

IN THE CIRCUIT COURT OF TYLER COUNTY, WEST VIRGINIA

ANTERO RESOURCES CORPORATION,

Petitioner,

v.

Civil Action No. 17-AA-1
The Honorable Cramer

THE HONORABLE DALE STEAGER,
West Virginia State Tax Commissioner,

FILED

THE HONORABLE JACKSON L. HAYES,
Assessor of Tyler County, and

MAR 17 2017

Candy L. Warner
Tyler Co. Circuit Clerk

THE COUNTY COMMISSION OF TYLER COUNTY,
Sitting as a Board of Equalization and Review,

Respondents.

COMPLAINT OF PETITIONER ANTERO RESOURCES CORPORATION

I. INTRODUCTION

Antero Resources Corporation ("Antero") is a producer of natural gas throughout the state of West Virginia, with eighteen (18) Marcellus wells located in Tyler County.

Those wells are appraised by the West Virginia Department of Revenue, State Tax Department, Property Tax Division (the "Tax Department" or "State") based on a mass appraisal system, state-wide. Certain variables are used by the State to value producing oil and natural gas wells, including, notably for this Brief, operating expenses. Specifically, the Tax Department periodically circulates a survey by which it solicits data from oil and natural gas producing taxpayers regarding operating expenses for their wells, and based on that, the Tax Department determines the operating expense variables used in its mass appraisal system. The amount of operating expenses applied to a well using the mass appraisal system is based on a percentage of the well's gross receipts not to exceed a maximum amount, and the percentage and maximum

vary by the type of well (typical or conventional, Marcellus, etc.). The operating expense calculations are included in a natural resources “valuation variables” document that the Tax Department releases annually.

In addition to the valuation variables document, the Tax Department releases an annual administrative notice that lists the percentages and maximum amounts for operating expense calculations. In prior years, the Tax Department invited taxpayers to submit actual operating expenses that exceed the percentages and maximum amounts listed in the valuation variables document. The 2016 and 2017 administrative notices, unlike administrative notices from 2000 through 2015, however, did not include language that invites taxpayers to submit actual expenses, despite no changes to the West Virginia Code or the Tax Department’s Legislative Rule that governs the valuation of producing natural gas wells.

In this matter, Antero evaluated its actual operating expenses for calendar year 2015, and determined that for Marcellus wells in the county, the amount of operating expenses that it was incurring significantly exceeded the percentages and maximum amounts set by the State. For property tax purposes, the operating expense data from calendar year 2015 is used to value the wells for tax year 2017.

When the Tax Department valued Antero’s gas well values for tax year 2017, it failed to adhere to its own regulations that direct how it is to consider actual operating expenses. Antero, like many mineral producers, generally reports its operating expenses to the Tax Department on a state-wide basis. For 2015, Antero’s average operating expense per well was 36% of revenue, or \$817,000, which includes all operating expenses, gathering and compression expenses, processing expenses, and transportation expenses, necessary to get the gas to the point of sale.

Antero reports its gross receipts based on the point of sale, and the allowed operating expenses should reflect the expenses incurred to get the gas to the point of sale. The goal of the State's calculation is to determine the value of the reserves. Under the current system, if two producers have the same production/reserves but one sells at the wellhead and the other sells to a market further away, the reserves of the producer who sells to a further market are valued substantially higher, which undermines the goal of the State's calculation.

For tax year 2017, the Tax Department calculates operating expenses at the lesser of 20% of gross receipts or \$175,000 for Marcellus wells (the "maximum amount" of \$175,000 of operating expenses per Marcellus well will be referred to alternatively throughout this complaint as the "maximum amount" or "cap"). This cap unduly restricts the amount of operating expenses that should be allowed for each well, and the imposition of a "cap" is not supported by the Tax Department's legislative rule regarding the valuation of producing oil and natural gas properties. The legislative rule, instead, requires that the Tax Department use "average annual industry operating expenses per well" in valuing producing wells, and does not authorize the Tax Department to "cap" operating expenses at a certain amount. In sum, the Tax Department incorrectly and unfairly ignored the actual operating expenses and instead relied on the maximum calculations found in its valuation variables document and administrative notice. By failing to consider Antero's actual operating expenses, the Tax Department overvalued Antero's wells and did not assess them at their true and actual value.

