

September 15<sup>th</sup>, 2017

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

API 47-085-10067FH6A County Ritchie District Clay  
Quad Pennsboro Pad Name PEN2HS Field/Pool Name Pennsboro  
Farm Name KIESSLING, TERRY & HELEN Well Number PEN2AHS - Fracture  
Operator (as registered with the OOG) CNX Gas Company LLC  
Address P.O. Box 1248 City Jane Lew State WV Zip 26378

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey  
Top Hole Northing 4,354,126.34 m Easting 498,907.78 m  
Landing Point of Curve Northing 4,353,829.08 m Easting 498,509.02 m  
Bottom Hole Northing 4,351,624.528m Easting 500,252.55 m

Elevation (ft) 1074.85' 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

Drilled 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)  
Synthetic Oil Based.

Date Permit Issued 02/08/2017 Date drilling commenced 03/21/2017 Date drilling ceased 04/03/2017  
Date completion activities began 03/21/2017 Date completion activities ceased 04/03/2017  
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 <sup>RECEIVED</sup> Office of Oil and Gas

Freshwater depth(s) ft 454' Open mine(s) (Y/N) depths N  
Salt water depth(s) ft None Noted for Offsets Void(s) encountered (Y/N) depths N  
Coal depth(s) ft No Coal Cavern(s) encountered (Y/N) depths N  
Is coal being mined in area (Y/N) N

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**APPROVED**  
NAME: Michael Duff  
DATE: 10-25-17

Reviewed by:  
Honce, Mike

01/05/2018





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PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number Of Perforations	Formation(s)
1	3/21/2017	16100	16258	40	Marcellus
2	3/22/2017	15905	16067	40	Marcellus
3	3/22/2017	15705	15867	40	Marcellus
4	3/23/2017	15505	15686	40	Marcellus
5	3/23/2017	15467	15305	40	Marcellus
6	3/23/2017	15105	15267	40	Marcellus
7	3/24/2017	14905	15067	40	Marcellus
8	3/24/2017	14705	14867	40	Marcellus
9	3/25/2017	14505	14667	40	Marcellus
10	3/25/2017	14305	14467	40	Marcellus
11	3/25/2017	14105	14267	40	Marcellus
12	3/25/2017	13905	14067	40	Marcellus
13	3/26/2017	13705	13867	40	Marcellus
14	3/26/2017	13505	13667	40	Marcellus
15	3/26/2017	13305	13467	40	Marcellus
16	3/26/2017	13105	13267	40	Marcellus
17	3/26/2017	12905	13067	40	Marcellus
18	3/26/2017	12705	12867	40	Marcellus
19	3/27/2017	12505	12667	40	Marcellus
20	3/27/2017	12305	12467	40	Marcellus
21	3/27/2017	12105	12267	40	Marcellus
22	3/28/2017	11905	12067	40	Marcellus
23	3/28/2017	11705	11867	40	Marcellus
24	3/28/2017	11505	11667	40	Marcellus
25	3/29/2017	11305	11467	40	Marcellus
26	3/29/2017	11105	11267	40	Marcellus
27	3/29/2017	10905	11067	40	Marcellus
28	3/29/2017	10705	10867	40	Marcellus
29	3/30/2017	10505	10667	40	Marcellus
30	3/30/2017	10305	10467	40	Marcellus
31	3/30/2017	10105	10286	40	Marcellus
32	3/31/2017	9905	10067	40	Marcellus
33	3/31/2017	9705	9867	40	Marcellus
34	3/31/2017	9505	9667	40	Marcellus
35	3/31/2017	9305	9467	40	Marcellus
36	4/1/2017	9105	9267	40	Marcellus
37	4/1/2017	8905	9067	40	Marcellus
38	4/2/2017	8705	8867	40	Marcellus

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Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number Of Perforations	Formation(s)
39	4/2/2017	8505	8667	40	Marcellus
40	4/2/2017	8305	8467	40	Marcellus
41	4/3/2017	8105	8267	40	Marcellus
42	4/3/2017	7905	8067	40	Marcellus

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STIMULATION INFORMATION PER STAGE

