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

PERMIT MODIFICATION APPROVAL

March 06, 2015

CNX GAS COMPANY LLC
POST OFFICE BOX 1248
JANE LEW, WV 26378

Re: Permit Modification Approval for API Number 3305815 , Well #: KST5BHS
Extend Lateral

Oil and Gas Operator:
The Office of Oil and Gas has reviewed the attached permit modification for the above referenced permit. The attached modification has been approved and well work may begin. Please be reminded that the oil and gas inspector is to be notified twenty-four (24) hours before permitted well work is commenced.

Please call James Martin at 304-926-0499, extension 1654 if you have any questions.

Sincerely,

for Gene Smith

Gene Smith
Assistant Chief of Permitting
Office of Oil and Gas

4703305815

CONSOL ENERGY

Carolinda Flanagan
Permitting Analyst
P.O. Box 1248
Jane Lew, WV 26378
(304) 884-2057
CNX GAS

February 24, 2015

West Virginia Department of Environmental Protection
Office of Oil & Gas
Attn: Laura Adkins
601 57th Street, SE
Charleston, WV 25304-2345

RE: KST5BHS - API# 47-033-05815 (Modification to Extend Lateral – extending 970.46' more)

Dear Laura,

Enclosed, please find a modification for the KST5BHS to extend the lateral due to additional leasing being obtained. I have attached an updated casing plan, mylar plat, and lease breakdown. The lateral has been extended 970.46' as shown on the mylar plat into lease C and G.

Should you need any further information, please contact me at (304) 884-2057 or by email at carolindaflanagan@consolenergy.com. Thank you!

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Environmental Protection

Sincerely,

Carolinda Flanagan

4703305815

WW-6B
(10/14)

API NO. 47- 33 - 05815
OPERATOR WELL NO. KST5BHS
Well Pad Name: KST5HS

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

1) Well Operator: CNX Gas Company LLC

494458046	Harrison	Union	West Milford
Operator ID	County	District	Quadrangle

2) Operator's Well Number: KST5BHS Well Pad Name: KST5HS

3) Farm Name/Surface Owner: James Ivan McDonald Public Road Access: Co. Rt. 19/18

4) Elevation, current ground: 1153' Elevation, proposed post-construction: 1136'

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

6) Existing Pad: Yes or No NO

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Associated Pressure(s):
Target - Marcellus, Depth - 6975', Thickness - 95', Pressure - 4500#

8) Proposed Total Vertical Depth: 7170'

9) Formation at Total Vertical Depth: Onondaga

10) Proposed Total Measured Depth: 18523

11) Proposed Horizontal Leg Length: 9761

12) Approximate Fresh Water Strata Depths: 40',811'

13) Method to Determine Fresh Water Depths: Offset Well Information

14) Approximate Saltwater Depths: 1720', 2345'

15) Approximate Coal Seam Depths: 349', 851'

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 X

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(a) If Yes, provide Mine Info: Name: ____
Depth: ____
Seam: ____
Owner: ____

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API NO. 47- 33 - 05815
OPERATOR WELL NO. KST5BHS
Well Pad Name: KST5HS

18) **CASING AND TUBING PROGRAM**

TYPE	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	CEMENT: Fill-up (Cu. Ft.)/CTS
Conductor	20	N	J-55	94	100	100	112.9/ CTS
Fresh Water	13.375	N	J-55	54.5	975	925	481.8/ CTS
Coal							
Intermediate	9.675	N	J-55	36	2500	2450	575.4/ CTS
Production	5.5	N	P-110	20	18523	18473	3082.2
Tubing	2.375	N	J-55	4.7	7000	7000	
Liners							

TYPE	Size (in)	Wellbore Diameter (in)	Wall Thickness (in)	Burst Pressure (psi)	Max. Associated Surface Pressure (psi)	Cement Type	Cement Yield (cu. ft./k)
Conductor	20	26	0.438	2110	0	Class A	1.18
Fresh Water	13.375	17.5	0.380	2730	0	Class A	1.39
Coal							
Intermediate	9.675	12.25	0.352	3520	1417.1	Class A	1.18
Production	5.5	8.75	0.361	14360	6478.7	Class A	1.26
Tubing	2.375	5.5 csg	0.190	7700			
Liners							

