

Well Operator's Report of Well Work



Where energy meets innovation.

Well Number: 516206

API: 47 - 085 - 10230

Submission: Initial Amended

Notes: Initial Report w/ Flowback

Reviewed

RECEIVED
Office of Oil and Gas

DEC 26 2017

WV Department of
Environmental Protection

02/16/2018

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

API 47 - 085 - 10230 County RITCHIE District CLAY
Quad PENNSBORO 7.5' Pad Name PEN54 Field/Pool Name _____
Farm name Jerry Morton et al Well Number 516206
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 4,345,363.42 Easting 506,280.13
Landing Point of Curve Northing 4,345,636.13 Easting 506,711.01
Bottom Hole Northing 4,347,044.06 Easting 506,224.72

Elevation (ft) 1016 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 based mud 12.8 ppg, barium sulfate, sodium chloride, xanthan gum, polyanionic cellulose, sodium hydroxide, chrome lignosulfonate, calcium hydroxide, sodium acid pyrophosphate, bentonite, Methyl ester of sulfonated tannin, treated silica, partially hydrolyzed polyacrylamide/polyacrylate, potassium chloride, glutaraldehyde, ground walnut shells, calcium carbonate, fibrous cellulose.

Date permit issued 08/17/2015 Date drilling commenced 04/20/2016 Date drilling ceased 06/24/2016
Date completion activities began 9/8/2017 Date completion activities ceased 9/26/2017
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 109',115',312',637',739',755',780' Open mine(s) (Y/N) depths N
Salt water depth(s) ft 1360' Void(s) encountered (Y/N) depths N
Coal depth(s) ft 336',799',877',1088',1192' Cavern(s) encountered (Y/N) depths N
Is coal being mined in area (Y/N) N

Reviewed by:

02/16/2018

API 47-085 . 10230 Farm name Jerry Morton et al Well number 516206

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"	913'	NEW	J-55 54.5LB/FT	281'	Y
Coal							
Intermediate 1	12.375"	9.625"	5186'	NEW	A-500 & P-110 40lb/ft	4974',3401'	Y
Intermediate 2							
Intermediate 3							
Production	8.5"	5.5"	12811'	NEW	P-110 20LB/FT	NONE	N
Tubing							
Packer type and depth set		Davis Lynch casing packer and diverter tool placed at 3382' Two stage cement job performed.					

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	59	15.6	1.18	70	0	8
Surface	CLASS A	739	15.6	1.20	887	0	8
Coal							
Intermediate 1	CLASS A	259/323 & 1230	14.2/15.6 & 15.6	1.24/1.18 & 1.18	2153	0	8
Intermediate 2							
Intermediate 3							
Production	CLASS H / CLASS H	881 / 919	15.2 / 15.6	1.10 / 1.84	2660	1676	72+
Tubing							

Drillers TD (ft) 12,815' Loggers TD (ft) N/A
 Deepest formation penetrated MARCELLUS Plug back to (ft) N/A
 Plug back procedure N/A

Kick off depth (ft) 5,250'

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- RAN AT LEAST EVERY 500' FEET
 INTERMEDIATE- RAN AT LEAST EVERY 500' FEET
 PRODUCTION- COMPOSITE BODY CENTRALIZERS RAN EVERY JOINT FROM SHOE TO KOP

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- 085 - 10230 Farm name Jerry Morton et al Well number 516206

PERFORATION RECORD

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

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)
							Please	See Attached

Please insert additional pages as applicable.

02/16/2018

API 47- 085 - 10230

Farm name Jerry Morton et al

Well number 516206

PRODUCING FORMATION(S)

DEPTHS

<u>Marcellus</u>	<u>6,277'</u>	<u>TVD</u>	<u>7,403</u>	<u>MD</u>
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

Please insert additional pages as applicable.

GAS TEST Build up Drawdown Open Flow OIL TEST Flow Pump

SHUT-IN PRESSURE Surface 1,950 psi Bottom Hole N/A psi DURATION OF TEST 67 hrs

OPEN FLOW Gas 6,538 mcfpd Oil N/A bpd NGL 115.3 bpd Water 682.6 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	

	<u>0</u>		<u>0</u>		

Please insert additional pages as applicable.

