

September 15th, 2017

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

API 47-085-10075FH6A County Ritchie District Clay
Quad Pennsboro Pad Name PEN2HS Field/Pool Name Pennsboro
Farm Name KIESSLING, TERRY & HELEN Well Number PEN2KHS - 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 4,354,134.38 m Easting 498,911.37 m
Landing Point of Curve Northing 4,353,998.26 m Easting 498,507.78 m
Bottom Hole Northing 4,355,740.36 m Easting 496,991.81 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
Office of Oil and Gas

Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug
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 Goff
DATE: 10-25-17

Reviewed by:
Honce, Mike

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CASING STRINGS Conductor	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft	Basket Depth(s)	Did cement Circulate (Y/N) * Provide details to the right *
Surface	17 1/2"	13 3/8"	590'	New	J-55 54.5# / 590'		Y
Coal							
Intermediate 1	12 3/8"	9 5/8"	5598'	N	HCK-55 36# / 5598'		Y
Intermediate 2							
Intermediate 3							
Production	8 3/4"	5 1/2"	14461.2'	N	P-110 20# / 14461.2'		Y
Tubing							
Packer Type and Depth Set		None					

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							
Surface	TYPE I	542 sks	15.60	1.20	116.3	0'	8
Coal							
Intermediate 1	Class A (Lead) / Class A (Tail)	959 sks / 292 sks	12.0 / 15.60	1.94 / 1.19	201 / 167	0'	8
Intermediate 2							
Intermediate 3							
Production	Class A (Lead) / Class A (Tail)	431 sks / 1663 sks	12.3 / 14.8	1.62 / 1.37	201 / 207	4575'	8
Tubing							

Drillers TD (ft) 6,314' Loggers TD (ft) 6,282'
 Deepest formation penetrated: Marcellus Plug back to (ft) Not a Pilot Hole
 Plug back procedure: Not a Pilot Hole
 Kick Off Depth (ft) 6,846'

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 - No centralizers used. Fresh Water / Surface - Surface - 5 centralizers used, one every third joint. Intermediate - 69 centralizers - bow spring centralizers on every joint to KOP, on every third joint from KOP to 100' from surface. Production - 221 centralizers - rigid bow spring every third joint from KOP to TOC, rigid bow spring every joint to KOP.

WAS WELL COMPLETED AS SHOT HOLE Yes No DETAILS Plug And Perforation Shot Hole RECEIVED Office of Oil and Gas

WAS WELL COMPLETED OPEN HOLE Yes No DETAILS _____ SEP 18 2017

WERE TRACERS USE Yes No TYPES OF TRACER(S) USED _____

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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	14111	14193	40	Marcellus
2	3/22/2017	14111	14193	40	Marcellus
3	3/23/2017	13716	13878	40	Marcellus
4	3/23/2017	13516	13678	40	Marcellus
5	3/23/2017	13316	13478	40	Marcellus
6	3/24/2017	13116	13278	40	Marcellus
7	3/24/2017	12916	13078	40	Marcellus
8	3/25/2017	12716	12878	40	Marcellus
9	3/25/2017	12516	12678	40	Marcellus
10	3/25/2017	12316	12478	40	Marcellus
11	3/26/2017	12116	12278	40	Marcellus
12	3/26/2017	11916	12078	40	Marcellus
13	3/27/2017	11716	11878	40	Marcellus
14	3/27/2017	11516	11678	40	Marcellus
15	3/27/2017	11316	11478	40	Marcellus
16	3/27/2017	11116	11278	40	Marcellus
17	3/28/2017	10916	11078	40	Marcellus
18	3/28/2017	10716	10878	40	Marcellus
19	3/28/2017	10716	10878	40	Marcellus
20	3/29/2017	10316	10478	40	Marcellus
21	3/29/2017	10116	10278	40	Marcellus
22	3/29/2017	9916	10078	40	Marcellus
23	3/29/2017	10667	10505	40	Marcellus
24	3/30/2017	9516	9678	40	Marcellus
25	3/30/2017	9316	9478	40	Marcellus
26	3/30/2017	9278	9116	40	Marcellus
27	3/31/2017	8916	6267	40	Marcellus
28	3/31/2017	8716	8878	40	Marcellus
29	3/31/2017	8516	8678	40	Marcellus
30	4/1/2017	8316	8478	40	Marcellus
31	4/1/2017	8116	8278	40	Marcellus
32	4/1/2017	7916	8078	40	Marcellus
33	4/2/2017	7878	7716	40	Marcellus
34	4/2/2017	7678	7516	40	Marcellus
35	4/2/2017	7321	7478	40	Marcellus
36	4/3/2017	7116	7278	40	Marcellus
37	4/3/2017	6916	7078	40	Marcellus
38	4/3/2017	6716	6878	40	Marcellus