PACKERS

Kind:	None		
Sizes:	None		
Depths Set:	None		

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WW-6B
(10/14)

API NO. 47- 33 - 05815
OPERATOR WELL NO. KST5BHS
Well Pad Name: KST5HS

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 18523'. Well to be drilled to a TVD of 7170', formation at TVD - Onondaga. Well will be plugged back to an approximate depth of 6500' (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): 16.3

22) Area to be disturbed for well pad only, less access road (acres): 11.5

23) Describe centralizer placement for each casing string:

Conductor - No centralizers used.
Surface - Rigid Bow spring centralizers on first joint then every third joint to surface.
Intermediate - Rigid Bow spring centralizers one on the first two joints and every third joint to surface.
Production - Rigid bow spring centralizer on first joint then every casing joint (free floating) through the lateral and every other joint in 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.
Surface - 3% CaCl2 & 1#/sk Celloflake LCM.
Intermediate - 3% CaCl2 & 0.5#/sk Celloflake LCM.
Production - 2.6% Cement extender, 0.7% Fluid loss additive, 0.5% High Temperature Retarder, 0.2% Friction Reducer

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25) Proposed borehole conditioning procedures:

Conductor - The hole is auger drilled w/ air and casing ran in air.
Surface - The hole is drilled w/ air and casing is ran in air. Once casing is on bottom, the casing string will be circulated w/ fresh water prior to cementing.
Intermediate - The hole is drilled w/ air and casing is ran in air. (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. At TD the hole is circulated at optimum pump rate until shale shaker deem the hole is clean. Once casing is ran the hole is circulated for a minimum of one hole volume prior to pumping cement.

*Note: Attach additional sheets as needed.

