

pm  
Page 1 of 21  
March 28, 2014

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

API 47-001-03223W County Barbour District Pleasant  
Quad Philippi Pad Name PHL13HS Field/Pool Name Philippi  
Farm name MCCAULEY, RANDALL Well Number PHL13DHS 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 4,341,376.901m Easting 585,254.130m  
Landing Point of Curve Northing 4,341,249.746m Easting 585,261.204m  
Bottom Hole Northing 4,338,873.220m Easting 586,769.049m

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.

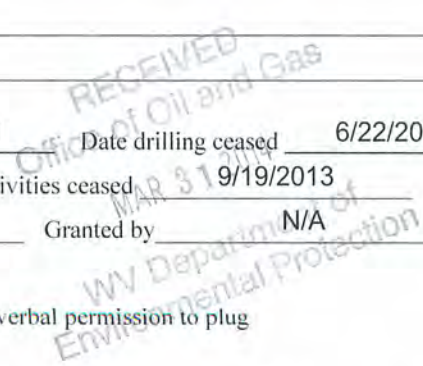
Date permit issued 02/12/2013 Date drilling commenced 9/6/2011 Date drilling ceased 6/22/2013  
Date completion activities began 8/22/2013 Date completion activities ceased 9/19/2013  
Verbal plugging (Y/N) N/A Date permission granted N/A Granted by N/A

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

Freshwater depth(s) ft None Reported 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:  
Stowpelle

04/25/2014



API 47-001 - 03223W Farm name MCCAULEY, RANDALL Well number PHL13DHS 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"	103'	N	L.S. 81.3 / 103'	N/A	Y
Surface	17 1/2"	13 3/8"	662'	N	J-55 54.5 / 662'	38'/123'	Y
Coal	-	-	-	-	-	-	-
Intermediate 1	12 3/8"	9 5/8"	1989'	N	J-55 36 / 1989'	82'/165'	Y
Intermediate 2	-	-	-	-	-	-	-
Intermediate 3	-	-	-	-	-	-	-
Production	8 3/4"	5 1/2"	15392'	N	P-110 20 / 15392'	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	155	Surface	8
Surface	Class A	530	15.2	1.39	1125	Surface	8
Coal	-	-	-	-	-	-	-
Intermediate 1	Class A	660	15.2	1.18	831	Surface	8
Intermediate 2	-	-	-	-	-	-	-
Intermediate 3	-	-	-	-	-	-	-
Production	Class A (Lead) / Class A (Tail)	886 / 2021	14.2 / 14.8	1.26	3680.54	2000'	8
Tubing	-	-	-	-	-	-	-

Drillers TD (ft) 7659.92' Loggers TD (ft) 7843'  
 Deepest formation penetrated Lower Marcellus Plug back to (ft) N/A  
 Plug back procedure N/A

Kick off depth (ft) 6376'

Check all wireline logs run  caliper  density  deviated/directional  induction  
 neutron  resistivity  gamma ray  temperature  sonic

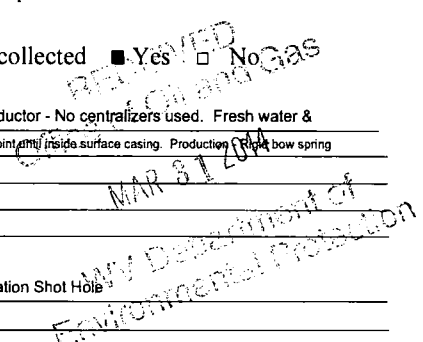
Well cored  Yes  No Conventional Sidewall Were cuttings collected  Yes  No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING Conductor - No centralizers used. Fresh water & 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, and inside surface casing. Production - 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 47-001-03223W Farm name MCCAULEY, RANDALL Well number PHL13DHS Rework

PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number Of Perforations	Formation(s)
1	8/22/2013	15252	15157	4	Marcellus
2	8/23/2013	15128	15006	5	Marcellus
3	8/24/2013	14978	14856	5	Marcellus
4	8/24/2013	14824	14666	5	Marcellus
5	8/25/2013	14404	14309	4	Marcellus
6	8/26/2013	14280	14158	5	Marcellus
7	8/26/2013	14130	14008	5	Marcellus
8	8/27/2013	13980	13858	5	Marcellus
9	8/27/2013	13830	13708	5	Marcellus
10	8/28/2013	13680	13558	5	Marcellus
11	8/29/2013	13530	13408	5	Marcellus
12	9/3/2013	13380	13258	5	Marcellus
13	9/4/2013	13230	13108	5	Marcellus
14	9/4/2013	13080	12958	5	Marcellus
15	9/5/2013	12930	12808	5	Marcellus
16	9/5/2013	12780	12658	5	Marcellus
17	9/6/2013	12630	12508	5	Marcellus
18	9/6/2013	12480	12358	5	Marcellus
19	9/7/2013	12330	12208	5	Marcellus
20	9/8/2013	12180	12058	5	Marcellus
21	9/8/2013	12030	11908	5	Marcellus
22	9/9/2013	11880	11758	5	Marcellus
23	9/10/2013	11730	11608	5	Marcellus
24	9/10/2013	11580	11458	5	Marcellus
25	9/11/2013	11430	11308	5	Marcellus
26	9/11/2013	11280	11158	5	Marcellus
27	9/12/2013	11130	11008	5	Marcellus
28	9/12/2013	10980	10858	5	Marcellus
29	9/12/2013	10830	10708	5	Marcellus
30	9/12/2013	10680	10558	5	Marcellus
31	9/13/2013	10530	10408	5	Marcellus
32	9/13/2013	10380	10258	5	Marcellus
33	9/13/2013	10230	10108	5	Marcellus
34	9/14/2013	10080	9958	5	Marcellus

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PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number Of Perforations	Formation(s)
35	9/14/2013	9930	9808	5	Marcellus
36	9/14/2013	9780	9658	5	Marcellus
37	9/15/2013	9630	9508	5	Marcellus
38	9/16/2013	9630	9508	5	Marcellus
39	9/17/2013	9330	9208	5	Marcellus
40	9/17/2013	9180	9058	5	Marcellus
41	9/17/2013	9030	8908	5	Marcellus
42	9/18/2013	8880	8758	5	Marcellus
43	9/18/2013	8730	8608	5	Marcellus
44	9/18/2013	8580	8458	5	Marcellus
45	9/19/2013	8430	8308	5	Marcellus
46	9/19/2013	8280	8158	5	Marcellus
47	9/19/2013	8130	8008	5	Marcellus
48	9/19/2013	7980	7858	5	Marcellus

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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)
1	8/22/2013	71.9	8619	8800	6533	194650	7209	3847
2	8/23/2013	56	8276	7121	6535	199350	6287	3662
3	8/24/2013	68.1	8389	8321	4945	200580	5078	3521
4	8/24/2013	67	8560	6673	7004	206750	6887	3675
5	8/25/2013	67.8	8016	6746	5854	202100	4891	3437
6	8/26/2013	59.4	8339	6748	5004	198950	5029	3443
7	8/26/2013	67.3	8033	7203	4990	200500	4674	6423
8	8/27/2013	59.5	8192	7009	6552	130450	5283	3506
9	8/27/2013	66.4	7834	6438	5324	199800	5145	3450
10	8/28/2013	87.9	8842	6612	5132	201750	5130	3489
11	8/29/2013	96	8574	6351	5986	202000	5173	3554
12	9/3/2013	78.7	8636	6616	5593	201300	5170	3572
13	9/4/2013	79.4	8044	6546	5808	201250	4786	3560
14	9/4/2013	84.1	8510	6271	5913	200900	4838	3476
15	9/5/2013	79.7	8047	6525	5317	197300	5038	3424
16	9/5/2013	85.9	8135	6331	6195	186000	5103	3486
17	9/6/2013	80.9	8094	6430	6043	200450	5134	3329
18	9/6/2013	75.1	8029	6583	5696	198250	5087	3476
19	9/7/2013	75	8011	6385	5990	200200	5357	3530
20	9/8/2013	76.2	8050	6602	6152	201000	5146	3473
21	9/8/2013	73	8130	6928	6373	200000	4848	3554
22	9/9/2013	68	8222	7444	5461	243200	6175	3696
23	9/10/2013	75.5	8144	7177	6334	201400	5132	3498
24	9/10/2013	75.3	8192	6909	5665	201450	6970	3666
25	9/11/2013	75.2	8016	6756	6022	203400	5120	3573
26	9/11/2013	78.2	8109	6870	5873	200700	5140	3503
27	9/12/2013	81.4	8143	6430	6199	201200	5167	3569
28	9/12/2013	83.5	7971	6258	5498	200150	5150	3433
29	9/12/2013	80.2	7839	6238	6074	202800	5109	3437
30	9/12/2013	99	8496	6239	5710	201300	5277	3549
31	9/13/2013	82.4	8031	6714	6045	201500	5336	3394
32	9/13/2013	84	8037	7045	6031	200900	5081	3554
33	9/13/2013	84.9	8091	6416	5969	208700	5096	3477
34	9/14/2013	98.8	8588	6034	6109	201250	5061	3384
35	9/14/2013	88.9	7814	6489	5822	202650	5019	3377
36	9/14/2013	99.9	8379	6485	5677	201500	5032	3377
37	9/15/2013	86	8159	5923	5687	157600	7223	3659

