

APPROVED

NAME: *David Fluck*

DATE: *1/27/16*

Well Operator's Report of Well Work



Where energy meets innovation.

Well Number: 515940

API: 47 - 017 - 06707

Submission: Initial Amended

Notes: Correction to Production Cement Top
(MD)

RECEIVED
Office of Oil and Gas

DEC 21 2015

WV Department of
Environmental Protection

02/05/2016

APPROVED

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

API 47 - 017 - 06707 County DODDRIDGE District SOUTHWEST
Quad OXFORD 7.5' Pad Name OXF44 Field/Pool Name _____
Farm name ARDEN & CAROL COGAR Well Number 515940
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 4,332,924.8 Easting 516,078.7
Landing Point of Curve Northing 4,333,018.6 Easting 516,584.5
Bottom Hole Northing 4,334,150.0 Easting 516,033.8

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 12.7 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, ferrocchrome lignosulfonate, calcium carbonate, fibrous cellulose

Date permit issued 03/1/2015 Date drilling commenced 03/20/2015 Date drilling ceased 6/4/2015
Date completion activities began 6/20/2015 Date completion activities ceased 6/24/2015
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 N
Salt water depth(s) ft 1821 Void(s) encountered (Y/N) depths N
Coal depth(s) ft N/A Cavern(s) encountered (Y/N) depths N
Is coal being mined in area (Y/N) N

Reviewed by:
WS 02/01/16 Axid
02/05/2016

API 47-017 - 06707

Farm name ARDEN & CAROL COGAR

Well number 515940

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	204'	Y
Coal							
Intermediate 1	12.375"	9.625"	3,036'	NEW	A-500 40LB/FT	NONE	Y
Intermediate 2							
Intermediate 3							
Production	8.5"	5.5"	11,760'	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	775 / 580	14.2 / 15.2	1.26 / 1.97	2119.1	2,767'	8
Tubing							

Drillers TD (ft) 11,762 Loggers TD (ft) N/A

Deepest formation penetrated Marcellus Plug back to (ft) N/A

Plug back procedure N/A

Kick off depth (ft) 3,840'

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- 205 Composite body centralizers run every joint from TD to 3,150'

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 - 6707 Farm name ARDEN & CAROL COGAR Well number 515940

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

515940 Final Formations (API #47-1706707)

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	4,011.20
BALLTOWN B	4,012.00	4,011.20	4,132.00	4,126.20
BRADFORD	4,132.00	4,126.20	4,394.00	4,346.30
RILEY	4,394.00	4,346.30	4,795.00	4,654.50
BENSON	4,795.00	4,654.50	5,052.00	4,848.40
ALEXANDER	5,052.00	4,848.40	5,800.00	5,410.30
RHINESTREET	5,800.00	5,410.30	6,049.00	5,598.90
RHINESTREET UPPER	6,049.00	5,598.90	6,884.00	6,250.60
SONYEA	6,884.00	6,250.60	7,064.00	6,390.10
MIDDLESEX	7,064.00	6,390.10	7,158.00	6,453.10
GENESSEE	7,158.00	6,453.10	7,284.00	6,523.80
GENESEO	7,284.00	6,523.80	7,392.00	6,570.00
TULLY	7,392.00	6,570.00	7,450.00	6,586.90
HAMILTON	7,450.00	6,586.90	7,480.00	6,594.00
MARCELLUS	7,480.00	6,594.00		

