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 9703848 , Well #: CENT 19 BHS
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

4709703848 MOD

CONSOL ENERGY

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

February 26, 2015

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

RE: **CENT19AHS - API# 47-097-03857 (Lateral Extension – extending 5381.18' more)**
CENT19BHS - API# 47-097-03848 (Lateral Extension – extending 4551.42 more)
CENT19CHS - API# 47-097-03849 (Lateral Extension – extending 4519.26' more)
CENT19DHS - API# 47-097-03850 (Lateral Extension – extending 1031.66 more)
CENT19EHS - API# 47-097-03851 (Lateral Extension – extending 2765.22' more)

Dear Laura,

Enclosed, please find modifications for the CENT19AHS – CENT19EHS to extend the laterals due to additional leasing being obtained. I have attached an updated casing plans, mylar plats, and lease breakdowns.

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
MAR 2 2015
WV Department of
Environmental Protection

4709703848MOD

WW-6B
(10/14)

API NO. 47- 097 - 03848
OPERATOR WELL NO. CENT19BHS
Well Pad Name: CENT19HS

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 | Upshur | Warren | Century
Operator ID | County | District | Quadrangle

2) Operator's Well Number: CENT19BHS Well Pad Name: CENT19HS

3) Farm Name/Surface Owner: William Rohr Public Road Access: County Route 13

4) Elevation, current ground: 1582' Elevation, proposed post-construction: 1585'

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 - 7410' (Top), Thickness - 90', Pressure - 5000#

8) Proposed Total Vertical Depth: 7600'

9) Formation at Total Vertical Depth: Onondaga

10) Proposed Total Measured Depth: 17428'

11) Proposed Horizontal Leg Length: 9156'

12) Approximate Fresh Water Strata Depths: 130', 550'

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

14) Approximate Saltwater Depths: None Anticipated

15) Approximate Coal Seam Depths: 105', 550'

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: ____

RECEIVED
Office of Oil and Gas
MAR 2 2015
WV Department of
Environmental Protection

WW-6B
(10/14)

API NO. 47- 097 - 03848
OPERATOR WELL NO. CENT19BHS
Well Pad Name: CENT19HS

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	80	80	90.3/ 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	17428	17378	2960.1
Tubing	2.375	N	J-55	4.7		7500	
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	1724.8	Class A	1.18
Production	5.5	8.75	0.361	14360	6290.3	Class A	1.26
Tubing	2.375	5.5 csg	0.190	7700			
Liners							

PACKERS

Kind:	None			
Sizes:	None			
Depths Set:	None			

RECEIVED
Office of Oil and Gas
MAR 2 2015
WV Department of
Environmental Protection

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 17428'. Well to be drilled to a TVD of 7600', 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): 25

22) Area to be disturbed for well pad only, less access road (acres): 16

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.

RECEIVED
Office of Oil and Gas
MAR 2 2015
WV Department of
Environmental Protection

*Note: Attach additional sheets as needed.