Stage No.	Stimulations Date	Avg Pump Rate (BPM)	Avg Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	WV Department of Environmental Protection		Amount of Nitrogen / other (gals)
						Amount of Proppant (lbs)	Amount of Water (bbls)	
1	3/21/2017	85.1	8495	5689	5004	400478	8950	5432
2	3/22/2017	82.6	8204	5580	4224	400312	9021	3810
3	3/22/2017	83.4	8435	5412	4616	400434	8499	4422
4	3/23/2017	85.9	8450	5564	4686	400405	9911	4474
5	3/23/2017	76.7	8233	5681	4797	400347	7157	4274
6	3/23/2017	86	8382	5528	3719	400350	8103	4340
7	3/24/2017	82.6	8239	5350	4294	332977	9291	8442
8	3/24/2017	80.4	7941	5773	4585	400405	7354	4377
9	3/25/2017	89.4	8115	5184	4774	400464	7344	4277
10	3/25/2017	83.1	7850	5295	4966	400828	6686	4258
11	3/25/2017	83.6	7925	5638	4762	404526	6452	4216
12	3/25/2017	89.2	8185	5316	5080	400564	6888	4290
13	3/26/2017	81.5	8218	5305	4114	400996	7213	4331
14	3/26/2017	81.3	7568	5546	4167	400682	6650	4279
15	3/26/2017	79.7	7431	6223	3723	400864	6656	4224
16	3/26/2017	81.6	7378	5970	3692	400851	6543	4062
17	3/26/2017	80.7	7353	5514	4821	400639	6191	4212
18	3/26/2017	85.2	7729	5523	3736	400343	6636	4245
19	3/27/2017	80.7	7580	5513	3954	400684	6620	4252
20	3/27/2017	81.6	7741	5953	4128	400478	6830	4318
21	3/27/2017	81.3	7370	5597	3971	400419	6520	4219
22	3/28/2017	82.3	7388	5513	4220	400606	6409	4223
23	3/28/2017	83	7438	5701	5051	400665	6427	4243
24	3/28/2017	84.5	7331	5936	4232	401579	6307	4233
25	3/29/2017	80.3	7561	5942	4104	401305	6750	4226
26	3/29/2017	86.4	7616	6417	3643	400365	7398	4266
27	3/29/2017	81.7	7217	5753	3953	400572	6966	4215
28	3/29/2017	83	7688	5602	4820	400641	8980	4391
29	3/30/2017	82.2	7888	5275	4357	370035	7202	4350
30	3/30/2017	79.3	7574	5346	4048	401023	7677	4605
31	3/30/2017	81.1	7412	5571	3533	400585	7974	4516
32	3/31/2017	84.4	7419	5358	4061	400520	6921	4290
33	3/31/2017	80.9	7499	5589	4129	401106	7297	4282
34	3/31/2017	81.2	7164	6097	4130	401546	6418	4267
35	4/1/2017	84.2	7020	5624	4344	400640	6896	4232
36	4/1/2017	na	na	5962	4530	26500	7095	8846
37	4/1/2017	85.7	7145	4725	3850	501616	7894	4378
38	4/2/2017	88.7	7412	6833	4640	400800	6662	4201

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39	4/2/2017	82.4	6975	5841	4120	400800	6425	4201
40	4/2/2017	83.3	6898	5896	4623	401673	6897	4222
41	4/3/2017	84.1	6533	5468	4719	400419	7018	4221
42	4/3/2017	na	na	6154	na	na	687	4116

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LITHOLOGY / FORMATION	TOP	BOTTOM	TOP	BOTTOM	DESCRIBE ROCK TYPE AND RECORD QUANTITY TYPE OF FLUID (FRESHWATER, BRINE, GAS, H2S, ETC)
	DEPTH IN FT TVD	DEPTH IN FT TVD	DEPTH IN FT MD	DEPTH IN FT MD	
SHALE AND SANDSTONE	0	1309	0	1309	
SANDSTONE	1309	1423	1309	1423	
SHALE AND SANDSTONE	1423	1593	1423	1593	
SANDSTONE	1593	1635	1593	1635	
SHALE AND SANDSTONE	1635	1737	1635	1737	
MAXTON SAND	1737	1820	1737	1820	
SHALE AND SANDSTONE	1820	1943	1820	1943	
BIG LIME	1943	1998	1943	1998	
BIG INJUN	1998	2133	1998	2133	
PRICE	2133	2405	2133	2405	
WEIR	2405	2444	2405	2444	
SHALE	2444	2724	2444	2724	
GORDON	2724	2741	2724	6301	
SHALE AND SANDSTONE	2741	2921	2741	6302	
5TH SAND	2921	2933	2921	6371	
SHALE	2933	3076	2933	Not Encountered	
SANDSTONE	3076	3090	3076	Not Encountered	
SHALE	3090	3498	3090	Not Encountered	
WARREN	3498	3560	3500	6300	
SHALE	3560	3894	3562	6301	
SANDSTONE	3894	3931	3900	6302	
SHALE AND SANDSTONE	3931	4925	3937	6371	
BENSON	4925	4987	4941	Not Encountered	
SHALE	4987	5147	5004	Not Encountered	
ALEXANDER	5147	5215	5166	Not Encountered	
SHALE	5215	5725	5234	Not Encountered	
RHEINSTREET	5725	6051	5750	Not Encountered	
CASHAQUA	6051	6143	6080	Not Encountered	
MIDDLESEX	6143	6172	6176	Not Encountered	
WEST RIVER	6172	6216	6206	Not Encountered	
BURKETT	6216	6259	6253	Not Encountered	
TULLY LIMESTONE	6259	6260	6300	Not Encountered	
HAMILTON	6260	6261	6301	6302	Gas
MARCELLUS	6261	6320	6302	6371	
ONONDAGA	6320		6371	Not Encountered	