Drilling Contractor Savanna Drilling - Rig 803
 Address 125 Industry Road City Waynesburg State PA Zip 15370

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

Cementing Company C&J (aka Nabors)
 Address 2504 SMITH CREEK ROAD City WAYNESBURG State PA Zip 15370

Stimulating Company Keane
 Address 1245 Old Route 119 City Mount Pleasant State PA Zip 15666

Please insert additional pages as applicable.

Completed by Michael Reh Telephone (412) 553-5815
 Signature *Michael Reh* Title Dir Completions Date 12/21/2017

API 47- 085 - 10230 Farm name Jerry Morton et al Well number 516206

Drilling Contractor _____
Address _____ City _____ State _____ Zip _____

Logging Company _____
Address _____ City _____ State _____ Zip _____

Logging Company PRO-DIRECTIONAL
Address 103 SUDS RUN ROAD City MT. CLARE State WV Zip 26408

Cementing Company ALLIED SERVICES
Address 116 KIMMEL SCHOOL ROAD City SHELOCTA State PA Zip 15773

API 47-085-10230		516206		PEN54
Final Formations				
Formation Name	Final Top MD (ftGL) (ft)	Final Top TVD (ft)	Final Btm MD (ftGL) (ft)	Final Btm TVD (ft)
SAND/SHALE	1	1	336	336
COAL	336	336	344	344
SAND/SHALE	344	344	799	799
COAL	799	799	802	802
SAND/SHALE	802	802	877	877
COAL	877	877	882	882
SAND/SHALE	882	882	1088	1088
COAL	1088	1088	1092	1092
SAND/SHALE	1092	1092	1192	1192
COAL	1192	1192	1197	1197
SAND/SHALE	1197	1197	1426	1426
MAXTON	1426	1426	1621	1621
BIG LIME	1621	1621	2003	2003
WEIR	2003	2003	2221	2221
GANTZ	2221	2221	2366	2366
50F	2366	2366	2461	2461
GORDON	2461	2461	2619	2619
5TH	2619	2619	2633	2633
BAYARD	2633	2633	3088	3088
WARREN	3088	3088	3166	3166
SPEECHLEY	3166	3166	3556	3556
BALLTOWN A	3556	3556	3911	3911
BALLTOWN B	3911	3911	3962	3962
BRADFORD	3962	3962	4212	4212
RILEY	4212	4212	4595	4595
BENSON	4595	4595	4842	4841
ALEXANDER	4842	4841	5381	5380
RHINESTREET	5381	5380	5643	5633
RHINESTREET UPPER	5643	5633	5780	5754
SONYEA	5780	5754	6610	6123
MIDDLESEX	6610	6123	6833	6173
GENESSEE	6833	6173	7057	6223
GENESE0	7057	6223	7262	6257
TULLY	7262	6257	7341	6269
HAMILTON	7341	6269	7403	6277
MARCELLUS	7403	6277	12815	6354