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STIMULATION INFORMATION PER STAGE

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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 Water (bbls)	Amount of Nitrogen / other (gals)
						Amount of Proppant (lbs)		
1	3/21/2017	89.9	8123	7927	4685	400714	8916	4254
2	3/22/2017	86.1	7933	5235	5237	400462	8484	4553
3	3/23/2017	85.8	8165	5197	4168	400512	7862	4372
4	3/23/2017	81.8	8054	6488	5046	400613	7107	4255
5	3/24/2017	85.6	8040	4974	4868	400461	7851	4343
6	3/24/2017	85	7912	5457	4029	400617	7115	4262
7	3/24/2017	88	7980	5168	4586	400638	7471	4308
8	3/25/2017	90.1	7716	5478	4248	400541	7166	4247
9	3/25/2017	84.6	7631	5095	4504	400945	6170	613
10	3/25/2017	91.2	7721	5052	4872	400373	6398	4211
11	3/26/2017	90.2	7648	5027	4974	400484	6497	4242
12	3/26/2017	82.2	7251	6109	4517	400759	6205	4219
13	3/27/2017	88.8	7609	5850	4352	400664	6505	4243
14	3/27/2017	84.6	7372	5587	4814	400392	6830	4208
15	3/27/2017	80.8	7248	5399	4703	400652	5738	4207
16	3/27/2017	82.5	7195	5254	4837	399558	6467	4232
17	3/28/2017	82.1	7013	5161	5073	400802	6039	4196
18	3/28/2017	81.7	7073	5862	4020	401296	5834	4177
19	3/28/2017	84.4	7065	6211	4178	378126	6606	4239
20	3/29/2017	82.2	7264	7032	4486	339034	6033	4281
21	3/29/2017	86.8	6954	5873	3951	400380	7492	4252
22	3/29/2017	88.5	6858	5630	4056	401447	7529	4295
23	3/29/2017	83.8	7496	6566	4338	400823	8214	4383
24	3/30/2017	82.7	7431	5757	4112	400998	8162	4432
25	3/30/2017	80.8	7280	6295	4301	400678	7294	4340
26	3/30/2017	84.7	7238	6297	4069	400325	7668	4322
27	3/31/2017	83.5	6916	5653	3862	400914	6668	4253
28	3/31/2017	86.6	7043	5815	4312	401408	6046	4211
29	3/31/2017	84.8	6720	5725	4088	400826	6818	4233
30	4/1/2017	84.2	6699	6086	4582	400919	6550	4197
31	4/1/2017	87.3	6810	5973	4750	400600	6696	4206
32	4/1/2017	86.8	6900	6145	3687	401983	6306	4210
33	4/2/2017	84.4	7181	6365	4509	381534	6472	4241
34	4/2/2017	88.8	7046	6324	4212	400300	6242	4245
35	4/2/2017	84.8	6662	5620	4985	402915	6787	4240
36	4/3/2017	86.4	6609	5495	5027	402725	6736	4199
37	4/3/2017	83.8	6723	6089	4643	400443	6865	4237
38	4/3/2017	87.3	6493	7446	4389	400415	6170	4258

