west virginia department of environmental protection

Office of Oil and Gas
601 57th Street SE
Charleston, WV 25304
(304) 926-0450
(304) 926-0452 fax

Earl Ray Tomblin, Governor
Randy C. Huffman, Cabinet Secretary
www.dep.wv.gov

August 04, 2014

WELL WORK PERMIT

Horizontal 6A Well

This permit, API Well Number: 47-103345, issued to CNX GAS COMPANY LLC , is evidence of permission granted to perform the specified well work at the location described on the attached pages and located on the attached plat, subject to the provisions of Chapter 22 of the West Virginia Code of 1931, as amended, and all rules and regulations promulgated thereunder, and to all conditions and provisions outlined in the pages attached hereto. Notification shall be given by the operator to the Oil and Gas Inspector at least 24 hours prior to the construction of roads, locations, and/or pits for any permitted work. In addition, the well operator shall notify the same inspector 24 hours before any actual well work is commenced and prior to running and cementing casing. Spills or emergency discharges must be promptly reported by the operator to 1-800-642-3074 and to the Oil and Gas inspector.

Please be advised that form WR-35, Well Operators Report of Well Work is to be submitted to this office within 90 days completion of permitted well work, as should form WR-34 Discharge Monitoring Report within 30 days of discharge of pits, if applicable. Failure to abide by all statutory and regulatory provisions governing all duties and operations hereunder may result in suspension or revocation of this permit and, in addition, may result in civil and/or criminal penalties being imposed upon the operators.

In addition to the applicable requirements of this permit, and the statutes and rules governing oil and gas activity in WV, this permit may contain specific conditions which must be followed. Permit conditions are attached to this cover letter.

Per 35CSR-4-5.2.g this permit will expire in two (2) years from the issue date unless permitted well work is commenced. If there are any questions, please feel free to contact me at (304) 926-0499 ext. 1654.

James Martin
Chief

Operator's Well No: PHL 21 CHS
Farm Name: PHILIPPI DEVELOPMENT, INC.
API Well Number: 47-103345
Permit Type: Horizontal 6A Well
Date Issued: 08/04/2014

Promoting a healthy environment.

API Number: 1-03345

PERMIT CONDITIONS

West Virginia Code § 22-6A-8(d) allows the Office of Oil and Gas to place specific conditions upon this permit. Permit conditions have the same effect as law. Failure to adhere to the specified permit conditions may result in enforcement action.

CONDITIONS

1. This proposed activity will require permit coverage from the United States Army Corps of Engineers (USACE) and WV DEP Department of Water and Waste Management (DWWM). No activity authorized under this permit shall be commenced until all necessary permits from USACE and DWWM are obtained.

2. If the operator encounters an unanticipated void, or an anticipated void at an unanticipated depth, the operator shall notify the inspector within 24 hours. Modifications to the casing program may be necessary to comply with W. Va. Code § 22-6A-5a (12), which requires drilling to a minimum depth of thirty feet below the bottom of the void, and installing a minimum of twenty (20) feet of casing. Under no circumstance should the operator drill more than fifty (50) feet below the bottom of the void or install less than twenty (20) feet of casing below the bottom of the void.

3. When compacting fills, each lift before compaction shall not be more than 12 inches in height, and the moisture content of the fill material shall be within limits as determined by the Standard Proctor Density test of the actual soils used in specific engineered fill, ASTM D698, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort, to achieve 95 % compaction of the optimum density. Each lift shall be tested for compaction, with a minimum of two tests per lift per acre of fill. All test results shall be maintained on site and available for review.

4. Operator shall install signage per § 22-6A-8g (6) (B) at all source water locations included in their approved water management plan within 24 hours of water management plan activation.