04/25/2014



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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	9/16/2013	83.4	8102	7859	5456	200650	5780	3597
39	9/17/2013	86.6	7722	5963	5798	200900	4999	3470
40	9/17/2013	87.1	7954	7156	5621	201450	4947	3373
41	9/17/2013	71.2	7939	7062	5744	207000	5303	3538
42	9/18/2013	89.4	7808	6611	6007	201150	4653	3335
43	9/18/2013	93.6	8027	6619	6287	200650	4670	3268
44	9/18/2013	72.6	8680	7250	5918	96700	5384	3552
45	9/19/2013	88.6	8074	6387	5463	200950	5542	3553
46	9/19/2013	72.4	7995	6926	5371	199150	7300	4095
47	9/19/2013	89.4	7208	6101	5800	200500	4522	3275
48	9/19/2013	89.4	7234	6220	5722	200900	4721	3278

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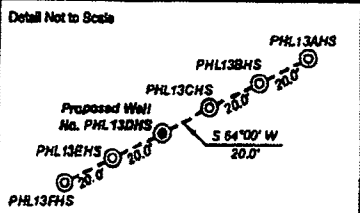
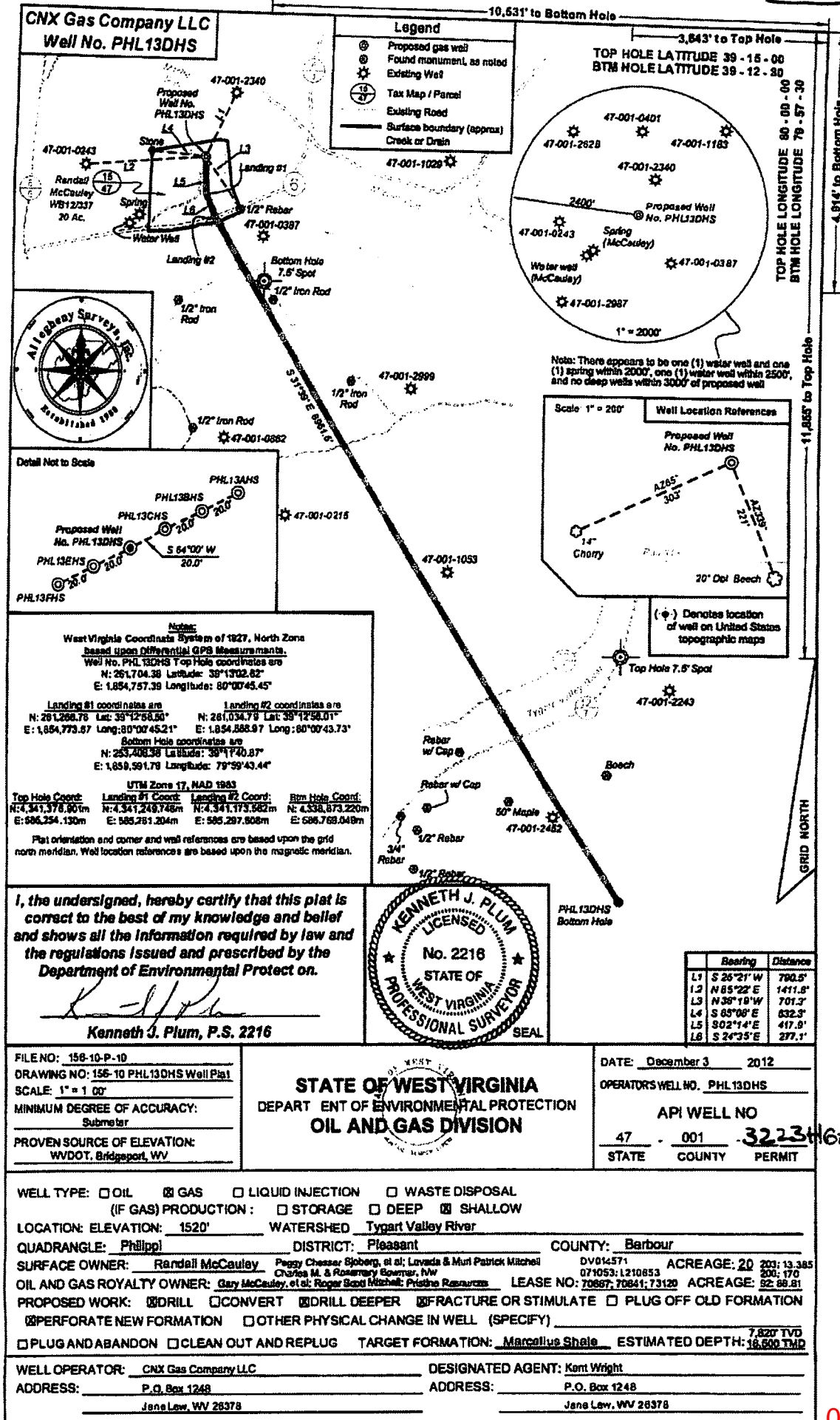




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LITHOLOGY / FORMATION	TOP	BOTTOM	TOP	BOTTOM	DESCRIBE ROCK TYPE AND RECORD QUANTITY TYPE OF FLUID (FRESHWATER,BRINE,GAS,H2S, ETC)
	DEPTH IN FT TVD	DEPTH IN FT TVD	DEPTH IN FT MD	DEPTH IN FT MD	
FILL	0	30			Brown
SAND/SHALE	30	190			Gray
COAL	190	195			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	7335	7355	7420	7445	
TULLY LIMESTONE	7355	7414	7445	7523	
HAMILTON SHALE	7414	7580	7523	7813	
UPPER MARCELLUS	7580	7592	7813	7847	
PURCELL	7592	7595	7847	7854	
MIDDLE MARCELLUS	7595	7628	7854	7988	
CHERRY VALLEY	7628	7638	7988	8050	
LOWER MARCELLUS	7638	7678	8050		
ONONDAGA LIMESTONE	7678	7692			
HUNTERSVILLE CHERT	7692				
LTD	7843				

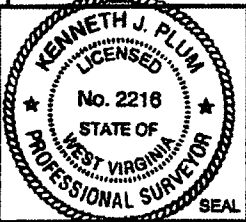
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**Notes:**  
 West Virginia Coordinate System of 1927, North Zone based upon differential GPS measurements.  
 Well No. PHL 13DHS Top Hole coordinates are N: 261,704.38 Longitude: 38°13'02.82" E: 1,854,757.39 Longitude: 80°00'43.45"  
 Landing #1 coordinates are N: 261,266.78 Lon: 38°12'58.50" E: 1,854,773.87 Long: 80°00'45.21" Landing #2 coordinates are N: 261,034.79 Lat: 38°12'58.01" E: 1,854,868.97 Long: 80°00'43.73"  
 Bottom Hole coordinates are N: 263,408.38 Longitude: 38°17'40.87" E: 1,859,591.78 Longitude: 79°59'43.44"  
 UTM Zone 17, MAD 1983  
 Top Hole Coord: N: 4,341,378.90m E: 686,254.130m Landing #1 Coord: N: 4,341,249.748m E: 685,281.204m Landing #2 Coord: N: 4,341,173.562m E: 685,297.808m Bottom Hole Coord: N: 4,338,873.220m E: 686,768.048m  
 Plat orientation and corner and well references 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 on.