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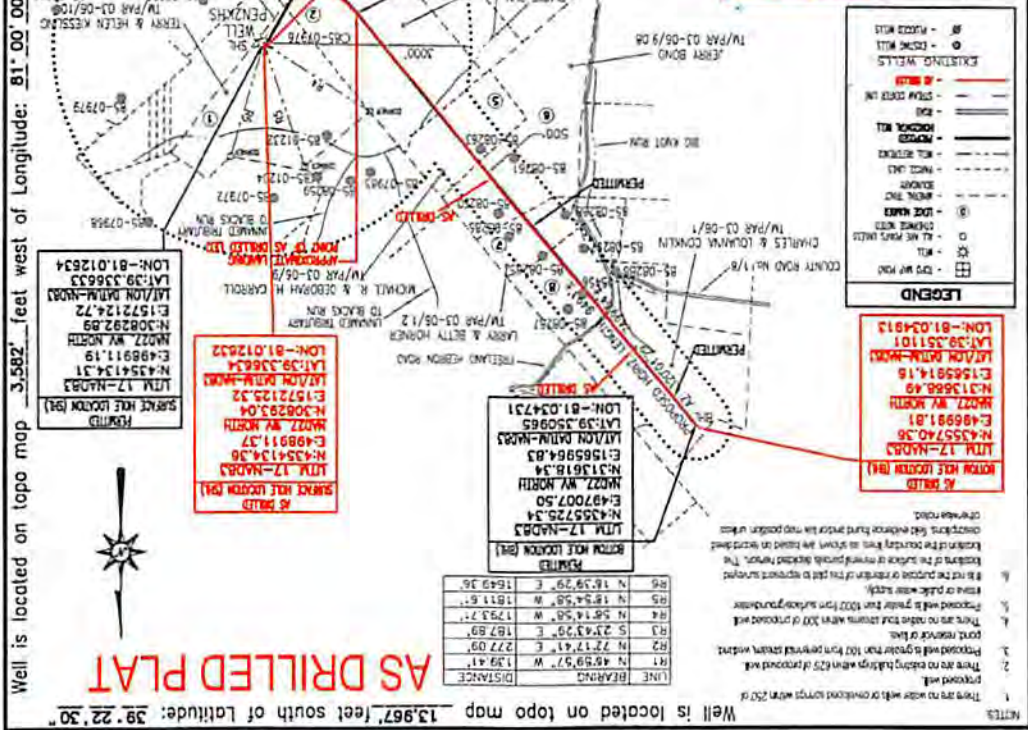
LITHOLOGY / FORMATION	TOP	BOTTOM	TOP	BOTTOM	DESCRIBE ROCK TYPE AND RECORD QUANTITY TYPE OF FLUID (FRESHWATER,BRINE,GAS,H2S, ETC)
	DEPTH IN FT	DEPTH IN FT	DEPTH IN FT	DEPTH IN FT	
	TVD	TVD	MD	MD	
SHALE AND SANDSTONE	0	1309	0	1309	
SANDSTONE	1309	1423	1309	1423	
SHALE AND SANDSTONE	1423	1593	1423	1593	
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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City: CANONSBURG State: PA Zip Code: 15317
 Address: 333 TECHNOLOGY DRIVE, SUITE 116
 Designated Agent: STEVEN M. GREEN
 Well Operator: NOBLE ENERGY, INC.
 Target Formation: MARCELLUS
 Estimated Depth: TVD: 6,314' ± TMD: 14,781' ±
 Clean Out & Replug Other Change
 Plug Off Old Formation Perforate New Formation Plug & Abandon
 Drill Convert Drill Deeper Redrill Fracture or Stimulate
 Oil & Gas Royalty Owner: TERRY KESSLING ET AL ACREAGE: 511.9844
 Surface Owner: TERRY & HELEN KESSLING ACREAGE: 79.2427
 County/District: RICHLIE / CLAY
 Watershed: NORTH FORK HUGHES RIVER
 Well Type: Gas Liquid Injection Storage Shallow Production Deep
 Office of Oil & Gas: 601 57TH STREET CHARLESTON, WV 25304
 Date: FEBRUARY 10, 2015
 API Well #: 47 STATE: 85 COUNTY: 10075 PERMIT

FILE #: PENZKHS-AS DRILLED
 DRAWING #: PENZKHS-AS DRILLED
 SCALE: 1" = 2000'
 MINIMUM DEGREE OF ACCURACY: 1/2500
 PROVEN SOURCE OF ELEVATION: U.S.G. MONUMENT THOMAS 1498.81
 R.P.E.: L.L.S., P.S. No. 2000
 PLACE SEAL HERE

THE UNDERIGNED, HEREBY CERTIFY THAT THIS PLAN 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 DEPARTMENT OF ENVIRONMENTAL PROTECTION.
PRELIMINARY
 Signed: _____
 R.P.E.: L.L.S., P.S. No. 2000
 PLACE SEAL HERE