5. Oil and gas water supply wells will be registered with the Office of Oil and Gas and all such wells will be constructed and plugged in accordance with the standards of the Bureau for Public Health set forth in its Legislative rule entitled *Water Well Regulations*, 64 C.S.R. 19. Operator is to contact the Bureau of Public Health regarding permit requirements. In lieu of plugging, the operator may transfer the well to the surface owner upon agreement of the parties. All drinking water wells within fifteen hundred feet of the water supply well shall be flow tested by the operator upon request of the drinking well owner prior to operating the water supply well.

6. Pursuant to the requirements pertaining to the sampling of domestic water supply wells/springs the operator shall, no later than thirty (30) days after receipt of analytical data provide a written copy to the Chief and any of the users who may have requested such analyses.

7. If any explosion or other accident causing loss of life or serious personal injury occurs in or about a well or well work on a well, the well operator or its contractor shall give notice, stating the particulars of the explosion or accident, to the oil and gas inspector and the Chief, within 24 hours of said accident.

8. During the casing and cementing process, in the event cement does not return to the surface, the oil and gas inspector shall be notified within 24 hours.

1-03345

WW-6B
(9/13)

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
WELL WORK PERMIT APPLICATION

6 545

1) Well Operator: CNX Gas Company LLC | 494458046 | Barbour | Pleasant | Philippi
Operator ID | County | District | Quadrangle

2) Operator's Well Number: PHL21CHS Well Pad Name: PHL21HS

3) Farm Name/Surface Owner: Philippi Development, INC. Public Road Access: Co. Rt. 77/6

4) Elevation, current ground: 1556' Elevation, proposed post-construction: 1567'

5) Well Type (a) Gas ■ Oil ____ Underground Storage ____
Other ____
(b)If Gas Shallow ■ Deep ____
Horizontal ■

6) Existing Pad: Yes or No NO

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Associated Pressure(s):
Target - Marcellus, Depth - 7905', Thickness - 90', Pressure - 2500#

8) Proposed Total Vertical Depth: 8095'

9) Formation at Total Vertical Depth: Oriskany Sand

10) Proposed Total Measured Depth: 18194'

11) Proposed Horizontal Leg Length: 8715'

12) Approximate Fresh Water Strata Depths: 150', 575', 730'

13) Method to Determine Fresh Water Depths: Offset Well

14) Approximate Saltwater Depths: 1650', 2455'

15) Approximate Coal Seam Depths: 660', 730'

16) Approximate Depth to Possible Void (coal mine, karst, other): None Anticipated

17) Does Proposed well location contain coal seams directly overlying or adjacent to an active mine? Yes ☑ No ☐