515940-47-017-06707-0000- Perforations

Stage Number	Perforation Date	Top Perf Depth (ftKB)	Bottom Perf Depth (ftKB)	Number of Shots	Formation
Initiation Sleeve	6/15/2015	11,758.00	11,760.00	10	MARCELLUS
1	6/20/2015	11,605.00	11,727.00	42	MARCELLUS
2	6/20/2015	11,425.00	11,547.00	42	MARCELLUS
3	6/20/2015	11,245.00	11,367.00	42	MARCELLUS
4	6/20/2015	11,065.00	11,187.00	42	MARCELLUS
5	6/21/2015	10,885.00	11,005.00	42	MARCELLUS
6	6/21/2015	10,705.00	10,827.00	42	MARCELLUS
7	6/21/2015	10,525.00	10,647.00	42	MARCELLUS
8	6/22/2015	10,345.00	10,467.00	42	MARCELLUS
9	6/22/2015	10,165.00	10,287.00	42	MARCELLUS
10	6/22/2015	9,987.00	10,107.00	42	MARCELLUS
11	6/22/2015	9,805.00	9,927.00	42	MARCELLUS
12	6/22/2015	9,625.00	9,747.00	42	MARCELLUS
13	6/23/2015	9,445.00	9,567.00	42	MARCELLUS
14	6/23/2015	9,265.00	9,387.00	42	MARCELLUS
15	6/23/2015	9,085.00	9,207.00	42	MARCELLUS
16	6/23/2015	8,905.00	9,027.00	42	MARCELLUS
17	6/23/2015	8,729.00	8,847.00	42	MARCELLUS
18	6/23/2015	8,545.00	8,667.00	42	MARCELLUS
19	6/23/2015	8,365.00	8,487.00	42	MARCELLUS
20	6/24/2015	8,185.00	8,307.00	42	MARCELLUS
21	6/24/2015	8,005.00	8,127.00	42	MARCELLUS
22	6/24/2015	7,825.00	7,947.00	42	MARCELLUS
23	6/24/2015	7,645.00	7,767.00	42	MARCELLUS
24	6/24/2015	7,465.00	7,590.00	42	MARCELLUS

515940-47-017-06707-0000- 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	6/20/2015	12.8	8,461.00	9,287.00	5,829.00	0	650	0
1	6/20/2015	99.3	8,142.00	9,458.00	5,979.00	301,340	7608	0
2	6/20/2015	100.6	8,092.00	8,718.00	4,076.00	292,440	7474	0
3	6/20/2015	100	7,991.00	8,310.00	4,142.00	296,580	7893	0
4	6/20/2015	101	7,958.00	8,391.00	3,591.00	300,980	7461	0
5	6/21/2015	101	7,814.00	7,997.00	3,577.00	297,520	7765	0
6	6/21/2015	100.8	8,113.00	8,766.00	4,071.00	297,580	8072	0
7	6/21/2015	101.2	8,047.00	9,064.00	3,968.00	296,300	7634	0
8	6/22/2015	100.1	7,518.00	7,880.00	4,786.00	296,660	7090	0
9	6/22/2015	99.8	7,695.00	8,294.00	4,929.00	297,140	7313	0
10	6/22/2015	99.9	7,454.00	7,632.00	4,637.00	299,980	7235	0
11	6/22/2015	100.9	7,682.00	8,402.00	5,131.00	295,280	7417	0
12	6/22/2015	99	7,895.00	9,055.00	4,951.00	294,340	7066	0
13	6/23/2015	101.5	7,511.00	8,236.00	5,056.00	289,760	7197	0
14	6/23/2015	98.6	7,318.00	8,020.00	4,358.00	296,680	7411	0
15	6/23/2015	100.8	7,494.00	8,642.00	4,539.00	296,220	6881	0
16	6/23/2015	101.1	7,382.00	7,834.00	4,728.00	295,800	6979	0
17	6/23/2015	101.60	7,595.00	8,672.00	4,620	295,460	7,087	0
18	6/23/2015	100.80	7,824.00	9,014.00	4,747	303,760	7,242	0
19	6/23/2015	101.60	7,840.00	8,590.00	5,137	297,020	7,066	0
20	6/24/2015	101.40	7,533.00	8,172.00	5,265	302,340	7,029	0
21	6/24/2015	100.80	7,487.00	7,951.00	5,219	294,500	6,838	0
22	6/24/2015	97.60	7,937.00	8,308.00	5,494	287,880	6,716	0
23	6/24/2015	101.40	7,553.00	8,504.00	5,184	288,020	6,949	0
24	6/24/2015	101.40	7,421.00	8,366.00	5,171	288,320	7,005	0

Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	6/20/2015
Job End Date:	6/24/2015
State:	West Virginia
County:	Doddridge
API Number:	47-017-06707-00-00
Operator Name:	EQT Production
Well Name and Number:	515940
Longitude:	-80.81410800
Latitude:	39.14528100
Datum:	NAD83
Federal/ Tribal Well:	NO
True Vertical Depth:	6,594
Total Base Water Volume (gal):	7,353,276
Total Base Non Water Volume:	0



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	89.29499	None
			Sand (Proppant)	Keane Group	Proppant	Silica Substrate	14808-60-7
MC MX 437-5	Multi-Chem	Calcium nitrate solution	Calcium nitrate	10124-37-5	60.00000	0.05654	None
			Hydrochloric Acid (15%)	Keane Group	Acidizing	Hydrochloric Acid	7647-01-0
FFR730	Keane Group	Friction Reducer	Oxyalkylated alcohol A	Proprietary	5.00000	0.00404	None
EC6330A	Keane Group	Scale Inhibitor	Ethylene Glycol	107-21-1	5.00000	0.00124	None
			Sodium Phosphate, Tribasic	7601-54-9	5.00000	0.00124	None
AI 600	Keane Group	Corrosion Inhibitor	Ethylene Glycol	107-21-1	40.00000	0.00017	None
			Dimethylformamide	68-12-2	20.00000	0.00008	None
			Pyridine, alkyl derives, quaternized with benzyl chloride	68909-18-2	15.00000	0.00006	None
			Cinnamaldehyde	104-55-2	15.00000	0.00006	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
		1-Octanol	111-87-5	5.00000	0.00002	None
		Methanol	67-56-1	2.50000	0.00001	None
		Triethyl Phosphate	78-40-0	2.50000	0.00001	None
		Alkyl Pyridine	68391-11-7	1.00000	0.00000	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)

Welcome Michelle N., Operator - OpNo. E1210363 [Log Out]

Hydraulic Fracturing
DISCLOSURE



Please use the FracFocus XML submission process or create disclosures online.

FIND A WELL
BY STATE

ABOUT PROJECT
PARTNERS

(Note: Clicking the FracFocus FIND A WELL links will open a new window.)

Prepare Disclosure for FracFocus Submission

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i Disclosure has been submitted.

Note: This window expires with 10 minutes of inactivity. After that you will be taken back to the dashboard.

Hydraulic Fracturing Data

Job Start Date 6/20/2015	Job End Date 6/24/2015	API Number 47-017-06707-00-00	State & County West Virginia --- Doddridge
Well Name 515940			
Longitude -80.814108	Latitude 39.145281	Datum NAD83	Federal/Tribal Well?
True Vertical Depth (ft) 6594	Total Water Vol (gal) 7353276	Total Non Water Vol 0	Total Mass (lbs) 68719523



MSDS Chemical Ingredients

	Trade Name	Supplier	Purpose	Ingredients	CAS #	% High Additive	% HF Job	Comments	Ingredient Mass
<input type="button" value="Edit"/>	Water	Keane Group	Carrier/Base Fluid	Water	7732-18-5	100%	89.2949851144%	None	61363088.22
<input type="button" value="Edit"/>	Sand (Proppant)	Keane Group	Proppant	Silica Substrate	14808-60-7	100%	10.3346176534%	None	7101900
<input type="button" value="Edit"/>	MC MX 437-5	Multi-Chem	Calcium nitrate solution	Calcium nitrate	10124-37-5	60%	.0565381107%	None	38852.72
<input type="button" value="Edit"/>	Hydrochloric Acid (15%)	Keane Group	Acidizing	Hydrochloric Acid	7647-01-0	15%	.0255401903%	None	17551.097
<input type="button" value="Edit"/>	FFR730	Keane Group	Friction Reducer	Oxyalkylated alcohol A	Proprietary	5%	.0040352915%	None	2773.033
<input type="button" value="Edit"/>	EC6330A	Keane Group	Scale Inhibitor	Ethylene Glycol	107-21-1	5%	.0012387529%	None	851.265
				Sodium Phosphate, Tribasic	7601-54-9	5%	.0012387529%	None	851.265
<input type="button" value="Edit"/>	AI 600	Keane Group	Corrosion Inhibitor	Ethylene Glycol	107-21-1	40%	.0001672898%	None	114.961
				Dimethylformamide	68-12-2	20%	.0000836449%	None	57.48