NOTES:
 1. There are no water wells or abandoned wells within 200' of proposed well.
 2. There are no existing buildings within 100' of proposed well.
 3. Proposed well is greater than 100' from proposed lateral, including port of access or lane.
 4. There are no other structures within 300' of proposed well.
 5. Proposed well is greater than 1000' from subgrade boundaries.
 6. Proposed well is greater than 1000' from subgrade boundaries.
 7. Proposed well is greater than 1000' from subgrade boundaries.
 8. If not the purpose or intention of this plat is to record surveyed locations of the boundary lines as shown, they shall be treated as if they were not shown.
 9. Locations of the surface or mineral interests depicted herein. The locations of the surface or mineral interests depicted herein.
 10. If not the purpose or intention of this plat is to record surveyed locations of the boundary lines as shown, they shall be treated as if they were not shown.

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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:	47-085-10075-00-00
Operator Name:	CONSOL Energy Inc.
Well Name and Number:	PEN-2K-HS
Latitude:	39.33663300
Longitude:	-81.01263400
Datum:	NAD83
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	6,282
Total Base Water Volume (gal):	11,625,331
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	84.99289	None
Sand	JWS	Proppant	Crystalline Silica in the form of Quartz	14808-60-7	99.90000	13.58684	None
HCL Acid (7.5%)	JWS	Acidizing	Hydrochloric Acid	7647-01-0	7.50000	0.09432	None
Unislick ST50	JWS	Friction reducer	Petroleum distillates, hydrotreated light	64742-47-8	30.00000	0.01672	None
			Ammonium acetate	631-61-8	13.00000	0.00725	None
			Alcohols, ethoxylated	68551-12-2	5.00000	0.00279	None
			Alcohols, ethoxylated	68439-50-9	5.00000	0.00279	None
			Alcohols, ethoxylated	68002-97-1	5.00000	0.00279	None
HCL Acid (15%)	JWS	Acidizing	Hydrochloric Acid	7647-01-0	15.00000	0.01049	None
Aquacar 714	JWS	Biocide	Water	7732-18-5	83.00000	0.00697	None
			Glutaraldehyde	111-30-8	14.00000	0.00118	None

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			Quarternary ammonium compounds, benzyl-C12-16-alkyldimethyl, chlorides	68424-85-1	2.50000	0.00021	None
			Ethanol	64-17-5	0.30000	0.00003	None
WGA-7	JWS	Viscosifier					
			Distillates (petroleum), hydrotreated light	64742-47-8	55.00000	0.00279	None
			Guar Gum	9000-30-0	55.00000	0.00279	None
Scale Inhibitor E	JWS	Scale Inhibitor					
			Copolymer of Maleic and Acrylic Acid	52255-49-9	20.00000	0.00176	None
			Hexamethylene Triamine Penta (Methylene Phosphonic Acid)	34690-00-1	5.00000	0.00044	None
			DETA phosphonate	15827-60-8	5.00000	0.00044	None
Unihib G	JWS	Acid inhibitor					
			Butyl diglycol	112-34-5	75.00000	0.00078	None
			Alcohols, C10-16, ethoxylated	68002-97-1	50.00000	0.00052	None
			Methanol	67-56-1	5.00000	0.00005	None
			Formaldehyde	50-00-0	1.00000	0.00001	None
			Thiourea	62-56-6	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	631-61-8	13.00000	0.00725	
			Water	7732-18-5	83.00000	0.00697	
			Distillates (petroleum), hydrotreated light	64742-47-8	55.00000	0.00279	
			Alcohols, ethoxylated	68551-12-2	5.00000	0.00279	
			Alcohols, ethoxylated	68002-97-1	5.00000	0.00279	
			Alcohols, ethoxylated	68439-50-9	5.00000	0.00279	
			Alcohols, C10-16, ethoxylated	68002-97-1	50.00000	0.00052	
			DETA phosphonate	15827-60-8	5.00000	0.00044	
			Hexamethylene Triamine Penta (Methylene Phosphonic Acid)	34690-00-1	5.00000	0.00044	
			Quarternary ammonium compounds, benzyl-C12-16-alkyldimethyl, chlorides	68424-85-1	2.50000	0.00021	
			Methanol	67-56-1	5.00000	0.00005	
			Ethanol	64-17-5	0.30000	0.00003	
			Thiourea	62-56-6	1.00000	0.00001	
			Formaldehyde	50-00-0	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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