On February 1, 2017, Antero protested the Tax Department's valuation (as adopted by the Tyler County Assessor) to the Tyler County Commission sitting as the Tyler County Board of Equalization and Review (the "Board"). Antero presented clear and convincing evidence that

the Tax Department failed to consider Antero's actual operating expenses in determining the valuation for the wells assessed for Tyler County. Antero also presented a complete analysis of its actual operating expenses from the state and local tax firm Altus Group US, Inc. ("Altus"), supported by testimony from an Altus Senior Consultant, Elizabeth Burg, that correctly applies the approach to arrive at allowable operating expenses. Antero also proved by clear and convincing evidence that the State erroneously calculated average operating expenses at the lesser of 20% of gross receipts or \$175,000. Antero demonstrated that it is the largest producer in West Virginia, at 40% of market share, and that its actual operating expenses per well are 36% of gross receipts or \$817,000. Under these circumstances, it is not mathematically possible for the average operating expenses for the industry to be \$175,000. The Board, however, made no adjustment to the Tax Department's valuation.

Antero timely petitioned the Court for appeal of the Board's decision. As explained below, the Tax Department has abused its discretion by failing to consider Antero's actual and allowable operating expenses in a manner contrary to the statutes, regulations and official releases from the Tax Department governing valuation of personal property. Moreover, the Tax Department has failed to support its valuation with substantial evidence. Antero, on the other hand, presented clear and convincing evidence for its allowable operating expenses to be used in valuing its wells for tax year 2017.

II. FACTUAL BACKGROUND

A. Antero's Property.

Antero owns 18 Marcellus wells in Tyler County. (Certified Transcript of February 1, 2017 Hearing before the Tyler County Board of Equalization and Review, See Exhibit A, p. 7 (hereinafter "Hr'g Tr.")). Antero pays significant taxes to Tyler County for its oil and gas wells.

B. Antero's 2015 Operating Expenses.

Antero completed the Tax Department's survey related to operating expenses. (Hr'g Exhibit 6). Phil Yoo of Antero testified, however, that the survey asked for expenses related to lifting the gas out of the ground only, not gathering and compression, transportation, or processing costs, which are necessary to get the gas to the market. (Hr'g Tr., pp. 54:17-54:24; Hr'g Exh. 6). The Tax Department's survey information for horizontal Marcellus wells pertained almost solely to typical lease operating expenses and was based on prior surveys used for conventional wells. (Hr'g Tr. at 21:1-21:12). No line items were included for gathering and compression, processing or transportation. (Hr'g Tr. at 21:13-21:20). If such expense categories had been included in the survey, Antero would have calculated and listed those substantial expenses, and the Tax Department's calculations would have been substantially different, given that Antero is the largest producer for Marcellus wells in West Virginia and represents approximately 40% of the Marcellus well production statewide. (Hr'g Tr., pp. 55:1-55:5, 48:9-49:11; *see also* Hr'g Exhibit 11). Altus demonstrated that it would be mathematically impossible to get a weighted average of \$175,000 in operating expenses for the industry if Antero's average operating expense of \$817,000 per well is taken into consideration. ((Hr'g Tr., p. 48:9-49-11; *see also* Hr'g Exhibit 11.) Accordingly, the State's cap of \$175,000 in operating

expenses does not truly represent the average operating expenses for the industry, as shown by the market share that Antero holds and its operating expenses of \$817,000.