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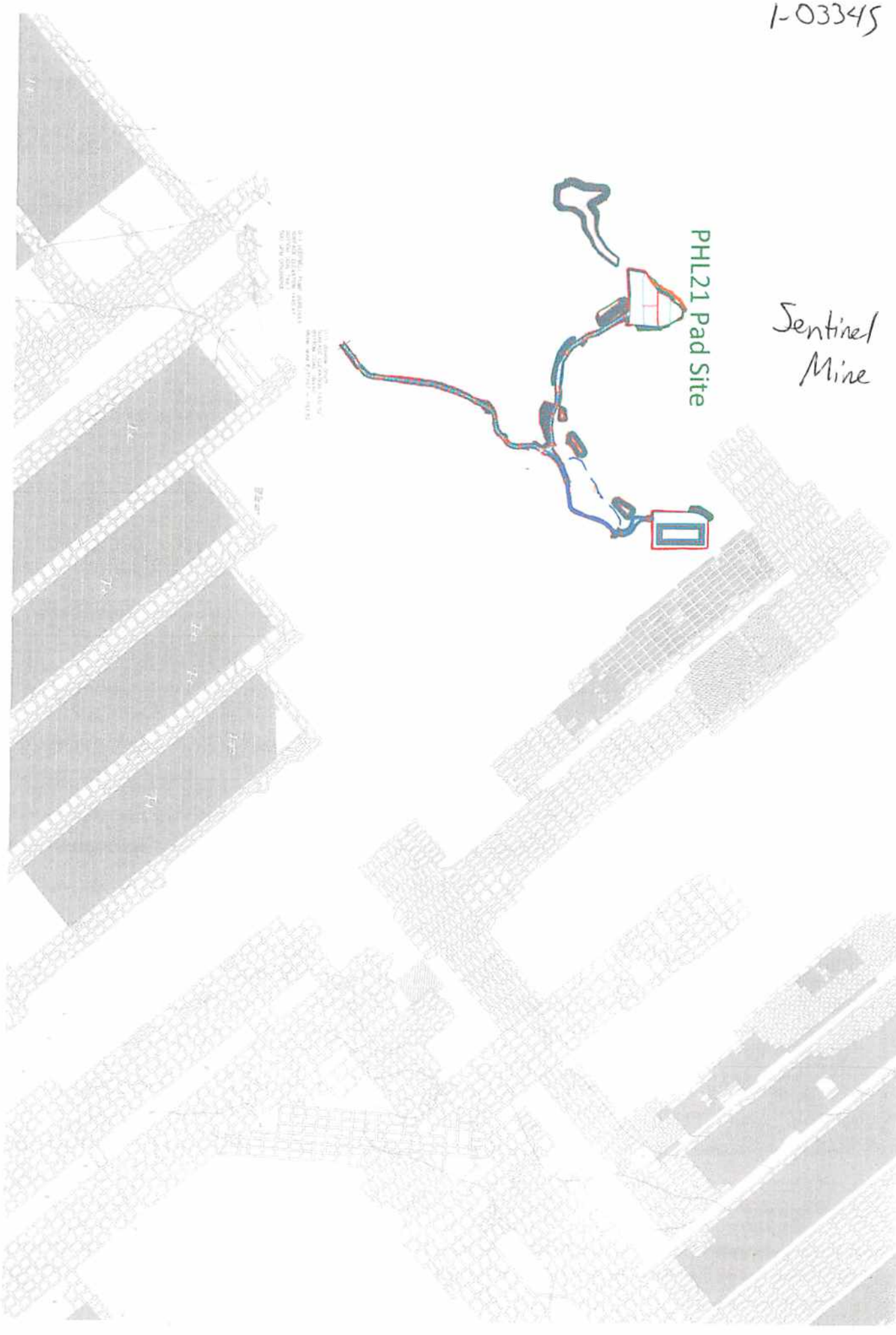
MAY 14 2014
Office of Oil and Gas
WV Dept. of Environmental Protection

(a) If Yes, provide Mine Info: Name: Sentinel Mine
Depth: 660' & 730'
Seam: Upper Kittaning and Lower Kittaning
Owner: Arch Coal

Kenneth L. Greynock
4-10-2014

Gayn J Kirk 4/10/14

1-03345



1-03345

WW-6B
(9/13)

18) **CASING AND TUBING PROGRAM**

TYPE	Size	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling	INTERVALS: Left in Well	CEMENT: Fill-up (Cu. Ft.)
Conductor	20"	N	J-55	94#	100'	100'	Grout to surface w/ Class A type cement
Fresh Water	13 3/8"	N	J-55	54.5#	800'	800'	CTS w/ Class A Type Cement
Coal							CTS w/ Class A Type Cement
Intermediate	9 5/8"	N	J-55	36#	2500'	2500'	CTS w/ Class A Type Cement
Production	5 1/2"	N	P-110	20#	18194'	18194'	2200 cu. ft. w/ 50/50 POZ Lead & Class A
Tubing	2 3/8"	N	J-55	4.7#	8500'	8500'	
Liners							

Gary J K 4/10/14 Kenneth T. Greywood 4-10-2014

TYPE	Size	Wellbore Diameter	Wall Thickness	Burst Pressure	Cement Type	Cement Yield (cu. ft./k)
Conductor	20"	26"	0.438	2110	Class A Type	1.18
Fresh Water	13 3/8"	17 1/2"	0.380	2730	Class A Type	1.39
Coal						
Intermediate	9 5/8"	12 3/8"	0.352	3520	Class A Type	1.18
Production	5 1/2"	8 3/4" & 8 1/2"	0.361	12640	Class A Type	1.26
Tubing	2 3/8"	5 1/2" Csg	0.190	7700	.....	.....
Liners						

