

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

API 47-017-6706 County DODDRIDGE District SOUTHWEST
Quad OXFORD 7.5' Pad Name OXF44 Field/Pool Name _____
Farm name ARDEN & CAROL COGAR Well Number 515939
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 4,332,922 Easting 516,075
Landing Point of Curve Northing 4,332,846 Easting 515,788
Bottom Hole Northing 4,333,635 Easting 515,404

Elevation (ft) 1170 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 12.5 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 03/1/2015 Date drilling commenced 03/20/2015 Date drilling ceased 5/25/2015
Date completion activities began 6/14/2015 Date completion activities ceased 6/19/2015
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 to plug

Freshwater depth(s) ft 4,93,130,244,285,596,919,1139 Open mine(s) (Y/N) depths _____
Salt water depth(s) ft 1821 Void(s) encountered (Y/N) depths _____
Coal depth(s) ft N/A Cavern(s) encountered (Y/N) depths _____
Is coal being mined in area (Y/N) N

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API 47-017 - 6706 Farm name ARDEN & CAROL COGAR Well number 515939

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"	1,153'	NEW	J-55 54.5LB/FT	201'	Y
Coal							
Intermediate 1	12.375"	9.625"	3,039'	NEW	A-500 40LB/FT	NONE	Y
Intermediate 2							
Intermediate 3							
Production	8.5"	5.5"	10,107'	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	970	15.6	1.20	1164	0	8
Coal							
Intermediate 1	CLASS A / CLASS A	894 / 208	15.6 / 15.6	1.18 / 1.20	1304.52	0	8
Intermediate 2							
Intermediate 3							
Production	CLASS A / CLASS H	545 / 400	14.2 / 15.2	1.26 / 1.97	1,474.7	4,350	8
Tubing							

Drillers TD (ft) 10,109 Loggers TD (ft) _____
 Deepest formation penetrated Marcellus Plug back to (ft) _____
 Plug back procedure _____

Kick off depth (ft) 5,097

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: 1.11, 21
 INTERMEDIATE- RAN AT LEAST EVERY 500' FEET
 PRODUCTION- Solid composite body centralizers ran every joint from TD to 4,500'

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 _____

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API 47- 017 - 6706 Farm name ARDEN & CAROL COGAR Well number 515939

Drilling Contractor Patterson UTI (Rig 252)
Address 207 Carlton Drive City Eighty Four State PA Zip 15330

Logging Company GYRODATA
Address 601 MAYER ST City BRIDGEVILLE State PA Zip 15017

Logging Company _____
Address _____ City _____ State _____ Zip _____

Cementing Company C&J Energy Services
Address 2504 Smith Creek Road City Waynesburg State PA Zip 15370

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17.06706

515939 Final Formations (API 47-1706706)				
Formation Name	Final Top MD (ftGL) (ft)	Final Top TVD (ft)	Final Btm MD (ftGL) (ft)	Final Btm TVD (ft)
FRESH WATER ZONE	1		1,149.00	
SAND/SHALE	1		1,898.00	
BIG LIME	1,898.00		2,166.00	
WEIR	2,166.00		2,361.00	
BEREA	2,361.00		2,374.00	
GANTZ	2,374.00		2,453.00	
50F	2,453.00		2,547.00	
30F	2,547.00		2,589.00	
GORDON	2,589.00		2,693.00	
4TH	2,693.00		2,851.00	
5TH	2,851.00		2,875.00	
BAYARD	2,875.00		3,210.00	
WARREN	3,210.00		3,281.00	
SPEECHLEY	3,281.00		3,770.00	
BALLTOWN A	3,770.00		4,012.00	
BALLTOWN B	4,012.00		4,132.00	
BRADFORD	4,132.00		4,394.00	
RILEY	4,394.00		4,795.00	
BENSON	4,795.00		5,052.00	5,047.50
ALEXANDER	5,052.00	5,047.50	5,800.00	5,695.30
RHINESTREET	5,800.00	5,695.30	6,049.00	5,881.90
RHINESTREET UPPER	6,049.00	5,881.90	6,490.00	6,216.70
SONYEA	6,490.00	6,216.70	6,684.00	6,360.30
MIDDLESEX	6,684.00	6,360.30	6,769.00	6,415.20
GENESSEE	6,769.00	6,415.20	6,890.00	6,482.40
GENESEO	6,890.00	6,482.40	6,994.00	6,525.00
TULLY	6,994.00	6,525.00	7,045.00	6,539.90
HAMILTON	7,045.00	6,539.90	7,077.00	6,547.20
MARCELLUS	7,077.00	6,547.20		

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515939- 47-017-06706-0000- Perforations