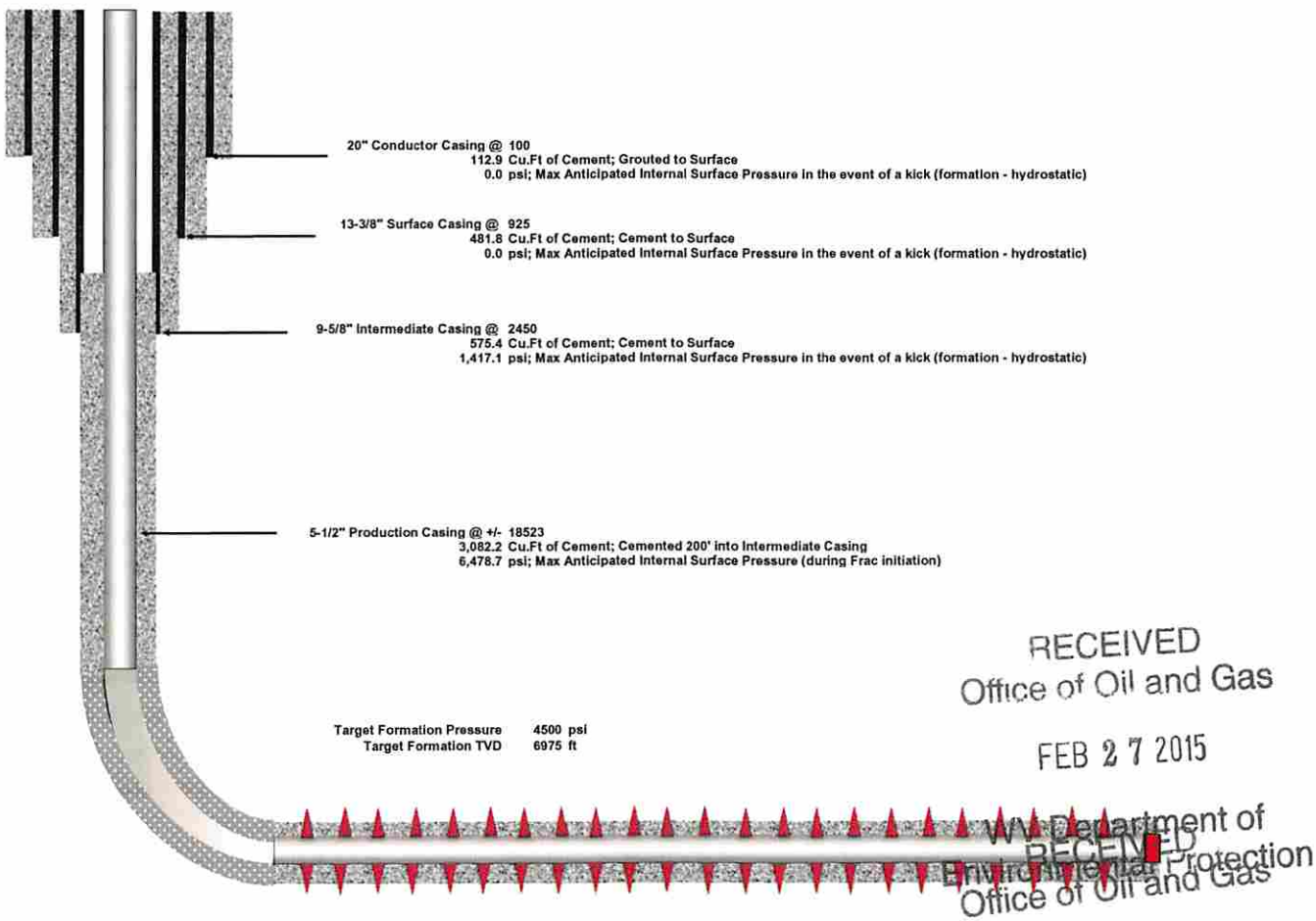
4703300815

CONSOL ENERGY

KST5BHS

Casing Schematic

SCHEMATIC NOT TO SCALE



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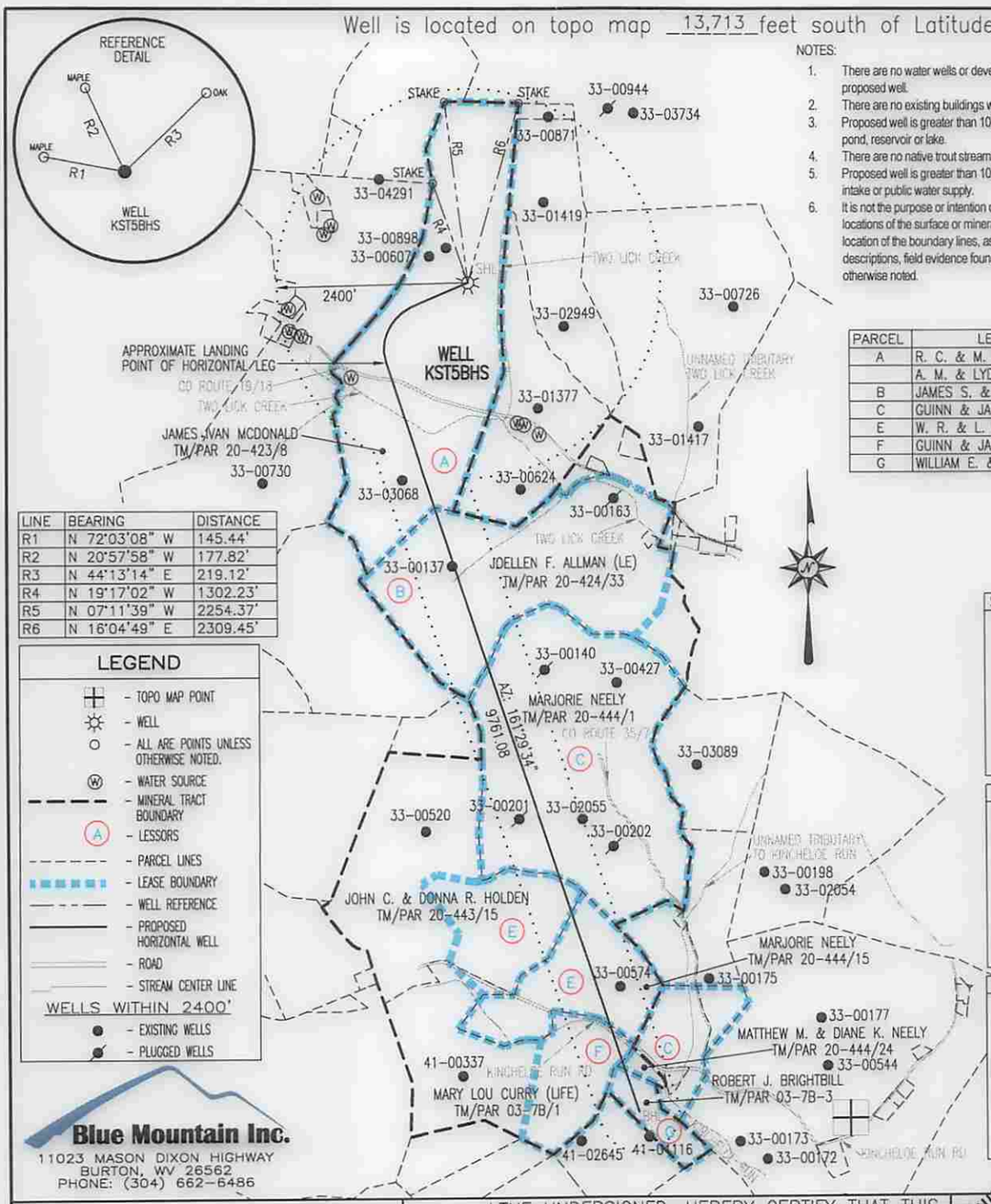
Well is located on topo map 13,713 feet south of Latitude: 39° 12' 30"