PACKERS

Kind:	None			
Sizes:	None			
Depths Set:	None			

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Office of Oil and Gas

1-03345
PHLZICHS

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(9/13)

19) Describe proposed well work, including the drilling and plugging back of any pilot hole:

Drill and stimulate new horizontal Marcellus well. Well to be drilled to a TMD of 18194'. Well to be drilled to a TVD of 8095', formation at TVD - Oriskany Sand. The well will be drilled no more than 100' beyond the top of the Onondaga. Well will be plugged back to an approximate depth of 6800' (approximate due to exact kick off point being unknown). Plugging back will be done using the displacement method and Class A Type cement. A solid cement plug will be set from TD to KOP. If an unexpected void is encountered, plan will be to set casing at a minimum of 30' past void and cement to surface with approved Class A type cement. There will not be any production, perforation, or stimulation of any formations below the target formation.

20) Describe fracturing/stimulating methods in detail, including anticipated max pressure and max rate:

The stimulation will be multiple stages divided over the lateral length of the well. Stage spacing is dependent upon engineering design. Slickwater fracturing technique will be utilized on each stage using sand, water, and chemicals. Max Pressure - 9500 psi. Max Rate - 100 bbl/min.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 25.7 Acres

22) Area to be disturbed for well pad only, less access road (acres): 19.3 Acres

23) Describe centralizer placement 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 forth 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.)

24) Describe all cement additives associated with each cement type:

Conductor - 2% CaCl2. Fresh Water/Coal - 2% CaCl2. Intermediate - 2% CaCl2. Production - 2.6% Cement extender, 0.7% Fluid loss additive, 0.5% High Temperature Retarder, 0.2% Friction Reducer

25) Proposed borehole conditioning procedures:

Conductor - The hole is drilled w/ air and casing ran in air. Apart from insuring the hole is clean via air circulation at TD, there are no other conditioning procedures. Fresh Water/Coal - The hole is drilled w/ air and casing is ran in air. Once casing is on bottom, the casing shoe will be cleared with fresh water and gel prior to cementing. Intermediate - The hole is drilled w/ air and casing is ran in air. Once casing is on bottom, the casing shoe will be cleared with fresh water and gel prior to cementing. (Note: Drilling soap may be utilized if the hole gets wet/damp during the drilling of all air holes with the exception of the conductor). Production - The hole will be drilled with synthetic oil base mud and once at TD the hole is circulated at a drilling pump rate until the hole is clean. Once casing is ran the hole is circulated for a minimum of one hole volume prior to pumping cement.

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*Note: Attach additional sheets as needed.

AUG 01 2014

WV Department of
Environmental Protection

1-03345

Cement Additives

- Conductor – 2% CaCl2
- Freshwater/Coal – 2% CaCl2
- Intermediate - 2% CaCl2
- Production -
  - 2.6% Cement extender
  - 0.7% Fluid Loss Additive
  - 0.5% High Temperature Retarder
  - 0.2% Friction Reducer

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Office of Oil and Gas
WV Dept. of Environmental Protection

WW-9
(9/13)

API Number 47 - 001 - 03345
Operator's Well No. PHL21CHS

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

FLUIDS/ CUTTINGS DISPOSAL & RECLAMATION PLAN

Operator Name CNX Gas Company LLC OP Code 494458046

Watershed (HUC 10) Pleasant Creek Quadrangle Philippi

Elevation 1556' County Barbour District Pleasant

Do you anticipate using more than 5,000 bbls of water to complete the proposed well work? Yes ☑ No ☐

Will a pit be used? Yes ☐ No ☑

If so, please describe anticipated pit waste: N/A

Will a synthetic liner be used in the pit? Yes ☐ No ☑ If so, what ml.? N/A

Proposed Disposal Method For Treated Pit Wastes:

_____ Land Application
_____ Underground Injection (UIC Permit Number _____)
_____ Reuse (at API Number _____)
■ Off Site Disposal (Supply form WW-9 for disposal location)
■ Other (Explain Recycle on other wells on same pad or adjacent pads

Will closed loop system be used? If so, describe: Yes, cuttings/fluid separated with the use of a centrifuge/shaker liquids recycled solids disposed offsite at approved landfill

Drilling medium anticipated for this well (vertical and horizontal)? Air, freshwater, oil based, etc. Air and oil based mud

-If oil based, what type? Synthetic, petroleum, etc. Synthetic

Additives to be used in drilling medium? Bactericide, Polymers, and Weighting Agents

Drill cuttings disposal method? Leave in pit, landfill, removed offsite, etc. Landfill

-If left in pit and plan to solidify what medium will be used? (cement, lime, sawdust) N/A

-Landfill or offsite name/permit number? Meadowfill, Northwestern Landfill, Max Environmental's Yukon Landfill and Bulger Landfill

I certify that I understand and agree to the terms and conditions of the GENERAL WATER POLLUTION PERMIT issued on August 1, 2005, by the Office of Oil and Gas of the West Virginia Department of Environmental Protection. I understand that the provisions of the permit are enforceable by law. Violations of any term or condition of the general permit and/or other applicable law or regulation can lead to enforcement action.

I certify under penalty of law that I have personally examined and am familiar with the information submitted on this application form and all attachments thereto and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment.

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WV Dept. of Environmental Protection

Company Official Signature _____

Company Official (Typed Name) Jeremy Jones

Company Official Title Designated Agent General Manager WV Gas Operations

Subscribed and sworn before me this 7th day of May, 2014

_____ Notary Public

My commission expires 09/15/2021

OFFICIAL SEAL
NOTARY PUBLIC
STATE OF WEST VIRGINIA
CAROLINDA FLANAGAN
PO Box 603
Lumberport WV 26386
My Commission Expires September 15, 2021

1-03345

Form WW-9

Operator's Well No. PHL21CHS

CNX Gas Company LLC

Proposed Revegetation Treatment: Acres Disturbed 25.7 Prevegetation pH 6.5

Lime according to PH test Tons/acre or to correct to pH 7.0

Fertilizer type 10/20/20 or equivalent

Fertilizer amount 500 lbs/acre

Mulch hay or straw @ 2 Tons/acre

Seed Mixtures

Temporary		Permanent	
Seed Type	lbs/acre	Seed Type	lbs/acre
Orchard Grass	25	Orchard Grass	25
Birdsfoot Trefoil	15	Birdsfoot Trefoil	15
Ladino Clover	10	Ladino Clover	10

Attach:
Drawing(s) of road, location, pit and proposed area for land application (unless engineered plans including this info have been provided)

Photocopied section of involved 7.5' topographic sheet.

Plan Approved by: [signature] [signature]

Comments: ARMY CORPS OF ENGINEERS APPROVAL ON WETLANDS MUST BE OBTAINED. SOIL STOCKPILE ALONG ACCESS ROAD IN WETLANDS NEEDS MOVED OR ADDRESSED

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Office of Oil and Gas
WV Dept. of Environmental Protection