Stage Number	Perforation Date	Top Perf Depth (ftKB)	Bottom Perf Depth (ftKB)	Number of Shots	Formation
Initiation Sleeve	6/15/2015	10,105.00	10,107.00	10	MARCELLUS
1	6/16/2015	9,952.00	10,074.00	42	MARCELLUS
2	6/16/2015	9,772.00	9,894.00	42	MARCELLUS
2.1	6/16/2015	9,712.00	9,742.00	42	MARCELLUS
3	6/17/2015	9,532.00	9,654.00	42	MARCELLUS
4	6/17/2015	9,352.00	9,476.00	42	MARCELLUS
5	6/17/2015	9,172.00	9,294.00	42	MARCELLUS
6	6/17/2015	8,994.00	9,114.00	42	MARCELLUS
7	6/17/2015	8,816.00	8,934.00	42	MARCELLUS
8	6/18/2015	8,632.00	8,754.00	42	MARCELLUS
9	6/18/2015	8,452.00	8,574.00	42	MARCELLUS
10	6/18/2015	8,272.00	8,392.00	42	MARCELLUS
11	6/18/2015	8,092.00	8,214.00	42	MARCELLUS
12	6/18/2015	7,912.00	8,032.00	42	MARCELLUS
13	6/18/2015	7,732.00	7,850.00	42	MARCELLUS
14	6/19/2015	7,552.00	7,672.00	42	MARCELLUS
15	6/19/2015	7,377.00	7,494.00	42	MARCELLUS
16	6/19/2015	7,190.00	7,314.00	42	MARCELLUS
17	6/19/2015	7,012.00	7,134.00	42	MARCELLUS

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515939- 47-017-06706-0000- 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	6/16/2015	13.2	7,251.00	9,062.00	4,321.00	0	535	0
1	6/16/2015	98.8	7,701.00	8,317.00	2,821.00	301,160	7520	0
2	6/16/2015	48.8	8,648.00	9,543.00	4,471.00	297,500	4032	0
2.1	6/16/2015	90.9	8,524.00	8,787.00	4,843.00	177,560	8053	0
3	6/17/2015	100.9	7,554.00	7,853.00	4,653.00	302,460	7600	0
4	6/17/2015	99.4	7,954.00	8,319.00	3,546.00	300,660	7979	0
5	6/17/2015	100.1	7,484.00	8,216.00	3,528.00	298,240	7279	0
6	6/17/2015	100.4	7,498.00	7,979.00	3,978.00	305,840	8803	0
7	6/17/2015	102.1	7,544.00	8,738.00	4,540.00	297,140	7213	0
8	6/18/2015	102.1	7,444.00	8,025.00	4,165.00	295,020	7175	0
9	6/18/2015	100.5	7,301.00	7,630.00	4,565.00	300,660	6871	0
10	6/18/2015	100.5	7,308.00	7,865.00	4,582.00	293,280	6995	0
11	6/18/2015	101.1	7,457.00	7,780.00	4,539.00	293,080	6878	0
12	6/18/2015	101.6	7,351.00	7,900.00	3,794.00	296,380	7174	0
13	6/19/2015	96.7	7,245.00	7,506.00	5,204.00	299,660	8491	0
14	6/19/2015	100.6	7,423.00	8,251.00	5,289.00	297,980	6499	0
15	6/19/2015	100.4	7,326.00	7,998.00	5,272.00	292,020	6796	0
16	6/19/2015	98.5	7,449.00	8,095.00	5,171.00	292,380	6805	0
17	6/19/2015	98.70	6,990.00	7,325.00	3,701	292,840	6,747	0

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Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	6/14/2015
Job End Date:	6/19/2015
State:	West Virginia
County:	Doddridge
API Number:	47-017-06706-00-00
Operator Name:	EQT Production
Well Name and Number:	515939
Longitude:	-80.81415100
Latitude:	39.14525700
Datum:	NAD83
Federal/Tribal Well:	NO
True Vertical Depth:	6,547
Total Base Water Volume (gal):	5,436,690
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	89.31753	None
Sand (Proppant)	Keane Group	Proppant	Silica Substrate	14808-60-7	100.00000	10.30381	None
MC MX 437-5	Multi-Chem	Calcium nitrate solution	Calcium nitrate	10124-37-5	60.00000	0.05673	None
Hydrochloric Acid (15%)	Keane Group	Acidizing	Hydrochloric Acid	7647-01-0	15.00000	0.02670	None
FFR730	Keane Group	Friction Reducer	Oxyalkylated alcohol A	Proprietary	5.00000	0.00406	None
EC6330A	Keane Group	Scale Inhibitor	Sodium Phosphate, Tribasic	7601-54-9	5.00000	0.00123	None
			Ethylene Glycol	107-21-1	5.00000	0.00123	None
AI600	Keane Group	Corrosion Inhibitor	Ethylene Glycol	107-21-1	40.00000	0.00017	None
			Dimethylformamide	68-12-2	20.00000	0.00009	None
			Cinnamialdehyde	104-55-2	15.00000	0.00007	None
			Pyridine, alkyl derives, quaternized with benzyl chloride	68909-18-2	15.00000	0.00007	None

