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 103294 , Well #: AUD5DHS
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

4700103294 MOD

CONSOL ENERGY

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

December 4, 2014

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

RE: **AUD5BHS - API# 47-001-03295 (Lateral Extension – extending 2840' more)**
AUD5CHS - API# 47-001-03296 (Lateral Extension – extending 2575' more)
AUD5DHS - API# 47-001-03294 (Lateral Extension – extending 2890' more)
AUD5EHS - API# 47-001-03293 (Lateral Extension – extending 2480' more)

Dear Laura,

Enclosed, please find modifications for the AUD5BHS-AUD5EHS to extend the laterals due to additional leasing being obtained. I have attached an updated casing plan, mylar plat, lease breakdown, and road letters where applicable.

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

Sincerely,

Carolinda Flanagan

RECEIVED
Office of Oil and Gas
DEC 05 2014
WV Department of
Environmental Protection

4700103294 MOD

CONSOL ENERGY

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

February 20, 2015

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

RE: **AUD5BHS - API# 47-001-03295 (Lateral Extension – extending 2840' more)**
AUD5CHS - API# 47-001-03296 (Lateral Extension – extending 2575' more)
AUD5DHS - API# 47-001-03294 (Lateral Extension – extending 2890' more)
AUD5EHS - API# 47-001-03293 (Lateral Extension – extending 2480' more)

Dear Melanie,

Enclosed, please find, per your request, clarification of the TVD, TMD, formation at TVD, and the cement section on the WW-6B for the modifications sent to you and dated December 4, 2014 for the AUD5BHS-AUD5EHS to extend the laterals due to additional leasing being obtained. I have attached updated casing plans, casing schematics, and mylar plats reflecting these changes.

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

Sincerely,

Carolinda Flanagan

Received
Office of Oil & Gas
FEB 23 2015

4700103294MOD

WW-6B
(10/14)

API NO. 47- 001 - 03294
OPERATOR WELL NO. AUD5DHS
Well Pad Name: AUD5HS

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 (Operator ID) | Barbour (County) | Union (District) | Audra (Quadrangle)

2) Operator's Well Number: AUD5DHS Well Pad Name: AUD5HS

3) Farm Name/Surface Owner: Dana L. Jenkins Public Road Access: US Rt 119

4) Elevation, current ground: 1621.5' Elevation, proposed post-construction: 1620'

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 - 7480' (Top), Thickness - 90', Pressure - 5000#

8) Proposed Total Vertical Depth: 7670'

9) Formation at Total Vertical Depth: Onondaga

10) Proposed Total Measured Depth: 14552'

11) Proposed Horizontal Leg Length: 5960'

12) Approximate Fresh Water Strata Depths: 72', 165', 505'

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

14) Approximate Saltwater Depths: None Anticipated

15) Approximate Coal Seam Depths: 165', 505'

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

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

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Office of Oil & Gas
FEB 23 2015

API NO. 47-001 03294 47001032 94 MOD
OPERATOR WELL NO. AUD5DHS
Well Pad Name: AUD5HS

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	60	60	67.7/ CTS
Fresh Water	13.375	N	J-55	54.5	650	600	312.5/ CTS
Coal							
Intermediate	9.675	N	J-55	36	2050	2000	469.7/ CTS
Production	5.5	N	P-110	20	14502	14552	2415.3
Tubing	2.375	N	J-55	4.7		7600	
Liners							

MSW 3/6/15

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	1693.8	Class A	1.18
Production	5.5	8.75	0.361	14360	6260.0	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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Office of Oil & Gas
FEB 23 2015

WW-6B
(10/14)

API NO. 47-001-03294 4700103294 MOD
OPERATOR WELL NO. AUD5DHS
Well Pad Name: AUD5HS

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 14552'. Well to be drilled to a TVD of 7670', formation at TVD - 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): 16.62

22) Area to be disturbed for well pad only, less access road (acres): 11.88

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

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.

