

Well Operator's Report of Well Work



Where energy meets innovation.

Well Number: 514562

API: 47 - 103 - 02980

Submission: Initial Amended

Notes: -Revised Plat
-Revised "As Drilled" Coordinates
-with Flowback

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10/28/2016

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

API 47-103-02980 County Wetzel District GRANT
Quad BIG RUN Pad Name BIG367 Field/Pool Name _____
Farm name DENCIL HENTHORN ET AL Well Number 514562
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 4,378,642.535 Easting 536,081.507
Landing Point of Curve Northing 4,378,618.921 Easting 536,850.982
Bottom Hole Northing 4,377,681.439 Easting 537,167.194

Elevation (ft) 1443 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 05/08/2014 Date drilling commenced 05/17/2014 Date drilling ceased 8/14/2015
Date completion activities began 12/3/2015 Date completion activities ceased 12/6/2016
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 433, 478, 705 Open mine(s) (Y/N) depths N
Salt water depth(s) ft 1965, 2130, 2168 Void(s) encountered (Y/N) depths N
Coal depth(s) ft 513, 727, 801, 822, 1010, 1100, 1680 Cavern(s) encountered (Y/N) depths N

Is coal being mined in area (Y/N) N

APPROVED

NAME: Dencil A. Henthorn
DATE: 9-23-16

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Reviewed by: Dan H
WV Department of Environmental Protection
10/28/2016

API 47-103 - 02980 Farm name DENCIL HENTHORN ET AL Well number 514562

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	30"	26"	53'	NEW	A-500 94LB/FT	NONE	Y
Surface	17.5"	13.375"	961'	NEW	J-55 54.5LB/FT	NONE	Y
Coal							
Intermediate 1	12.375"	9.625"	2911'	NEW	A-500 40LB/FT	NONE	Y
Intermediate 2							
Intermediate 3							
Production	8.5"	5.5"	11,976'	NEW	P-110 20LB/FT	NONE	N
Tubing							
Packer type and depth set							

Comment Details N/A

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	49	15.6	1.18	57.82	0	8
Surface	CLASS A	820	15.6	1.19	975.8	0	8
Coal							
Intermediate 1	CLASS A	1075	15.6	1.18	1268.5	0	8
Intermediate 2							
Intermediate 3							
Production	CLASS H / CLASS H	849 / 417	15.2 / 15.6	1.25/2.06	1061.25/859.02	3,675	24
Tubing							

Drillers TD (ft) 12,009' MD Loggers TD (ft) N/A

Deepest formation penetrated Marcellus Plug back to (ft) 3,990'

Plug back procedure Wellbore plugged back f/ 4,686 ft t/ 3,990 ft with 16.8 ppg, 1.02 yield DenseCem kick off blend. Plug was used to kick off to begin building curve.

Kick off depth (ft) 4,190' 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: 1,11,18
INTERMEDIATE- 6 CENTRALIZERS RAN AT LEAST EVERY 500' FEET
PRODUCTION- Composite body spiral centralizers run every joint from TD to 3,976 fTMD.

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- 103 - 02980 Farm name DENCIL HENTHORN ET AL Well number 514562

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.

API 47- 103 - 02980 Farm name DENCIL HENTHORN ET AL Well number 514562

<u>PRODUCING FORMATION(S)</u>	<u>DEPTHS</u>		
MARCELLUS	7,568.40	TVD	8,516.00 MD

Please insert additional pages as applicable.

GAS TEST Build up Drawdown Open Flow OIL TEST Flow Pump

SHUT-IN PRESSURE Surface 825 psi Bottom Hole N/A psi DURATION OF TEST 121.00 hrs

OPEN FLOW Gas 6,166 mcfpd Oil N/A bpd NGL 0.0 bpd Water 1,097 bpd GAS MEASURED BY Estimated Orifice Pilot

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

Please insert additional pages as applicable.

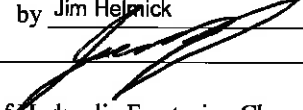
Drilling Contractor ALPHA HUNTER DRILLING (RIG 4)
Address P.O. BOX 430 City RENO State OH Zip 45773

Logging Company Phoenix Technology Services
Address 1805 Brittmoore Road City Houston State TX Zip 77043

Cementing Company Nabors
Address 2504 Smith Creek Road City Waynesburg State PA Zip 15370

Stimulating Company C&J Energy Services
Address 3990 Rogerdale Road City Houston State TX Zip 77042

Please insert additional pages as applicable.