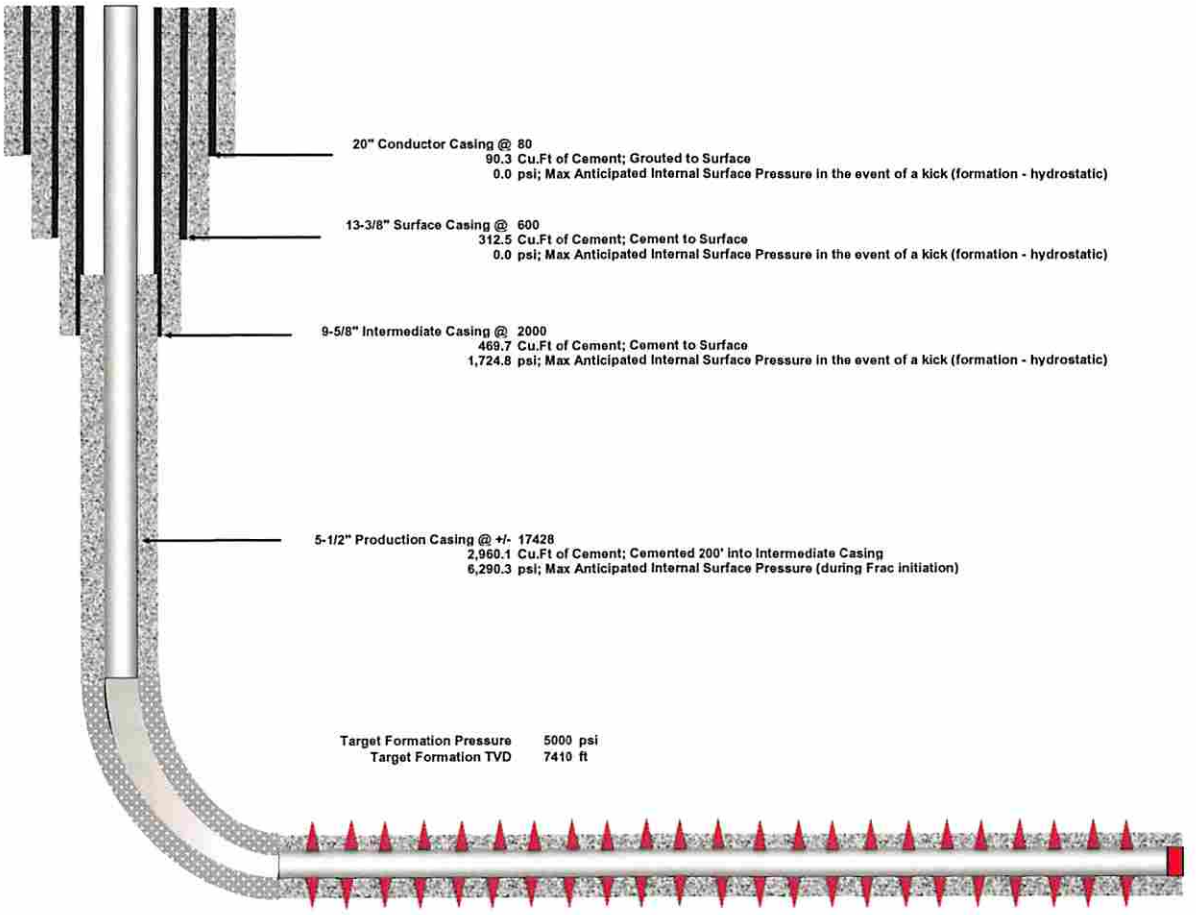
4709703848
MOD

CONSOL ENERGY

CENT19BHS

Casing Schematic

SCHEMATIC NOT TO SCALE



20" Conductor Casing @ 80
90.3 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
1,724.8 psi; Max Anticipated Internal Surface Pressure in the event of a kick (formation - hydrostatic)

5-1/2" Production Casing @ +/- 17428
2,960.1 Cu.Ft of Cement; Cemented 200' into Intermediate Casing
6,290.3 psi; Max Anticipated Internal Surface Pressure (during Frac initiation)

Target Formation Pressure 5000 psi
Target Formation TVD 7410 ft

RECEIVED
Office of Oil and Gas
MAR 2 2015
WV Department of
Environmental Protection

FORM WW 6

11,626'

NOTES ON SURVEY

1. NO WATER WELLS WERE FOUND WITHIN 250' OF PROPOSED GAS WELL. NO AGRICULTURAL BUILDINGS ≥ 2500 SQ. FT. OR DWELLINGS WERE FOUND WITHIN 625' OF THE CENTER OF PROPOSED WELL PAD.