Well is located on topo map 4,166 feet west of Longitude: 80° 27' 30"



NOTES:

1. There are no water wells or developed springs within 250' of proposed well.
2. There are no existing buildings within 625' of proposed well.
3. Proposed well is greater than 100' from perennial stream, wetland, pond, reservoir or lake.
4. There are no native trout streams within 300' of proposed well.
5. Proposed well is greater than 1000' from surface/groundwater intake or public water supply.
6. It is not the purpose or intention of this plat to represent surveyed locations of the surface or mineral parcels depicted hereon. The location of the boundary lines, as shown, are based on record deed descriptions, field evidence found and/or tax map position, unless otherwise noted.

PARCEL	LESSOR
A	R. C. & M. B. MCDONALD
	A. M. & LYDIA D. MCDONALD
B	JAMES S. & SUSANNA LAW
C	GUINN & JANE MINTER
E	W. R. & L. E. NEELY
F	GUINN & JANE MINTER
G	WILLIAM E. & HARRIET BEEGHLEY

LINE	BEARING	DISTANCE
R1	N 72°03'08" W	145.44'
R2	N 20°57'58" W	177.82'
R3	N 44°13'14" E	219.12'
R4	N 19°17'02" W	1302.23'
R5	N 07°11'39" W	2254.37'
R6	N 16°04'49" E	2309.45'

LEGEND

- TOPO MAP POINT
- WELL
- ALL ARE POINTS UNLESS OTHERWISE NOTED.
- WATER SOURCE
- MINERAL TRACT BOUNDARY
- LESSORS
- PARCEL LINES
- LEASE BOUNDARY
- WELL REFERENCE
- PROPOSED HORIZONTAL WELL
- ROAD
- STREAM CENTER LINE

WELLS WITHIN 2400'

- EXISTING WELLS
- PLUGGED WELLS

SURFACE HOLE LOCATION (SHL)
UTM 17-NAD83
N:4335850.15
E:545521.82
NAD27, WV NORTH
N:245738.53
E:1724077.98
LAT/LON DATUM-NAD83
LAT:39.170685
LON:-80.473027

APPROX. LANDING POINT
UTM 17-NAD83
N:4335545.37
E:545216.52
NAD27, WV NORTH
N:244755.07
E:1723059.48
LAT/LON DATUM-NAD83
LAT:39.167954
LON:-80.476581

BOTTOM HOLE LOCATION (BHL)
UTM 17-NAD83
N:4332741.15
E:546207.42
NAD27, WV NORTH
N:235498.803
E:1726157.896
LAT/LON DATUM-NAD83
LAT:39.142633
LON:-80.465303

Blue Mountain Inc.
11023 MASON DIXON HIGHWAY
BURTON, WV 26562
PHONE: (304) 662-6486

FILE #: KST5BHS REV. 7

DRAWING #: KST5BHS REV. 7

SCALE: 1" = 2000'

MINIMUM DEGREE OF ACCURACY: 1/2500

PROVEN SOURCE OF ELEVATION: U.S.G.S. MONUMENT THOMAS 1498.81'

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.

