

JA

WR-35  
Rev. 8/23/13

Page 1 of 22  
March 28, 2014  
PM

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

API 47-001-03221W County Barbour District Pleasant  
Quad Philippi Pad Name PHL13HS Field/Pool Name Philippi  
Farm name MCCAULEY, RANDALL Well Number PHL13BHS Rework  
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 4,341,382.424m Easting 585,264.995m  
Landing Point of Curve Northing 4,341,298.087m Easting 585,682.200m  
Bottom Hole Northing 4,339,182.937m Easting 587,116.714m

Elevation (ft) 1520' 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)  
Waterbased Mud, Bactericide, Polymers and Weighting Agents.

RECEIVED  
Office of Oil and Gas  
MAR 31 2014  
WV Department of Environmental Protection

Date permit issued 02/11/2013 Date drilling commenced 10/8/2011 Date drilling ceased 7/28/2013  
Date completion activities began 9/24/2013 Date completion activities ceased 10/30/2013  
Verbal plugging (Y/N) N/A 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 30' Open mine(s) (Y/N) depths N  
Salt water depth(s) ft None Reported Void(s) encountered (Y/N) depths 6803' - Fault  
Coal depth(s) ft 190', 230', 310' Cavern(s) encountered (Y/N) depths N  
Is coal being mined in area (Y/N) N

Reviewed by:  
Steve Spith

04/25/2014

API 47- 001 - 03221W Farm name MCCAULEY, RANDALL Well number PHL13BHS Rework

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	26"	20"	100'	N	L.S. 81.3 / 100'	N/A	Y
Surface	17 1/2"	13 3/8"	663'	N	J-55 54.5 / 663'	84.05'	Y
Coal	-	-	-	-	-	-	-
Intermediate 1	12 3/8"	9 5/8"	2022'	N	J-55 36 / 2022'	82.65'/168.05'	Y
Intermediate 2	-	-	-	-	-	-	-
Intermediate 3	-	-	-	-	-	-	-
Production	8 3/4"	5 1/2"	16638'	N	P-110 20 / 16638'	N/A	Y
Tubing	8 3/4"	2 3/8"	7595'	N	J-55 4.7 / 7595'	N/A	N
Packer type and depth set		None					

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	Grouted to Surface	15.6	1.18	150.5	Surface	8
Surface	Class A	550	14.6	1.39	628.83	Surface	8
Coal	-	-	-	-	-	-	-
Intermediate 1	Class A	652	15.2	1.26	769.2	Surface	8
Intermediate 2	-	-	-	-	-	-	-
Intermediate 3	-	-	-	-	-	-	-
Production	Class A (Lead) / Class A (Tail)	997.45 / 2155.62	14.2 / 14.8	1.26	3992.82	2000'	8
Tubing	-	-	-	-	-	-	-

Drillers TD (ft) 7630.38' Loggers TD (ft) 7843'

Deepest formation penetrated Lower Marcellus Plug back to (ft) N/A

Plug back procedure N/A

Kick off depth (ft) 6684'

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 & gas

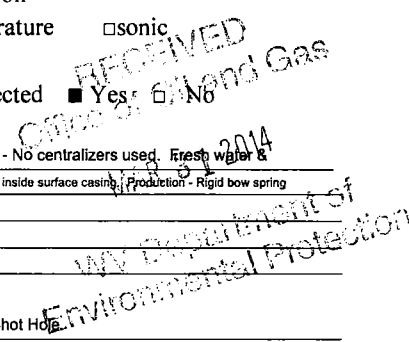
Coal - Bow spring centralizers on first joint then every fourth joint to 100 feet from surface. Intermediate - Bow spring centralizers one on the first two joints and every fourth joint until inside surface casing. Production - Rigid bow spring centralizer on first joint then every 2 casing joints (free floating) through the lateral and the curve.

(Note: cementing the 5 1/2" casing completely in open hole lateral and curve.)

WAS WELL COMPLETED AS SHOT HOLE  Yes  No DETAILS Plug and Perforation Shot Hole

WAS WELL COMPLETED OPEN HOLE?  Yes  No DETAILS \_\_\_\_\_

WERE TRACERS USED  Yes  No TYPE OF TRACER(S) USED \_\_\_\_\_







API 47-001-03221W Farm name MCCAULEY, RANDALL Well number PHL13BHS Rework

PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number Of Perforations	Formation(s)
1	9/24/2013	16463	16342	4	Marcellus
2	9/24/2013	16309	16187	5	Marcellus
3	9/24/2013	16159	16037	5	Marcellus
4	9/25/2013	16009	15887	5	Marcellus
5	9/25/2013	15859	15737	5	Marcellus
6	9/25/2013	15709	15587	5	Marcellus
7	9/26/2013	15559	15437	5	Marcellus
8	9/26/2013	15409	15287	5	Marcellus
9	9/29/2013	15259	15137	5	Marcellus
10	9/29/2013	15109	14987	5	Marcellus
11	9/29/2013	14959	14837	5	Marcellus
12	9/30/2013	14809	14687	5	Marcellus
13	9/30/2013	14653	14483	5	Marcellus
14	9/30/2013	14107	13986	4	Marcellus
15	10/4/2013	13953	13831	5	Marcellus
16	10/4/2013	13803	13681	5	Marcellus
17	10/4/2013	13653	13531	5	Marcellus
18	10/9/2013	13503	13381	5	Marcellus
19	10/11/2013	13353	13231	5	Marcellus
20	10/11/2013	13203	13081	5	Marcellus
21	10/12/2013	13053	12931	5	Marcellus
22	10/14/2013	12903	12781	5	Marcellus
23	10/15/2013	12753	12631	5	Marcellus
24	10/17/2013	12603	12481	5	Marcellus
25	10/18/2013	12453	12331	5	Marcellus
26	10/18/2013	12303	12181	5	Marcellus
27	10/19/2013	12153	12031	5	Marcellus
28	10/19/2013	12003	11881	5	Marcellus
29	10/20/2013	11853	11731	5	Marcellus
30	10/21/2013	11703	11581	5	Marcellus
31	10/21/2013	11553	11431	5	Marcellus
32	10/21/2013	11403	11281	5	Marcellus
33	10/22/2013	11253	11131	5	Marcellus
34	10/24/2013	11103	10981	5	Marcellus

Office of Oil and Gas  
April 31 2014  
Department of Environmental Protection

API 47-001-03221W Farm name MCCAULEY, RANDALL Well number PHL13BHS Rework

PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number Of Perforations	Formation(s)
35	10/25/2013	10953	10831	5	Marcellus
36	10/26/2013	10803	10681	5	Marcellus
37	10/26/2013	10653	10531	5	Marcellus
38	10/27/2013	10503	10381	5	Marcellus
39	10/27/2013	10353	10231	5	Marcellus
40	10/28/2013	10203	10081	5	Marcellus
41	10/28/2013	10053	9931	5	Marcellus
42	10/29/2013	9903	9781	5	Marcellus
43	10/29/2013	9753	9631	5	Marcellus
44	10/29/2013	9603	9481	5	Marcellus
45	10/30/2013	9453	9331	5	Marcellus
46	10/30/2013	9303	9181	5	Marcellus
47	10/30/2013	9145	8959	5	Marcellus



API 47-001-03221W Farm name MCCAULEY, RANDALL Well number PHL13BHS Rework

STIMULATION INFORMATION PER STAGE

Stage No.	Stimulations Date	Avg Pump Rate (BPM)	Avg Treatment Pressure (PSI)	Max Breakdown Perforations	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen / other (gals)
1	9/24/2013	54.9	7720	6883	5036	198800	7438	5982
2	9/24/2013	77	8471	7536	4880	199900	5092	3504
3	9/24/2013	78.2	8465	7426	5071	207700	5896	3615
4	9/25/2013	81.5	8438	7578	5425	202050	5725	3532
5	9/25/2013	76.1	8062	7529	5502	199600	5648	3504
6	9/25/2013	77.1	8058	6851	5263	199100	5529	3487
7	9/26/2013	77.5	8112	7464	5279	199600	5762	3510
8	9/26/2013	78.1	8184	7693	5434	198750	5528	3479
9	9/29/2013	80	7984	6449	5789	199200	5641	3409
10	9/29/2013	90.1	8659	6692	5714	199300	5746	3385
11	9/29/2013	84.7	7979	6124	5531	200050	5426	3536
12	9/30/2013	86.9	7981	6200	5502	199500	5499	3526
13	9/30/2013	98	8521	6105	5587	199000	5487	3429
14	9/30/2013	63.9	7899	8133	8752	201250	8646	3501
15	10/4/2013	73	8456	8248	5504	200100	5255	3567
16	10/4/2013	66.1	8042	7615	6213	199800	5899	3530
17	10/4/2013	66.8	8226	8066	5775	200000	6914	3547
18	10/9/2013	69.1	8010	7031	6077	199550	6965	3596
19	10/11/2013	76.9	8094	7320	5665	199450	5340	3434
20	10/11/2013	81.6	8187	7157	5425	197800	5391	3637
21	10/12/2013	84.8	8001	6411	5729	200550	5480	3560
22	10/14/2013	80	7800	6305	5684	201250	5451	3502
23	10/15/2013	80.8	7885	6411	5770	200250	4944	3543
24	10/17/2013	78.2	8205	7675	5902	198450	6220	3649
25	10/18/2013	89.2	8590	7425	5942	198850	5414	3501
26	10/18/2013	82.3	8066	6947	6079	200150	5362	3450
27	10/19/2013	93.5	8500	6507	5990	200100	5359	3464
28	10/19/2013	81.7	8069	6794	6530	199850	5165	3438
29	10/20/2013	93.8	8439	6583	6054	199650	5321	3442
30	10/21/2013	93.2	8444	7296	6019	199300	5064	3456
31	10/21/2013	76.9	8349	7664	6911	200350	5036	3402
32	10/21/2013	85.1	8103	6793	6023	200200	5294	3451
33	10/22/2013	83.5	8031	7354	6124	203100	5258	3395
34	10/24/2013	98.3	8460	6735	6069	200750	5122	3447
35	10/25/2013	98	8590	6817	5935	199800	5213	3398
36	10/26/2013	95	8585	6957	6031	199450	5063	3374
37	10/26/2013	98.1	8401	7045	5906	202050	5031	3416