LEGEND

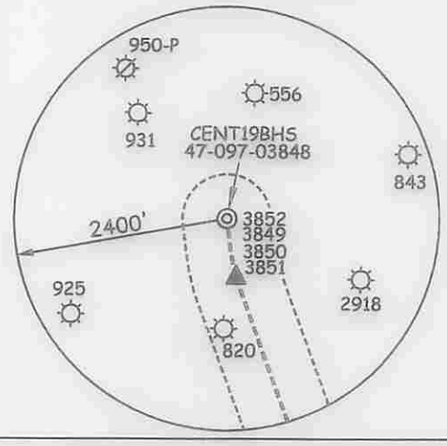
LEASE LINE	
SURFACE LINE	
WELL LATERAL	
OFFSET LINE	
TIE LINE	
CREEK	
ROAD	
FENCE LINE	
ROYALTY OWNERS	1
SURFACE OWNERS	A
COUNTY ROUTE	
PROPOSED WELL	
EXISTING WELL	

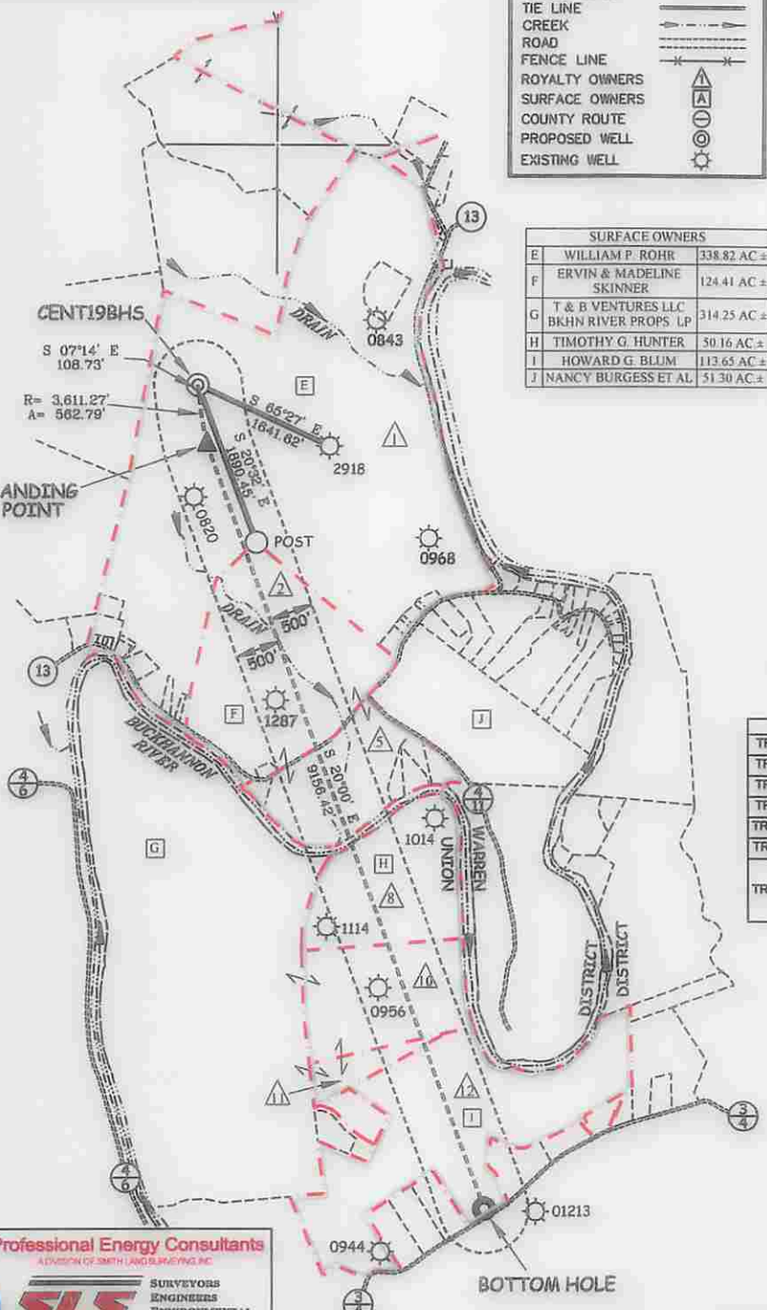
LATITUDE 39°02'30"