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FEB 23 2015

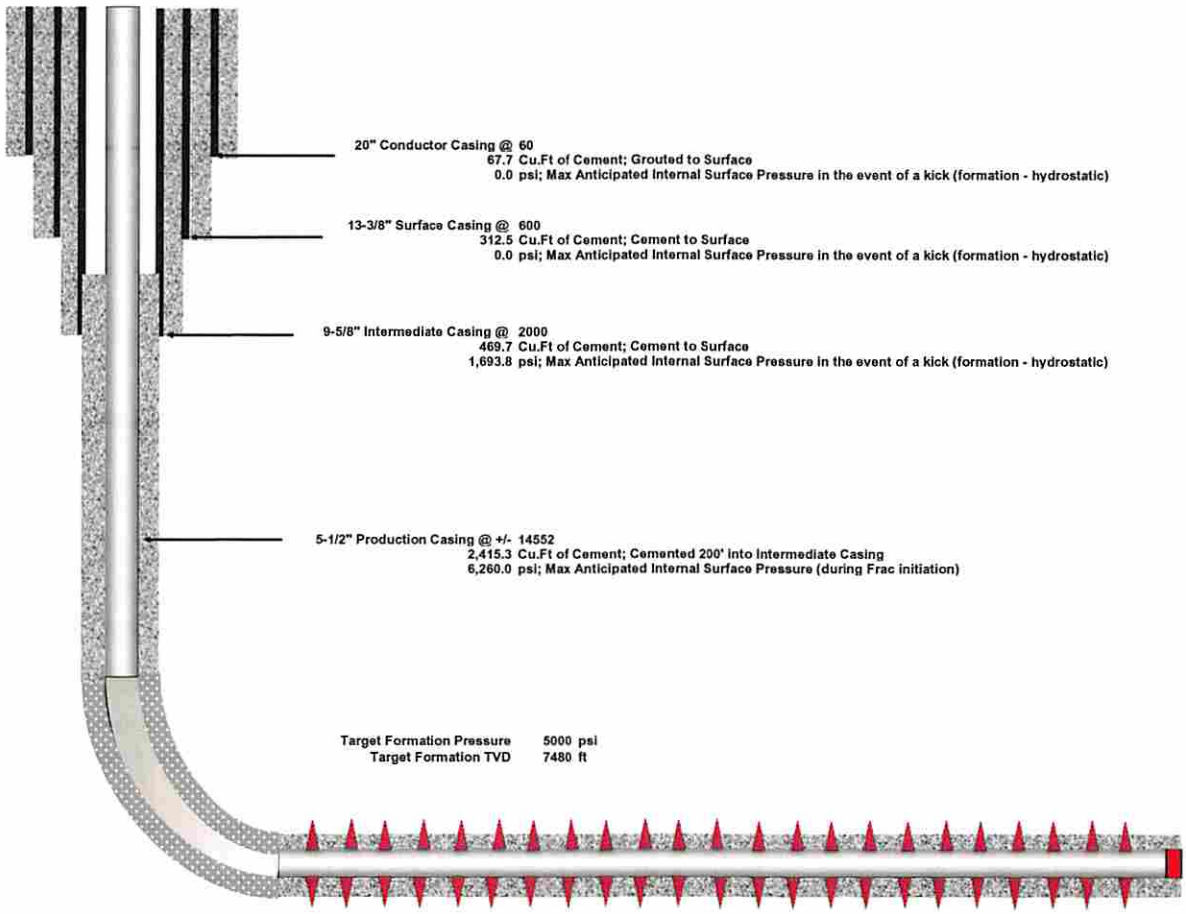
4700103294 MOD

CONSOL ENERGY

AUD5DHS

Casing Schematic

SCHEMATIC NOT TO SCALE



20" Conductor Casing @ 60
67.7 Cu.Ft of Cement; Grouted to Surface
0.0 psi; Max Anticipated Internal Surface Pressure in the event of a kick (formation - hydrostatic)

13-3/8" Surface Casing @ 600
312.5 Cu.Ft of Cement; Cement to Surface
0.0 psi; Max Anticipated Internal Surface Pressure in the event of a kick (formation - hydrostatic)

9-5/8" Intermediate Casing @ 2000
469.7 Cu.Ft of Cement; Cement to Surface
1,693.8 psi; Max Anticipated Internal Surface Pressure in the event of a kick (formation - hydrostatic)

5-1/2" Production Casing @ +/- 14552
2,415.3 Cu.Ft of Cement; Cemented 200' into Intermediate Casing
6,260.0 psi; Max Anticipated Internal Surface Pressure (during Frac initiation)