Pyridine, alkyl derives, quaternized with benzyl chloride	68909-18-2	15%	.0000627337%	None	43.11
Cinnamialdehyde	104-55-2	15%	.0000627337%	None	43.11
1-Decanol	112-30-1	5%	.0000209112%	None	14.37
Nonyl Phenol Ethoxylate, Branched	127087- 87-0	5%	.0000209112%	None	14.37
2-Butoxyethanol	111-76-2	5%	.0000209112%	None	14.37
1-Octanol	111-87-5	5%	.0000209112%	None	14.37
Methanol	67-56-1	2.5%	.0000104556%	None	7.185
Triethyl Phosphate	78-40-0	2.5%	.0000104556%	None	7.185
Alkyl Pyridine	68391-11-7	1%	.0000041822%	None	2.874

Non-MSDS Chemical Ingredients

New Ingredients

Trade Name	Supplier	Purpose	Ingredients	CAS #	% High Additive	% HF Job	Comments	Ingredient Mass
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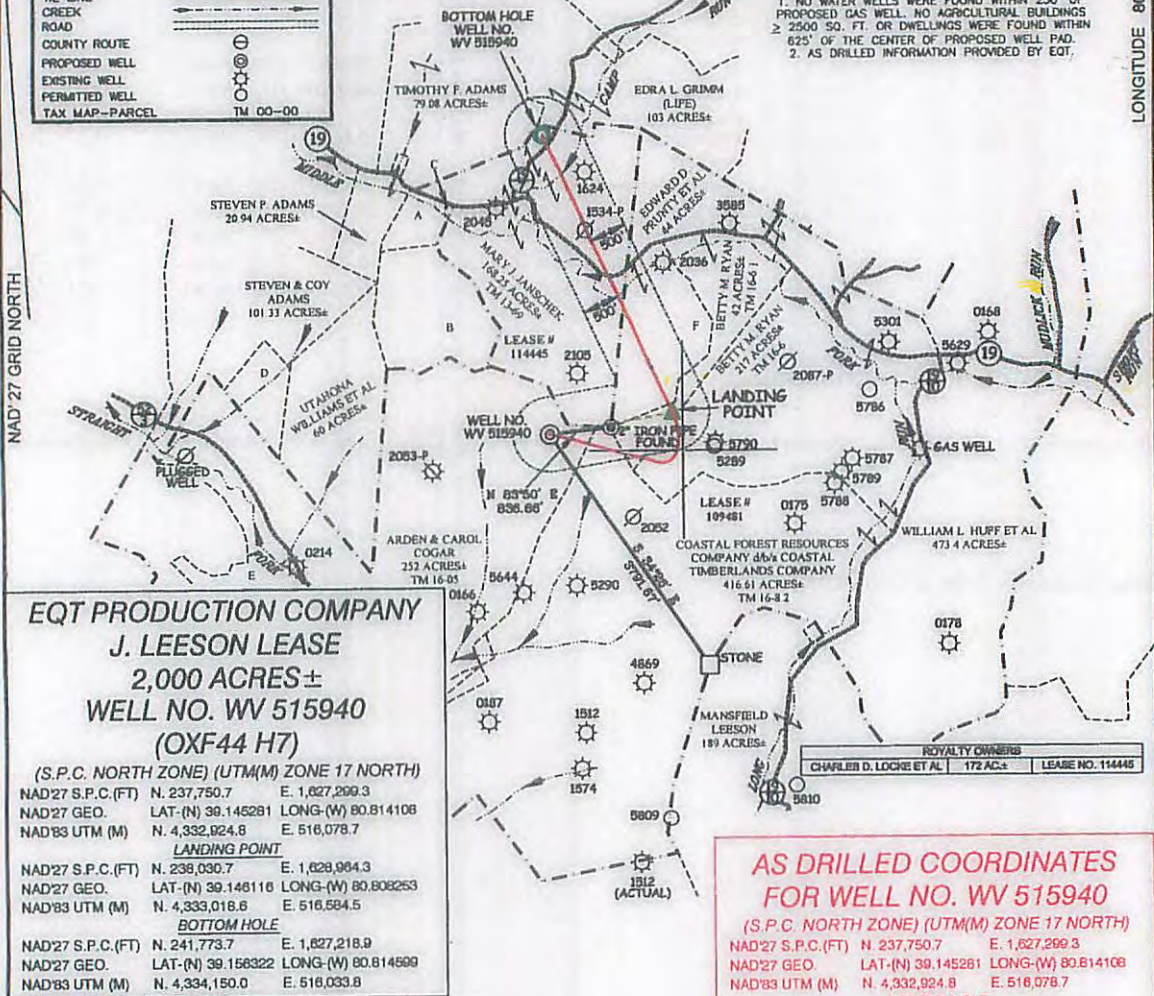
LEGEND