LONGITUDE 80°07'30"

3,058'

NAD' 27 GRID NORTH





SURFACE OWNERS		
E	WILLIAM P. ROHR	338.82 AC.±
F	ERVIN & MADELINE SKINNER	124.41 AC.±
G	T & B VENTURES LLC BKHN RIVER PROPS LP	314.25 AC.±
H	TIMOTHY G. HUNTER	50.16 AC.±
I	HOWARD G. BLUM	113.65 AC.±
J	NANCY BURGESS ET AL	51.30 AC.±

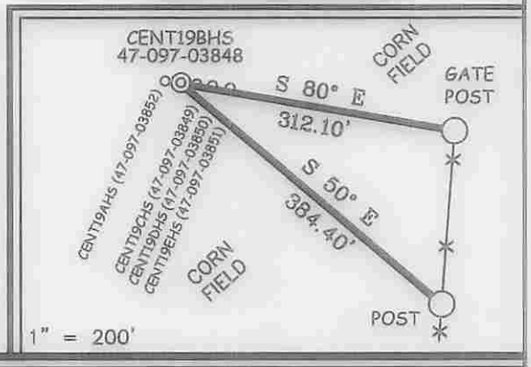
WELL NO. CENT19BHS

(S.P.C. SOUTH ZONE) (UTM(M) ZONE 17 NORTH)

NAD'27 S.P.C.(FT)	N. 741,478	E. 2,236,951
NAD'27 GEO.	LAT-(N) 39.03327	LONG-(W) 80.16592
NAD'83 UTM (M)	N. 4,320,811	E. 572,208
LANDING POINT		
NAD'27 S.P.C.(FT)	N. 740,815	E. 2,237,054
NAD'27 GEO.	LAT-(N) 39.03145	LONG-(W) 80.16558
NAD'83 UTM (M)	N. 4,320,609	E. 572,239
BOTTOM HOLE		
NAD'27 S.P.C.(FT)	N. 732,210	E. 2,240,185
NAD'27 GEO.	LAT-(N) 39.00775	LONG-(W) 80.15483
NAD'83 UTM (M)	N. 4,317,987	E. 573,194

ROYALTY OWNERS			
TRACT 1	HARRIET M JARVIS ET AL	485 AC.±	LEASE NO. 132520000
TRACT 2	VIRGINIA M. P. MEIER ET AL	86.80 AC.±	LEASE NO. 132557000
TRACT 5	ERVIN SKINNER	45.30 AC.±	LEASE NO. 255579001
TRACT 8	JACK W. HUNTER ET AL	50.16 AC.±	LEASE NO. 253783000
TRACT 10	HILL & AMYE STUMP ET AL	50 AC.±	LEASE NO. 132597000
TRACT 11	HILL & AMYE STUMP ET AL	9.75 AC.±	LEASE NO. 132597000
TRACT 12	MABEL & RAYMOND STEEL	113.12 AC.±	LEASE NO. 251768001
	ANDREW & CAROLYN BRINKLEY		LEASE NO. 251768002
	PORTER & ROSA BRINKLEY		LEASE NO. 267298000

REFERENCES



Professional Energy Consultants
A DIVISION OF SMITH LAND SURVEYING, INC.
SLS SURVEYORS ENGINEERS ENVIRONMENTAL PROJECT MGMT.
(304) 462-5834 WWW.SLSSURVEYS.COM

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 DIVISION OF ENVIRONMENTAL PROTECTION.