Signed: George D. Six

R.P.E.: _____ L.L.S.: P.S. No. 2000

GEORGE D. SIX LICENSED No. 2000 STATE OF WEST VIRGINIA PROFESSIONAL SURVEYOR

PLACE SEAL HERE

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

WVDEP
OFFICE OF OIL & GAS
601 57TH STREET
CHARLESTON, WV 25304

DATE: FEBRUARY 20, 2015

OPERATOR'S WELL #: KST5BHS

API WELL #: 47 (STATE) 33 (COUNTY) _____ (PERMIT)

Well Type: ☐ Oil ☐ Waste Disposal ☒ Production ☐ Deep
☒ Gas ☐ Liquid Injection ☐ Storage ☒ Shallow

WATERSHED: MIDDLE WEST FORK CREEK ELEVATION: 1154.29'±

COUNTY/DISTRICT: HARRISON / UNION QUADRANGLE: WEST MILFORD, WV 7.5'

SURFACE OWNER: JAMES IVAN MCDONALD ACREAGE: 176.000±

OIL & GAS ROYALTY OWNER: R. C. MCDONALD & M. B. MCDONALD; A. M. MCDONALD & LYDIA D. MCDONALD ACREAGE: 805.050±

DRILL ☒ CONVERT ☐ DRILL DEEPER ☐ REDRILL ☐ FRACTURE OR STIMULATE ☒

PLUG OFF OLD FORMATION ☐ PERFORATE NEW FORMATION ☐ PLUG & ABANDON ☐

CLEAN OUT & REPLUG ☐ OTHER CHANGE ☐ (SPECIFY): _____

TARGET FORMATION: MARCELLUS ESTIMATED DEPTH: TVD: 7,170'± TMD: 18,523'±

WELL OPERATOR CNX GAS COMPANY LLC DESIGNATED AGENT MATTHEW IMRICH

Address P.O. BOX 1248 Address P.O. BOX 1248

City JANE LEW State WV Zip Code 26378 City JANE LEW State WV Zip Code 26378

Attachment - Form WW-6A-1 for KST5BHS:

Tract ID		Lease	Grantor, Lessor, etc	Grantee, Lessee, etc	Royalty	Book/Page
2, 8, 9	A	FK026553	R.C.McDonald and M.B. McDonald; A.M. McDonald and Lydia D. McDonald	Hope Natural Gas Company	1/8	237/94
			Hope Natural Gas Company	Consolidated Gas Supply Corporation	Merger/name change	903/179
			Consolidated Gas Supply Corporation	Consolidated Gas Transmission Corporation	Assignment	1136/250
			Consolidated Gas Transmission Corporation	CNG Transmission Corporation	Merger/name change	51/795
			CNG Transmission Corporation	Dominion Transmission, Inc	Merger/name change	58/362
			Dominion Transmission, Inc	CNX Gas Company, LLC	Farmout Agreement	1522/33

Tract ID		Lease	Grantor, Lessor, etc	Grantee, Lessee, etc	Royalty	Book/Page
19	B	FK052937	James S. Law and Susanna Law	Reserve Gas Company	1/8	234/201
			Reserve Gas Company	Hope Natural Gas Company	Merger/Name Change	Sec. of State Website
			Hope Natural Gas Company	Consolidated Gas Supply Corporation	Merger/name change	903/179
			Consolidated Gas Supply Corporation	Consolidated Gas Transmission Corporation	Assignment	1136/250
			Consolidated Gas Transmission Corporation	CNG Transmission Corporation	Merger/name change	51/795
			CNG Transmission Corporation	Dominion Transmission, Inc	Merger/name change	58/362
			Dominion Transmission, Inc	CNX Gas Company, LLC	Farmout Agreement	1522/33