LEASE LINE	---
SURFACE LINE	---
PROPOSED PATH	---
AS DRILLED PATH	---
OFFSET LINE	---
TRAIL LINE	---
CREEK	---
ROAD	---
COUNTY ROUTE	---
PROPOSED WELL	○
EXISTING WELL	○
PERMITTED WELL	○
TAZ MAP-PARCEL	TM 00-00

A	RANDALL & DEBBY FARLEY	10 ACRES±
B	DELBERT & BARBARA OSBORNE	53.50 ACRES±
C	DELBERT & BARBARA OSBORNE	0.125 ACRES±
D	UTAHONA WILLIAMS ET AL	13.25 ACRES±
E	JEFFREY A. SPERRY	72.86 ACRES±
F	ARBBIE & PHYLLIS JONES	30 ACRES± TM 16-6.2

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 EOT.



EQT PRODUCTION COMPANY
J. LEESON LEASE
2,000 ACRES±
WELL NO. WV 515940
(OXF44 H7)

(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)
 NAD27 S.P.C.(FT) N. 237,750.7 E. 1,627,209.3
 NAD27 GEO. LAT-(N) 39.145281 LONG-(W) 80.814108
 NAD83 UTM (M) N. 4,332,924.8 E. 516,078.7

LANDING POINT
 NAD27 S.P.C.(FT) N. 239,030.7 E. 1,628,984.3
 NAD27 GEO. LAT-(N) 39.146116 LONG-(W) 80.808263
 NAD83 UTM (M) N. 4,333,018.6 E. 516,584.5

BOTTOM HOLE
 NAD27 S.P.C.(FT) N. 241,773.7 E. 1,627,218.9
 NAD27 GEO. LAT-(N) 39.156322 LONG-(W) 80.814699
 NAD83 UTM (M) N. 4,334,150.0 E. 516,033.8

AS DRILLED COORDINATES FOR WELL NO. WV 515940
 (S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)
 NAD27 S.P.C.(FT) N. 237,750.7 E. 1,627,209.3
 NAD27 GEO. LAT-(N) 39.145281 LONG-(W) 80.814108
 NAD83 UTM (M) N. 4,332,924.8 E. 516,078.7

BOTTOM HOLE
 NAD27 S.P.C.(FT) N. 241,780.0 E. 1,627,214.7
 NAD27 GEO. LAT-(N) 39.156340 LONG-(W) 80.814614
 NAD83 UTM (M) N. 4,334,151.9 E. 516,032.5



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 NOVEMBER 20, 20 14
 REVISED JUNE 29, 20 15
 OPERATORS WELL NO. WV 515940
 API WELL NO. 47-017-06707H
 STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1/200 FILE NO. 6113AD515940
 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 WASTE IF
 INJECTION DISPOSAL "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±
 LEASE NO. 109481

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 6,542'

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

02/05/2016