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



	Bearing	Distance
L1	S 26°21' W	760.5'
L2	N 65°22' E	1411.5'
L3	N 38°10' W	701.3'
L4	S 65°06' E	632.3'
L5	S 02°14' E	417.9'
L6	S 24°35' E	277.1'

FILE NO: 156-10-P-10  
 DRAWING NO: 156-10 PHL13DHS Well Plat  
 SCALE: 1" = 100'  
 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 3, 2012  
 OPERATOR'S WELL NO. PHL 13DHS  
 API WELL NO. 47-001-3223-16A  
 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 Peggy Chesser Sjoberg, et al; Lavada & Muri Patrick Mitchell DV014571 ACREAGE: 20 203; 13.385  
 Charles M. & Rosemary Bowmer, NW 071053; 1210853 200; 170  
 OIL AND GAS ROYALTY OWNER: Gary McCauley, et al; Roger Scott Mitchell; Pristina Resources LEASE NO: 70667; 70641; 73120 ACREAGE: 52; 86.81  
 PROPOSED WORK:  DRILL  CONVERT  DRILL DEEPER  FRACTURE OR STIMULATE  PLUG OFF OLD FORMATION  
 PERFORM A NEW FORMATION  OTHER PHYSICAL CHANGE IN WELL (SPECIFY) \_\_\_\_\_  
 PLUG AND ABANDON  CLEAN OUT AND REPLUG TARGET FORMATION: Marcellus Shale ESTIMATED DEPTH: 7,820' TMD  
 16,500' TMD

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



47-001-03223

PHL13DHS

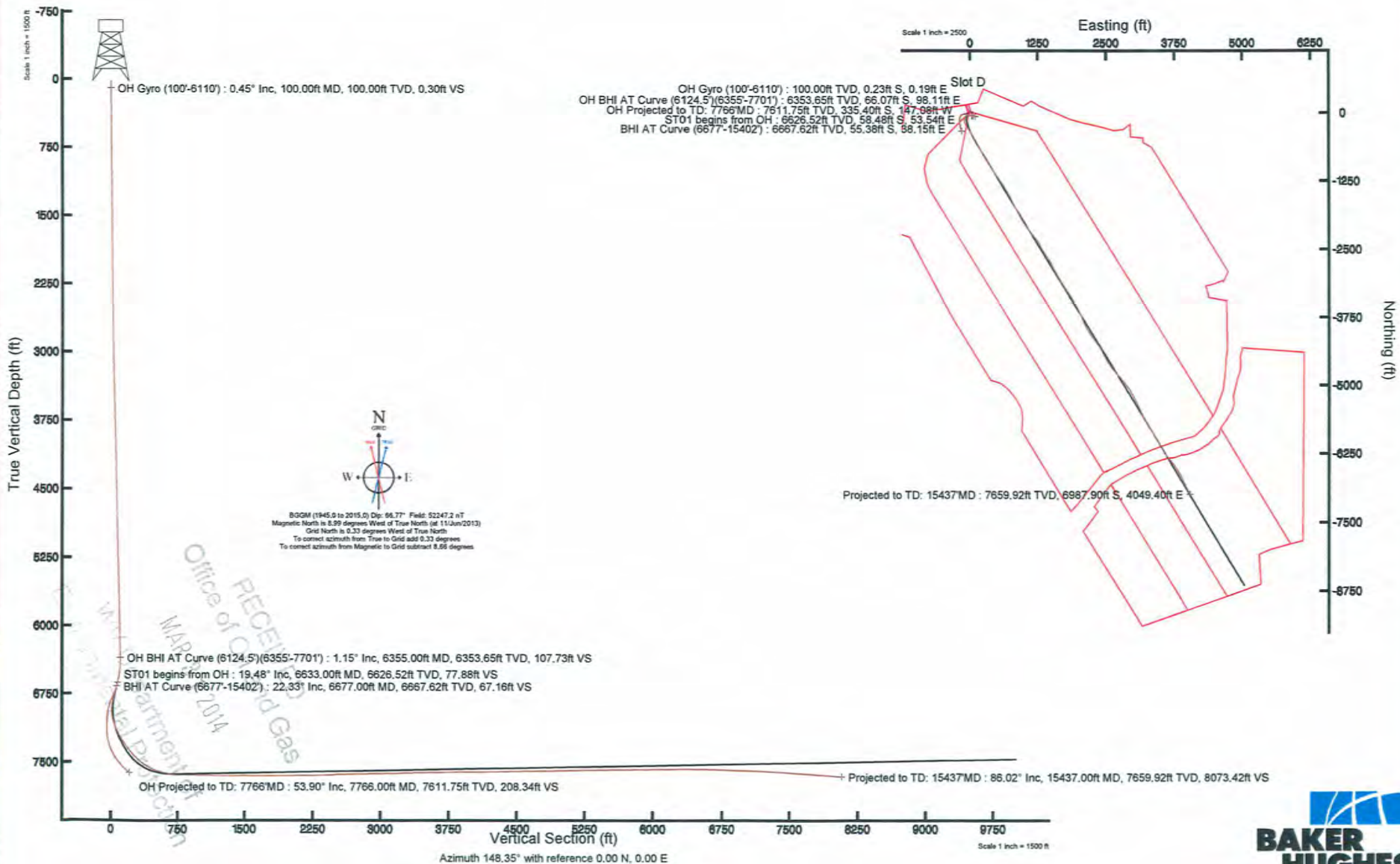
# CNX GAS COMPANY, LLC

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

Slot: Slot D  
 Well: PHL13DHS ST01  
 Wellbore: PHL13DHS ST01 PWB



This reference well path is the 13DHS ST01 Rev-C-5	
True vertical depths are referenced to Patterson 331 (RT)	Grid System: NAD83 / Lambert West Virginia SP, Northern Zone (47D), US feet
Measured depths are referenced to Patterson 331 (RT)	North Reference: Grid north
Patterson 331 (RT) to Mean Sea Level: 1551.44 feet	Scale: True distance
Mean Sea Level to Mud line (JK Slot C): 0 feet	Depth: are in feet
Coordinates are in feet referenced to Slot	Created by: thomson on 26 Jun 2013



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 City







# Actual Wellpath Report

PHL13DHS AWP ST01 Proj: 15437' MD

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## REFERENCE WELLPATH IDENTIFICATION

Operator	CNX GAS COMPANY, LLC	Slot	Slot D
Area	Barbour County, WV	Well	PHL13DHS ST01
Field	Barbour	Wellbore	PHL13DHS AWP ST01
Facility	PHL13 Pad	Sidetrack from	PHL13DHS AWP at 6633.00 MD