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STIMULATION INFORMATION PER STAGE

Stage No.	Stimulations Date	Avg Pump Rate (BPM)	Avg Treatment Pressure (PSI)	Max Breakdown Perforations	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen / other (gals)
38	10/27/2013	96	8571	7697	5840	192700	5032	3428
39	10/27/2013	94.2	8630	8264	5815	201750	4696	3400
40	10/28/2013	96.8	8516	8303	5653	202000	5292	3502
41	10/28/2013	98	8693	7608	5815	205800	4670	3335
42	10/29/2013	96	8501	7281	5677	201900	4966	3372
43	10/29/2013	97	8634	7802	5890	199850	4677	3377
44	10/29/2013	86.4	8050	7650	5644	200600	4991	3338
45	10/30/2013	91.1	8535	8145	5753	199900	5146	3472
46	10/30/2013	95	8441	8460	5584	202250	5175	3416
47	10/30/2013	78.9	8026	8557	5896	200050	4817	3329

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<u>PRODUCING FORMATION(S)</u>	<u>DEPTHS</u>	
Upper Marcellus	7595' TVD	8850' MD
Middle Marcellus	7617'	8926'

Please insert additional pages as applicable.

GAS TEST  Build up  Drawdown  Open Flow OIL TEST  Flow  Pump

SHUT-IN PRESSURE Surface 1100 psi Bottom Hole 5102 psi DURATION OF TEST 283 hrs

OPEN FLOW Gas 9652 mcfpd Oil N/A bpd NGL N/A bpd Water 1355 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 <sub>2</sub> S, ETC)
	0		0		
					See Attached

Please insert additional pages as applicable.

Drilling Contractor Patterson UTI  
Address 450 Gears Road Suite 500 City Houston State TX Zip 77067

Logging Company Diversified Mud Logging  
Address 440 Route 519 City Eighty Four State PA Zip 15330

Cementing Company CalFrac  
Address 2001 Summit View Rd City Smithfield State PA Zip 15478

Stimulating Company CalFrac  
Address 2001 Summit View Rd City Smithfield State PA Zip 15478

Please insert additional pages as applicable.

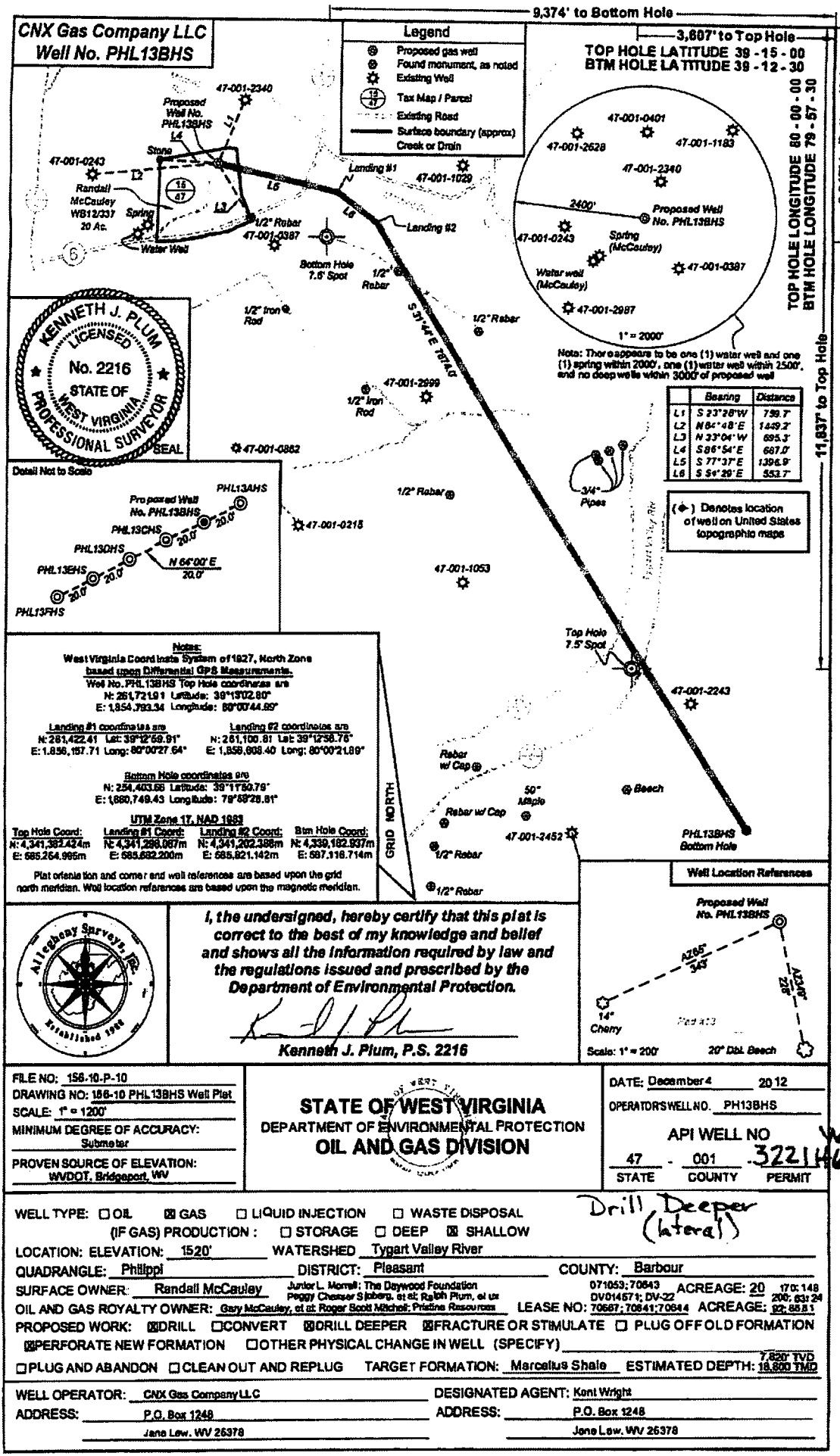
Completed by CNX Gas WV Operations Company, LLC - Drilling and Completions Telephone 304-884-2000  
Signature Steve Spittler Title Steve Spittler - Completions Manager-Gas WV Date 3/26/14

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

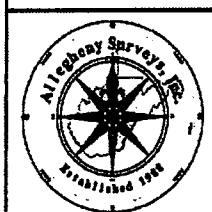


API 47-001-03221W Farm name MCCAULEY, RANDALL Well number PHL13BHS Rework

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	
FILL	0	30			Brown
SAND/SHALE	30	190			Gray
COAL	190	195			Black
SAND/CLAY	195	230			Red
SAND/SHALE/COAL	230	310			Gray/Black
COAL	310	315			Black
SAND/SHALE	315	1045			Gray/Red/Brown/Black
SHALE/REDROCK	1045				Gray/Red
LITTLE LIME	1162	1170			
BIG LIME	1188	1240			
BIG INJUN	1240	1365			
GANTZ	1550	1574			
FOURTH SAND	2089	2118			
WARREN	2520	2550			
SPEECHLEY	2834	2873			
BALLTOWN	2996	3024			
RILEY	3720	3940			
BENSON SAND	4020	4085			
FIRST ELK	4250	4302			
SECOND ELK	4400	4480			
THIRD ELK	4660	4680			
FOURTH ELK	4934	4975			
SYCAMORE GRIT	6298	6405			
UN-NAMED SILTSTONE	6672	6760			
FAULT	6803				
UN-NAMED SILTSTONE REPEAT	6850	6927			
BURKET SHALE	7329	7354	7791	7846	
TULLY LIMESTONE	7354	7427	7846	8100	
HAMILTON SHALE	7427	7595	8100	8850	
UPPER MARCELLUS	7595	7615	8850	8916	
PURCELL	7615	7617	8916	8926	
MIDDLE MARCELLUS	7617	7678	8926		
ONONDAGA LIMESTONE	7678	7692			
HUNTERSVILLE CHERT	7692				
LTD	7843				



**Notes:**  
 West Virginia Coordinate System of 1927, North Zone based upon Differential GPS Measurements.  
 Well No. PHL13BHS Top Hole coordinates are N: 251,721.91 Latitude: 39°13'02.80" E: 1,854,793.34 Longitude: 80°00'44.89"  
 Landing #1 coordinates are N: 281,422.41 Lat: 39°12'59.91" E: 1,856,157.71 Long: 80°00'27.64"  
 Landing #2 coordinates are N: 281,100.81 Lat: 39°12'58.76" E: 1,856,908.40 Long: 80°00'21.89"  
 Bottom Hole coordinates are N: 254,403.66 Latitude: 39°11'50.79" E: 1,880,749.43 Longitude: 79°59'28.81"  
 UTM Zone 17, NAD 1983  
 Top Hole Coord: N: 4,341,392.42m E: 685,264.996m  
 Landing #1 Coord: N: 4,341,296.067m E: 685,692.200m  
 Landing #2 Coord: N: 4,341,262.366m E: 685,821.142m  
 Btm Hole Coord: N: 4,339,162.937m E: 697,118.714m  
 Plat orientation and corner and well reference are based upon the grid north meridian. Well location references are based upon the magnetic meridian.