Target Formation Pressure 5000 psi
Target Formation TVD 7480 ft

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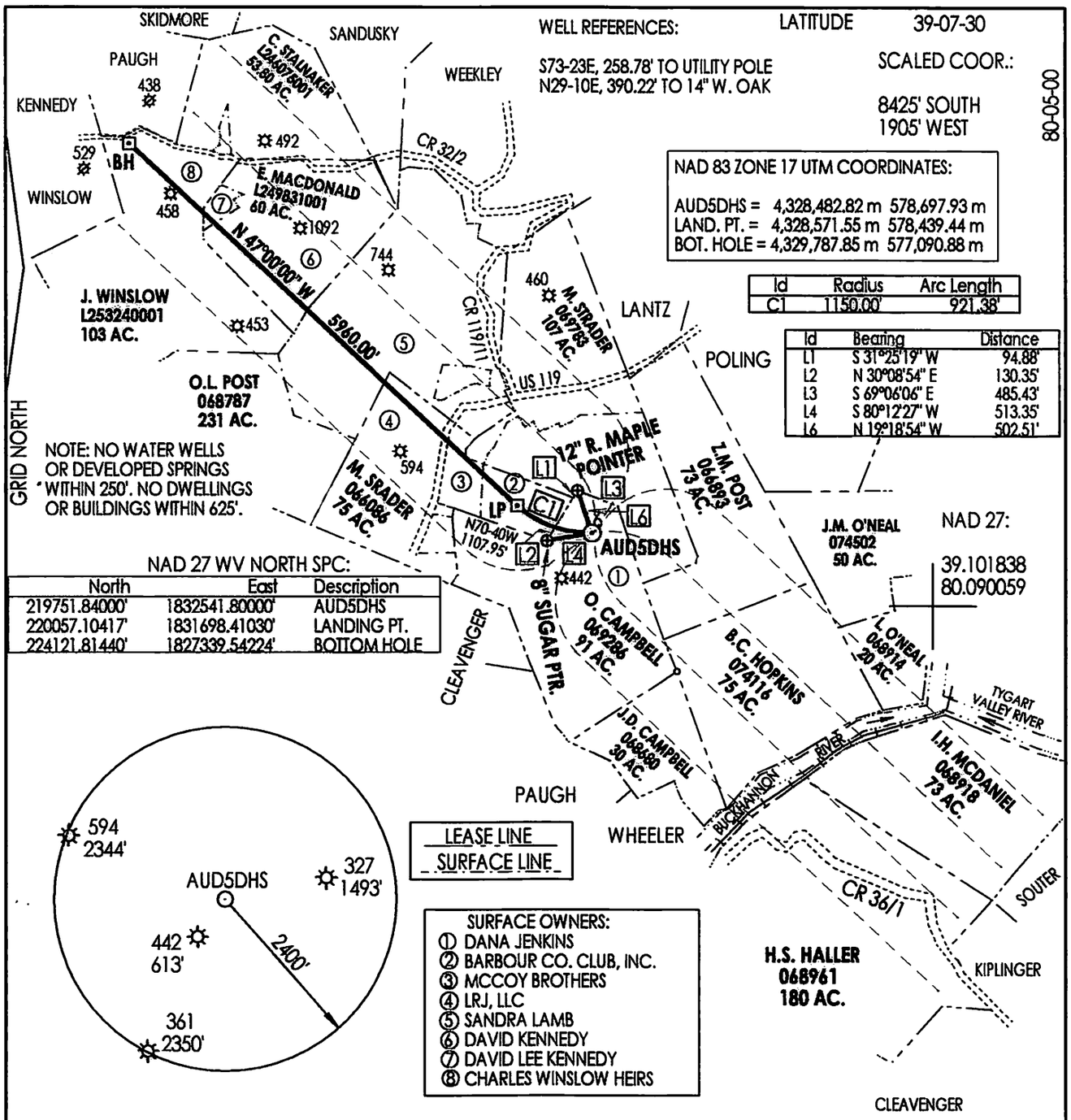

WELL REFERENCES:

S73-23E, 258.78' TO UTILITY POLE
N29-10E, 390.22' TO 14" W. OAK

LATITUDE 39-07-30

SCALED COOR.:

8425' SOUTH
1905' WEST

08-05-00

NAD 83 ZONE 17 UTM COORDINATES:

AUD5DHS = 4,328,482.82 m 578,697.93 m
LAND. PT. = 4,328,571.55 m 578,439.44 m
BOT. HOLE = 4,329,787.85 m 577,090.88 m

Id	Radius	Arc Length
C1	1150.00'	921.38'

Id	Bearing	Distance
L1	S 31°25'19" W	94.88'
L2	N 30°08'54" E	130.35'
L3	S 69°06'06" E	485.43'
L4	S 80°12'27" W	513.35'
L6	N 19°18'54" W	502.51'

NAD 27:

39.101838
80.090059

NAD 27 WV NORTH SPC:

North	East	Description
219751.84000'	1832541.80000'	AUD5DHS
220057.10417'	1831698.41030'	LANDING PT.
224121.81440'	1827339.54224'	BOTTOM HOLE

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

FILE NUMBER:
DRAWING NUMBER: CNXAUD5DHSR4.PCS
SCALE: 1" = 1600'
MINIMUM DEGREE OF ACCURACY: SUBMETER
PROVEN SOURCE OF ELEVATION: RTK GPS SURVEY
CENTIMETER 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