Title: OIL & GAS INSPECTOR Date: 4-10-2010

Field Reviewed? (✓) Yes ( ) No

PG. 2 OF 3

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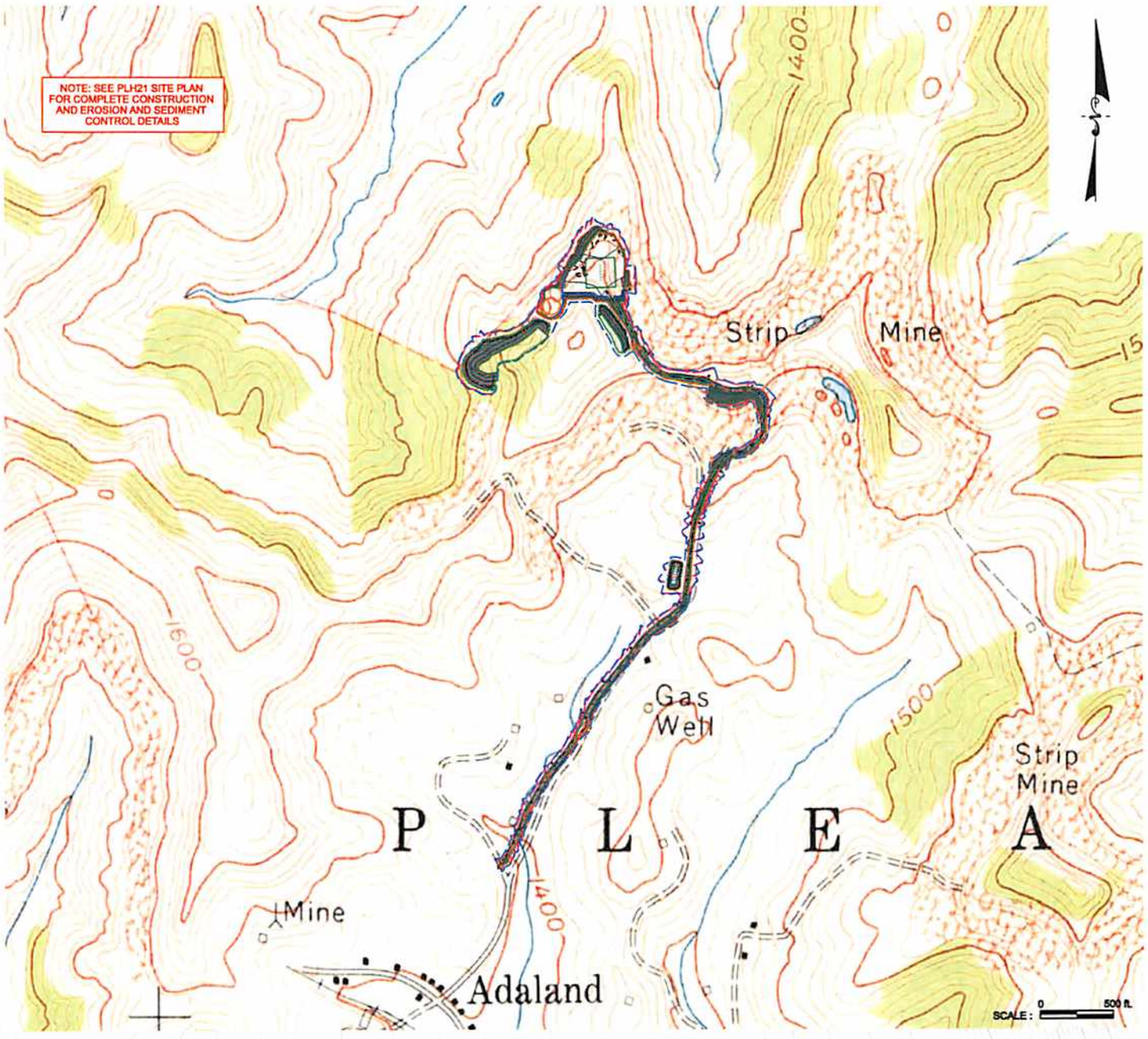