## WELLPATH DATA (175 stations) † = interpolated/extrapolated station

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]
0.00†	0.000	141.520	0.00	0.00	0.00	0.00	1854757.37	261704.01	39°13'02.620"N	80°00'45.450"W	0.00	0.000	0.00	0.00	0.00
24.50	0.000	141.520	24.50	0.00	0.00	0.00	1854757.37	261704.01	39°13'02.620"N	80°00'45.450"W	0.00	0.000	0.00	0.00	0.00
114.50	0.540	141.520	114.50	0.42	-0.33	0.26	1854757.63	261703.68	39°13'02.616"N	80°00'45.446"W	0.42	141.520	0.60	0.60	0.00
214.50	0.600	97.440	214.49	1.22	-0.77	1.08	1854758.44	261703.24	39°13'02.612"N	80°00'45.436"W	1.32	125.534	0.43	0.06	-44.08
314.50	0.380	140.200	314.49	1.88	-1.09	1.81	1854759.18	261702.92	39°13'02.609"N	80°00'45.427"W	2.11	121.118	0.41	-0.22	42.76
414.50	0.320	113.620	414.49	2.44	-1.46	2.28	1854759.64	261702.56	39°13'02.605"N	80°00'45.421"W	2.70	122.644	0.17	-0.06	-26.58
514.50	0.380	100.060	514.49	2.89	-1.63	2.86	1854760.23	261702.39	39°13'02.604"N	80°00'45.413"W	3.29	119.661	0.10	0.06	-13.56
614.50	0.640	108.260	614.48	3.53	-1.86	3.72	1854761.08	261702.15	39°13'02.601"N	80°00'45.402"W	4.16	116.603	0.27	0.26	8.20
714.50	0.360	93.720	714.48	4.14	-2.06	4.56	1854761.93	261701.96	39°13'02.599"N	80°00'45.392"W	5.00	114.275	0.31	-0.28	-14.54
814.50	0.620	104.150	814.48	4.71	-2.21	5.40	1854762.76	261701.80	39°13'02.598"N	80°00'45.381"W	5.83	112.256	0.27	0.26	10.43
914.50	0.750	124.270	914.47	5.70	-2.71	6.46	1854763.83	261701.30	39°13'02.593"N	80°00'45.367"W	7.01	112.746	0.27	0.13	20.12
1014.50	0.530	135.410	1014.46	6.75	-3.41	7.33	1854764.70	261700.61	39°13'02.586"N	80°00'45.356"W	8.08	114.937	0.25	-0.22	11.14
1114.50	0.460	113.060	1114.46	7.52	-3.89	8.02	1854765.39	261700.12	39°13'02.582"N	80°00'45.348"W	8.92	115.892	0.20	-0.07	-22.35
1214.50	0.410	127.480	1214.46	8.19	-4.27	8.68	1854766.04	261699.74	39°13'02.578"N	80°00'45.339"W	9.67	116.200	0.12	-0.05	14.42
1314.50	0.570	102.070	1314.45	8.86	-4.59	9.45	1854766.81	261699.42	39°13'02.575"N	80°00'45.329"W	10.50	115.920	0.27	0.16	-25.41
1414.50	0.370	107.790	1414.45	9.45	-4.79	10.24	1854767.61	261699.22	39°13'02.573"N	80°00'45.319"W	11.31	115.085	0.21	-0.20	5.72
1514.50	0.490	123.640	1514.45	10.09	-5.13	10.90	1854768.27	261698.88	39°13'02.569"N	80°00'45.311"W	12.05	115.192	0.17	0.12	15.85
1614.50	0.310	97.080	1614.44	10.64	-5.40	11.53	1854768.90	261698.61	39°13'02.567"N	80°00'45.303"W	12.73	115.097	0.25	-0.18	-26.56
1714.50	0.540	105.400	1714.44	11.16	-5.56	12.25	1854769.62	261698.46	39°13'02.565"N	80°00'45.294"W	13.45	114.402	0.24	0.23	8.32
1814.50	0.730	86.110	1814.43	11.80	-5.64	13.34	1854770.71	261698.37	39°13'02.565"N	80°00'45.280"W	14.48	112.916	0.28	0.19	-19.29
1914.50	0.740	99.120	1914.43	12.52	-5.70	14.61	1854771.98	261698.31	39°13'02.564"N	80°00'45.264"W	15.69	111.304	0.17	0.01	13.01
2014.50	0.730	101.370	2014.42	13.38	-5.93	15.88	1854773.24	261698.09	39°13'02.562"N	80°00'45.248"W	16.95	110.471	0.03	-0.01	2.25
2114.50	0.790	116.950	2114.41	14.40	-6.36	17.11	1854774.48	261697.65	39°13'02.558"N	80°00'45.232"W	18.26	110.399	0.21	0.06	15.58
2214.50	0.910	105.760	2214.40	15.57	-6.89	18.49	1854775.86	261697.12	39°13'02.552"N	80°00'45.214"W	19.74	110.441	0.20	0.12	-11.19
2314.50	1.020	111.380	2314.38	16.87	-7.43	20.09	1854777.45	261696.58	39°13'02.547"N	80°00'45.194"W	21.42	110.307	0.14	0.11	5.62
2414.50	0.980	108.880	2414.37	18.24	-8.03	21.72	1854779.09	261695.98	39°13'02.541"N	80°00'45.173"W	23.16	110.295	0.06	-0.04	-2.50
2514.50	1.020	104.210	2514.35	19.54	-8.53	23.40	1854780.76	261695.48	39°13'02.537"N	80°00'45.152"W	24.90	110.030	0.09	0.04	-4.67
2614.50	0.820	112.340	2614.34	20.76	-9.02	24.92	1854782.29	261694.99	39°13'02.532"N	80°00'45.133"W	26.50	109.897	0.24	-0.20	8.13
2714.50	0.940	108.660	2714.33	21.97	-9.55	26.36	1854783.73	261694.46	39°13'02.527"N	80°00'45.114"W	28.04	109.923	0.13	0.12	-3.68
2814.50	0.810	114.090	2814.32	23.18	-10.11	27.78	1854785.15	261693.91	39°13'02.521"N	80°00'45.096"W	29.56	109.988	0.15	-0.13	5.43





# Actual Wellpath Report

PHL13DHS AWP ST01 Proj: 15437' MD  
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REFERENCE WELLPATH IDENTIFICATION			
Operator	CNX GAS COMPANY, LLC	Slot	Slot D
Area	Barbour County, WV	Well	PHL13DHS ST01
Field	Barbour	Wellbore	PHL13DHS AWB ST01
Facility	PHL13 Pad	Sidetrack from	PHL13DHS AWB at 6633.00 MD

**WELLPATH DATA (175 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	1.060	118.590	2914.30	24.57	-10.84	29.24	1854786.61	261693.18	39°13'02.514"N	80°00'45.078"W	31.18	110.335	0.26	0.25	4.50
3014.50	1.310	119.340	3014.28	26.37	-11.84	31.05	1854788.42	261692.17	39°13'02.504"N	80°00'45.054"W	33.23	110.872	0.25	0.25	0.75
3114.50	1.390	130.660	3114.26	28.53	-13.19	32.97	1854790.33	261690.82	39°13'02.491"N	80°00'45.030"W	35.51	111.806	0.28	0.08	11.32
3214.50	1.390	126.530	3214.23	30.81	-14.70	34.86	1854792.23	261689.31	39°13'02.476"N	80°00'45.006"W	37.83	112.867	0.10	0.00	-4.13
3314.50	1.480	123.850	3314.19	33.11	-16.14	36.91	1854794.27	261687.87	39°13'02.462"N	80°00'44.980"W	40.28	113.624	0.11	0.09	-2.68
3414.50	1.600	128.670	3414.16	35.60	-17.73	39.07	1854796.44	261686.28	39°13'02.446"N	80°00'44.952"W	42.91	114.415	0.18	0.12	4.82
3514.50	1.550	124.790	3514.12	38.15	-19.38	41.27	1854798.64	261684.64	39°13'02.430"N	80°00'44.924"W	45.59	115.153	0.12	-0.05	-3.88
3614.50	1.570	124.120	3614.08	40.64	-20.92	43.51	1854800.88	261683.10	39°13'02.415"N	80°00'44.895"W	48.28	115.675	0.03	0.02	-0.67
3714.50	1.560	137.770	3714.05	43.23	-22.70	45.56	1854802.93	261681.32	39°13'02.398"N	80°00'44.869"W	50.90	116.478	0.37	-0.01	13.65
3814.50	1.650	133.460	3814.01	45.96	-24.69	47.52	1854804.89	261679.32	39°13'02.378"N	80°00'44.844"W	53.56	117.456	0.15	0.09	-4.31
3914.50	1.750	129.140	3913.96	48.79	-26.65	49.75	1854807.12	261677.37	39°13'02.359"N	80°00'44.816"W	56.44	118.173	0.16	0.10	-4.32
4014.50	1.560	133.070	4013.92	51.55	-28.54	51.93	1854809.30	261675.47	39°13'02.340"N	80°00'44.788"W	59.26	118.792	0.22	-0.19	3.93
4114.50	1.540	127.040	4113.89	54.11	-30.28	54.00	1854811.36	261673.73	39°13'02.323"N	80°00'44.762"W	61.91	119.281	0.16	-0.02	-6.03
4214.50	1.590	128.930	4213.85	56.67	-31.96	56.15	1854813.52	261672.05	39°13'02.307"N	80°00'44.734"W	64.61	119.649	0.07	0.05	1.89
4314.50	1.660	119.070	4313.81	59.24	-33.54	58.50	1854815.86	261670.48	39°13'02.291"N	80°00'44.704"W	67.43	119.826	0.29	0.07	-9.86
4414.50	1.500	119.670	4413.77	61.65	-34.89	60.90	1854818.26	261669.13	39°13'02.278"N	80°00'44.674"W	70.18	119.808	0.16	-0.16	0.60
4514.50	1.360	128.350	4513.74	63.92	-36.27	62.97	1854820.33	261667.74	39°13'02.265"N	80°00'44.647"W	72.67	119.944	0.26	-0.14	8.68
4614.50	1.460	137.910	4613.71	66.29	-37.95	64.75	1854822.12	261666.06	39°13'02.248"N	80°00'44.624"W	75.06	120.377	0.26	0.10	9.56
4714.50	1.520	136.460	4713.67	68.84	-39.86	66.52	1854823.88	261664.15	39°13'02.229"N	80°00'44.602"W	77.55	120.932	0.07	0.06	-1.45
4814.50	1.440	111.820	4813.64	71.14	-41.29	68.60	1854825.96	261662.73	39°13'02.215"N	80°00'44.575"W	80.07	121.043	0.64	-0.08	-24.64
4914.50	1.660	116.220	4913.61	73.38	-42.40	71.07	1854828.43	261661.62	39°13'02.205"N	80°00'44.544"W	82.75	120.820	0.25	0.22	4.40
5014.50	1.570	115.820	5013.57	75.76	-43.63	73.60	1854830.96	261660.38	39°13'02.192"N	80°00'44.512"W	85.56	120.662	0.09	-0.09	-0.40
5114.50	1.540	124.430	5113.53	78.15	-44.99	75.94	1854833.30	261659.03	39°13'02.179"N	80°00'44.482"W	88.27	120.644	0.24	-0.03	8.61
5214.50	1.530	133.940	5213.49	80.67	-46.68	78.01	1854835.37	261657.34	39°13'02.163"N	80°00'44.455"W	90.91	120.894	0.25	-0.01	9.51
5314.50	1.560	126.180	5313.46	83.22	-48.41	80.07	1854837.43	261655.61	39°13'02.146"N	80°00'44.429"W	93.56	121.155	0.21	0.03	-7.76
5414.50	1.480	124.500	5413.42	85.66	-49.94	82.23	1854839.60	261654.07	39°13'02.131"N	80°00'44.401"W	96.21	121.271	0.09	-0.08	-1.68
5514.50	1.470	131.390	5513.39	88.07	-51.52	84.26	1854841.62	261652.50	39°13'02.115"N	80°00'44.376"W	98.76	121.444	0.18	-0.01	6.89
5614.50	1.330	139.800	5613.36	90.44	-53.25	85.97	1854843.33	261650.76	39°13'02.098"N	80°00'44.354"W	101.13	121.776	0.25	-0.14	8.41
5714.50	1.430	138.410	5713.33	92.82	-55.07	87.55	1854844.91	261648.94	39°13'02.080"N	80°00'44.333"W	103.43	122.173	0.11	0.10	-1.39
5814.50	1.360	140.550	5813.30	95.23	-56.92	89.13	1854846.49	261647.09	39°13'02.062"N	80°00'44.313"W	105.76	122.565	0.09	-0.07	2.14