516206 47-085-10230-0000 - Perforations

<i>Stage Number</i>	<i>Perforation Date</i>	<i>Top Perf Depth (ftKB)</i>	<i>Bottom Perf Depth (ftKB)</i>	<i>Number of Shots</i>	<i>Formation</i>
Initiation Sleeve	9/11/2016	12,785	12,821	10	MARCELLUS
1	9/9/2017	12,625	12,746	32	MARCELLUS
2	9/9/2017	12,425	12,586	40	MARCELLUS
3	9/9/2017	12,225	12,387	40	MARCELLUS
4	9/10/2017	12,025	12,187	40	MARCELLUS
5	9/13/2017	11,825	11,987	40	MARCELLUS
6	9/13/2017	11,625	11,787	40	MARCELLUS
7	9/14/2017	11,425	11,587	40	MARCELLUS
8	9/14/2017	11,225	11,387	40	MARCELLUS
9	9/14/2017	11,025	11,187	40	MARCELLUS
10	9/15/2017	10,825	10,987	40	MARCELLUS
11	9/15/2017	10,625	10,787	40	MARCELLUS
12	9/15/2017	10,425	10,587	40	MARCELLUS
13	9/15/2017	10,225	10,387	40	MARCELLUS
14	9/15/2017	10,025	10,187	40	MARCELLUS
15	9/16/2017	9,825	9,987	40	MARCELLUS
16	9/16/2017	9,625	9,787	40	MARCELLUS
17	9/20/2017	9,425	9,587	40	MARCELLUS
18	9/20/2017	9,225	9,387	40	MARCELLUS
19	9/21/2017	9,025	9,187	40	MARCELLUS
20	9/21/2017	8,825	8,987	40	MARCELLUS
21	9/23/2017	8,625	8,787	40	MARCELLUS
22	9/24/2017	8,425	8,587	40	MARCELLUS
23	9/24/2017	8,225	8,387	40	MARCELLUS
24	9/25/2017	7,985	8,187	48	MARCELLUS
25	9/25/2017	7,668	7,830	40	MARCELLUS
26	9/26/2017	7,468	7,630	40	MARCELLUS

Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	9/8/2017
Job End Date:	9/26/2017
State:	West Virginia
County:	Ritchie
API Number:	47-085-10230-00-00
Operator Name:	EQT Production
Well Name and Number:	516206
Latitude:	39.25749700
Longitude:	-80.92737900
Datum:	NAD83
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	6,277
Total Base Water Volume (gal):	8,588,996
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	Carrier/Base Fluid					
			Water	7732-18-5	100.00000	85.67282	None
BrOx	Dirk Thomas Solutions	Sodium Hypochlorite					
			Water	7732-18-5	50.00000	0.03510	None

			Water	7732-18-5	89.00000	0.00096	None
Other Chemical (s)	Listed Above	See Trade Name (s) List					
			Water	7732-18-5	50.00000	0.03510	
			Water	7732-18-5	89.00000	0.00096	
KWG-111L	Keane	Gel					
				Listed Below			
KSI-19	Keane	Scale Inhibitor					
				Listed Below			
Sand (Proppant)	Keane	Proppant					
				Listed Below			
KFR-23	Keane	Friction Reducer					
				Listed Below			
KWBO-2	Keane	Gel Breaker					
				Listed Below			
Hydrochloric Acid (15%)	Keane	Acidizing					
				Listed Below			
KAI-12	Keane	Acid Corrosion Inhibitor					

				Listed Below			
Items above are Trade Names with the exception of Base Water . Items below are the Individual Ingredients.							
			Silica Substrate	14808-60-7	100.00000	14.07458	None
			Hydrochloric Acid	7647-01-0	15.00000	0.02409	None
			Distillates (petroleum), hydrotreated light	64742-47-8	20.00000	0.01404	
			copolymer of 2-propenamide	69418-26-4	20.00000	0.01404	
			Distillates (petroleum), hydrotreated light	64742-47-8	20.00000	0.01404	None
			copolymer of 2-propenamide	69418-26-4	20.00000	0.01404	None
			Methanol	67-56-1	30.00000	0.00594	None
			Methanol	67-56-1	30.00000	0.00594	
			oleic acid diethanolamide	93-83-4	2.00000	0.00140	
			alcohols, C12-16, ethoxylated	68551-12-2	2.00000	0.00140	None
			alcohols, C12-16, ethoxylated	68551-12-2	2.00000	0.00140	
			oleic acid diethanolamide	93-83-4	2.00000	0.00140	None
			Solvent Naphtha (petroleum) heavy aliph	64742-96-7	60.00000	0.00038	
			Guar Gum	9000-30-0	60.00000	0.00038	
			Guar Gum	9000-30-0	60.00000	0.00038	None
			Solvent Naphtha (petroleum) heavy aliph	64742-96-7	60.00000	0.00038	None
			Methanol	67-56-1	90.00000	0.00022	None
			Sodium Hypochlorite	7681-52-9	16.00000	0.00017	
			Sodium Hypochlorite	7681-52-9	16.00000	0.00017	None
			Trade Secret	Proprietary	10.00000	0.00006	None
			Trade Secret	Proprietary	10.00000	0.00006	
			Sodium Hydroxide	1310-73-2	5.00000	0.00005	
			Sodium Hydroxide	1310-73-2	5.00000	0.00005	None
			Sodium Persulfate	7775-27-1	99.00000	0.00004	None