Kenneth L. Greynert
4-10-2014

Gayne J. Kirk
4/10/14

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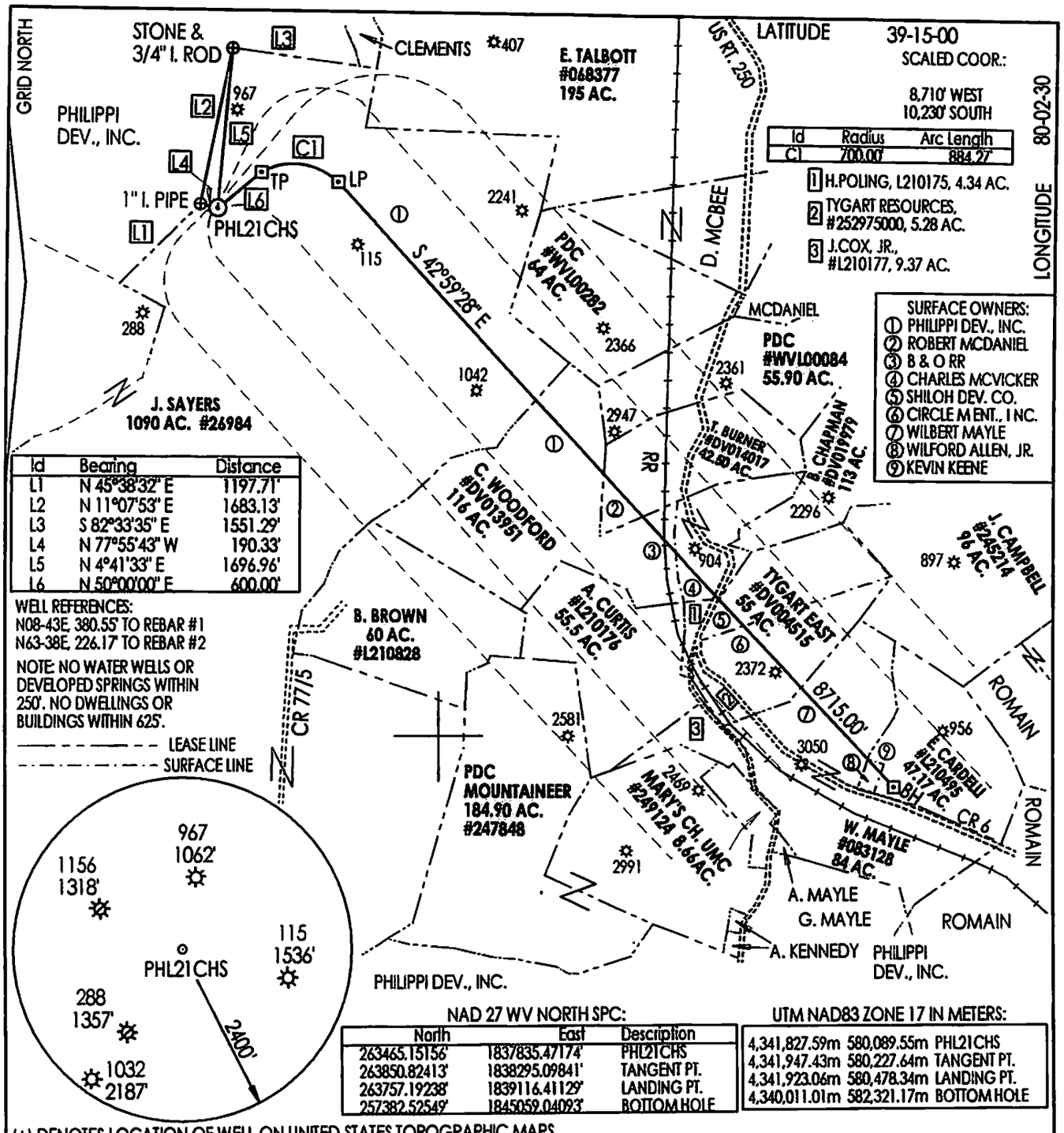
WV Dept. of Environmental Protection

Title	Project	Client	Date	Project No.	
FORM WW-9	PHL21 WELL SITE	CNX GAS COMPANY LLC.	APRIL 2014	1229041	DIEFFENBAUCH & HRITZ MORGANTOWN, WV

PG. 3 OF 3



Id	Radius	Arc Length
C1	700.00'	884.27'

Id	Bearing	Distance
L1	N 45°38'32" E	1197.71'
L2	N 11°07'53" E	1683.13'
L3	S 82°33'35" E	1551.29'
L4	N 77°55'43" W	190.33'
L5	N 4°41'33" E	1696.96'
L6	N 50°00'00" E	600.00'

WELL REFERENCES:
N08-43E, 380.55' TO REBAR #1
N63-38E, 226.17' TO REBAR #2

NOTE: NO WATER WELLS OR DEVELOPED SPRINGS WITHIN 250'. NO DWELLINGS OR BUILDINGS WITHIN 625'.