# Actual Wellpath Report

PHL13DHS AWP ST01 Proj: 15437' MD

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## REFERENCE WELLPATH IDENTIFICATION

Operator	CNX GAS COMPANY, LLC	Slot	Slot D
Area	Barbour County, WV	Well	PHL13DHS ST01
Field	Barbour	Wellbore	PHL13DHS AWP ST01
Facility	PHL13 Pad	Sidetrack from	PHL13DHS AWP at 6633.00 MD

## WELLPATH DATA (175 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]
5914.50	1.330	131.170	5913.27	97.51	-58.60	90.76	1854848.12	261645.41	39°13'02.045"N	80°00'44.292"W	108.03	122.851	0.22	-0.03	-9.38
6014.50	1.380	134.770	6013.25	99.79	-60.22	92.49	1854849.85	261643.80	39°13'02.030"N	80°00'44.270"W	110.36	123.068	0.10	0.05	3.60
6124.50	1.510	135.300	6123.21	102.49	-62.18	94.45	1854851.81	261641.84	39°13'02.010"N	80°00'44.245"W	113.08	123.359	0.12	0.12	0.48
6355.00	1.150	138.610	6353.65	107.73	-66.07	98.11	1854855.48	261637.94	39°13'01.972"N	80°00'44.198"W	118.29	123.958	0.16	-0.16	1.44
6445.00	6.420	275.420	6443.48	105.58	-66.28	93.69	1854851.06	261637.74	39°13'01.970"N	80°00'44.255"W	114.76	125.274	8.11	5.86	152.01
6491.00	8.830	280.880	6489.07	101.64	-65.37	87.66	1854845.03	261638.65	39°13'01.978"N	80°00'44.331"W	109.35	126.710	5.46	5.24	11.87
6538.00	12.350	281.430	6535.26	95.77	-63.69	79.19	1854836.56	261640.33	39°13'01.995"N	80°00'44.439"W	101.63	128.807	7.49	7.49	1.17
6595.00	16.810	281.580	6590.41	85.96	-60.82	65.14	1854822.50	261643.19	39°13'02.022"N	80°00'44.618"W	89.12	133.039	7.82	7.82	0.26
6633.00	19.480	281.290	6626.52	77.88	-58.48	53.54	1854810.90	261645.53	39°13'02.045"N	80°00'44.765"W	79.29	137.527	7.03	7.03	-0.76
6677.00	22.330	281.450	6667.62	67.16	-55.38	38.15	1854795.51	261648.63	39°13'02.074"N	80°00'44.961"W	67.25	145.442	6.48	6.48	0.36
6728.00	23.370	283.210	6714.62	53.41	-51.15	18.80	1854776.17	261652.87	39°13'02.115"N	80°00'45.207"W	54.50	159.815	2.44	2.04	3.45
6774.00	22.220	279.730	6757.02	41.22	-47.59	1.35	1854758.72	261656.42	39°13'02.149"N	80°00'45.429"W	47.61	178.377	3.85	-2.50	-7.57
6820.00	22.240	272.090	6799.61	30.64	-45.81	-15.93	1854741.44	261658.21	39°13'02.166"N	80°00'45.649"W	48.50	199.173	6.28	0.04	-16.61
6869.00	22.250	264.190	6844.98	21.44	-46.41	-34.43	1854722.94	261657.61	39°13'02.159"N	80°00'45.884"W	57.78	216.570	6.10	0.02	-16.12
6916.00	22.160	253.270	6888.51	15.28	-49.86	-51.78	1854705.59	261654.15	39°13'02.124"N	80°00'46.104"W	71.88	226.079	8.77	-0.19	-23.23
6962.00	21.470	237.560	6931.25	13.16	-56.88	-67.20	1854690.17	261647.13	39°13'02.054"N	80°00'46.299"W	88.04	229.755	12.74	-1.50	-34.15
7059.00	24.110	206.610	7020.99	23.86	-84.22	-91.15	1854666.22	261619.80	39°13'01.782"N	80°00'46.602"W	124.10	227.263	12.51	2.72	-31.91
7105.00	24.160	197.320	7062.99	34.99	-101.61	-98.16	1854659.21	261602.40	39°13'01.610"N	80°00'46.690"W	141.28	224.011	8.25	0.11	-20.20
7154.00	25.400	184.590	7107.51	50.06	-121.68	-101.99	1854655.38	261582.34	39°13'01.411"N	80°00'46.737"W	158.77	219.970	11.16	2.53	-25.98
7199.00	27.740	172.110	7147.78	67.45	-141.69	-101.32	1854656.05	261562.33	39°13'01.213"N	80°00'46.727"W	174.19	215.570	13.42	5.20	-27.73
7255.00	30.020	162.230	7196.84	92.99	-167.96	-95.26	1854662.12	261536.06	39°13'00.954"N	80°00'46.648"W	193.09	209.560	9.43	4.07	-17.64
7296.00	31.380	157.580	7232.10	113.49	-187.59	-88.05	1854669.32	261516.43	39°13'00.760"N	80°00'46.555"W	207.23	205.145	6.67	3.32	-11.34
7345.00	33.740	153.000	7273.40	139.65	-211.52	-77.01	1854680.36	261492.50	39°13'00.525"N	80°00'46.413"W	225.10	200.005	6.96	4.82	-9.35
7390.00	35.080	149.480	7310.53	165.04	-233.80	-64.76	1854692.61	261470.22	39°13'00.305"N	80°00'46.256"W	242.60	195.483	5.33	2.98	-7.82
7433.00	36.460	147.450	7345.42	190.17	-255.21	-51.61	1854705.76	261448.81	39°13'00.094"N	80°00'46.087"W	260.38	191.433	4.23	3.21	-4.72
7484.00	41.440	146.730	7385.07	222.21	-282.11	-34.19	1854723.18	261421.91	39°12'59.829"N	80°00'45.864"W	284.18	186.910	9.80	9.76	-1.41
7533.00	44.230	147.130	7421.00	255.51	-310.03	-16.02	1854741.35	261393.99	39°12'59.554"N	80°00'45.631"W	310.44	182.957	5.72	5.69	0.82
7576.00	47.360	147.900	7450.98	286.33	-336.03	0.53	1854757.90	261367.99	39°12'59.298"N	80°00'45.419"W	336.03	179.909	7.39	7.28	1.79
7626.00	50.250	148.210	7483.91	323.95	-367.95	20.43	1854777.80	261336.07	39°12'58.984"N	80°00'45.164"W	368.52	176.821	5.80	5.78	0.62
7670.00	55.180	147.430	7510.55	358.95	-397.57	39.08	1854796.45	261306.46	39°12'58.692"N	80°00'44.924"W	399.49	174.386	11.29	11.20	-1.77