			Sodium Persulfate	7775-27-1	99.00000	0.00004	
			Isoproyl Alcohol	67-63-0	5.00000	0.00001	None
			Xylene	1330-20-7	5.00000	0.00001	None
			Fatty Imidazoline	61790-69-0	5.00000	0.00001	None
			Prop-2-yn-1-ol	107-19-7	5.00000	0.00001	None
			Alcohols, C7-9-iso-, C8-rich	68526-83-0	5.00000	0.00001	None
			Ethylbenzene	100-41-4	1.00000	0.00000	None
			Ethylbenzene	100-41-4	1.00000	0.00000	

* Total Water Volume sources may include various types of water including fresh water, produced water, and recycled water

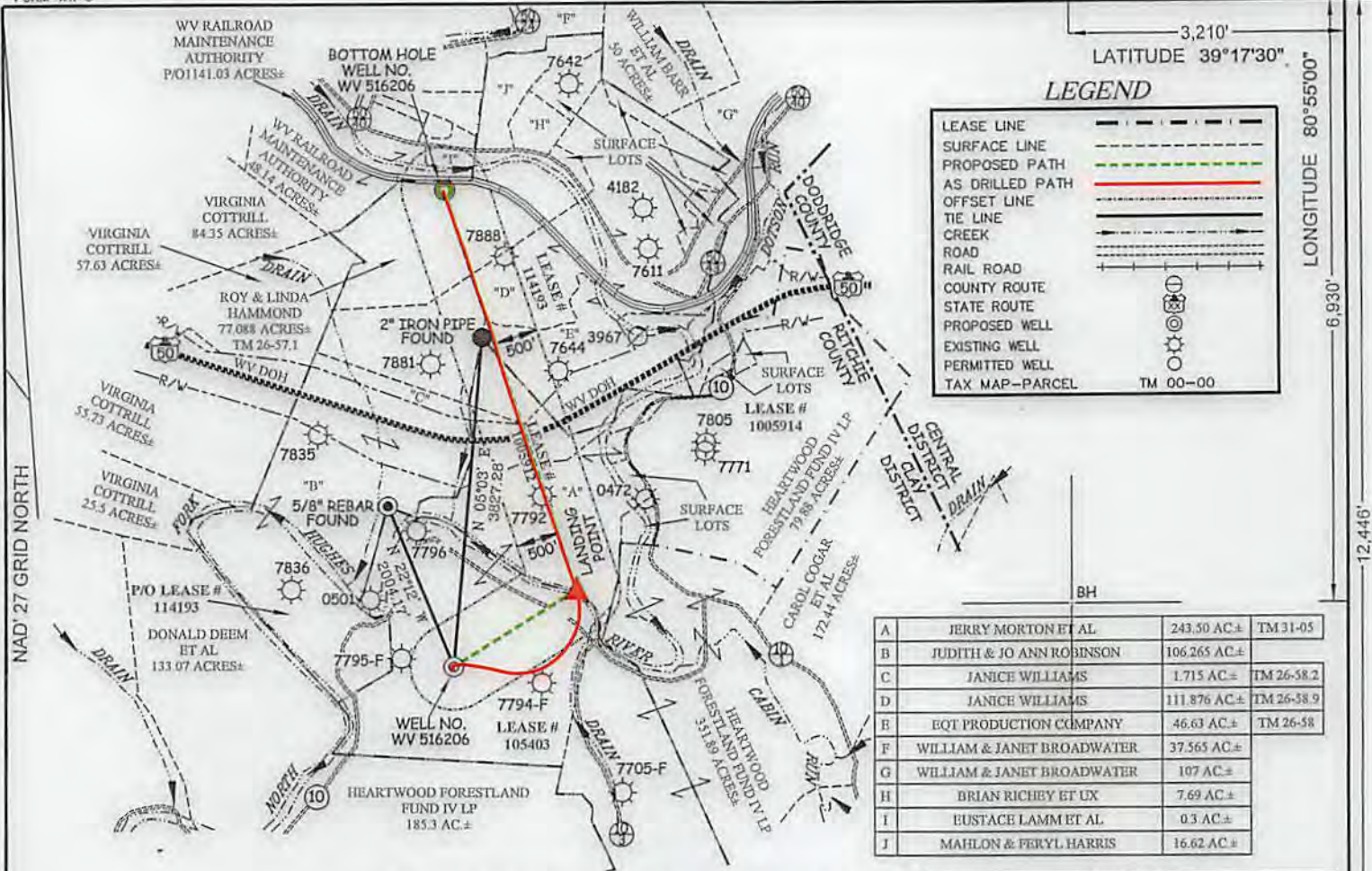
** Information is based on the maximum potential for concentration and thus the total may be over 100%

