

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

API 47-103-02939 County WETZEL District GRANT  
Quad BIG RUN Pad Name BIG367 Field/Pool Name \_\_\_\_\_  
Farm name DENCIL HENTHORN ET AL Well Number 514565  
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 4,378,632.888 Easting 536,091.251  
Landing Point of Curve Northing 4,378,562.720 Easting 536,081.568  
Bottom Hole Northing 4,375,971.997 Easting 536,751.102

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)  
SBM 13.2 ppg – powdered hydrocarbon resin, calcium carbonate, ground almond hulls, barium sulfate, calcium chloride, lecithin liquid, organophilic clay,  
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 11/12/2013 Date drilling commenced 3/18/2014 Date drilling completed 10/15/2014  
Date completion activities began 10/19/2015 Date completion activities ceased 10/30/2015  
Verbal plugging (Y/N) N Date permission granted N/A Granted by N/A  
*RECEIVED 10/15/2014*  
*Office of Oil and Gas*  
*JUN 27 2015*

Please note: Operator is required to submit a plugging application within 5 days of verbal permission.

Freshwater depth(s) ft 708' Open mine(s) (Y/N) depths N  
Salt water depth(s) ft 2171' Void(s) encountered (Y/N) depths N  
Coal depth(s) ft 516', 730', 834', 885', 1022', 1193', 1683' Cavern(s) encountered (Y/N) depths N

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

**APPROVAL**  
NAME: Derek M. Hought  
DATE: 9-23-16

Reviewed by: DmH  
10/28/2016

API 47-103 02939

Farm name DENCIL HENTHORN ET AL

Well number 514565

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	28"	26"	40'	NEW	A-500 85.69lb/ft	NONE	Y
Surface	17-1/2"	13-3/8"	961'	NEW	J-55 54.5lb/ft	NONE	Y
Coal							
Intermediate 1	12-3/8"	9-5/8"	2,900'	NEW	A-500 40lb/ft	NONE	Y
Intermediate 2							
Intermediate 3							
Production	8-1/2"	5-1/2"	15,245'	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 <sup>3</sup> /sks)	Volume (ft <sup>3</sup> )	Cement Top (MD)	WOC (hrs)
Conductor	Class A	49	15.6	1.18	57.8	0	8
Surface	Class A	820	15.6	1.19	976	0	8
Coal							
Intermediate 1	Class A	1075	15.6	1.18	1269	0	8
Intermediate 2							
Intermediate 3	Class A/Class H	675/1005	14.2/15.2	1.26/1.97	2830	2910	72
Production							
Tubing							

Drillers TD (ft) 15,263'

Loggers TD (ft) N/A

Deepest formation penetrated Genesee

Plug back to (ft) N/A

Plug back procedure \_\_\_\_\_

Kick off depth (ft) 5,803'

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- N/A

Surface-Bowspring centralizer on shoe track and every 150' to surface

Intermediate-Bowspring centralizer on shoe track and every 150' to surface

Production- Composite bodied centralizers on every joint from TD up to 4,254'

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 \_\_\_\_\_

RECEIVED  
Office of Oil and Gas

JUN 27 2016

WV Department of  
Environmental Protection





API 47- 103 - 02939

Drilling Contractor: Savanna Drilling

Address: 2204 Timberloch Place Suite 230      City: Woodlands      State: TX      Zip: 77380

10/28/2016

## API 47- 103 - 02939

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	708	708
SAND/SHALE	0	0	516	516
COAL	516	516	528	528
SAND/SHALE	528	528	730	730
FAIRVIEW COAL	730	730	734	734
SAND/SHALE	734	734	834	834
WAYNESBURG COAL	834	834	836	836
SAND/SHALE	836	836	885	885
COAL	885	885	896	896
SAND/SHALE	896	896	1,022	1,022
MAPLETOWN COAL	1,022	1,022	1,025	1,025
SAND/SHALE	1,025	1,025	1,193	1,193
PITTSBURGH COAL	1,193	1,193	1,199	1,199
SAND/SHALE	1,199	1,199	1,683	1,683
COAL	1,683	1,683	1,687	1,687
SAND/SHALE	1,687	1,687	2,255	2,255
MAXTON	2,255	2,255	2,410	2,410
BIG LIME	2,410	2,410	2,512	2,512
BIG INJUN	2,512	2,512	2,806	2,806
WEIR	2,806	2,806	2,956	2,956
GANTZ	2,956	2,956	3,006	3,006
50F	3,006	3,006	3,100	3,100
30F	3,100	3,100	3,224	3,224
GORDON	3,224	3,224	3,317	3,317
4TH	3,317	3,317	3,472	3,472
BAYARD	3,472	3,472	3,838	3,838
WARREN	3,838	3,838	4,052	4,052
SPEECHLEY	4,052	4,052	4,402	4,402
BALLTOWN A	4,402	4,402	4,837	4,837
RILEY	4,837	4,837	5,514	5,514
BENSON	5,514	5,514	5,906	5,905
ALEXANDER	5,906	5,905	5,935	5,934
ELKS	5,935	5,934	7,239	7,134
SONYEA	7,239	7,134	7,434	7,285
MIDDLESEX	7,434	7,285	7,504	7,330
GENESEE	7,504	7,330	7,710	7,420
GENESE0	7,710	7,420	15,263	7,508