Completed by Jim Helmick Telephone (412) 395-5518
Signature  Title VP Completions Date 7/26/2016

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

10/28/2016

API 47- 103 - 02980 Farm name DENCIL HENTHORN ET AL Well number 514562

Drilling Contractor Savanna Drilling Rig 654
Address 125 Industry Road City Rices Landing State PA Zip 15357

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

Logging Company Hoss Co. Services LLC
Address 614 Trotters Lane City Charleston State WV Zip 25312

Cementing Company Baker Hughes Oil Field Operations
Address 837 Phillippi Pike City Clarksburg State WV Zip 26301

514562 Final Formations

API #47-10302980

Formation Name	Final Top MD (ftGL) (ft)	Final Top TVD (ft)	Final Btm MD (ftGL) (ft)	Final Btm TVD (ft)
FRESH WATER ZONE	1		708	
SAND/SHALE	1		516	
COAL	516		528	
SAND/SHALE	528		730	
FAIRVIEW COAL	730		734	
SAND/SHALE	734		834	
WAYNESBURG COAL	834		836	
SAND/SHALE	836		885	
COAL	885		896	
SAND/SHALE	896		1,022.00	
MAPLETOWN COAL	1,022.00		1,025.00	
SAND/SHALE	1,025.00		1,193.00	
PITTSBURGH COAL	1,193.00		1,199.00	
SAND/SHALE	1,199.00		1,683.00	
COAL	1,683.00		1,687.00	
SAND/SHALE	1,687.00		2,255.00	
MAXTON	2,255.00		2,410.00	
BIG LIME	2,410.00		2,512.00	
BIG INJUN	2,512.00		2,806.00	
WEIR	2,806.00		2,956.00	
GANTZ	2,956.00		3,006.00	
50F	3,006.00		3,100.00	
30F	3,100.00		3,224.00	
GORDON	3,224.00		3,317.00	
4TH	3,317.00		3,472.00	
BAYARD	3,472.00		3,838.00	
WARREN	3,838.00		4,052.00	
SPEECHLEY	4,052.00		4,402.00	4,398.30
BALLTOWN A	4,402.00	4,398.30	4,879.00	4,836.90
RILEY	4,879.00	4,836.90	5,748.00	5,507.30
BENSON	5,748.00	5,507.30	6,248.00	5,900.20
ALEXANDER	6,248.00	5,900.20	6,279.00	5,924.50
ELKS	6,279.00	5,924.50	7,852.00	7,144.70
SONYEA	7,852.00	7,144.70	8,044.00	7,292.30
MIDDLESEX	8,044.00	7,292.30	8,108.00	7,339.50
GENESSEE	8,108.00	7,339.50	8,240.00	7,429.10
GENESE0	8,240.00	7,429.10	8,281.00	7,454.40
TULLY	8,281.00	7,454.40	8,319.00	7,476.60
HAMILTON	8,319.00	7,476.60	8,516.00	7,568.40
MARCELLUS	8,516.00	7,568.40		

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514562- 47-103-02980-0000 - Perforations

Stage Number	Perforation Date	Top Perf Depth (ftKB)	Bottom Perf Depth (ftKB)	Number of Shots	Formation
Initiation Sleeve	8/19/2015	11,975	11,976	10	MARCELLUS
1	12/3/2015	11,830	11,922	32	MARCELLUS
2	12/3/2015	11,678	11,802	40	MARCELLUS
3	12/3/2015	11,528	11,652	40	MARCELLUS
4	12/4/2015	11,380	11,502	40	MARCELLUS
5	12/4/2015	11,230	11,352	40	MARCELLUS
6	12/4/2015	11,078	11,200	40	MARCELLUS
7	12/4/2015	10,930	11,052	40	MARCELLUS
8	12/4/2015	10,780	10,902	40	MARCELLUS
9	12/4/2015	10,630	10,752	40	MARCELLUS
10	12/4/2015	10,484	10,600	40	MARCELLUS
11	12/5/2015	10,330	10,452	40	MARCELLUS
12	12/5/2015	10,180	10,302	40	MARCELLUS
13	12/5/2015	10,030	10,150	40	MARCELLUS
14	12/5/2015	9,880	10,016	40	MARCELLUS
15	12/5/2015	9,730	9,852	40	MARCELLUS
16	12/5/2015	9,580	9,702	40	MARCELLUS
17	12/5/2015	9,434	9,550	40	MARCELLUS
18	12/6/2015	9,280	9,400	40	MARCELLUS
19	12/6/2015	9,130	9,248	40	MARCELLUS
20	12/6/2015	8,980	9,102	40	MARCELLUS
21	12/6/2015	8,830	8,950	40	MARCELLUS
22	12/6/2015	8,680	8,802	40	MARCELLUS