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 Department of Environmental Protection.

*Kenneth J. Plum*  
 Kenneth J. Plum, P.S. 2216

FILE NO: 156-10-P-10  
 DRAWING NO: 156-10 PHL13BHS Well Plat  
 SCALE: 1" = 1200'  
 MINIMUM DEGREE OF ACCURACY: Submeter  
 PROVEN SOURCE OF ELEVATION: WVDOT, Bridgeport, WV

**STATE OF WEST VIRGINIA**  
 DEPARTMENT OF ENVIRONMENTAL PROTECTION  
**OIL AND GAS DIVISION**

DATE: December 4, 2012  
 OPERATOR'S WELL NO. PH13BHS  
 API WELL NO. 47-001-3221  
 STATE COUNTY PERMIT

WELL TYPE:  OIL  GAS  LIQUID INJECTION  WASTE DISPOSAL  
 (IF GAS) PRODUCTION:  STORAGE  DEEP  SHALLOW  
 LOCATION: ELEVATION: 1520' WATERSHED Tygart Valley River  
 QUADRANGLE: Phillip DISTRICT: Pleasant COUNTY: Barbour  
 SURFACE OWNER: Randall McCauley Junior L. Morrell: The Daywood Foundation 071053; 70843 ACREAGE: 20 170: 148  
 Peggy Cheaser Sifers, et al; Ralph Plum, et al DV014671; DV-22 200: 63: 24  
 OIL AND GAS ROYALTY OWNER: Gary McCauley, et al; Roger Scott Mitchell; Pristine Resources LEASE NO: 70667; 70841; 70844 ACREAGE: 82: 85: 1  
 PROPOSED WORK:  DRILL  CONVERT  DRILL DEEPER  FRACTURE OR STIMULATE  PLUG OFF OLD FORMATION  
 PERFORATE NEW FORMATION  OTHER PHYSICAL CHANGE IN WELL (SPECIFY)  
 PLUG AND ABANDON  CLEAN OUT AND REPLUG TARGET FORMATION: Marcellus Shale ESTIMATED DEPTH: 7,820' TVD 18,800' TMD

WELL OPERATOR: CNX Gas Company LLC DESIGNATED AGENT: Kent Wright  
 ADDRESS: P.O. Box 1248 Jane Low, WV 26378 ADDRESS: P.O. Box 1248 Jane Low, WV 26378



47-001-03221

PHL13BHS



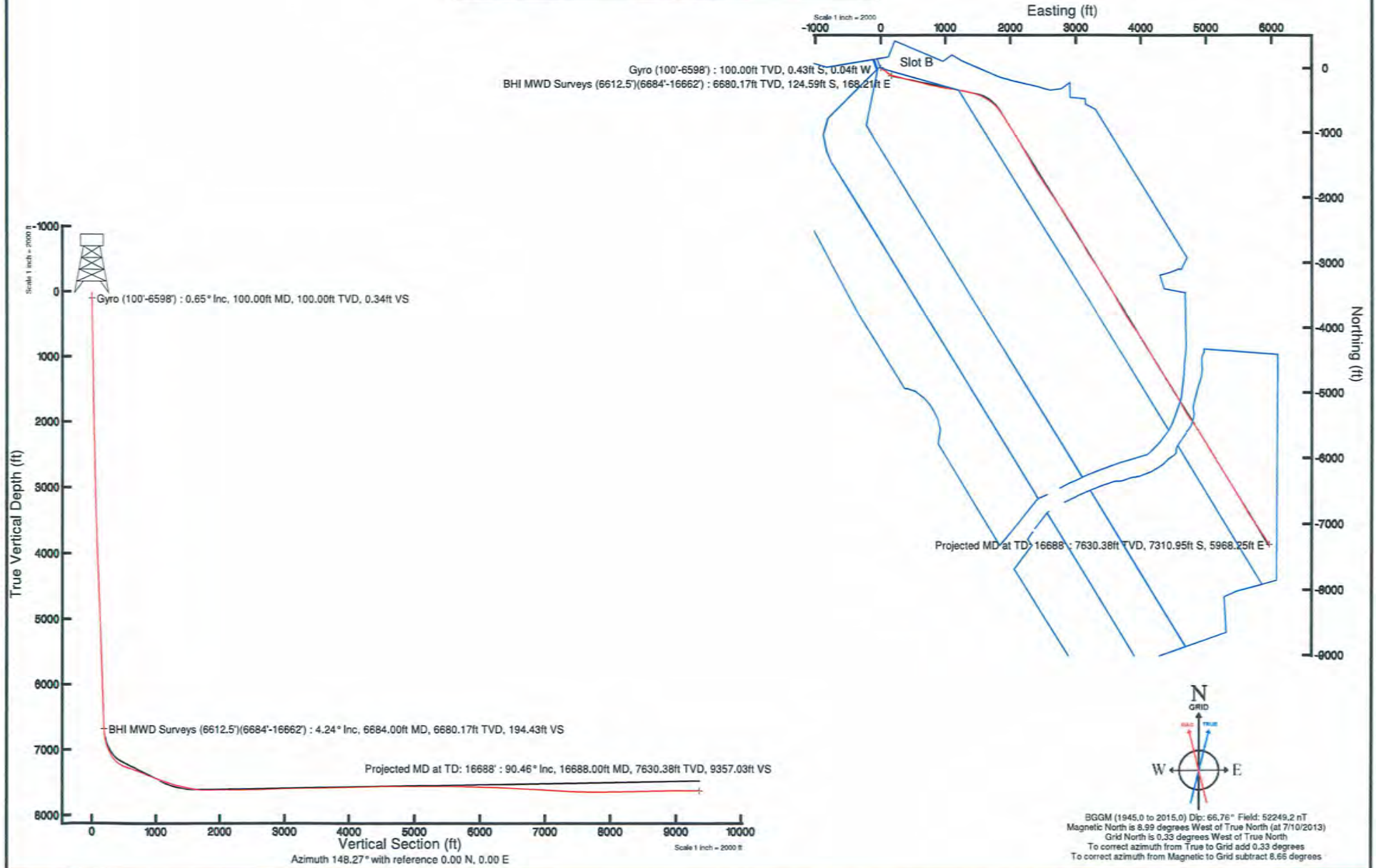
# CNX GAS COMPANY, LLC

Location: Barbour County, WV  
 Field: Barbour  
 Facility: PHL13 Pad

Slot: Slot B  
 Well: PHL13BHS  
 Wellbore: PHL13BHS PWB



This reference wellbore is PHL13BHS TWP Dev-0.5	
True vertical depths are referenced to Patterson 311 (RT)	Grid System: NAD2011 / Lambert West Virginia SP, Northern Zone 14761, US feet
Measured depths are referenced to Patterson 311 (RT)	North Reference: Grid north
Patterson 311 (RT) to Mean Sea Level: 1507.59 feet	Scale: True distance
Mean Sea Level to Mudline (at Slot B): 0 feet	Depths are in feet
Coordinates are in feet referenced to Slot	Created by: mlsayler on 7/10/2013



47-001-03221



# Actual Wellpath Report

PHL13BHS AWP Proj: 16688'

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## REFERENCE WELLPATH IDENTIFICATION

Operator	CNX GAS COMPANY, LLC	Slot	Slot B
Area	Barbour County, WV	Well	PHL13BHS
Field	Barbour	Wellbore	PHL13BHS AWB
Facility	PHL13 Pad		

## REPORT SETUP INFORMATION

Projection System	NAD27 / Lambert West Virginia SP, Northern Zone (4701), US feet	Software System	WellArchitect@ 4.0.0
North Reference	Grid	User	Edsaryar
Scale	0.999966	Report Generated	7/24/2013 at 3:50:29 PM
Convergence at slot	0.33° West	Database/Source file	Well Architect Eastern US/PHL13BHS_AWB.xml

## WELLPATH LOCATION

	Local coordinates		Grid coordinates		Geographic coordinates	
	North[ft]	East[ft]	Easting[US ft]	Northing[US ft]	Latitude	Longitude
Slot Location	-8.99	-17.21	1854793.81	261722.08	39°13'02.800"N	80°00'44.988"W
Facility Reference Pt			1854811.03	261731.07	39°13'02.890"N	80°00'44.770"W
Field Reference Pt			1853088.00	260038.65	39°12'46.064"N	80°01'06.538"W

## WELLPATH DATUM

Calculation method	Minimum curvature	Patterson 331 (RT) to Facility Vertical Datum	1551.59ft
Horizontal Reference Pt	Slot	Patterson 331 (RT) to Mean Sea Level	1551.59ft
Vertical Reference Pt	Patterson 331 (RT)	Patterson 331 (RT) to Mud Line at Slot (Slot B)	1551.59ft
MD Reference Pt	Patterson 331 (RT)	Section Origin	N 0.00, E 0.00 ft
Field Vertical Reference	Mean Sea Level	Section Azimuth	148.27°