Tract ID		Lease	Grantor, Lessor, etc	Grantee, Lessee, etc	Royalty	Book/Page
31	C	FK052896 and FK108080	Guinn Minter and Jane Minter	Reserve Gas Company	1/8	174/203
			Reserve Gas Company	Hope Natural Gas Company	Fee Conveyance	508/573
			Hope Natural Gas Company	Consolidated Gas Supply Corporation	Merger/name change	903/179
			Consolidated Gas Supply Corporation	Consolidated Gas Transmission Corporation	Assignment	1136/250
			Consolidated Gas Transmission Corporation	CNG Transmission Corporation	Merger/name change	51/795
			CNG Transmission Corporation	Dominion Transmission, Inc	Merger/name change	58/362
			Dominion Transmission, Inc	CNX Gas Company, LLC	Farmout Agreement	1522/33

Tract ID		Lease	Grantor, Lessor, etc	Grantee, Lessee, etc	Royalty	Book/Page
41, 42	E	FK052898	W. R. Neely and L. E. Neely	Reserve Gas Company	1/8	174/205
			Reserve Gas Company	Hope Natural Gas Company	Fee Conveyance	508/573
			Hope Natural Gas Company	Consolidated Gas Supply Corporation	Merger/name change	903/179
			Consolidated Gas Supply Corporation	Consolidated Gas Transmission Corporation	Assignment	1136/250
			Consolidated Gas Transmission Corporation	CNG Transmission Corporation	Merger/name change	51/795
			CNG Transmission Corporation	Dominion Transmission, Inc	Merger/name change	58/362
			Dominion Transmission, Inc	CNX Gas Company, LLC	Farmout Agreement	1522/33

Tract ID		Lease	Grantor, Lessor, etc	Grantee, Lessee, etc	Royalty	Book/Page
47	F	FK052752	Guinn Minter and Jane Minter	Reserve Gas Company	1/8	174/203
			Edward G. Smith and Jessie B. Smith	Reserve Gas Company	Fee Conveyance	77/264
			Reserve Gas Company	Hope Natural Gas Company	Fee Conveyance	508/573
			Hope Natural Gas Company	Consolidated Gas Supply Corporation	Merger/name change	903/179
			Consolidated Gas Supply Corporation	Consolidated Gas Transmission Corporation	Assignment	1136/250
			Consolidated Gas Transmission Corporation	CNG Transmission Corporation	Merger/name change	51/795
			CNG Transmission Corporation	Dominion Transmission, Inc	Merger/name change	58/362
			Dominion Transmission, Inc	CNX Gas Company, LLC	Farmout Agreement	1522/33
			Dominion Transmission, Inc	CNX Gas Company, LLC	Amendment to Farmout Agreement	1524/491

Tract ID		Lease	Grantor, Lessor, etc	Grantee, Lessee, etc	Royalty	Book/Page
46	C	FK052896 and FK108080	Guinn Minter and Jane Minter	Reserve Gas Company	1/8	174/203
			Reserve Gas Company	Hope Natural Gas Company	Fee Conveyance	508/573
			Hope Natural Gas Company	Consolidated Gas Supply Corporation	Merger/name change	903/179
			Consolidated Gas Supply Corporation	Consolidated Gas Transmission Corporation	Assignment	1136/250
			Consolidated Gas Transmission Corporation	CNG Transmission Corporation	Merger/name change	51/795
			CNG Transmission Corporation	Dominion Transmission, Inc	Merger/name change	58/362
			Dominion Transmission, Inc	CNX Gas Company, LLC	Farmout Agreement	1522/33

Tract ID		Lease	Grantor, Lessor, etc	Grantee, Lessee, etc	Royalty	Book/Page
48	G	FK053258	William E. and Harriet Beeghley	Reserve Gas Company	1/8	68/302
			Reserve Gas Company	Hope Natural Gas Company	Fee Conveyance	155/202
			Hope Natural Gas Company	Consolidated Gas Supply Corporation	Merger/name change	294/89
			Consolidated Gas Supply Corporation	Consolidated Gas Transmission Corporation	Assignment	425/127
			Consolidated Gas Transmission Corporation	CNG Transmission Corporation	Merger/name change	Sec. of State Website
			CNG Transmission Corporation	Dominion Transmission, Inc	Merger/name change	Sec. of State Website
			Dominion Transmission, Inc	Consol Energy Holdings LLC	Assignment	651/318
			Consol Energy Holdings LLC	CNX Gas Company, LLC	Farmout Agreement	[illegible]54

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