47-001-03223

PHL13DHS



BAKER HUGHES



# Actual Wellpath Report

PHL13DHS AWP ST01 Proj: 15437MD

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## REFERENCE WELLPATH IDENTIFICATION

Operator	CNX GAS COMPANY, LLC
Area	Barbour County, WV
Field	Barbour
Facility	PHL13 Pad
Slot	Slot D
Slot	PHL13DHS ST01
Wellbore	PHL13DHS AWP ST01
Sidetrack from	PHL13DHS AWP at 6633.00 MD

## WELLPATH DATA (175 stations)

MD [ft]	Inclination [°]	Azimuth [°]	TVD [ft]	Vert Sect [ft]	North [ft]	East [ft]	Grid East [ft]	Grid North [ft]	Latitude [ft]	Longitude [ft]	Closure Dist [ft]	Closure Dir [°]	DLS [ft]	Build Rate [%/100ft]	Turn Rate [%/100ft]
772.00	58.870	147.870	7538.85	402.56	-434.42	62.41	1854819.78	261269.61	39°12'58.329"N	80°00'44.625"W	438.88	171.824	7.13	7.10	0.85
7767.00	62.310	148.400	7560.94	441.75	-467.71	83.10	1854840.47	261236.32	39°12'58.002"N	80°00'44.360"W	475.03	169.925	7.71	7.64	1.18
7860.00	72.980	151.650	7596.27	527.58	-542.14	125.93	1854883.29	261161.89	39°12'57.268"N	80°00'43.811"W	556.57	166.924	11.92	11.47	3.49
7955.00	76.490	153.630	7621.28	618.96	-623.53	168.02	1854925.39	261080.51	39°12'56.466"N	80°00'43.270"W	645.77	164.918	4.21	3.69	2.08
8049.00	83.060	152.400	7637.96	711.10	-705.91	209.99	1854967.35	260998.13	39°12'55.654"N	80°00'42.731"W	736.48	163.434	7.11	6.99	-1.31
8142.00	89.260	149.130	7644.19	803.76	-786.83	255.28	1855012.64	260917.22	39°12'54.857"N	80°00'42.149"W	827.20	162.024	7.53	6.67	-3.52
8237.00	89.380	148.650	7645.31	898.74	-868.16	304.37	1855061.72	260835.89	39°12'54.056"N	80°00'41.520"W	919.96	160.680	0.52	0.13	-0.51
8331.00	89.010	148.050	7646.64	992.73	-948.17	353.68	1855111.04	260755.88	39°12'53.268"N	80°00'40.888"W	1011.99	159.544	0.75	-0.39	-0.64
8426.00	89.260	145.770	7648.07	1087.69	-1027.75	405.54	1855162.89	260676.30	39°12'52.484"N	80°00'40.223"W	1104.86	158.466	2.41	0.26	-2.40
8521.00	89.940	144.100	7648.73	1182.51	-1105.50	460.12	1855217.47	260598.55	39°12'51.719"N	80°00'39.524"W	1197.43	157.403	1.90	0.72	-1.76
8615.00	89.940	144.060	7648.83	1276.25	-1181.62	515.26	1855272.61	260522.43	39°12'50.970"N	80°00'38.818"W	1289.08	156.440	0.04	0.00	-0.04
8710.00	90.060	144.220	7648.83	1371.00	-1258.62	570.91	1855328.26	260445.44	39°12'50.212"N	80°00'38.105"W	1382.05	155.601	0.21	0.13	0.17
8804.00	90.180	148.120	7648.63	1464.91	-1336.69	623.24	1855380.58	260367.38	39°12'49.443"N	80°00'37.435"W	1474.84	155.003	4.15	0.13	4.15
8901.00	89.630	149.030	7648.80	1561.91	-1419.46	673.81	1855431.15	260284.61	39°12'48.628"N	80°00'36.786"W	1571.27	154.607	1.10	-0.57	0.94
8994.00	89.940	149.590	7649.14	1654.89	-1499.43	721.27	1855478.62	260204.64	39°12'47.840"N	80°00'36.178"W	1663.89	154.311	0.69	0.33	0.60
9086.00	90.150	153.220	7649.07	1746.75	-1580.19	765.30	1855522.64	260123.88	39°12'47.044"N	80°00'35.613"W	1755.76	154.159	3.95	0.23	3.95
9180.00	89.880	155.550	7649.05	1840.22	-1664.95	805.94	1855563.27	260039.12	39°12'46.209"N	80°00'35.090"W	1849.75	154.170	2.50	-0.29	2.48
9274.00	89.910	152.520	7649.22	1933.75	-1743.45	847.09	1855604.42	259954.62	39°12'45.376"N	80°00'34.561"W	1943.74	154.164	3.22	0.03	-3.22
9369.00	90.580	151.340	7648.81	2028.56	-1833.28	891.79	1855649.12	259870.80	39°12'44.550"N	80°00'33.987"W	2038.67	154.060	1.43	0.71	-1.24
9463.00	90.650	151.180	7647.80	2122.43	-1915.69	936.98	1855694.32	259788.39	39°12'43.738"N	80°00'33.407"W	2132.56	153.936	0.19	0.07	-0.17
9558.00	89.940	146.670	7647.32	2217.40	-1997.03	986.00	1855743.34	259707.05	39°12'42.937"N	80°00'32.779"W	2227.18	153.723	4.81	-0.75	-4.75
9654.00	91.970	149.440	7645.71	2313.37	-2078.47	1036.78	1855794.11	259625.62	39°12'42.135"N	80°00'32.128"W	2322.71	153.489	3.58	2.11	2.89
9748.00	91.320	138.130	7643.01	2406.88	-2154.16	1092.21	1855849.54	259549.93	39°12'41.390"N	80°00'31.418"W	2415.22	153.114	12.05	-0.69	-12.03
9841.00	94.070	139.520	7638.63	2498.49	-2224.07	1153.36	1855910.69	259480.02	39°12'40.702"N	80°00'30.636"W	2505.34	152.590	3.31	2.96	1.49
9937.00	91.140	143.050	7634.27	2593.63	-2298.88	1213.32	1855970.65	259405.21	39°12'39.966"N	80°00'29.869"W	2599.42	152.175	4.78	-3.05	3.68
9985.00	91.350	145.010	7633.23	2641.48	-2337.72	1241.51	1855998.83	259366.38	39°12'39.584"N	80°00'29.508"W	2646.94	152.028	4.11	0.44	4.08
10080.00	91.350	153.370	7630.99	2736.36	-2419.22	1290.11	1856047.43	259284.88	39°12'38.781"N	80°00'28.885"W	2741.71	151.930	8.80	0.00	8.80
10123.00	90.890	152.250	7630.15	2779.22	-2457.46	1309.76	1856067.08	259246.65	39°12'38.404"N	80°00'28.632"W	2784.70	151.944	2.82	-1.07	-2.60
10218.00	90.950	147.460	7628.62	2874.15	-2539.57	1357.44	1856114.76	259164.53	39°12'37.595"N	80°00'28.021"W	2879.60	151.875	5.04	0.06	-5.04
10312.00	90.580	144.770	7627.36	2968.06	-2617.59	1409.84	1856167.16	259086.51	39°12'36.827"N	80°00'27.349"W	2973.12	151.693	2.89	-0.39	-2.86



47-001-03223



# Actual Wellpath Report

PHL13DHS AWP ST01 Proj: 15437MD  
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PHL13DHS

## REFERENCE WELLPATH IDENTIFICATION

Operator	CNX GAS COMPANY, LLC
Area	Barbour County, WV
Field	Barbour
Facility	PHL13 Pad
	Wellbore
	PHL13DHS AWP ST01
	Well
	PHL13DHS ST01
	Slot
	Slot D