P.S. 677 Gregory A. Smith

GREGORY A. SMITH LICENSED No. 677 STATE OF WEST VIRGINIA PROFESSIONAL SURVEYOR

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

DATE APRIL 08 20 13

REVISED FEBRUARY 10 20 15

OPERATORS WELL NO. CENT19BHS

API WELL NO. 47 — 97 — 03848

STATE COUNTY PERMIT

RECEIVED Office of Oil and Gas MAR 2 2015 WV Department of Environmental Protection

MINIMUM DEGREE OF ACCURACY 1 / 2500 FILE NO. 7830P19BHSR5

SCALE 1" = 2000'

HORIZONTAL & VERTICAL CONTROL DETERMINED BY DGPS (SURVEY GRADE)

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

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

LOCATION: ELEVATION GROUND 1582.6' PROPOSED 1585.0' WATERSHED BUCKHANNON RIVER

DISTRICT WARREN COUNTY UPSHUR QUADRANGLE CENTURY 7.5'

SURFACE OWNER WILLIAM P. ROHR ACREAGE 338.82±

ROYALTY OWNER HARRIET M. JARVIS ET AL ACREAGE 485±

PROPOSED WORK: LEASE NO. 132520000

DRILL X CONVERT ___ DRILL DEEPER ___ REDRILL ___ FRACTURE OR STIMULATE X PLUG OFF OLD FORMATION ___ PERFORATE NEW FORMATION ___ PLUG AND ABANDON ___ CLEAN OUT AND REPLUG ___ OTHER ___

PHYSICAL CHANGE IN WELL (SPECIFY) ___ TARGET FORMATION MARCELLUS

ESTIMATED DEPTH TVD 7,600' / TMD 17,428'

COUNTY NAME

PERMIT

WELL OPERATOR CNX GAS COMPANY, LLC. DESIGNATED AGENT MATTHEW IMRICH

ADDRESS P.O. BOX 1248 ADDRESS P.O. BOX 1248

JANE LEW, WV 26378 JANE LEW, WV 26378

4709703848 mad

Attachment - Form WW-6A1 for CENT19BHS:

Tract #	Grantor, Lessor, etc	Grantee, Lessee, etc	Royalty	Book/Page
1	**Harriet M. Jarvis et al**	**Hope Natural Gas Company**	**1/8**	**37/513**
	Hope Natural Gas Company	Consolidated Gas Supply Corp.	Merger/Name Change	53/261
	Consolidated Gas Supply Corp.	Consolidated Gas Transmission Corp.	Merger/Name Change	99/481
	Consolidate Gas Transmissino Corp.	CNG Transmission Corp	Merger/Name Change	51/795
	CNG Transmission Corp	Dominion Transmission, Inc.	Merger/Name Change	58/362
	Dominion Transmission, Inc.	Consol Energy Holdings, LLC, XVI	Merger/Name Change	151/423
	Consol Energy Holdings, LLC, XVI	Consol Gas Company	Merger/Name Change	16/577
	Consol Gas Company	CNX Gas Company LLC	Merger/Name Change	17/1
2	**Virginia P. Meier Trust/ WV Wesleyan College**	Consolidated Gas Supply Corp.	**1/8**	47/97
	Consolidated Gas Supply Corp.	Consolidated Gas Transmission Corp.	Merger/Name Change	20/342
	Consolidated Gas Transmission Corp.	CNG Transmission Corp	Merger/Name Change	51/795
	CNG Transmission Corp	Dominion Transmission, Inc.	Merger/Name Change	58/362
	Dominion Transmission, Inc.	Consol Energy Holdings, LLC, XVI	Merger/Name Change	151/423
	Consol Energy Holdings, LLC, XVI	Consol Gas Company	Merger/Name Change	16/577
	Consol Gas Company	CNX Gas Company LLC	Merger/Name Change	17/1
5	**Ervin Skinner**	**CNX Gas Company LLC**	**12.50%**	**99/682**
8	**Jack W. Hunter et al**	**J & J Enterprise**	**12.50%**	**O&G 46/595**
	J & J Enterprises	Marvin E. Wilhite and Francis M. McGahee	Assignment	AB 8/215
	Marvin E. Wilhite and Francis M. McGahee	White Shield Oil and Gas Corporation	Assignment	AB 10/48
	White Shield Oil and Gas Corporation	Partnership Properties Co.	Assignment	AB 12/562
	Partnership Properties Co.	PLR, Inc.	Assignment	AB 13/185
	PLR, Inc.	Petro-Lewis Corporation	Assignment	AB 13/557
	Petro-Lewis Corporation	Petro-Lewis Funds, Inc.	Assignment	AB 13/532
	Petro-Lewis Funs, Inc.	Partnership Properties, Co.	Assignment	AB 13/582
	Partnership Properties Co.	Eastern American Energy Corporation	Assignment	AB 18/410
	Eastern American Energy Corporation	Energy Corporation of America	Assignment	DB 487/705
	Energy Corporation of America	CNX Gas Company LLC	Assignment	164/551
10, 11	**Hill Stump and Amye Stump et al**	**C. L. Eleson**	**12.50%**	**O&G 42/489**
	C. L. Eleson	Central Developers, Inc.	Assignment	AB 6/278
	Central Developers, Inc.	Sunset International Petroleum Corporation	Assignment	AB 7/415
	Sunset International Petroleum Corporation	SIPCO, Inc.	Merger/Name Change	AOI 4/149
	SIPCO, Inc.	Sunset International Petroleum Corporation	Merger/Name Change	AOI 4/166
	Sunset International Petroleum Corporation	Marth Oil Co.	Assignment	DB 221/228
	Marth Oil Co.	Crown Central Petroleum Corporation	Assignment	DB 221/228
	Crown Central Petroleum Corporation	Johnson Energy Co.	Assignment	AB 21/203
	Johnson Energy Co.	Glenn H. Johnson	Assignment	AB 32/274
	Glenn H. Johnson	Mountain V Oil & Gas, Inc.	Assignment	AB 33/551
	Mountain V Oil & Gas, Inc.	North Coast Energy Eastern, Inc.	Assignment	AB 45/54
	North Coast Energy Eastern, Inc.	EXCO - North Coast Energy Eastern, Inc.	Merger/Name Change	AOI 20/269
	EXCO - North Coast Energy Eastern, Inc.	EXCO Resources, Inc.	Assignment	RB 149/1
	EXCO Resources, Inc.	CNX Gas Company LLC	Assignment	56/285
12	**Mabel & Raymond Steel, Andrew & Carolyn Brinkley, and Porter & Rosa Brinkley**	**C.L. Eleson**	**12.50%**	**LB 46/430**
	C.L. Eleson	Sunset International Petroleum Corporation	Assignment	AB 8/165
	Sunset International Petroleum Corporation	SIPCO, Inc.	Merger/Name Change	AOI 4/149
	SIPCO, Inc.	Sunset International Petroleum Corporation	Merger/Name Change	AOI 4/164
	Sunset International Petroleum Corporation	Marth Oil Co.	Assignment	DB 221/228
	Marth Oil Co.	Crown Central Petroleum Corporation	Assignment	DB 221/228
	Crown Central Petroleum Corporation	Johnson Energy Co.	Assignment	AB 21/203
	Johnson Energy Co.	Glenn H. Johnson	Assignment	AB 32/274
	Glenn H. Johnson	Mountain V Oil & Gas, Inc.	Assignment	AB 33/551
	Mountain V Oil & Gas, Inc.	North Coast Energy Eastern, Inc.	Assignment	AB 46/54
	North Coast Energy Eastern, Inc.	EXCO - North Coast Energy Eastern, Inc.	Merger/Name Change	AOI 20/269
	EXCO - North Coast Energy Eastern, Inc.	EXCO Resources, Inc.	Assignment	RB 149/1
	EXCO Resources, Inc.	CNX Gas Company LLC	Assignment	56/285

RECEIVED
Office of Oil and Gas
MAR 2 2015
WV Department of
Environmental Protection