For the 2017 tax year, the Tax Department increased the allowed operating expenses cap from \$150,000 to \$175,000 based on public comments received in 2016. The State's calculation remains erroneous, however, because it relies on data from the faulty 2014 survey, and because the State disregarded the operating expenses of Antero (the largest operator in the State) in calculating the new "average" operating expense.¹

Furthermore, the Tax Department does not attempt to differentiate between different business models in its survey, administrative notice, or the legislative rule. As a result, certain producers are penalized through an understated amount of operating expenses. As required by the State Tax Department, Antero reports its gross receipts based on the point of sale, and the allowed operating expenses should reflect the expenses incurred to get the gas to the point of sale. Requiring gross receipts to be reported based on the point of sale, while not recognizing the substantial expenses incurred to get the gas to the point of sale, results in overvaluation of the produced natural gas.

Antero submitted proof of its actual operating expenses from 2015 to the Tax Department and the Board for consideration for tax year 2017. (*See* Hr'g Tr., pp.1-58; Hr'g Exhibits 2, 3, 4, 5, 7, 11, 12, 13). Antero's average operating costs for Marcellus wells is approximately 36% of gross receipts, or \$817,000. (Hr'g Tr. at p. 11:20-12:1). Ultimately, neither the Tax Department

¹ The State testified that Antero's operating expenses were thrown out because Antero asserted that it did not include all operating expenses in its survey response. (Hr'g Tr. at pp. 62:23-63:24).

nor the Board adjusted the operating expenses used to value Antero's wells in Tyler County for tax year 2017.

C. The Tax Department's Calculation of Antero's Operating Expenses.

The Tax Department prepares annual natural resource property valuation variables for appraising oil and gas. Further, the Tax Department makes determination of those valuation variables pursuant to Series 1J of Title 110, a legislative rule of the Tax Department, promulgated pursuant to W. Va. Code §§ 11-1C-5(b), 11-1C-5a, and 11-1C-10(d). In order to determine the amount of Antero's operating expenses, and, in turn, the value of Antero's oil and gas wells, the Tax Department further is governed by Administrative Notices.

In the past, the Tax Department included a statement in its Administrative Notices indicating that it was willing to consider actual operating expenses if a taxpayer thought that the value of their wells was overstated. (Hr'g Tr. at pp. 18:14-19:6). In 2016, the Tax Department decided that it would no longer consider actual operating expenses. (Hr'g Tr. at pp. 18:14-19:6).

The State calculates the allowed operating expenses at the lesser of 20% of gross receipts, or \$175,000, for Marcellus Wells. (Hr'g Tr. Exh. 8). Antero's operating expenses for Marcellus wells are on average \$817,000. Due to the State's failure to take into account Antero's actual operating expenses, the value of Antero's wells is significantly overstated. The State valued Antero's wells in Tyler County at \$71.2 million, whereas Antero, using the State's mass appraisal model and Antero's actual operating expenses, appraised them at \$36.8 million. (Hr'g Tr., at p. 32:5-32:12; Hr'g Tr. Exh. 1). Antero also hired Hein & Associates to appraise the true and actual value of the wells. Hein & Associates appraised the wells at \$32.9 million. (See Hr'g Tr., 33:6-33:8; Hr'g Tr. Exh. 13).

Antero timely noticed the Tyler County Commission with its Notice of Protest on January 19, 2017. (Hr'g Tr. Exh. 1). The Tyler County Commission, sitting as the Tyler County Board of Equalization and Review, held a hearing on February 1, 2017.

At the hearing, the Tax Department offered no credible evidence as the basis for its refusal to accept Antero's calculation of its operating expenses, except to argue that the State's current procedures, including the cap, are in accordance with the legislative rules and the law, and that the Tax Department was not "sure of the point of sale" of Antero's gas, despite the abundance of documentation Antero presented. (Hr'g Tr. at pp. 58-70).