## WELLPATH DATA (175 stations)

MD	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]
10407.00	90.950	147.520	7626.10	3062.97	-2696.47	1462.76	1856220.07	259007.64	39°12'36.05"N	80°00'26.67"W	3067.67	151.521	2.92	0.39	2.89
10501.00	91.170	155.690	7624.35	3156.73	-2779.08	1507.41	1856264.73	258925.04	39°12'35.237"N	80°00'26.098"W	3161.58	151.524	8.69	0.23	8.69
10597.00	92.250	150.860	7621.49	3252.30	-2864.76	1550.55	1856307.86	258839.36	39°12'34.392"N	80°00'25.544"W	3257.46	151.576	5.15	1.13	-5.03
10691.00	90.860	149.620	7618.94	3346.21	-2946.33	1597.19	1856354.50	258757.79	39°12'33.589"N	80°00'24.946"W	3351.40	151.538	1.98	-1.48	-1.32
10785.00	91.140	151.750	7617.30	3440.11	-3028.27	1643.20	1856400.51	258675.85	39°12'32.781"N	80°00'24.555"W	3445.37	151.515	2.29	0.30	2.27
10880.00	90.860	150.140	7615.64	3535.00	-3111.30	1689.33	1856446.64	258592.82	39°12'31.963"N	80°00'23.763"W	3540.34	151.500	1.72	-0.29	-1.69
10975.00	90.710	145.740	7614.33	3629.96	-3191.79	1739.74	1856497.05	258512.34	39°12'31.170"N	80°00'23.117"W	3635.13	151.407	4.63	-0.16	-4.63
11070.00	90.890	144.010	7613.01	3724.77	-3269.48	1794.39	1856551.70	258434.66	39°12'30.406"N	80°00'22.418"W	3729.52	151.241	1.83	0.19	-1.82
11163.00	91.450	147.800	7611.11	3817.65	-3346.46	1846.51	1856603.81	258357.67	39°12'29.488"N	80°00'21.750"W	3822.09	151.111	4.12	0.60	4.08
11258.00	89.850	151.940	7610.03	3912.59	-3428.60	1894.18	1856651.48	258275.54	39°12'28.838"N	80°00'21.139"W	3917.04	151.081	4.67	-1.68	4.36
11353.00	89.720	150.180	7610.39	4007.48	-3511.73	1940.14	1856697.44	258192.41	39°12'28.019"N	80°00'20.549"W	4012.03	151.080	1.86	-0.14	-1.85
11448.00	90.990	152.520	7609.80	4102.34	-3595.09	1985.69	1856742.98	258109.05	39°12'27.198"N	80°00'19.964"W	4107.02	151.087	2.80	1.34	2.46
11541.00	91.110	154.840	7608.09	4194.91	-3678.43	2026.91	1856784.21	258025.72	39°12'26.377"N	80°00'19.434"W	4199.91	151.144	2.50	0.13	2.49
11636.00	90.950	159.690	7606.39	4288.72	-3766.01	2063.61	1856820.90	257938.14	39°12'25.513"N	80°00'18.962"W	4294.33	151.279	5.11	-0.17	5.11
11731.00	91.320	155.650	7604.50	4382.43	-3853.85	2099.69	1856856.98	257850.30	39°12'24.647"N	80°00'18.497"W	4388.72	151.417	4.27	0.39	-4.25
11825.00	91.080	152.080	7602.53	4475.96	-3938.21	2141.08	1856898.37	257765.95	39°12'23.815"N	80°00'17.966"W	4482.60	151.468	3.81	-0.26	-3.80
11921.00	90.920	148.040	7600.86	4571.88	-4021.36	2188.98	1856946.27	257682.79	39°12'22.996"N	80°00'17.351"W	4578.54	151.439	4.21	-0.17	-4.21
12013.00	90.920	145.620	7599.38	4663.83	-4098.36	2239.30	1856996.59	257605.80	39°12'22.238"N	80°00'16.706"W	4670.23	151.348	2.63	0.00	-2.63
12107.00	90.710	142.210	7598.04	4757.53	-4174.30	2294.60	1857051.94	257529.86	39°12'21.490"N	80°00'15.998"W	4763.43	151.202	3.63	-0.22	-3.63
12201.00	90.550	144.880	7597.01	4851.18	-4249.90	2350.50	1857107.78	257454.27	39°12'20.746"N	80°00'15.283"W	4856.59	151.054	2.85	-0.17	2.84
12296.00	91.050	149.340	7595.68	4946.13	-4329.64	2402.07	1857159.35	257374.53	39°12'19.961"N	80°00'14.622"W	4951.34	150.979	4.72	0.53	4.69
12390.00	91.020	154.770	7593.98	5039.88	-4412.64	2446.09	1857203.37	257291.53	39°12'19.143"N	80°00'14.057"W	5045.27	150.999	5.78	-0.03	5.78
12484.00	90.920	150.430	7592.39	5133.59	-4496.06	2489.34	1857246.61	257208.11	39°12'18.321"N	80°00'13.502"W	5139.20	151.028	4.62	-0.11	-4.62
12579.00	91.350	150.440	7590.51	5228.50	-4578.68	2536.20	1857293.48	257125.50	39°12'17.507"N	80°00'12.901"W	5234.17	151.017	0.45	0.45	0.01
12675.00	90.340	145.040	7589.09	5324.45	-4659.82	2587.42	1857344.69	257044.36	39°12'16.708"N	80°00'12.244"W	5329.97	150.958	5.72	-1.05	-5.63
12769.00	91.020	139.210	7587.98	5417.85	-4733.98	2645.10	1857402.37	256970.21	39°12'15.978"N	80°00'11.506"W	5422.83	150.806	6.24	0.72	-6.20
12863.00	90.920	134.380	7586.38	5509.90	-4802.46	2709.42	1857466.69	256901.72	39°12'15.305"N	80°00'10.684"W	5514.04	150.569	5.14	-0.11	-5.14
12957.00	90.460	142.320	7585.25	5602.40	-4872.64	2771.84	1857529.11	256831.55	39°12'14.615"N	80°00'09.886"W	5605.87	150.366	8.46	-0.49	8.45
13052.00	90.520	142.100	7584.44	5696.85	-4947.71	2830.05	1857587.32	256756.48	39°12'13.876"N	80°00'09.142"W	5699.92	150.231	0.24	0.06	-0.23
13147.00	90.800	143.890	7583.34	5791.42	-5023.57	2887.22	1857644.49	256680.62	39°12'13.129"N	80°00'08.410"W	5794.16	150.113	1.91	0.29	1.88





# Actual Wellpath Report

PHL13DHS AWP ST01 Proj: 15437' MD  
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REFERENCE WELLPATH IDENTIFICATION			
Operator	CNX GAS COMPANY, LLC	Slot	Slot D
Area	Barbour County, WV	Well	PHL13DHS ST01
Field	Barbour	Wellbore	PHL13DHS AWP ST01
Facility	PHL13 Pad	Sidetrack from	PHL13DHS AWP at 6633.00 MD