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# Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	3/21/2017
Job End Date:	4/3/2017
State:	West Virginia
County:	Ritchie
API Number:	47-085-10067-00-00
Operator Name:	CONSOL Energy Inc.
Well Name and Number:	PEN-2A-HS
Latitude:	39.33656200
Longitude:	-81.01267500
Datum:	NAD83
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	6,295
Total Base Water Volume (gal):	13,195,434
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	Consol	Carrier/Base Fluid	Water	7732-18-5	100.00000	85.98711	None
Sand	JWS	Proppant	Crystalline Silica in the form of Quartz	14808-60-7	99.90000	12.53939	None
HCL Acid (7.5%)	JWS	Acidizing	Hydrochloric Acid	7647-01-0	7.50000	0.09564	None
Unislick ST50	JWS	Friction reducer	Petroleum distillates, hydrotreated light	64742-47-8	30.00000	0.01817	None
			Ammonium acetate	631-61-8	13.00000	0.00787	None
			Alcohols, ethoxylated	68551-12-2	5.00000	0.00303	None
			Alcohols, ethoxylated	68002-97-1	5.00000	0.00303	None
			Alcohols, ethoxylated	68439-50-9	5.00000	0.00303	None
HCL Acid (15%)	JWS	Acidizing	Hydrochloric Acid	7647-01-0	15.00000	0.01499	None
Aquar 714	JWS	Biocide	Water	7732-18-5	83.00000	0.00691	None
			Glutaraldehyde	111-30-8	14.00000	0.00117	None

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				Quarternary ammonium compounds, benzyl-C12-16-alkyldimethyl, chlorides	58424-85-1	2.50000	0.00021	None
WGA-7	JWS	Viscosifier		Ethanol	54-17-5	0.30000	0.00002	None
				Guar Gum	9000-30-0	55.00000	0.00384	None
				Distillates (petroleum), hydrotreated light	54742-47-8	55.00000	0.00384	None
Scale Inhibitor E	JWS	Scale Inhibitor		Copolymer of Maleic and Acrylic Acid	52255-49-9	20.00000	0.00176	None
				DETA phosphonate	15827-60-8	5.00000	0.00044	None
				Hexamethylene Triamine Penta (Methylene Phosphonic Acid)	34690-00-1	5.00000	0.00044	None
Unihib G	JWS	Acid inhibitor		Butyl diglycol	112-34-5	75.00000	0.00081	None
				Alcohols, C10-16, ethoxylated	88002-97-1	50.00000	0.00054	None
				Methanol	67-56-1	5.00000	0.00005	None
				Thiourea	52-56-6	1.00000	0.00001	None
				Formaldehyde	50-00-0	1.00000	0.00001	None
AP Breaker	JWS	Gel breaker		Ammonium peroxydisulfate	7727-54-0	100.00000	0.00003	None
				Sulfuric acid	7664-93-9	0.50000	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.								
Other Chemical(s)	Listed Above	See Trade Name(s) List						
				Ammonium acetate	531-61-8	13.00000	0.00787	
				Water	7732-18-5	83.00000	0.00691	
				Distillates (petroleum), hydrotreated light	54742-47-8	55.00000	0.00384	
				Alcohols, ethoxylated	58551-12-2	5.00000	0.00303	
				Alcohols, ethoxylated	58002-97-1	5.00000	0.00303	
				Alcohols, ethoxylated	58439-50-9	5.00000	0.00303	
				Alcohols, C10-16, ethoxylated	88002-97-1	50.00000	0.00054	
				Hexamethylene Triamine Penta (Methylene Phosphonic Acid)	34690-00-1	5.00000	0.00044	
				DETA phosphonate	15827-60-8	5.00000	0.00044	
				Quarternary ammonium compounds, benzyl-C12-16-alkyldimethyl, chlorides	58424-85-1	2.50000	0.00021	
				Methanol	67-56-1	5.00000	0.00005	
				Ethanol	54-17-5	0.30000	0.00002	
				Formaldehyde	50-00-0	1.00000	0.00001	
				Thiourea	52-56-6	1.00000	0.00001	
				Sulfuric acid	7664-93-9	0.50000	0.00000	

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\* 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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