**514565 - 47-103-02939-0000 - Perforations**

Stage Number	Perforation Date	Top Perf Depth (ftKB)	Bottom Perf Depth (ftKB)	Number of Shots	Formation
Initiation Sleeve	9/30/2015	15,217.00	15,219.00	10	GENESEO
1	10/20/2015	15,098.00	15,190.00	32	GENESEO
2	10/21/2015	14,948.00	15,070.00	40	GENESEO
3	10/21/2015	14,798.00	14,920.00	40	GENESEO
4	10/21/2015	14,648.00	14,770.00	40	GENESEO
5	10/21/2015	14,498.00	14,620.00	40	GENESEO
6	10/21/2015	14,348.00	14,470.00	40	GENESEO
7	10/22/2015	14,196.00	14,320.00	40	GENESEO
8	10/22/2015	14,048.00	14,170.00	40	GENESEO
9	10/22/2015	13,900.00	14,018.00	40	GENESEO
10	10/22/2015	13,748.00	13,870.00	40	GENESEO
11	10/23/2015	13,598.00	13,714.00	40	GENESEO
12	10/23/2015	13,448.00	13,570.00	40	GENESEO
13	10/23/2015	13,298.00	13,420.00	40	GENESEO
14	10/23/2015	13,152.00	13,270.00	40	GENESEO
15	10/23/2015	12,998.00	13,120.00	40	GENESEO
16	10/23/2015	12,848.00	12,970.00	40	GENESEO
17	10/23/2015	12,698.00	12,818.00	40	GENESEO
18	10/24/2015	12,548.00	12,671.00	40	GENESEO
19	10/24/2015	12,398.00	12,520.00	40	GENESEO
20	10/24/2015	12,248.00	12,370.00	40	GENESEO
21	10/24/2015	12,098.00	12,220.00	40	GENESEO
22	10/24/2015	11,948.00	12,070.00	40	GENESEO
23	10/24/2015	11,798.00	11,916.00	40	GENESEO
24	10/25/2015	11,648.00	11,768.00	40	GENESEO
25	10/25/2015	11,498.00	11,618.00	40	GENESEO
26	10/26/2015	11,348.00	11,468.00	40	GENESEO
27	10/26/2015	11,198.00	11,318.00	40	GENESEO
28	10/27/2015	11,050.00	11,168.00	40	GENESEO
29	10/27/2015	10,898.00	11,018.00	40	GENESEO
30	10/27/2015	10,748.00	10,866.00	40	GENESEO
31	10/27/2015	10,598.00	10,718.00	40	GENESEO
32	10/27/2015	10,448.00	10,568.00	40	GENESEO
33	10/27/2015	10,296.00	10,418.00	40	GENESEO
34	10/27/2015	10,148.00	10,268.00	40	GENESEO
35	10/28/2015	9,998.00	10,118.00	40	GENESEO
36	10/28/2015	9,848.00	9,968.00	40	GENESEO
37	10/28/2015	9,698.00	9,814.00	40	GENESEO
38	10/28/2015	9,548.00	9,668.00	40	GENESEO
39	10/28/2015	9,398.00	9,518.00	40	GENESEO
40	10/28/2015	9,245.00	9,368.00	40	GENESEO
41	10/28/2015	9,098.00	9,218.00	40	GENESEO
42	10/29/2015	8,948.00	9,070.00	40	GENESEO
43	10/29/2015	8,798.00	8,920.00	40	GENESEO
44	10/29/2015	8,548.00	8,766.00	40	GENESEO
45	10/29/2015	8,498.00	8,620.00	40	GENESEO
46	10/29/2015	8,348.00	8,470.00	40	GENESEO
47	10/29/2015	8,200.00	8,318.00	40	GENESEO
48	10/29/2015	8,048.00	8,168.00	40	GENESEO
49	10/30/2015	7,898.00	8,017.00	40	GENESEO
50	10/30/2015	7,748.00	7,868.00	40	GENESEO