47-001-03221

# Actual Wellpath Report

PHL13BHS AWP Proj: 16688  
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Operator	CNX GAS COMPANY, LLC
Area	Barbour County, WV
Field	Barbour
Facility	PHL13 Pad
Slot	Slot B
Well	PHL13BHS
Wellbore	PHL13BHS A WB

## REFERENCE WELLPATH IDENTIFICATION

WELLPATH DATA (183 stations) † = interpolated/extrapolated station															
MD	Inclination	Azimuth	TVD	Vert Sect	North	East	Grid East	Grid North	Latitude	Longitude	Closure Dist	Closure Dir	DLS	Build Rate	Turn Rate
[ft]	[°]	[°]	[ft]	[ft]	[ft]	[ft]	[US ft]	[US ft]			[ft]	[°]	[%/100ft]	[%/100ft]	[%/100ft]
0.00	0.00	185.270	0.00	0.00	0.00	0.00	1854793.81	261722.08	39°13'02.800"N	80°00'44.988"W	0.00	0.00	0.00	0.00	0.00
24.50	0.000	185.270	24.50	0.00	0.00	0.00	1854793.81	261722.08	39°13'02.800"N	80°00'44.988"W	0.00	0.00	0.00	0.00	0.00
114.50	0.780	185.270	114.50	0.49	-0.61	-0.06	1854793.75	261721.47	39°13'02.794"N	80°00'44.989"W	0.61	185.270	0.87	0.87	0.00
214.50	1.060	168.470	214.48	1.90	-2.19	0.07	1854793.88	261719.88	39°13'02.778"N	80°00'44.987"W	2.20	178.274	0.39	0.28	-16.80
314.50	1.430	139.260	314.46	4.00	-4.05	1.07	1854794.88	261718.03	39°13'02.760"N	80°00'44.974"W	4.18	165.248	0.72	0.37	-29.21
414.50	1.260	142.710	414.43	6.33	-5.87	2.55	1854796.36	261716.21	39°13'02.742"N	80°00'44.955"W	6.39	156.540	0.19	-0.17	3.45
514.50	1.170	132.950	514.41	8.41	-7.44	3.96	1854797.77	261714.64	39°13'02.727"N	80°00'44.937"W	8.42	151.969	0.23	-0.09	-9.76
614.50	1.050	126.620	614.39	10.24	-8.68	5.44	1854799.25	261713.40	39°13'02.715"N	80°00'44.918"W	10.24	147.910	0.17	-0.12	-6.33
714.50	0.880	140.230	714.38	11.86	-9.82	6.67	1854800.48	261712.26	39°13'02.704"N	80°00'44.903"W	11.87	145.808	0.28	-0.17	13.61
814.50	1.100	134.920	814.36	13.55	-11.08	7.84	1854801.65	261710.99	39°13'02.691"N	80°00'44.888"W	13.58	144.728	0.24	-0.22	-5.31
914.50	0.530	146.230	914.35	14.95	-12.15	8.78	1854802.59	261709.93	39°13'02.681"N	80°00'44.876"W	14.98	144.149	0.59	-0.57	11.31
1014.50	1.040	137.080	1014.34	16.30	-13.19	9.65	1854803.46	261708.88	39°13'02.670"N	80°00'44.864"W	16.35	143.816	0.52	0.51	-9.15
1114.50	1.100	138.620	1114.33	18.13	-14.58	10.90	1854804.71	261707.50	39°13'02.657"N	80°00'44.848"W	18.21	143.208	0.07	0.06	1.54
1214.50	0.590	125.980	1214.32	19.56	-15.60	11.95	1854805.77	261706.47	39°13'02.647"N	80°00'44.835"W	19.66	142.539	0.54	-0.51	-12.64
1314.50	1.030	113.080	1314.30	20.77	-16.26	13.20	1854807.01	261705.82	39°13'02.640"N	80°00'44.819"W	20.94	140.928	0.47	0.44	-12.90
1414.50	0.620	132.810	1414.29	22.02	-16.98	14.42	1854808.23	261705.10	39°13'02.633"N	80°00'44.804"W	22.28	139.652	0.49	-0.41	19.73
1514.50	0.880	125.230	1514.29	23.25	-17.79	15.45	1854809.26	261704.29	39°13'02.625"N	80°00'44.791"W	23.56	139.030	0.28	0.26	-7.58
1614.50	1.220	144.040	1614.27	25.02	-19.09	16.70	1854810.51	261702.98	39°13'02.612"N	80°00'44.775"W	25.36	138.826	0.48	0.34	18.81
1714.50	1.100	113.680	1714.25	26.87	-20.34	18.20	1854812.01	261701.74	39°13'02.600"N	80°00'44.755"W	27.30	138.173	0.62	-0.12	-30.36
1814.50	1.160	129.750	1814.23	28.62	-21.37	19.86	1854813.67	261700.70	39°13'02.590"N	80°00'44.734"W	29.18	137.100	0.32	0.06	16.07
1914.50	1.660	114.700	1914.20	30.79	-22.62	21.95	1854815.76	261699.45	39°13'02.578"N	80°00'44.707"W	31.53	135.862	0.62	0.50	-15.05
2014.50	1.660	117.870	2014.16	33.25	-23.91	24.55	1854818.36	261698.17	39°13'02.565"N	80°00'44.674"W	34.27	134.239	0.09	0.00	3.17
2114.50	1.310	122.820	2114.12	35.53	-25.20	26.79	1854820.60	261696.87	39°13'02.553"N	80°00'44.646"W	36.78	133.251	0.37	-0.35	4.95
2214.50	1.310	134.080	2214.10	37.67	-26.62	28.57	1854822.38	261695.46	39°13'02.539"N	80°00'44.623"W	39.05	132.971	0.26	0.00	11.26
2314.50	1.860	122.320	2314.06	40.23	-28.28	30.77	1854824.58	261693.79	39°13'02.522"N	80°00'44.595"W	41.79	132.590	0.64	0.55	-11.76
2414.50	1.670	116.150	2414.01	42.93	-29.79	33.45	1854827.26	261692.28	39°13'02.508"N	80°00'44.561"W	44.79	131.693	0.27	-0.19	-6.17
2514.50	1.820	108.520	2513.97	45.38	-30.94	36.26	1854830.07	261691.14	39°13'02.496"N	80°00'44.525"W	47.66	130.472	0.28	0.15	-7.63
2614.50	1.890	114.000	2613.91	47.97	-32.11	39.27	1854833.08	261689.96	39°13'02.485"N	80°00'44.487"W	50.73	129.273	0.19	0.07	5.48
2714.50	1.740	109.300	2713.86	50.51	-33.29	42.21	1854836.02	261688.79	39°13'02.474"N	80°00'44.449"W	53.76	128.258	0.21	-0.15	-4.70
2814.50	1.230	112.510	2813.83	52.56	-34.20	44.64	1854838.44	261687.88	39°13'02.465"N	80°00'44.418"W	56.23	127.458	0.52	-0.51	3.21



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## REFERENCE WELLPATH IDENTIFICATION

Operator	CNX GAS COMPANY, LLC
Area	Barbour County, WV
Field	Barbour
Facility	PHL13 Pad