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			1-Octanol	111-87-5	5.00000	0.00002	None
			1-Decanol	112-30-1	5.00000	0.00002	None
			Nonyl Phenol Ethoxylate, Branched	127087-87-0	5.00000	0.00002	None
			2-Butoxyethanol	111-76-2	5.00000	0.00002	None
			Triethyl Phosphate	78-40-0	2.50000	0.00001	None
			Methanol	67-56-1	2.50000	0.00001	None
			Alkyl Pyridine	68391-11-7	1.00000	0.00000	None
LEB-10X	Keane Group	Gel Breaker					
			Ethylene Glycol	107-21-1	30.00000	0.00003	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)

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LEGEND

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

A	RANDALL & DEBBY FARLEY	10 ACRES±	TM 13-68.1
B	DELBERT & BARBARA OSBORNE	53.50 ACRES±	TM 13-68
C	DELBERT & BARBARA OSBORNE	0.125 ACRES±	
D	UTAHONA WILLIAMS ET AL	13.25 ACRES±	
E	JEFFREY A. SPERRY	72.86 ACRES±	

LATITUDE 39°10'00"

ROYALTY OWNERS	
VICKIE D. MOORE ET AL	71 AC± LEASE NO. 114446

LONGITUDE 80°47'30"

NAD 27 GRID NORTH

7,798'



EQT PRODUCTION COMPANY
J. LEESON LEASE
2,000 ACRES±
WELL NO. WV 515939
(OXF44 H6)

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

NAD'27 S.P.C.(FT)	N. 237,742.1	E. 1,627,287.0
NAD'27 GEO.	LAT-(N) 39.145257	LONG-(W) 80.814151
NAD'83 UTM (M)	N. 4,332,922.1	E. 516,075.0

LANDING POINT

NAD'27 S.P.C.(FT)	N. 237,506.6	E. 1,626,339.9
NAD'27 GEO.	LAT-(N) 39.144572	LONG-(W) 80.817478
NAD'83 UTM (M)	N. 4,332,845.5	E. 515,787.7

BOTTOM HOLE

NAD'27 S.P.C.(FT)	N. 240,116.7	E. 1,625,122.8
NAD'27 GEO.	LAT-(N) 39.151689	LONG-(W) 80.821904
NAD'83 UTM (M)	N. 4,333,634.5	E. 515,403.6

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 515939

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

NAD'27 S.P.C.(FT)	N. 237,742.1	E. 1,627,287.0
NAD'27 GEO.	LAT-(N) 39.145257	LONG-(W) 80.814151
NAD'83 UTM (M)	N. 4,332,922.1	E. 516,075.0

BOTTOM HOLE

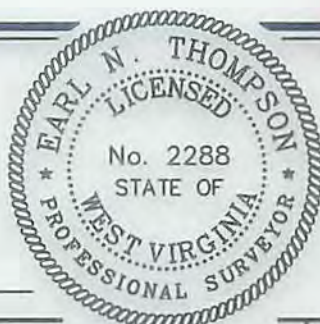
NAD'27 S.P.C.(FT)	N. 240,116.3	E. 1,625,123.5
NAD'27 GEO.	LAT-(N) 39.151688	LONG-(W) 80.821901
NAD'83 UTM (M)	N. 4,333,634.4	E. 515,403.9

Professional Energy Consultants
 A DIVISION OF SLS SURVEYS & ENGINEERING, INC.

 SURVEYORS
 ENGINEERS
 ENVIRONMENTAL
 PROJECT MGMT.
 (304) 492-5434 WWW.SLSSURVEYS.COM

I THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAN 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 NOVEMBER 20, 20 14

REVISED JUNE 26, 20 15

OPERATORS WELL NO. WV 515939

API WELL NO. 47 - 017 - 06706H
 STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 200 FILE NO. 6113P515939
 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 1170' (EXISTING PAD) WATERSHED TRIBUTARY OF STRAIGHT FORK

DISTRICT SOUTHWEST COUNTY DODDRIDGE QUADRANGLE OXFORD 7.5'

SURFACE OWNER ARDEN & CAROL COGAR ACREAGE 252±

ROYALTY OWNER ADELE McDOUGAL ET AL ACREAGE 2,000± **10/16/2015**

PROPOSED WORK: LEASE NO. 109481

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 6,542'

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