D. Antero's Expert Analysis and Testimony.

Antero's expert, Altus, a leading independent state and local tax firm, by Senior Consultant Elizabeth Burg, testified before the Board on February 1, 2017, and showed that a correct application of the allowable operating expenses demonstrated that the Tax Department had erred by failing to allow the operating expenses documented by Antero. (*See* Hr'g Tr., pp. 9-52). Detailed charts and documentation of actual operating expenses, with numbers specific to Tyler County, were also submitted to the Board. (*see* Certified Record, Petitioner's Exhibits, 2, 3, 4, 5, 7, 11, 12, 13).

Altus explained that by artificially capping operating expenses at \$175,000, which is not permitted by the legislative rule, the State is grossly overvaluing the fair market value of Antero's wells. (Hr'g Tr., at pp. 10:2-10:24; 12:22-13:7). The State also does not take into account Antero's point-of-sale, and the operating expenses incurred to get the gas downstream to market. (Hr'g Tr. at p. 22-26). Altus testified that Antero volumetrically represented 40% of horizontal production in West Virginia from 2013 through 2015, and that its average operating

expense was \$817,000 per well. (Hr'g Tr., p. 48:9-49-11). Altus explained that, under these circumstances, it would not be mathematically possible to get to an average of \$175,000 in operating expenses for the industry if Antero's average operating expenses of \$817,000 per well is taken into consideration. (Hr'g Tr., p. 48:9-49-11).

Ms. Burg also testified that Antero hired Hein & Associates to appraise its wells in Tyler County. (See Hr'g Tr., 32:17-33:3, Hr'g Tr. Exh. 13). Ms. Burg explained that Hein & Associates found that the Tax Department's valuation did not properly account for the decline rate or actual operating costs of the wells at issue, and used a different discount rate than the rate used by the Tax Department. Hein & Associates appraised the fair market value of Antero's Tyler County wells at \$32.9 million, while the State valued them at \$71.2 million. (See Hr'g Tr., 32:17-33:3; 34:16-35:17; Hr'g Tr. Exh. 13).

Finally, Altus testified that, while Hein & Associates' valuation is the fair market value of the wells, an alternative approach would be to calculate operating costs as 20% of gross production, without any cap. Altus stressed that this method would still overstate the fair market value of the wells, but that 20%, without a cap, is a reasonable resolution. (Hr'g Tr., pp. 34:9-35:6). This approach would value Antero's wells at approximately \$55 million. (Hr'g Tr., pp. 34:9-35:6).

E. Antero's Protest to the Tyler County Board of Equalization and Review.

On January 19, 2017, Antero submitted to the Tyler County Assessor and the Tyler County Commission sitting as the Board of Equalization and Review an Application for Review of Property Assessment with regard to its gas wells, and Antero appeared on February 1, 2017, by counsel, before the Board. (See W. Va. Code § 11-3-24). Antero hired a third-party court

reporter to produce a certified transcript of the hearing at which it presented the evidence discussed above. Exhibits introduced at the hearing and provided to the Board will be transmitted to the Court within thirty (30) days, as provided by West Virginia Code § 11-3-25. The original transcript of the proceeding was attached to Antero's Petition as Exhibit A. (See W. Va. Code § 58-3-4.)

By February 7, 2017 Order, the Board determined to make no adjustment to the State Tax Department's valuation of Antero's gas wells for the 2017 tax year. (See Ex. B to Antero's Petition). Antero timely petitioned this Court for relief from the Board's erroneous determination within thirty (30) days of the adjournment of the Board. (See W. Va. Code § 11-3-25).

III. ANALYSIS

A. Applicable Legal Standards.

All property in the State of West Virginia is required to "be assessed annually at its true and actual value" W. Va. Code § 11-3-1. The West Virginia State Tax Commissioner² is charged with determining "the fair market value of all natural resource property in the State" and then providing the values to county assessors to use in assessing the property. W. Va. Code § 11-1C-10(d).

Pursuant to this responsibility to value producing mineral property and reserves, the Tax Commissioner promulgated Title 110, Series 1J of the West Virginia Code of State Rules, which explains the mechanisms to be utilized in valuing taxable property.