## WELLPATH DATA (183 stations)

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Closure Dist [ft]	Closure Dir [°]	DLS ["/100ft]	Build Rate ["/100ft]	Turn Rate ["/100ft]
2914.50	1.750	104.060	2913.80	54.53	-34.98	47.11	1854840.92	261687.10	39°13'02.457"N	80°00'44.387"W	58.68	126.596	0.56	0.52	-8.45
3014.50	1.850	117.730	3013.75	57.01	-36.10	50.02	1854843.83	261685.97	39°13'02.446"N	80°00'44.350"W	61.69	125.821	0.44	0.40	-9.92
3114.50	1.880	130.930	3113.70	59.45	-37.27	52.76	1854846.57	261684.80	39°13'02.435"N	80°00'44.315"W	64.60	125.241	0.40	0.27	-9.92
3214.50	2.370	116.890	3213.64	62.26	-38.63	55.92	1854849.73	261683.44	39°13'02.421"N	80°00'44.275"W	67.96	124.640	0.85	0.79	9.08
3314.50	1.880	130.930	3313.57	65.60	-40.64	59.00	1854852.81	261681.43	39°13'02.402"N	80°00'44.236"W	71.64	124.561	0.71	-0.49	14.04
3414.50	1.800	139.140	3413.52	68.71	-42.90	61.27	1854855.08	261679.17	39°13'02.380"N	80°00'44.207"W	74.80	125.003	0.28	-0.08	8.21
3514.50	2.330	124.000	3513.46	72.12	-45.23	63.98	1854857.79	261676.85	39°13'02.357"N	80°00'44.172"W	78.35	125.258	0.76	0.53	-15.14
3614.50	2.410	125.720	3613.37	75.91	-47.59	67.37	1854861.18	261674.48	39°13'02.334"N	80°00'44.129"W	82.49	125.238	0.11	0.08	1.72
3714.50	2.240	134.880	3713.29	79.75	-50.20	70.46	1854864.27	261671.88	39°13'02.308"N	80°00'44.089"W	86.52	125.467	0.41	-0.17	9.16
3814.50	2.360	118.770	3813.21	83.45	-52.57	73.65	1854867.46	261669.51	39°13'02.285"N	80°00'44.048"W	90.49	125.517	0.66	0.12	-16.11
3914.50	2.380	112.900	3913.13	86.93	-54.37	77.37	1854871.18	261667.71	39°13'02.267"N	80°00'44.001"W	94.56	125.096	0.24	0.02	-5.87
4014.50	2.410	125.310	4013.04	90.56	-56.39	81.00	1854874.81	261665.69	39°13'02.247"N	80°00'43.955"W	98.70	124.846	0.52	0.03	12.41
4114.50	2.140	132.520	4112.96	94.29	-58.87	84.09	1854877.90	261663.21	39°13'02.223"N	80°00'43.915"W	102.65	124.994	0.39	-0.27	7.21
4214.50	2.620	134.650	4212.87	98.31	-61.74	87.09	1854880.90	261660.34	39°13'02.195"N	80°00'43.877"W	106.75	125.331	0.49	0.48	2.13
4314.50	2.580	136.920	4312.77	102.74	-64.99	90.26	1854884.06	261657.09	39°13'02.163"N	80°00'43.837"W	111.22	125.755	0.11	-0.04	2.27
4414.50	2.300	121.140	4412.68	106.73	-67.67	93.51	1854887.32	261654.41	39°13'02.137"N	80°00'43.795"W	115.43	125.891	0.72	-0.28	-15.78
4514.50	2.360	125.130	4512.60	110.41	-69.89	96.91	1854890.72	261652.19	39°13'02.115"N	80°00'43.752"W	119.48	125.798	0.17	0.06	3.99
4614.50	2.450	119.280	4612.51	114.18	-72.12	100.46	1854894.27	261649.96	39°13'02.093"N	80°00'43.706"W	123.67	125.675	0.26	0.09	-5.85
4714.50	2.780	137.730	4712.41	118.43	-74.96	103.96	1854897.76	261647.12	39°13'02.065"N	80°00'43.662"W	128.16	125.795	0.90	0.33	18.45
4814.50	2.850	139.160	4812.29	123.27	-78.64	107.21	1854901.02	261643.44	39°13'02.029"N	80°00'43.620"W	132.96	126.259	0.10	0.07	1.43
4914.50	2.690	135.470	4912.17	128.01	-82.19	110.48	1854904.29	261639.89	39°13'01.994"N	80°00'43.578"W	137.70	126.646	0.24	-0.16	-3.69
5014.50	2.790	128.230	5012.06	132.59	-85.37	114.04	1854907.85	261636.71	39°13'01.963"N	80°00'43.533"W	142.45	126.818	0.36	0.10	-7.24
5114.50	2.760	122.320	5111.94	137.04	-88.16	117.99	1854911.79	261633.92	39°13'01.935"N	80°00'43.483"W	147.29	126.768	0.29	-0.03	-5.91
5214.50	1.960	133.930	5211.85	140.86	-90.64	121.25	1854915.06	261631.44	39°13'01.911"N	80°00'43.441"W	151.38	126.778	0.93	-0.80	11.61
5314.50	2.190	132.510	5311.79	144.35	-93.11	123.89	1854917.70	261628.97	39°13'01.887"N	80°00'43.407"W	154.98	126.927	0.24	0.23	-1.42
5414.50	2.490	123.590	5411.71	148.17	-95.61	127.11	1854920.92	261626.47	39°13'01.862"N	80°00'43.366"W	159.05	126.948	0.47	0.30	-8.92
5514.50	2.440	133.290	5511.61	152.20	-98.27	130.47	1854924.28	261623.81	39°13'01.836"N	80°00'43.323"W	163.34	126.986	0.42	-0.05	9.70
5614.50	2.340	121.890	5611.53	156.08	-100.81	133.75	1854927.56	261621.27	39°13'01.811"N	80°00'43.281"W	167.49	127.004	0.48	-0.10	-11.40
5714.50	2.440	118.800	5711.44	159.76	-102.91	137.35	1854931.16	261619.17	39°13'01.791"N	80°00'43.236"W	171.63	126.842	0.16	0.10	-3.09
5814.50	2.550	131.130	5811.35	163.74	-105.40	140.89	1854934.70	261616.68	39°13'01.766"N	80°00'43.190"W	175.95	126.799	0.55	0.11	12.33



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# Actual Wellpath Report

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## REFERENCE WELLPATH IDENTIFICATION

Operator	CNX GAS COMPANY, LLC
Area	Barbour County, WV
Field	Barbour
Facility	PHL13 Pad
Slot	Slot B
	PHL13BHS
	Well
	Wellbore
	PHL13BHS AWB

WELLPATH DATA (183 stations)															
MD	Inclination	Azimuth	TVD	Vert Sect	North	East	Grid East	Grid North	Latitude	Longitude	Closure Dist	Closure Dir	DLS	Build Rate	Turn Rate
[ft]	[°]	[°]	[ft]	[ft]	[ft]	[ft]	[US ft]	[US ft]			[ft]	[°]	[%/100ft]	[%/100ft]	[°/100ft]
5914.50	1.450	135.110	5911.28	167.10	-107.76	143.46	1854937.27	261614.32	39°13'01.743"N	80°00'43.158"W	179.42	126.911	1.11	-1.10	3.98
6014.50	2.300	123.960	6011.23	170.16	-109.78	146.02	1854939.83	261612.30	39°13'01.723"N	80°00'43.125"W	182.68	126.935	0.92	0.85	-11.15
6114.50	2.120	122.440	6111.16	173.66	-111.89	149.24	1854943.05	261610.19	39°13'01.703"N	80°00'43.048"W	186.53	126.859	0.19	-0.18	-1.52
6214.50	1.910	130.770	6211.09	176.91	-113.97	152.07	1854945.87	261608.11	39°13'01.682"N	80°00'43.048"W	190.04	126.850	0.36	-0.21	8.33
6314.50	2.300	136.840	6311.03	180.47	-116.52	154.70	1854948.51	261605.56	39°13'01.657"N	80°00'43.014"W	193.67	126.987	0.45	0.39	6.07
6414.50	2.270	126.630	6410.95	184.27	-119.17	157.66	1854951.47	261602.91	39°13'01.631"N	80°00'42.976"W	197.63	127.083	0.41	-0.03	-10.21
6514.50	2.270	123.090	6510.87	187.91	-121.43	160.91	1854954.72	261600.65	39°13'01.609"N	80°00'42.935"W	201.59	127.039	0.14	0.00	-3.54
6612.50	2.310	114.020	6608.79	191.30	-123.29	164.34	1854958.15	261598.79	39°13'01.591"N	80°00'42.891"W	205.45	126.878	0.37	0.04	-9.26
6684.00	4.240	95.300	6680.17	194.43	-124.59	168.21	1854962.01	261597.49	39°13'01.578"N	80°00'42.842"W	209.32	126.527	2.78	2.70	-11.87
6730.00	8.840	97.000	6725.86	197.71	-125.25	173.38	1854967.18	261596.83	39°13'01.572"N	80°00'42.776"W	213.89	125.846	10.39	10.00	-26.37
6824.00	13.820	97.000	6818.00	208.90	-127.05	191.74	1854985.55	261595.03	39°13'01.555"N	80°00'42.543"W	230.01	123.529	5.35	5.30	3.83
6916.00	21.550	102.640	6905.59	227.62	-132.09	219.18	1855012.98	261589.99	39°13'01.507"N	80°00'42.194"W	255.91	121.077	8.60	8.40	6.13
7010.00	29.020	103.580	6990.53	255.94	-141.24	258.24	1855052.04	261580.84	39°13'01.419"N	80°00'41.697"W	294.34	118.675	7.96	7.95	1.00
7104.00	38.710	104.470	7068.49	293.46	-153.97	308.99	1855102.79	261568.11	39°13'01.296"N	80°00'41.051"W	345.22	116.487	10.32	10.31	0.95
7198.00	47.480	104.340	7137.06	339.71	-169.92	371.13	1855164.93	261552.16	39°13'01.142"N	80°00'40.260"W	408.18	114.601	9.33	9.33	-0.14
7294.00	57.920	104.090	7195.16	394.51	-188.64	445.06	1855238.85	261533.44	39°13'00.961"N	80°00'39.320"W	483.38	112.970	10.88	10.88	-0.26
7387.00	69.110	103.150	7236.57	453.61	-208.18	525.83	1855319.63	261513.91	39°13'00.772"N	80°00'38.292"W	565.54	111.598	12.07	12.03	-1.01
7482.00	75.730	104.450	7265.25	518.21	-229.78	613.73	1855407.52	261492.30	39°13'00.564"N	80°00'37.174"W	655.33	110.526	7.09	6.97	1.37
7575.00	75.860	106.070	7288.07	584.13	-253.51	700.70	1855494.49	261468.57	39°13'00.334"N	80°00'36.067"W	745.15	109.890	1.69	0.14	1.74
7670.00	75.920	102.060	7311.24	650.16	-275.90	790.05	1855583.84	261446.19	39°13'00.118"N	80°00'34.930"W	836.84	109.250	4.09	0.06	-4.22
7763.00	75.820	102.050	7333.94	712.57	-294.73	878.25	1855672.03	261427.35	39°12'59.936"N	80°00'33.808"W	926.39	108.551	0.11	-0.11	-0.01
7857.00	75.960	99.380	7356.86	774.09	-311.68	967.82	1855761.59	261410.41	39°12'59.774"N	80°00'32.669"W	1016.77	107.851	2.76	0.15	-2.84
7951.00	75.800	99.600	7379.79	834.16	-326.71	1057.73	1855851.50	261395.38	39°12'59.630"N	80°00'31.526"W	1107.04	107.165	0.28	-0.17	0.23
8046.00	75.790	99.740	7403.10	895.06	-342.18	1148.52	1855942.28	261379.91	39°12'59.483"N	80°00'30.371"W	1198.40	106.590	0.14	-0.01	0.15
8139.00	75.820	97.660	7425.91	953.53	-355.82	1237.63	1856031.40	261366.27	39°12'59.353"N	80°00'29.238"W	1287.77	106.040	2.17	0.03	-2.24
8233.00	75.820	101.600	7448.95	1013.73	-371.06	1327.46	1856121.23	261351.03	39°12'59.207"N	80°00'28.096"W	1378.35	105.617	4.06	0.00	4.19
8326.00	75.920	104.640	7471.66	1077.33	-391.53	1415.29	1856209.05	261330.56	39°12'59.010"N	80°00'26.978"W	1468.44	105.464	3.17	0.11	3.27
8373.00	75.920	106.800	7483.09	1110.91	-403.88	1459.17	1856252.92	261318.21	39°12'58.890"N	80°00'26.420"W	1514.03	105.471	4.46	0.00	4.60
8419.00	74.840	111.740	7494.71	1145.49	-418.56	1501.17	1856294.93	261303.53	39°12'58.747"N	80°00'25.885"W	1558.43	105.580	10.65	-2.35	10.74
8464.00	74.930	113.440	7506.44	1180.78	-435.25	1541.28	1856335.03	261286.85	39°12'58.585"N	80°00'25.375"W	1601.55	105.769	3.65	0.20	3.78