WELLPATH DATA (175 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]
13242.00	90.620	149.770	7582.16	5886.34	-5103.05	2939.17	1857696.44	256601.15	39°12'12.347"N	80°00'07.744"W	5888.96	150.060	6.19	-0.19	6.19
13336.00	90.580	151.360	7581.18	5980.26	-5184.91	2985.36	1857742.62	256519.29	39°12'11.540"N	80°00'07.152"W	5982.95	150.068	1.69	-0.04	1.69
13430.00	90.650	151.510	7580.17	6074.12	-5267.46	3030.31	1857787.57	256436.74	39°12'10.727"N	80°00'06.575"W	6076.92	150.089	0.18	0.07	0.16
13524.00	90.150	152.300	7579.51	6167.94	-5350.38	3074.57	1857831.83	256353.82	39°12'09.910"N	80°00'06.007"W	6170.87	150.116	0.99	-0.53	0.84
13618.00	90.920	156.340	7578.64	6261.40	-5435.08	3115.30	1857872.55	256269.13	39°12'09.075"N	80°00'05.484"W	6264.59	150.179	4.38	0.82	4.30
13714.00	89.630	151.800	7578.18	6356.90	-5521.39	3157.26	1857914.52	256182.83	39°12'08.224"N	80°00'04.944"W	6360.35	150.238	4.92	-1.34	-4.73
13808.00	89.690	150.850	7578.73	6450.77	-5603.86	3202.37	1857959.62	256100.36	39°12'07.411"N	80°00'04.366"W	6454.33	150.254	1.01	0.06	-1.01
13901.00	88.830	147.990	7579.93	6543.73	-5683.91	3249.67	1858006.92	256020.31	39°12'06.623"N	80°00'03.759"W	6547.30	150.242	3.21	-0.92	-3.08
13995.00	88.770	149.460	7581.90	6637.71	-5764.23	3298.46	1858055.71	255939.99	39°12'05.832"N	80°00'03.134"W	6641.24	150.221	1.56	-0.06	1.56
14090.00	87.780	152.580	7584.76	6732.55	-5847.28	3344.46	1858101.71	255856.94	39°12'05.013"N	80°00'02.544"W	6736.18	150.232	3.44	-1.04	3.28
14183.00	87.780	151.670	7588.37	6825.27	-5929.43	3387.91	1858145.16	255774.80	39°12'04.204"N	80°00'01.986"W	6829.06	150.258	0.98	0.00	-0.98
14277.00	88.400	147.540	7591.50	6919.18	-6010.45	3435.43	1858192.68	255693.78	39°12'03.406"N	80°00'01.376"W	6922.98	150.249	4.44	0.66	-4.39
14370.00	88.250	148.460	7594.22	7012.14	-6089.28	3484.69	1858241.94	255614.95	39°12'02.629"N	80°00'00.745"W	7015.87	150.219	1.00	-0.16	0.99
14463.00	88.180	149.070	7597.12	7105.09	-6168.76	3532.90	1858290.14	255535.48	39°12'01.846"N	80°00'00.127"W	7108.79	150.200	0.66	-0.08	0.66
14557.00	86.640	147.970	7601.36	7198.99	-6248.84	3581.93	1858339.17	255455.40	39°12'01.057"N	79°59'59.499"W	7202.65	150.178	2.01	-1.64	-1.17
14650.00	86.830	137.960	7606.67	7291.31	-6322.86	3637.78	1858395.02	255381.38	39°12'00.329"N	79°59'58.784"W	7294.66	150.087	10.75	0.20	-10.76
14745.00	86.430	139.280	7612.26	7384.78	-6394.02	3700.47	1858457.71	255310.22	39°11'59.629"N	79°59'57.983"W	7387.62	149.940	1.45	-0.42	1.39
14839.00	86.400	144.170	7618.14	7477.94	-6467.65	3758.57	1858515.80	255236.60	39°11'58.905"N	79°59'57.240"W	7480.46	149.838	5.19	-0.03	5.20
14933.00	86.360	148.430	7624.08	7571.67	-6545.68	3810.61	1858567.84	255158.57	39°11'58.136"N	79°59'56.573"W	7574.07	149.794	4.52	-0.04	4.53
15026.00	86.430	150.710	7629.93	7664.46	-6625.70	3857.61	1858614.84	255078.55	39°11'57.348"N	79°59'55.970"W	7666.88	149.791	2.45	0.08	2.45
15123.00	86.240	152.810	7636.13	7761.08	-6710.98	3903.41	1858660.64	254993.28	39°11'56.507"N	79°59'55.383"W	7763.62	149.816	2.17	-0.20	2.16
15214.00	85.410	153.560	7642.75	7851.52	-6791.97	3944.36	1858701.58	254912.28	39°11'55.709"N	79°59'54.857"W	7854.23	149.855	1.23	-0.91	0.82
15308.00	85.290	151.870	7650.37	7944.93	-6875.24	3987.30	1858744.53	254829.02	39°11'54.889"N	79°59'54.305"W	7947.80	149.888	1.80	-0.13	-1.80
15402.00	86.020	150.720	7657.50	8038.54	-6957.45	4032.32	1858789.54	254746.82	39°11'54.078"N	79°59'53.728"W	8041.50	149.905	1.45	0.78	-1.22
15437.00	86.020	150.720	7659.92	8073.42	-6987.90	4049.40	1858806.62	254716.36	39°11'53.778"N	79°59'53.509"W	8076.41	149.908	0.00	0.00	0.00



47-001-03223

PHL13DHS



## Actual Wellpath Report

PHL13DHS AWP ST01 Proj: 15437'MD

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### REFERENCE WELLPATH IDENTIFICATION

Operator	CNX GAS COMPANY, LLC	Slot	Slot D
Area	Barbour County, WV	Well	PHL13DHS ST01
Field	Barbour	Wellbore	PHL13DHS AWP ST01
Facility	PHL13 Pad	Sidetrack from	PHL13DHS AWP at 6633.00 MD

### TARGETS

Name	MD [ft]	TVD [ft]	North [ft]	East [ft]	Grid East [US ft]	Grid North [US ft]	Latitude	Longitude	Shape
PHL13DHS ST01 PBHL Rev-2		7468.03	-8639.57	5042.56	1859799.75	253064.75	39°11'37.508"N	79°59'40.778"W	point
PHL13DHS ST01 LP Rev-2		7631.38	-672.90	131.84	1854889.20	261031.14	39°12'55.976"N	80°00'43.726"W	point
PHL13DHS ST01 LP Rev-3		7632.49	-742.74	235.21	1854992.57	260961.30	39°12'55.292"N	80°00'42.408"W	point

### WELLPATH COMPOSITION - Ref Wellbore: PHL13DHS AWP ST01 Ref Wellpath: PHL13DHS AWP ST01 Proj: 15437'MD

Start MD [ft]	End MD [ft]	Positional Uncertainty Model	Log Name/Comment	Wellbore
24.50	6124.50	Generic gyro - northseeking (Standard)	VES Gyro (100'-6110')	PHL13DHS AWP
6124.50	6633.00	NaviTrak (MagCorr)	BHI AT Curce (6124.5')(6355'-7701')	PHL13DHS AWP
6633.00	15402.00	NaviTrak (MagCorr)	BHI ATCurve ST01 (6633')(6677'-15402')	PHL13DHS AWP ST01
15402.00	15437.00	Blind Drilling (std)	Projection to bit	PHL13DHS AWP ST01



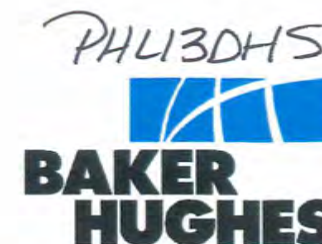
47-001-03223



## Actual Wellpath Report

PHL13DHS AWP ST01 Proj: 15437'MD

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### REFERENCE WELLPATH IDENTIFICATION

Operator	CNX GAS COMPANY, LLC	Slot	Slot D
Area	Barbour County, WV	Well	PHL13DHS ST01
Field	Barbour	Wellbore	PHL13DHS AWP ST01
Facility	PHL13 Pad	Sidetrack from	PHL13DHS AWP at 6633.00 MD

### 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	Thomsuzc
Scale	0.999966	Report Generated	28/Jun/2013 at 09:12
Convergence at slot	0.33° West	Database/Source file	WA_Eastern_US/PHL13DHS_AWP_ST01.xml

### WELLPATH LOCATION

	Local coordinates		Grid coordinates		Geographic coordinates	
	North[ft]	East[ft]	Easting[US ft]	Northing[US ft]	Latitude	Longitude
Slot Location	-27.06	-53.66	1854757.37	261704.01	39°13'02.620"N	80°00'45.450"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	1551.44ft
Horizontal Reference Pt	Slot	Patterson 331 (RT) to Mean Sea Level	1551.44ft
Vertical Reference Pt	Patterson 331 (RT)	Patterson 331 (RT) to Mud Line at Slot (Slot D)	1551.44ft
MD Reference Pt	Patterson 331 (RT)	Section Origin	N 0.00, E 0.00 ft
Field Vertical Reference	Mean Sea Level	Section Azimuth	148.35°



### Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	8/22/2013
Job End Date:	9/19/2013
State:	West Virginia
County:	Barbour
API Number:	47-001-03223-00-00
Operator Name:	CONSOL Energy Inc.
Well Name and Number:	PHL13DHS
Longitude:	-80.01351900
Latitude:	39.21558000
Datum:	NAD83
Federal/Tribal Well:	NO
True Vertical Depth:	7,892
Total Base Water Volume (gal):	10,624,811
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	90.26370	
Sand (Proppant)	CWS	Propping Agent					
			Silicon Dioxide	14808-60-7	100.00000	9.63970	
DWP-NE1	CWS	Non-Emulsifier					
			Dimethylcocoamine, bis (chlorethyl)ether, diquatary ammonium salt	68607-28-03	40.00000	0.01990	
			Isopropyl alcohol	67-63-0	40.00000	0.01990	
			Methyl Alcohol	67-56-1	15.00000	0.00750	
			Dimethyldiallylammonium Chloride	7398-69-8	5.00000	0.00250	
DAP-903	CWS	Scale Inhibitor					
			No Hazardous Materials	NA	100.00000	0.01580	
DWP-111	CWS	Gel Slurry					
			No Hazardous Materials	NA	100.00000	0.01340	
BioClear 2000	CWS	Biocide					
			2,2-Dibromo-3-Nitripropionamide	10222-01-2	40.00000	0.01070	
DWP-614	CWS	Viscosifier					
			Polyethylene glycol nonylphenyl ether	9016-45-9	5.00000	0.00560	



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PHL3DHS

DWP-901	CWS	Breaker	Ammonium Persulfate	7727-54-0	95.00000	0.00120
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)