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514562-47-103-02980-0000 - 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 (bbbls)	Amount of Nitrogen/other (units)
Initiation Sleeve	12/3/2015	11.8	6,851	8,292	4,685	0	741	0
1	12/3/2015	92	8,423	8,592	5,435	201100	5,507	0
2	12/3/2015	99.4	8,522	8,950	5,074	199700	5,081	0
3	12/3/2015	97.2	8,697	8,944	5,322	201,400.00	5,303	0
4	12/4/2015	98.1	8,746	8,942	5,378	200,100.00	5,261	0
5	12/4/2015	100.4	8,644	8,831	5,448	202,500.00	5,160	0
6	12/4/2015	100.3	8,593	8,809	5,610	202,300.00	5,232	0
7	12/4/2015	100.3	8,610	8,836	5,930	203,900.00	5,211	0
8	12/4/2015	100.1	8,624	8,969	5,114	202,300.00	5,151	0
9	12/4/2015	101.1	8,456	8,824	5,469	201,800.00	5,179	0
10	12/5/2015	100.9	8,356	8,536	5,364	200,400.00	4,960	0
11	12/5/2015	101	8,505	8,896	5,616	201,600.00	5,117	0
12	12/5/2015	91	8,579	8,735	5,516	205,400.00	5,242	0
13	12/5/2015	99.3	8,410	8,745	5,501	199,200.00	4,934	0
14	12/5/2015	100	8,386	8,721	6,041	205,100.00	4,987	0
15	12/5/2015	100.7	8,231	8,544	5,559	199,400.00	4,982	0
16	12/5/2015	100.5	8,315	8,480	5,405	201,600.00	5,091	0
17	12/6/2015	101.8	8,256	8,634	5,551	199,400.00	5,004	0
18	12/6/2015	100.6	8,477	8,898	5,859	199,800.00	4,993	0
19	12/6/2015	100.8	8,154	8,491	5,785	196,900.00	4,717	0
20	12/6/2015	99.5	8,430	8,814	5,777	200,800.00	5,134	0
21	12/6/2015	100.9	8,160	8,486	5,888	202,200.00	4,931	0
22	12/6/2015	98.5	8,611	8,831	5,711	206,600.00	4,952	0

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Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date	12/3/2015
Job End Date	12/8/2015
State	West Virginia
County	Wetzel
API Number	47-103-02980-00-00
Operator Name	EQT Production
Well Name and Number	514562
Longitude	-80.58019000
Latitude	39.55662800
Datum	NAD83
Federal/Tribal Well	NO
True Vertical Depth	7,568
Total Base Water Volume (gal)	4,740,540
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	C and J Energy Services	Carrier/Base Fluid	Water	7732-18-5	100.00000	89.52868	None
Sand (Proppant)	C and J Energy Services	Proppant	Silica Substrate	14808-60-7	100.00000	10.03359	None
MC MX 437-5	Multi-Chem Group	Calcium Nitrate Solution	Calcium Nitrate	10124-37-5	60.00000	0.05724	None
FR-18	C and J Energy Services	Anionic Friction Reducer	Distillates (petroleum), Hydrotreated Light	64742-47-8	45.00000	0.0336	None
Hydrochloric Acid (15%)	C and J Energy Services	Acidizing	Ethylene Glycol	107-21-1	10.00000	0.00747	None
SI-6	C and J Energy Services	Scale Inhibitor	Hydrochloric Acid	7647-01-0	15.00000	0.03637	None
			Trade Secret	Proprietary	7.00000	0.00173	None
			Methanolamine hydrochloride	2002-24-6	2.00000	0.00049	None
			Ammonium Chloride	12125-02-9	2.00000	0.00049	None
			Methanol	67-56-1	1.00000	0.00025	None