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## REFERENCE WELLPATH IDENTIFICATION

Operator	CNX GAS COMPANY, LLC
Area	Barbour County, WV
Field	Barbour
Facility	PHL13 Pad
Slot	Slot B
Well	PHL13BHS
Wellbore	PHL13BHS AWB

## WELLPATH DATA (183 stations)

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Closure Dist [ft]	Closure Dir [°]	DLS ["/100ft]	Build Rate ["/100ft]	Turn Rate ["/100ft]
8512.00	74.840	118.050	7518.97	1219.83	-455.37	1583.00	1856376.76	261266.72	39°12'58.388"N	80°00'24.843"W	1647.20	106.048	9.27	-0.19	9.60
8558.00	75.260	121.420	7530.84	1258.87	-477.41	1621.59	1856415.34	261244.68	39°12'58.173"N	80°00'24.351"W	1690.40	106.405	7.14	0.91	7.33
8606.00	75.440	122.620	7542.98	1300.52	-502.03	1660.96	1856454.71	261220.06	39°12'57.931"N	80°00'23.849"W	1735.17	106.818	2.45	0.38	2.50
8653.00	76.300	126.910	7554.45	1342.31	-528.02	1698.39	1856492.14	261194.08	39°12'57.677"N	80°00'23.372"W	1778.58	107.270	9.04	1.83	9.13
8700.00	76.970	130.430	7565.32	1385.38	-556.58	1734.09	1856527.83	261165.51	39°12'57.396"N	80°00'22.916"W	1821.22	107.795	7.42	1.43	7.49
8748.00	78.250	133.980	7575.62	1430.42	-588.07	1768.80	1856562.55	261134.02	39°12'57.087"N	80°00'22.473"W	1864.00	108.390	7.70	2.67	7.40
8794.00	79.420	138.920	7584.54	1474.58	-620.77	1799.88	1856593.63	261101.32	39°12'56.765"N	80°00'22.076"W	1903.93	109.029	10.84	2.54	10.74
8840.00	79.480	143.150	7592.96	1519.43	-655.93	1828.31	1856622.06	261066.17	39°12'56.420"N	80°00'21.712"W	1942.41	109.736	9.04	0.13	9.20
8887.00	80.890	146.320	7600.98	1565.65	-693.74	1855.05	1856648.79	261028.36	39°12'56.047"N	80°00'21.370"W	1980.52	110.504	7.29	3.00	6.74
8981.00	81.970	148.160	7614.98	1658.58	-771.90	1905.34	1856699.08	260950.20	39°12'55.278"N	80°00'20.725"W	2055.76	112.054	2.25	1.15	1.96
9075.00	89.380	147.740	7622.07	1752.24	-851.29	1955.05	1856748.79	260870.82	39°12'54.496"N	80°00'20.088"W	2132.35	113.530	7.90	7.88	-0.45
9170.00	90.860	147.760	7621.87	1847.24	-931.63	2005.74	1856799.48	260790.48	39°12'53.704"N	80°00'19.438"W	2211.54	114.914	1.56	1.56	0.02
9263.00	90.890	148.980	7620.45	1940.22	-1010.80	2054.50	1856848.24	260711.31	39°12'52.925"N	80°00'18.813"W	2289.70	116.197	1.31	0.03	1.31
9356.00	89.850	148.980	7619.85	2033.21	-1090.50	2102.43	1856896.16	260631.61	39°12'52.140"N	80°00'18.198"W	2368.42	117.415	1.12	-1.12	0.00
9450.00	89.940	148.560	7620.02	2127.21	-1170.88	2151.16	1856944.90	260551.24	39°12'51.348"N	80°00'17.573"W	2449.18	118.559	0.46	0.10	-0.45
9545.00	90.650	150.030	7619.53	2222.19	-1252.56	2199.67	1856993.40	260469.56	39°12'50.543"N	80°00'16.951"W	2531.30	119.658	1.72	0.75	1.55
9638.00	90.740	150.970	7618.40	2315.11	-1333.49	2245.46	1857039.19	260388.63	39°12'49.746"N	80°00'16.364"W	2611.57	120.704	1.02	0.10	1.01
9730.00	90.680	151.250	7617.26	2406.99	-1414.04	2289.91	1857083.64	260308.09	39°12'48.952"N	80°00'15.793"W	2691.32	121.696	0.31	-0.07	0.30
9824.00	90.860	152.260	7616.00	2500.81	-1496.84	2334.39	1857128.11	260225.29	39°12'48.136"N	80°00'15.222"W	2773.06	122.668	1.09	0.19	1.07
9919.00	91.200	149.400	7614.29	2595.69	-1579.77	2380.68	1857174.40	260142.36	39°12'47.319"N	80°00'14.628"W	2857.15	123.567	3.03	0.36	-3.01
10012.00	92.250	145.530	7611.49	2688.62	-1658.12	2430.66	1857224.38	260064.01	39°12'46.548"N	80°00'13.988"W	2942.36	124.301	4.31	1.13	-4.16
10109.00	92.650	147.150	7607.35	2785.47	-1738.78	2484.37	1857278.10	259983.36	39°12'45.753"N	80°00'13.300"W	3032.40	124.988	1.72	0.41	1.67
10201.00	91.910	147.540	7603.69	2877.39	-1816.18	2533.98	1857327.70	259905.96	39°12'44.991"N	80°00'12.664"W	3117.62	125.630	0.91	-0.80	0.42
10297.00	91.720	145.470	7600.64	2973.29	-1896.19	2586.92	1857380.64	259825.95	39°12'44.203"N	80°00'11.986"W	3207.45	126.241	2.16	-0.20	-2.16
10391.00	91.140	144.690	7598.30	3067.11	-1973.24	2640.72	1857434.43	259748.90	39°12'43.445"N	80°00'11.297"W	3296.52	126.768	1.03	-0.62	-0.83
10485.00	90.520	145.100	7596.94	3160.94	-2050.13	2694.77	1857488.48	259672.01	39°12'42.688"N	80°00'10.605"W	3385.97	127.263	0.79	-0.66	0.44
10579.00	90.890	145.610	7595.78	3254.81	-2127.46	2748.20	1857541.91	259594.69	39°12'41.926"N	80°00'09.920"W	3475.44	127.744	0.67	0.39	0.54
10673.00	91.350	147.790	7593.94	3348.75	-2206.01	2799.80	1857593.51	259516.15	39°12'41.153"N	80°00'09.259"W	3564.45	128.235	2.37	0.49	2.32
10769.00	91.320	148.240	7591.71	3444.72	-2287.41	2850.63	1857644.34	259434.75	39°12'40.351"N	80°00'08.608"W	3654.91	128.744	0.47	-0.03	0.47
10864.00	91.170	147.550	7589.64	3539.70	-2367.86	2901.11	1857694.82	259354.30	39°12'39.559"N	80°00'07.961"W	3744.76	129.221	0.74	-0.16	-0.73



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## REFERENCE WELLPATH IDENTIFICATION

Operator	CNX GAS COMPANY, LLC	Slot	Slot B
Area	Barbour County, WV	Well	PHL13BHS
Field	Barbour	Wellbore	PHL13BHS AWB
Facility	PHL13 Pad		