10/28/2016

514565 - 47-103-02939-0000 - 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	10/19/2015	11.40	8,287.00	9,441.00	1,397.00	0	1397	0
1	10/21/2015	87.90	8,745.00	8,999.00	5,423.00	200,800	6545	0
2	10/21/2015	97.50	8,425.00	8,797.00	5,143.00	202,200	5561	0
3	10/21/2015	90.80	8,514.00	8,833.00	5,325.00	196,700	5793	0
4	10/21/2015	92.90	8,559.00	8,877.00	4,974.00	200,800	5407	0
5	10/21/2015	99.80	8,676.00	8,982.00	4,925.00	201,900	5295	0
6	10/22/2015	83.00	8,841.00	9,269.00	5,142.00	200,600	5514	0
7	10/22/2015	92.00	8,617.00	8,960.00	5,733.00	203,700	6108	0
8	10/22/2015	93.60	8,524.00	8,784.00	4,997.00	204,500	5388	0
9	10/22/2015	95.50	8,692.00	9,124.00	5,110.00	199,900	5481	0
10	10/22/2015	96.50	8,642.00	8,996.00	5,033.00	198,900	5359	0
11	10/23/2015	98.80	8,634.00	9,145.00	5,157.00	203,300	5476	0
12	10/23/2015	96.10	8,531.00	8,697.00	5,115.00	199,800	5441	0
13	10/23/2015	96.80	8,443.00	8,721.00	4,973.00	202,400	5264	0
14	10/23/2015	94.20	8,517.00	8,674.00	5,064.00	201,900	5359	0
15	10/23/2015	98.70	8,393.00	9,064.00	5,081.00	202,100	5353	0
16	10/23/2015	100.70	8,269.00	9,123.00	5,170.00	201,800	5445	0
17	10/24/2015	97.20	8,482.00	8,727.00	6,731.00	201,200	7006	0
18	10/24/2015	91.70	8,419.00	8,614.00	5,402.00	202,200	5,672	0
19	10/24/2015	100.90	8,238.00	8,576.00	5,280.00	201,500	5,552	0
20	10/24/2015	100.70	8,000.00	8,511.00	4,978.00	201,200	5,233	0
21	10/24/2015	101.00	7,915.00	8,325.00	4,883.00	204,200	5,135	0
22	10/24/2015	101.10	7,954.00	8,511.00	5,373.00	200,700	5,617	0
23	10/24/2015	100.60	7,907.00	8,432.00	5,612.00	201,600	5,858	0
24	10/25/2015	98.80	8,443.00	8,883.00	5,878.00	203,400	6117	0
25	10/25/2015	99.30	8,275.00	8,633.00	4,870.00	203,000	5099	0
26	10/26/2015	98.30	8,472.00	9,422.00	4,985.00	205,000	5207	0
27	10/26/2015	101.20	8,231.00	8,863.00	5,095.00	203,000	5266	0
28	10/27/2015	100.70	8,149.00	8,812.00	4,969.00	201,200	5136	0
29	10/27/2015	99.80	8,328.00	8,794.00	4,873.00	206,000	5027	0
30	10/27/2015	98.40	8,335.00	8,763.00	4,590.00	201,700	4780	0
31	10/27/2015	101.70	8,848.00	8,465.00	4,708.00	201,700	4944	0
32	10/27/2015	99.70	8,120.00	8,967.00	5,061.00	201,300	5199	0
33	10/27/2015	100.30	7,970.00	8,777.00	5,689.00	201,600	5807	0
34	10/28/2015	100.50	7,892.00	8,375.00	4,988.00	203,100	5098	0
35	10/28/2015	100.00	8,288.00	9,206.00	5,005.00	201,900	5122	0
36	10/28/2015	100.80	7,832.00	8,342.00	4,604.00	203,100	4747	0
37	10/28/2015	98.80	8,083.00	8,783.00	4,911.00	205,200	5,045	0
38	10/28/2015	101.00	7,374.00	8,254.00	4,771.00	202,900	4,893	0
39	10/28/2015	100.40	7,480.00	8,227.00	5,088.00	200,000	4,992	0
40	10/28/2015	100.30	7,600.00	8,190.00	4,956.00	200,300	5,036	0
41	10/29/2015	100.90	7,599.00	8,466.00	4,801.00	202,300	4868	0
42	10/29/2015	101.00	7,504.00	8,517.00	4,925.00	200,100	4992	0
43	10/29/2015	100.30	7,632.00	8,528.00	4,759.00	200,700	4819	0
44	10/29/2015	99.60	7,843.00	8,644.00	4,614.00	201,200	4682	0
45	10/29/2015	101.20	7,541.00	8,213.00	4,615.00	203,700	4678	0
46	10/29/2015	99.10	7,725.00	8,536.00	4,696.00	200,300	4752	0
47	10/29/2015	99.40	7,514.00	8,486.00	4,658.00	200,100	4694	0
48	10/29/2015	99.50	7,639.00	8,208.00	4,932.00	206,800	4961	0
49	10/30/2015	100.90	7,351.00	8,278.00	4,797.00	200,400	4818	0
50	10/30/2015	96.80	7,630.00	8,636.00	5,027.00	202,400	5048	0



# Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date	10/19/2015
Job End Date	10/30/2015
State	West Virginia
County	Wayne
API Number	47-103-02939-00-00
Operator Name	EQT Production
Well Name and Number	514563
Longitude	-80.58007700
Latitude	39.55654000
Federal/Tribal Well	NAD83
True Vertical Depth	7,420
Total Base Water Volume (gal)	11,184,558
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	89.84967	None
Sand (Proppant)	C and J Energy Services	Proppant	Silica Substrate	14808-60-7	100.00000	9.71927	None
MC MX 437-5	Multi-Chem Group	Calcium Nitrate Solution	Calcium Nitrate	10124-37-5	60.00000	0.05750	None
FR-18	C and J Energy Services	Antonic Friction Reducer	Distillates (petroleum) hydrotreated light	64742-47-8	45.00000	0.03219	None
Hydrochloric Acid (15%)	C and J Energy Services	Acidizing	Ethylene Glycol	107-21-1	10.00000	0.00715	None
SI-4	C and J Energy Services	Scale Inhibitor	Hydrochloric Acid	7647-01-0	15.00000	0.03610	None
AI-2	C and J Energy Services	Acid corrosion inhibitor	Bis (hexamethylene triaminepenta(methylene phosphonic acid)) Sodium Hydroxide	Proprietary	10.00000	0.00226	None
			Sodium Hydroxide	1310-73-2	1.00000	0.00023	None

					Isopropyl Alcohol	67-63-0	40.00000	0.00018	None
					Glycol Ethers	111-76-2	40.00000	0.00018	None
					Propargyl Alcohol	107-19-7	40.00000	0.00018	None
					Ethoxyated Nonyphenol	69412-54-4	13.00000	0.00006	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)

EQT WELL NO. 514565

LATITUDE 39°35'00"

AS DRILLED COORDINATES FOR WELL NO. WV 514565 (BIG367 H4)

Table with 3 columns: NAD'27 S.P.C.(FT), NAD'27 GEO., NAD'83 UTM (M). Rows include LANDING POINT and BOTTOM HOLE coordinates.

NOTES:

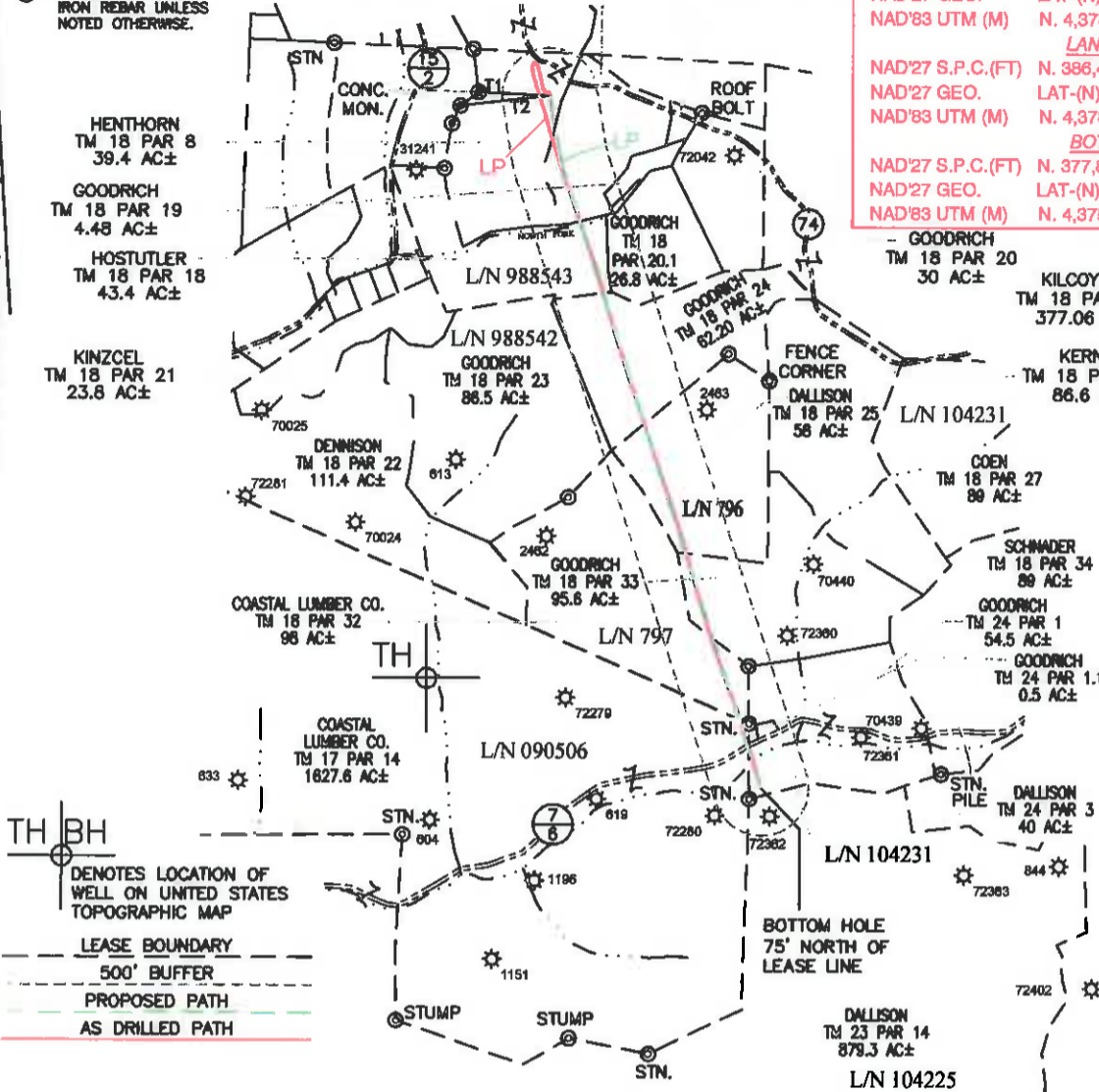
- PLAT ORIENTATION, CORNERS, AND WELL REFERENCES ARE BASED UPON THE GRID NORTH MERIDIAN FOR THE WV STATE PLANE COORDINATE SYSTEM, NORTH ZONE NAD 27. WELL LOCATION REFERENCE TIES ARE BASED UPON THE MAGNETIC MERIDIAN.
-THERE ARE NO (0) WATER WELL(S) LOCATED WITHIN 250' OF WELL H1.
-THERE ARE NO (0) STRUCTURE(S) LOCATED WITHIN 825' OF WELL H1.

MONUMENT FOUND IRON REBAR UNLESS NOTED OTHERWISE.

NAD 27 GRID NORTH

LONGITUDE 80°32'30"

9,732' TOP HOLE



TH BH DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAP
LEASE BOUNDARY
500' BUFFER
PROPOSED PATH
AS DRILLED PATH

SPECIAL NOTES
-LEASE AND SURFACE INFO SHOWN HEREON WAS TAKEN FROM PERMIT PLAT FOR APN 47-103-02939H.
-AS DRILLED INFORMATION PROVIDED BY EQT.

Table with 3 columns: LINE, BEARING, DIST. Rows T1 and T2.



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 JANUARY 13, 20 14

REVISED 06/13/16

OPERATORS WELL NO. WV 514565

API WELL NO. 47 - 103 - 02939H STATE COUNTY PERMIT

MINIMUM DEGREE OF ACCURACY 1 / 2500 FILE NO. 8471BIG367WELLS-RH1R SCALE 1" = 2000'

HORIZONTAL & VERTICAL CONTROL DETERMINED BY OPUS (SURVEY GRADE GPS)

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



WELL TYPE: OIL \_\_\_ GAS X INJECTION \_\_\_ WASTE DISPOSAL \_\_\_ IF "GAS" PRODUCTION X STORAGE \_\_\_ DEEP \_\_\_ SHALLOW X

LOCATION: ELEVATION PROP: 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. CNX GAS CO., LLC ACREAGE 2,117.03±

PROPOSED WORK: DRILL X CONVERT \_\_\_ DRILL DEEPER \_\_\_ REDRILL \_\_\_ FRACTURE OR STIMULATE X PLUG OFF OLD

FORMATION \_\_\_ PERFORATE NEW FORMATION \_\_\_ PLUG AND ABANDON \_\_\_ CLEAN OUT AND REPLUG \_\_\_ OTHER \_\_\_

PHYSICAL CHANGE IN WELL (SPECIFY) TARGET FORMATION GENESEO ESTIMATED DEPTH TVD/MD

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