² Elsewhere in Brief, the Tax Commissioner is variously referred to as the Tax Department or simply the State. All terms refer to the same entity.

To determine the fair market value of producing oil and natural gas property, the Tax Department applies “a yield capitalization model to the net receipts (gross receipts less royalties paid less operating expenses) for the working interest. . . .” W. Va. Code R. § 110-1J-4.1. The methodology set forth in § 110-1J-4.1 is reflected in Tax Department’s 2017 Administrative Notice, in which the Tax Commissioner states that the Tax Department primarily relies upon the income approach in valuing producing oil and gas property.

The Tax Department should consider actual operating expenses to offset the presumed valuation of expenses for each well. According to the Tax Department’s legislative rule, the Tax Commissioner considers “operating expenses” to be “the “ordinary expenses which are directly related to the maintenance of production of natural gas and/or oil. These expenses do not include extraordinary expenses, depreciation, ad valorem taxes, capital expenditures, or expenditures relating to vehicles or other tangible personal property not permanently used in the production of natural gas or oil.” Section 3.16 of Series 1J, Title 110 State Tax Department Legislative Rule for Valuation of Producing and Reserve Oil & Natural Gas for Ad Valorem Property Tax Purposes. Based on the testimony of Antero’s expert, Altus, the report of Hein & Associates, and the documents submitted to the Tax Department and the Board, the operating expenses submitted by Antero are those contemplated in Section 3.16.

Antero’s burden before the Board was to show by clear and convincing evidence that the Tax Department’s valuation (and, hence, the County’s assessment) of its gas well operating expenses was erroneous. Syl. pts. 5-6, *Stone Brooke*, 224 W. Va. 691, 688 S.E.2d 300. On appeal to this Court, the Court relies on the record developed before the Board and determines

whether the challenged property valuation is supported by substantial evidence.³ See W. Va. Code § 58-3-4; syl. pts. 1-2, *Stone Brooke*, 224 W. Va. 691, 688 S.E.2d 300.

In this case, the Tax Department failed to apply the demonstrated actual operating expenses supplied by Antero in both informal and formal testimony. Accordingly, Antero now petitions this Court to find (1) that the Board incorrectly made no changes to the Tax Department's valuation, (2) that the State's "cap" of \$175,000 in operating expenses be removed, and (3) that the value of Antero's Tyler County gas wells for the 2017 tax year be set at \$55,000,000, based on the compromise value calculated by applying the State's 20% average annual industry operating expense percentage by Antero's gross receipts.⁴

B. The Tax Department Failed to Consider the Actual Operating Expenses of Antero's Gas Wells and, Thus, Failed to Correctly Value that Property; Antero, on the Other Hand, Introduced Clear Evidence of the Allowable Operating Expenses.

While the State Tax Department has discretion to select the appraisal method that it determines should provide the most accurate valuation of personal property, once it chooses a method, it must correctly apply the method.

For Antero's Marcellus wells in Tyler County, the Tax Department has not followed its own rules regarding average industry operating expenses, as set forth in Antero's Exhibits and

³ Furthermore, "[p]ursuant to *In Re Pocahontas Land Co.*, 172 W. Va. 53, 61, 303 S.E.2d 691, 699 (1983), once a taxpayer makes a showing that tax appraisals are erroneous, the Assessor is then bound by law to rebut the taxpayer's evidence." *Mountain Am., LLC v. Huffman*, 224 W. Va. 669, 786 n.23, 687 S.E.2d 768, 785 n.23 (2009). While the Court in *In Re Pocahontas Land Co.* suggested that a county assessor could meet that burden by introducing the State Tax Department's valuation, in this case, Antero showed that the State Tax Department's valuation itself is incorrect, so it was incumbent on the State Tax Department to rebut Antero's evidence.