LEASE LINE
SURFACE LINE

NAD 27 WV NORTH SPC:

North	East	Description
263465.15156'	1837835.47174'	PHL21CHS
263850.82413'	1838295.09841'	TANGENT PT.
263757.19238'	1839116.41129'	LANDING PT.
257382.52549'	1845059.04093'	BOTTOM HOLE

UTM NAD83 ZONE 17 IN METERS:

4,341,827.59m	580,089.55m	PHL21CHS
4,341,947.43m	580,227.64m	TANGENT PT.
4,341,923.06m	580,478.34m	LANDING PT.
4,340,011.01m	582,321.17m	BOTTOM HOLE

(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS

FILE NUMBER:
DRAWING NUMBER: CNXPHL21CHSR2.PCS
SCALE: 1" = 1500'
MINIMUM DEGREE OF ACCURACY: SUBMETER
PROVEN SOURCE OF ELEVATION: DGPS SURVEY
RTK SYSTEM

I THE UNDERSIGNED, HEREBY STATE 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 ENERGY.

(SIGNED)
STEPHEN D. LOSH, P.S. #674

PROFESSIONAL LAND SURVEYOR
STEPHEN D. LOSH
NO. 674
STATE OF WEST VIRGINIA
PLACE SEAL HERE

STATE OF WEST VIRGINIA
DIVISION OF ENVIRONMENTAL PROTECTION
OFFICE OF OIL AND GAS
#10 McJUNKIN ROAD
NITRO, WV 25143-2506

FORM WW-6

LAND SURVEYING SERVICES
21 CEDAR LANE, BRIDGEPORT, WV 26330
PHONE: 304-842-2018 OR 842-5762

DATE: JULY 31, 2014
OPERATORS WELL NO.: PHL21CHS
API WELL NO.
47 — 001 — 03345 H6A
STATE COUNTY PERMIT

WELL TYPE: OIL ___ GAS X LIQUID INJECTION ___ WASTE DISPOSAL ___ CBM ___
(IF "GAS") PRODUCTION X STORAGE ___ DEEP ___ SHALLOW X

LOCATION: ELEVATION 1556.00' WATERSHED PLEASANT CREEK
DISTRICT PLEASANT COUNTY BARBOUR
QUADRANGLE PHILIPPI LEASE NUMBER SEE ABOVE
SURFACE OWNER PHILIPPI DEVELOPMENT, INC. ACREAGE 2218.55 (20-23)
OIL & GAS ROYALTY OWNER JAMES E. SAYERS, ET. AL. LEASE ACREAGE 2277.96

PROPOSED WORK: DRILL X CONVERT ___ DRILL DEEPER ___ REDRILL ___ FRACTURE OR STIMULATE X PLUG OFF OLD FORMATION ___
PERFORATE NEW FORMATION ___ OTHER PHYSICAL CHANGE (SPECIFY) HORIZONTAL
PLUG & ABANDON ___ CLEAN OUT & REPLUG ___

TARGET FORMATION MARCELLUS ESTIMATED DEPTH TVD = 8095' TMD = 18194'
WELL OPERATOR CNX GAS COMPANY LLC DESIGNATED AGENT JEREMY JONES
ADDRESS P. O. BOX 1248 JANE LEW, WV 26378 ADDRESS P. O. BOX 1248 JANE LEW, WV 26378

COUNTY NAME PERMIT