AI-2	C and J Energy Services	Acid corrosion inhibitor					
			Glycol Ethers	111-76-2	40.00000	0.00018	None
			Propargyl Alcohol	107-19-7	40.00000	0.00018	None
			Isopropyl Alcohol	67-63-0	40.00000	0.00018	None
			Ethoxyolated Nonylpheno-	68412-54-4	13.00000	0.00000	None
			Tar bases, quinoline derivs, benzyl chloride-quaternized	72480-70-7	10.00000	0.00004	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)



June 8, 2016

Mr. Gene Smith
West Virginia Department of Environmental Protection
Office of Oil and Gas
601 57th Street SE
Charleston, WV 25304

Re: Modification of 47-103-02980

Dear Mr. Smith,

Please accept the attached updates for the above referenced permit. Upon inspection of our as-drilled plat, we noted the curve geometry crossed into 1 additional lease, #993904. Enclosed is an updated WW-6A1, WW-6B, mylar plat and rec plan reflecting corrections to update the permit file to be consistent with the as-drilled well bore.

If you have any questions, please do not hesitate to contact me at (304) 848-0076.

Sincerely,

Vicki Roark
Permitting Supervisor-WV

Enc.

10/28/2016

EQT WELL NO. 514562

AS DRILLED COORDINATES FOR WELL NO. WV 514562

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

NAD'27 S.P.C.(FT)	N. 386,677.150	E. 1,695,439.735
NAD'27 GEO.	LAT-(N) 39.556711	LONG-(W) 80.580004
NAD'83 UTM (M)	N. 4,378,642.535	E. 536,081.507

LANDING POINT

NAD'27 S.P.C.(FT)	N. 386,557.452	E. 1,697,963.382
NAD'27 GEO.	LAT-(N) 39.556382	LONG-(W) 80.571235
NAD'83 UTM (M)	N. 4,378,618.921	E. 536,850.982

BOTTOM HOLE

NAD'27 S.P.C.(FT)	N. 383,463.841	E. 1,698,949.775
NAD'27 GEO.	LAT-(N) 39.547921	LONG-(W) 80.567807
NAD'83 UTM (M)	N. 4,377,681.439	E. 537,167.194

NOTES:

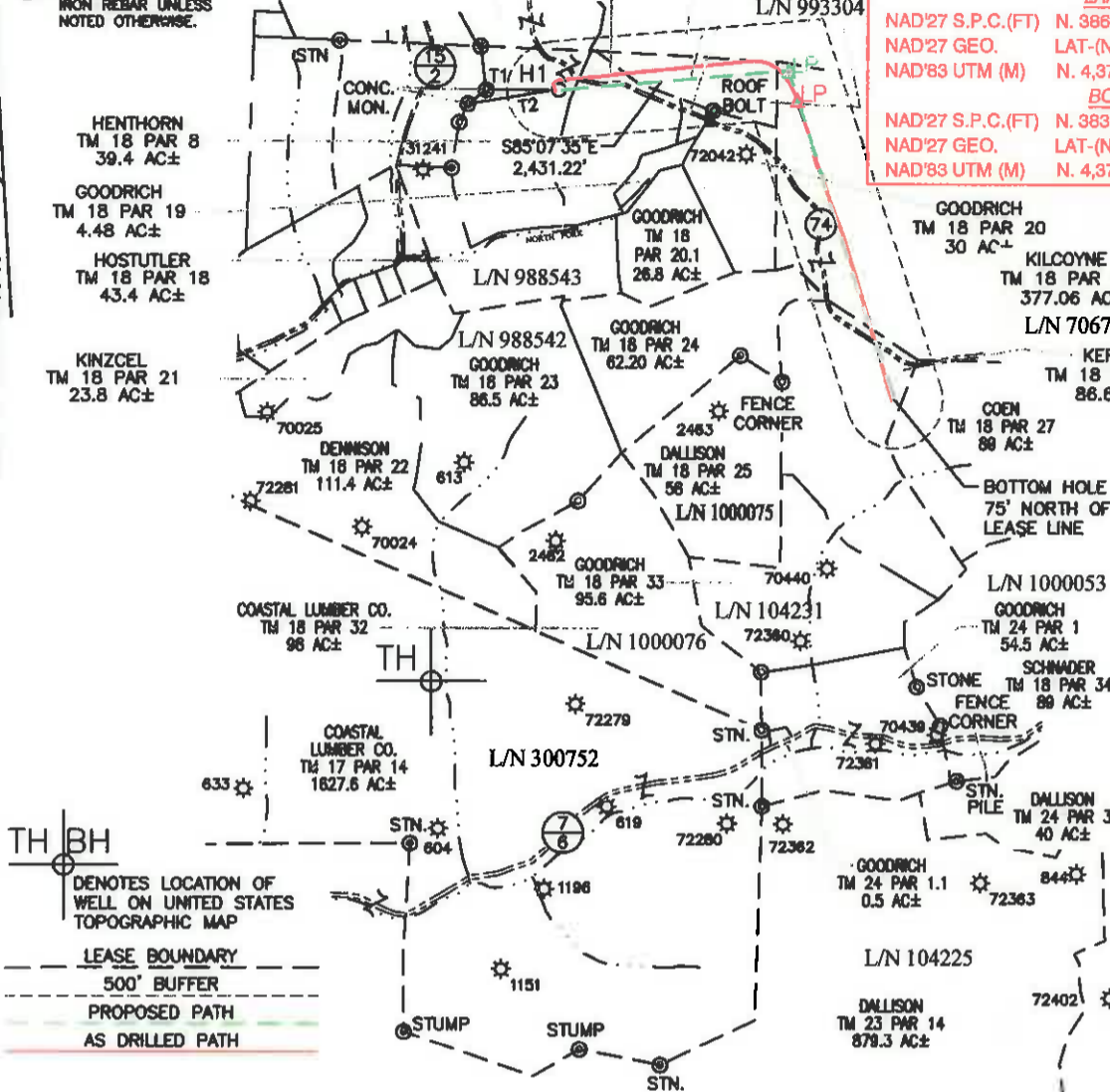
- PLAT ORIENTATION, CORNERS, AND WELL REFERENCES ARE BASED UPON THE GRID NORTH MERIDIAN FOR THE WV STATE PLANE COORDINATE SYSTEM, NORTH ZONE NAD 27. WELL LOCATION REFERENCE TIES ARE BASED UPON THE MAGNETIC MERIDIAN.
- THERE ARE NO (0) WATER WELL(S) LOCATED WITHIN 250' OF WELL H1.
- THERE ARE NO (0) STRUCTURE(S) LOCATED WITHIN 625' OF WELL H1.

⊙ = MONUMENT FOUND IRON REBAR UNLESS NOTED OTHERWISE.

NAD'27 GRID NORTH

LONGITUDE 80°32'30"

9,700' TOP HOLE



SPECIAL NOTES
 -LEASE AND SURFACE INFO SHOWN HEREON WAS TAKEN FROM PERMIT PLAT DATED JUNE 23, 2014 FOR AP# 47-103-02980H.
 -AS DRILLED INFORMATION PROVIDED BY EQT.

LINE	BEARING	DIST.
T1	S89°49'17"E	717.10'
T2	N81°05'07"E	459.40'

LEASE NO.	ROYALTY OWNER	ACRES
706740	EQT PRODUCTION CO.	1003.75±
104231	JOYCE M. MARTIN et al	300±

Professional Energy Consultants
 A DIVISION OF SLS SURVEYING, INC.
SLS
 SURVEYORS
 ENGINEERS
 ENVIRONMENTAL
 PROJECT MGMT.
 (304) 482-8834
 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.



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS.
 DATE JUNE 23, 20 14
 REVISED AUGUST 25, 2015 & JUNE 06, 2016
 OPERATORS WELL NO. WV 514562
 API WELL NO. 47-103-02980H
 STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 2500 FILE NO. 8471BIG 367 WELLSR2
 HORIZONTAL & VERTICAL CONTROL DETERMINED BY OPUS (SURVEY GRADE GPS) 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 1,442.9' WATERSHED NORTH FORK OF FISHING CREEK
 DISTRICT GRANT COUNTY WETZEL QUADRANGLE BIG RUN 7.5'

SURFACE OWNER DENCIL HENTHORN ET AL ACREAGE 39.4±
 ROYALTY OWNER SHIBEN ESTATE, INC. ACREAGE 297.50±

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 7,565'

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