## WELLPATH DATA (183 stations)

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Closure Dist [ft]	Closure Dir [°]	DLS ["/100ft]	Build Rate ["/100ft]	Turn Rate ["/100ft]
10957.00	91.200	146.590	7587.72	3632.65	-2445.90	2951.66	1857745.36	259276.26	39°12'38.790"N	80°00'07.313"W	3833.37	129.647	1.03	0.03	-1.03
11053.00	91.420	147.170	7585.52	3728.60	-2526.28	3004.10	1857797.80	259195.88	39°12'37.999"N	80°00'06.641"W	3925.14	130.062	0.65	0.23	0.60
11148.00	91.320	150.260	7583.25	3823.56	-2607.44	3053.41	1857847.11	259114.73	39°12'37.199"N	80°00'06.009"W	4015.23	130.495	3.25	-0.11	3.25
11241.00	91.510	153.540	7580.95	3916.33	-2689.44	3097.19	1857890.89	259032.73	39°12'36.391"N	80°00'05.447"W	4101.91	130.969	3.53	0.20	3.53
11337.00	91.260	153.830	7578.63	4011.87	-2775.47	3139.74	1857933.44	258946.71	39°12'35.543"N	80°00'04.900"W	4190.60	131.476	0.40	-0.26	0.30
11431.00	91.290	149.340	7576.54	4105.67	-2858.10	3184.45	1857978.14	258864.08	39°12'34.729"N	80°00'04.326"W	4278.95	131.909	4.78	0.03	-4.78
11524.00	91.350	145.200	7574.40	4198.61	-2936.30	3234.70	1858028.40	258785.88	39°12'33.959"N	80°00'03.682"W	4368.66	132.232	4.45	0.06	-4.45
11618.00	91.420	145.440	7572.13	4292.46	-3013.57	3288.17	1858081.87	258708.61	39°12'33.198"N	80°00'02.997"W	4460.24	132.505	0.27	0.07	0.26
11715.00	91.230	146.440	7569.88	4389.35	-3093.91	3342.48	1858136.18	258628.28	39°12'32.407"N	80°00'02.302"W	4554.61	132.788	1.05	-0.20	1.03
11810.00	91.390	146.230	7567.71	4484.27	-3172.96	3395.13	1858188.82	258549.23	39°12'31.629"N	80°00'01.627"W	4647.00	133.063	0.28	0.17	-0.22
11902.00	90.340	147.220	7566.32	4576.23	-3249.86	3445.60	1858239.29	258472.33	39°12'30.871"N	80°00'00.981"W	4736.43	133.325	1.57	-1.14	1.08
11996.00	89.850	148.930	7566.17	4670.22	-3329.64	3495.31	1858288.99	258392.55	39°12'30.086"N	80°00'00.344"W	4827.39	133.609	1.89	-0.52	1.82
12091.00	89.910	150.640	7566.37	4765.19	-3411.73	3543.11	1858336.80	258310.47	39°12'29.277"N	79°59'59.731"W	4918.70	133.918	1.80	0.06	1.80
12186.00	90.280	151.170	7566.21	4860.08	-3494.74	3589.31	1858382.99	258227.46	39°12'28.459"N	79°59'59.138"W	5009.63	134.235	0.68	0.39	0.56
12280.00	90.550	151.320	7565.53	4953.95	-3577.15	3634.53	1858428.21	258145.05	39°12'27.647"N	79°59'58.558"W	5099.59	134.544	0.33	0.29	0.16
12374.00	90.340	151.460	7564.80	5047.81	-3659.67	3679.54	1858473.22	258062.54	39°12'26.834"N	79°59'57.980"W	5189.62	134.845	0.27	-0.22	0.15
12469.00	89.940	149.380	7564.57	5142.74	-3742.28	3726.43	1858520.11	257979.93	39°12'26.020"N	79°59'57.379"W	5281.19	135.122	2.23	-0.42	-2.19
12564.00	89.940	148.250	7564.66	5237.73	-3823.55	3775.62	1858569.30	257898.66	39°12'25.219"N	79°59'56.748"W	5373.54	135.361	1.19	0.00	-1.19
12659.00	89.480	146.520	7565.15	5332.72	-3903.57	3826.82	1858620.50	257818.65	39°12'24.431"N	79°59'56.092"W	5466.48	135.569	1.88	-0.48	-1.82
12754.00	89.910	145.100	7565.65	5427.63	-3982.15	3880.20	1858673.88	257740.07	39°12'23.658"N	79°59'55.408"W	5559.99	135.743	1.56	0.45	-1.49
12849.00	89.380	144.110	7566.24	5522.43	-4059.59	3935.23	1858728.90	257662.90	39°12'22.895"N	79°59'54.704"W	5653.87	135.891	1.18	-0.56	-1.04
12943.00	88.950	144.770	7567.61	5616.21	-4136.05	3989.89	1858783.56	257585.60	39°12'22.143"N	79°59'54.004"W	5746.83	136.030	0.84	-0.46	0.70
13038.00	89.010	147.330	7569.30	5711.11	-4214.83	4042.93	1858836.60	257507.39	39°12'21.367"N	79°59'53.325"W	5840.39	136.193	2.70	0.06	2.69
13132.00	88.460	149.870	7571.38	5805.08	-4295.04	4091.89	1858885.55	257427.19	39°12'20.577"N	79°59'52.697"W	5932.19	136.388	2.76	-0.59	2.70
13226.00	88.340	150.520	7574.00	5898.99	-4376.58	4138.59	1858932.25	257345.66	39°12'19.773"N	79°59'52.098"W	6023.48	136.601	0.70	-0.13	0.69
13320.00	88.430	150.450	7576.65	5992.88	-4458.34	4184.88	1858978.54	257263.89	39°12'18.968"N	79°59'51.504"W	6114.74	136.812	0.12	0.10	-0.07
13415.00	88.860	149.840	7578.90	6087.81	-4540.71	4232.16	1859025.82	257181.53	39°12'18.156"N	79°59'50.898"W	6207.19	137.014	0.79	0.45	-0.64
13509.00	88.860	147.270	7580.77	6181.78	-4620.89	4281.19	1859074.84	257101.36	39°12'17.367"N	79°59'50.269"W	6299.30	137.185	2.73	0.00	-2.73
13604.00	88.310	145.940	7583.11	6276.71	-4700.17	4333.46	1859127.11	257022.07	39°12'16.586"N	79°59'49.600"W	6393.00	137.325	1.51	-0.58	-1.40
13699.00	86.920	145.780	7587.07	6371.54	-4778.73	4386.73	1859180.38	256943.51	39°12'15.812"N	79°59'48.918"W	6486.88	137.449	1.47	-1.46	-0.17



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# Actual Wellpath Report

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PHL13BHS

## REFERENCE WELLPATH IDENTIFICATION

Operator	CNX GAS COMPANY, LLC	Slot	Slot B
Area	Barbour County, WV	Well	PHL13BHS
Field	Barbour	Wellbore	PHL13BHS AWB
Facility	PHL13 Pad		

