL BUILDINGS ≥ 2500 SQ. FT. OR DWELLINGS WERE FOUND WITHIN 625' OF THE CENTER OF PROPOSED WELL PAD.
2. AS DRILLED INFORMATION PROVIDED BY EQT.

AS DRILLED COORDINATES FOR WELL NO. WV 513342

(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)

NAD'27 S.P.C.(FT)	N. 290,267.6	E. 1,645,159.8
NAD'27 GEO.	LAT-(N) 39.290158	LONG-(W) 80.753726
NAD'83 UTM (M)	N. 4,349,014.8	E. 521,252.9

BOTTOM HOLE

NAD'27 S.P.C.(FT)	N. 283,386.2	E. 1,644,519.1
NAD'27 GEO.	LAT-(N) 39.271242	LONG-(W) 80.755650
NAD'83 UTM (M)	N. 4,346,915.1	E. 521,092.7

Professional Energy Consultants
A DIVISION OF SMITH LAND SURVEYING, INC.

SLS
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ENVIRONMENTAL
PROJECT MGMT.

(304) 462-5634 WWW.SLSURVEYS.COM



I THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE REGULATIONS ISSUED AND PRESCRIBED BY THE DIVISION OF ENVIRONMENTAL PROTECTION.

P.S. 2288 *Earl N. Thompson*

(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.

DATE JUNE 09, 20 14

REVISED 08/01/14 & 01/21/15

OPERATORS WELL NO. WV 513342

API WELL NO. 47-017-06572

STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 200 FILE NO. 7831ASDRILLED513342

HORIZONTAL & VERTICAL CONTROL DETERMINED BY DGPS (SURVEY GRADE TIE TO CORS NETWORK) SCALE 1" = 2000'

STATE OF WEST VIRGINIA
DIVISION OF ENVIRONMENTAL PROTECTION
OFFICE OF OIL AND GAS

WELL TYPE: OIL GAS LIQUID INJECTION WASTE DISPOSAL IF "GAS" PRODUCTION STORAGE DEEP SHALLOW

LOCATION:
ELEVATION 1,260' (PAD ELEVATION) WATERSHED BLUESTONE CREEK & MIDDLE ISLAND CREEK
DISTRICT WEST UNION COUNTY DODDRIDGE QUADRANGLE WEST UNION 7.5'

SURFACE OWNER FRANKLIN L. BUTLER & KEY OIL COMPANY ACREAGE 86.09±
ROYALTY OWNER LEWIS MAXWELL HEIRS ACREAGE 640±

PROPOSED WORK:
DRILL CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE PLUG OFF OLD FORMATION PERFORATE NEW FORMATION PLUG AND ABANDON CLEAN OUT AND REPLUG OTHER

PHYSICAL CHANGE IN WELL (SPECIFY) TARGET FORMATION MARCELLUS
ESTIMATED DEPTH TVD 6,854'

WELL OPERATOR EQT PRODUCTION COMPANY DESIGNATED AGENT REX C. RAY
ADDRESS 115 PROFESSIONAL PLACE P.O. BOX 280 BRIDGEPORT, WV 26330 ADDRESS 115 PROFESSIONAL PLACE P.O. BOX 280 BRIDGEPORT, WV 26330

COUNTY NAME
PERMIT