*** If you are calculating a percentage of total ingredients do not add the water volume below the green line to the water volume above the green line

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)

3,034'
3,210'
LATITUDE 39°17'30"
LONGITUDE 80°55'00"



LEGEND

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

	OWNER	ACRES	TM
A	JERRY MORTON ET AL	243.50 AC±	TM 31-05
B	JUDITH & JO ANN ROBINSON	106.265 AC±	
C	JANICE WILLIAMS	1.715 AC±	TM 26-58.2
D	JANICE WILLIAMS	111.876 AC±	TM 26-58.9
E	EQT PRODUCTION COMPANY	46.63 AC±	TM 26-58
F	WILLIAM & JANET BROADWATER	37.565 AC±	
G	WILLIAM & JANET BROADWATER	107 AC±	
H	BRIAN RICHEY ET UX	7.69 AC±	
I	EUSTACE LAMM ET AL	0.3 AC±	
J	MAHLON & FERYL HARRIS	16.62 AC±	

**EQT PRODUCTION COMPANY
FLANAGAN LEASE
268 ACRES±
WELL NO. WV 516206
(PEN54 H9)**

AS DRILLED COORDINATES
(S.P.C. NORTH ZONE) (UTM(M) ZONE 17 NORTH)
NAD'27 S.P.C.(FT) N. 279,106.53 E. 1,595,825.78
NAD'27 GEO. LAT-(N) 39.257497 LONG-(W) 80.927379
NAD'83 UTM (M) N. 4,345,363.42 E. 506,280.13

LANDING POINT
NAD'27 S.P.C.(FT) N. 279,977.81 E. 1,597,254.68
NAD'27 GEO. LAT-(N) 39.259951 LONG-(W) 80.922383
NAD'83 UTM (M) N. 4,345,836.13 E. 506,711.01

BOTTOM HOLE
NAD'27 S.P.C.(FT) N. 284,624.67 E. 1,595,736.03
NAD'27 GEO. LAT-(N) 39.272641 LONG-(W) 80.928006
NAD'83 UTM (M) N. 4,347,044.08 E. 506,224.72

ROYALTY OWNERS

GUY FLANNAGAN ET AL	126 AC±	LEASE NO. 1005912
MARY LEE AZELVANDRE ET AL	500 AC±	LEASE NO. 114193



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. 849 *C. Victor Moyers*



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.
DATE JUNE 25, 20 15
REVISED AUGUST 03, 20 16
OPERATORS WELL NO. WV 516206
API WELL NO. 47-085-10230H
STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1/200 FILE NO. 8083AD516206
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: PAD ELEVATION 1,016' WATERSHED NORTH FORK HUGHES RIVER
DISTRICT CLAY COUNTY RITCHIE QUADRANGLE PENNSBORO 7.5'
SURFACE OWNER JERRY MORTON ET AL ACREAGE 243.50±
ROYALTY OWNER ELLEN S. FRANCAVIGLIA ET AL ACREAGE 268±
PROPOSED WORK: LEASE NO. 105403
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 6,275'

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

02/16/2016

COUNTY NO. 1001 PERMIT