## WELLPATH DATA (183 stations)

MD	Inclination	Azimuth	TVD	Vert Sect	North	East	Grid East	Grid North	Latitude	Longitude	Closure Dist	Closure Dir	DLS	Build Rate	Turn Rate
[ft]	[°]	[°]	[ft]	[ft]	[ft]	[ft]	[US ft]	[US ft]	[Latitude]	[Longitude]	[ft]	[°]	[%/100ft]	[%/100ft]	[°/100ft]
13793.00	86.550	147.540	7592.42	6465.34	-4857.13	4438.30	1859231.95	256865.12	39°12'15.04"N	79°59'48.25"W	6579.53	137.580	1.91	-0.39	1.87
13887.00	86.950	147.510	7597.75	6559.18	-4936.31	4488.69	1859282.34	256785.95	39°12'14.26"N	79°59'47.61"W	6671.99	137.719	0.43	0.43	-0.03
13982.00	86.950	149.220	7607.76	6747.82	-5098.93	4584.37	1859378.01	256623.33	39°12'12.65"N	79°59'46.385"W	6856.79	138.042	3.17	0.06	3.17
14169.00	86.920	153.060	7612.68	6840.42	-5181.40	4627.06	1859420.71	256540.86	39°12'11.845"N	79°59'45.836"W	6946.70	138.235	0.93	-0.10	0.92
14264.00	86.950	150.640	7617.76	6935.09	-5265.04	4671.81	1859465.46	256457.22	39°12'11.021"N	79°59'45.262"W	7038.93	138.416	2.54	0.03	-2.55
14359.00	86.740	147.660	7622.99	7029.93	-5346.47	4720.45	1859514.09	256375.80	39°12'10.219"N	79°59'44.639"W	7132.13	138.558	3.14	-0.22	-3.14
14453.00	86.890	144.350	7628.22	7123.69	-5424.27	4772.92	1859566.56	256298.00	39°12'09.453"N	79°59'43.967"W	7225.19	138.655	3.52	0.16	-3.52
14548.00	87.070	142.830	7633.22	7218.24	-5500.62	4829.23	1859622.86	256221.66	39°12'08.701"N	79°59'43.246"W	7319.71	138.719	1.61	0.19	-1.60
14641.00	87.110	147.980	7637.95	7310.98	-5577.05	4881.94	1859675.58	256145.23	39°12'07.949"N	79°59'42.571"W	7411.94	138.802	5.53	0.04	5.54
14735.00	87.780	148.980	7642.14	7404.88	-5657.10	4931.04	1859724.67	256065.18	39°12'07.160"N	79°59'41.942"W	7504.52	138.923	1.28	0.71	1.06
14830.00	89.230	149.980	7644.62	7499.82	-5738.90	4979.26	1859772.89	255983.38	39°12'06.354"N	79°59'41.324"W	7597.90	139.054	1.85	1.53	1.05
14925.00	88.430	149.030	7646.56	7594.78	-5820.74	5027.46	1859821.09	255901.54	39°12'05.548"N	79°59'40.706"W	7691.32	139.182	1.31	-0.84	-1.00
15019.00	89.940	148.470	7647.89	7688.76	-5901.10	5076.22	1859869.85	255821.19	39°12'04.757"N	79°59'40.081"W	7784.02	139.297	1.71	1.61	-0.60
15114.00	89.940	147.720	7647.99	7783.76	-5981.74	5126.43	1859920.05	255740.55	39°12'03.962"N	79°59'39.437"W	7877.91	139.403	0.79	0.00	-0.79
15209.00	90.060	146.630	7647.99	7878.74	-6061.57	5177.92	1859971.55	255660.72	39°12'03.176"N	79°59'38.778"W	7972.05	139.495	1.15	0.13	-1.15
15304.00	90.890	148.680	7647.20	7973.73	-6141.82	5228.74	1860022.37	255580.47	39°12'02.386"N	79°59'38.126"W	8066.09	139.591	2.33	0.87	2.16
15398.00	90.830	148.500	7645.79	8067.72	-6222.04	5277.73	1860071.35	255500.26	39°12'01.596"N	79°59'37.499"W	8158.93	139.694	0.20	-0.06	-0.19
15493.00	90.860	147.740	7644.39	8162.70	-6302.70	5327.90	1860121.52	255419.60	39°12'00.801"N	79°59'36.856"W	8252.91	139.791	0.80	0.03	-0.80
15587.00	90.890	148.270	7642.96	8256.69	-6382.41	5377.70	1860171.31	255339.89	39°12'00.016"N	79°59'36.218"W	8345.95	139.883	0.56	0.03	0.56
15681.00	90.920	148.830	7641.47	8350.68	-6462.59	5426.73	1860220.35	255259.71	39°11'59.226"N	79°59'35.589"W	8438.87	139.979	0.60	0.03	0.60
15774.00	90.890	149.100	7640.00	8443.66	-6542.27	5474.68	1860268.29	255180.04	39°11'58.441"N	79°59'34.975"W	8530.73	140.077	0.29	-0.03	0.29
15870.00	91.020	148.920	7638.40	8539.64	-6624.56	5524.10	1860317.71	255097.76	39°11'57.631"N	79°59'34.341"W	8625.57	140.176	0.23	0.14	-0.19
15965.00	90.950	149.390	7636.77	8634.61	-6706.11	5572.80	1860366.41	255016.21	39°11'56.827"N	79°59'33.717"W	8719.40	140.273	0.50	-0.07	0.49
16059.00	90.800	150.140	7635.33	8728.57	-6787.31	5620.13	1860413.73	254935.01	39°11'56.027"N	79°59'33.110"W	8812.12	140.374	0.81	-0.16	0.80
16154.00	90.520	146.490	7634.24	8823.55	-6868.13	5670.01	1860463.62	254854.19	39°11'55.231"N	79°59'32.471"W	8906.19	140.458	3.85	-0.29	-3.84
16246.00	90.370	145.720	7633.53	8915.48	-6944.49	5721.32	1860514.92	254777.83	39°11'54.479"N	79°59'31.814"W	8997.75	140.516	0.85	-0.16	-0.84
16340.00	90.430	144.310	7632.87	9009.32	-7021.50	5775.21	1860568.81	254700.82	39°11'53.721"N	79°59'31.124"W	9091.46	140.563	1.50	0.06	-1.50
16435.00	90.370	145.110	7632.21	9104.14	-7099.04	5830.09	1860623.69	254623.29	39°11'52.957"N	79°59'30.421"W	9186.21	140.605	0.84	-0.06	0.84
16530.00	90.400	146.950	7631.57	9199.06	-7177.83	5883.17	1860676.77	254544.51	39°11'52.182"N	79°59'29.742"W	9280.78	140.661	1.94	0.03	1.94





# Actual Wellpath Report

PHL13BHS AWP Proj: 16688'  
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**REFERENCE WELLPATH IDENTIFICATION**

Operator	CNX GAS COMPANY, LLC	Slot	Slot B
Area	Barbour County, WV	Well	PHL13BHS
Field	Barbour	Wellbore	PHL13BHS AWB
Facility	PHL13 Pad		

**WELLPATH DATA (183 stations)**

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Closure Dist [ft]	Closure Dir [°]	DLS [°/100ft]	Build Rate [°/100ft]	Turn Rate [°/100ft]
16623.00	90.430	147.660	7630.89	9292.04	-7256.09	5933.40	1860727.00	254466.25	39°11'51.411"N	79°59'29.098"W	9373.16	140.727	0.76	0.03	0.76
16662.00	90.460	147.540	7630.59	9331.04	-7289.02	5954.30	1860747.90	254433.32	39°11'51.087"N	79°59'28.831"W	9411.88	140.755	0.32	0.08	-0.31
16688.00	90.460	147.540	7630.38	9357.03	-7310.95	5968.25	1860761.85	254411.39	39°11'50.870"N	79°59'28.652"W	9437.69	140.774	0.00	0.00	0.00

**HOLE & CASING SECTIONS - Ref Wellbore: PHL13BHS AWB Ref Wellpath: PHL13BHS AWP Proj: 16688'**

String/Diameter	Start MD [ft]	End MD [ft]	Interval [ft]	Start TVD [ft]	End TVD [ft]	Start N/S [ft]	Start E/W [ft]	End N/S [ft]	End E/W [ft]
9.625in Casing	24.50	2033.50	2009.00	24.50	2033.15	0.00	0.00	-24.16	25.03

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**Actual Wellpath Report**  
 PHL13BHS AWP Proj: 16688'  
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PHL13BHS

**REFERENCE WELLPATH IDENTIFICATION**

Operator	CNX GAS COMPANY, LLC	Slot	Slot B
Area	Barbour County, WV	Well	PHL13BHS
Field	Barbour	Wellbore	PHL13BHS AWB
Facility	PHL13 Pad		

Name	MD [ft]	TVD [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Shape
PHL13BHS PBHL Plat	7471.12	-7318.68	5955.83	1860749.43	254403.66	39°11'50.793"N	79°59'28.809"W	point	
PHL13BHS PBHL Rev-1	7478.10	-7318.68	5955.83	1860749.43	254403.66	39°11'50.793"N	79°59'28.809"W	point	
PHL13BHS LP:Rev-1	7605.05	-792.66	1920.56	1856714.30	260929.44	39°12'55.073"N	80°00'20.530"W	point	
PHL13BHS LP:Rev-2	7612.00	-792.66	1920.56	1856714.30	260929.44	39°12'55.073"N	80°00'20.530"W	point	
PHL13BHS LP2 Plat	7652.09	-621.29	1814.65	1856608.40	261100.81	39°12'56.761"N	80°00'21.888"W	point	

<b>WELLPATH COMPOSITION - Ref Wellbore: PHL13BHS AWB Ref Wellpath: PHL13BHS AWP Proj: 16688'</b>										
Start MD [ft]	End MD [ft]	Positional Uncertainty Model	Log Name/Comment	Wellbore						
24.50	6612.50	Generic gyro - northseeking (Standard)	Excel Gyro (100'-6598')	PHL13BHS AWB						
6612.50	16662.00	NavTrak (MagCorr)	BHI MWD Surveys (6612.5')(6684'-16662')	PHL13BHS AWB						
16662.00	16688.00	Blind Drilling (std)	Projection to bit	PHL13BHS AWB						



## Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	9/24/2013
Job End Date:	10/30/2013
State:	West Virginia
County:	Barbour
API Number:	47-001-03221-00-00
Operator Name:	CONSOL Energy Inc.
Well Name and Number:	PHL13BHS
Longitude:	-80.01339700
Latitude:	39.21562600
Datum:	NAD83
Federal/Tribal Well:	NO
True Vertical Depth:	7,637
Total Base Water Volume (gal):	10,547,525
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	Customer	Base Fluid					
			Water	7732-18-5	100.00000	90.25610	
Sand (Proppant)	CWS	Propping Agent					
			Silicon Dioxide	14808-60-7	100.00000	9.66470	
DWP-NE1	CWS	Non-Emulsifier					
			Dimethylcocoamine, bis (chlorethyl)ether, diquatary ammonium salt	68607-28-03	40.00000	0.01580	
			Isopropyl alcohol	67-63-0	40.00000	0.01580	
			Methyl Alcohol	67-56-1	15.00000	0.00590	
			Dimethyldiallylammonium Chloride	7398-69-8	5.00000	0.00200	
DAP-903	CWS	Scale Inhibitor					
			No Hazardous Materials	NA	100.00000	0.01570	
BioClear 2000	CWS	Biocide					
			2,2-Dibromo-3-Nitrilopropionamide	10222-01-2	40.00000	0.01040	
DWP-111	CWS	Gel Slurry					
			No Hazardous Materials	NA	100.00000	0.00780	
DWP-614	CWS	Viscosifier					
			Polyethylene glycol nonylphenyl ether	9016-45-9	5.00000	0.00560	

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PHL13BHS

DWP-901	CWS	Breaker	Ammonium Persulfate	7727-54-0	95.00000	0.00020
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)