FORM WW-6

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

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

DATE: FEBRUARY 11, 2015
OPERATORS WELL NO.: AUD5DHS
API WELL NO.
47 — 001 — 03294 MOD
STATE COUNTY PERMIT

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

LOCATION: ELEVATION 1621.50' (494.24 m) WATERSHED BUCKHANNON RIVER
DISTRICT UNION COUNTY BARBOUR
QUADRANGLE AUDRA LEASE NUMBER SEE ABOVE
SURFACE OWNER DANA L. JENKINS ACREAGE 50.00 (10-42)
OIL & GAS ROYALTY OWNER O. CAMPBELL, ET. AL. LEASE ACREAGE 1221.80

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 = 7670' TMD = 14552'
WELL OPERATOR CNX GAS COMPANY LLC DESIGNATED AGENT MATTHEW IMRICH
ADDRESS P. O. BOX 1248 JANE LEW, WV 26378 ADDRESS P. O. BOX 1248 JANE LEW, WV 26378

COUNTY NAME
PERMIT

4700103294 mod

Attachment - Form WW-6A-1 for AUD5DHS:

Lease No.	Grantor, Lessor, etc	Grantee, Lessee, etc	Royalty	Book/Page
069286	**Orville Campbell, et al**	**Hope Natural Gas Company**	**$75.00/Gas Well; 1/8 Oil**	**42/46**
	Hope Natural Gas Company	Consolidated Gas Supply Corp	Assignment	53/261
	Consolidated Gas Supply Corp	Consolidated Gas Transmission Corp	Assignment	99/481
	Consolidated Gas Transmission Corp	CNG Transmission Corp	Merger/Name Change	Aol 51/795 Harrison
	CNG Transmission Corp	Dominion Transmission, Inc.	Merger/Name Change	Aol 58/362 Harrison
	Dominion Transmission, Inc.	Consol Energy Holdings LLC XVI	Assignment	151/423
	Consol Energy Holdings LLC XVI	Consol Gas Company	Merger/Name Change	Col 16/577
	Consol Gas Company	CNX Gas Company, LLC	Merger/Name Change	Col 17/1
066086	**Martha Dyer Strader, et al**	**Hope Natural Gas Company**	**1/8**	**53/321**
	Hope Natural Gas Company	Consolidated Gas Supply Corp	Assignment	53/261
	Consolidated Gas Supply Corp	Consolidated Gas Transmission Corp	Assignment	99/481
	Consolidated Gas Transmission Corp	CNG Transmission Corp	Merger/Name Change	Aol 51/795 Harrison
	CNG Transmission Corp	Dominion Transmission, Inc.	Merger/Name Change	Aol 58/362 Harrison
	Dominion Transmission, Inc.	Consol Energy Holdings, LLC	Assignment	151/423
	Consol Energy Holdings, LLC	Consol Gas Company	Merger/Name Change	Col 16/577
	Consol Gas Company	CNX Gas Company LLC	Merger/Name Change	Col 17/1
068787	**O.L. Post, et al**	**Consolidated Gas Supply Corp**	**1/8**	**66/504**
	Consolidated Gas Supply Corp	Consolidated Gas Transmission Corp	Assignment	99/481
	Consolidated Gas Transmission Corp	CNG Transmission Corp	Merger/Name Change	Aol 51/795 Harrison
	CNG Transmission Corp	Dominion Transmission, Inc.	Merger/Name Change	Aol 58/362 Harrison
	Dominion Transmission, Inc.	Consol Energy Holdings, LLC	Assignment	151 / 423
	Consol Energy Holdings, LLC	Consol Gas Company	Merger/Name Change	Col 16/577
	Consol Gas Company	CNX Gas Company LLC	Merger/Name Change	Col 17/1
L249831001	**Ethel Jane MacDonald**	**CNX Gas Company LLC**	**1/8**	**166/386**
	Roberta Scofield	CNX Gas Company LLC	1/8	168/559
	Sammy Rohrbaugh	CNX Gas Company LLC	1/8	168/549
	Gale Espinoza	CNX Gas Company LLC	1/8	168/533
	Brenda Lagrou	CNX Gas Company LLC	1/8	168/554
	Nona Rauch	CNX Gas Company LLC	1/8	168/528
	Freddy Rohrbaugh	CNX Gas Company LLC	1/8	168/564
	Billy Rohrbaugh	CNX Gas Company LLC	1/8	168/523
	Kay Lutz	CNX Gas Company LLC	1/8	168/518
L253240001	**Joshua D. Winslow**	**CNX Gas Company LLC**	**1/8**	**166/68**
	Natasha R. Winslow	CNX Gas Company LLC	1/8	166/72
	John Stephen Winslow	CNX Gas Company LLC	1/8	166/76

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DEC 05 2014
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