⁴ Antero asserts, however, that in order to calculate the fair market value of the Marcellus wells, as is required of the Tax Commissioner under W. Va. Code § 11-1C-10(d), actual operating expenses must be considered.

expert testimony at the hearing before the Board on February 1, 2017, and the Tax Department has, therefore, failed to properly calculate the fair market value of Antero's Marcellus wells. It is also improper for the Tax Department to place a cap on operating expenses, another factor resulting in an inflated value for Antero's Marcellus wells. As demonstrated at the hearing, the survey used by the Tax Department to calculate average industry operating expenses for Marcellus wells was poorly drafted and misleading and resulted in the Tax Department calculating an operating expense "cap" well below the amount of operating expenses actually required to operate a Marcellus well. Antero avers that not only is a "cap" not supported by law, but that the Tax Department also calculated a wildly inaccurate "cap."

Additionally, by calculating the allowed operating expenses at the lesser of 20% of gross receipts or \$175,000, the Tax Department treats similarly situated tax payers differently in violation of United States Constitution and the West Virginia Constitution, as the "cap" of \$175,000 only adversely affects tax payers that have wells with gross receipts over a certain threshold.

Finally, the Tax Department's valuation of Antero's wells did not properly account for the decline rate or discount rate. As a result, Antero's wells were overvalued.

IV. CONCLUSION

WHEREFORE, Antero Resources Corporation respectfully requests that the Court:

- (i) Find that the Tyler County Board of Equalization and Review incorrectly upheld the valuation of Antero's Tyler County gas wells by the West Virginia Department of Revenue, State Tax Department, Property Tax Division for the 2017 tax year;

(ii) Fix the value of Antero's Tyler County gas wells for the 2017 tax year at \$55,000,000, based on the compromise value calculated by applying the State's 20% average annual industry operating expense percentage by Antero's gross receipts; and

(iii) Order such other relief as the Court deems appropriate.

ANTERO RESOURCES CORPORATION,

By Counsel

Craig Griffith / by Allison Farrell

Craig A. Griffith (WVSB No. 8549)

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Melissa Beane

From: Nancy Sifton
Sent: Wednesday, December 07, 2016 2:48 PM
To: 'Krista.M.Lawrence@wv.gov'
Cc: 'Hoover, Cindi R'; Kirsten Evans; Elizabeth Burg
Subject: Antero Resources Corporation - TY17 Tentative Values
Attachments: Antero 7-1-16 New well support.xls; 2017 TY valuation variables response signed.pdf; RE: Comments

Krista,

Please see comments below regarding Antero's TY17 tentative appraisal values.

- **Year 1 wells:** We are requesting that the appraised values reflect the actual receipts for the first twelve months rather than annualized estimates based on reported receipts for the 2015 calendar year (see attached). The actual receipts (both WI and royalty) have been provided in columns N-Q. Please note that twelve months of receipts is not yet available for some first year wells. Where twelve months of data is not available, we have also included data for these wells because 8-11 months of data (annualized) provides a more accurate estimate of receipts for the first year than 1-4 months of reported production. Please let me know if there is any additional information we can provide that will save you time in processing this request. I can provide an e-file with updated receipts if that would be helpful.
- **Operating Expenses:**
The tentative values issued reflect the State's variables for operating expenses, which are understated compared to the company's actual operating expenses and result in a total appraised value that exceeds fair market value. Antero previously addressed this concern in its response to the 2017 tax year operating expense variables (attached). Antero also provided the State with back-up documentation for its operating expense as requested in August 2016 (attached). The final valuation variables issued by the State in September 2016 included changes to certain operating expense variables but the variables continue to be understated compared to Antero's actual operating expenses. Additionally, it is our understanding that the State has reversed its long held position of considering actual operating expenses in its appraisals based on language removed from the administrative notice regarding operating expenses and the producer return. As a result, the tentative values for Antero's horizontal Marcellus wells are significantly overstated.

Please let me know if you have any questions or would like to have a call to discuss further.

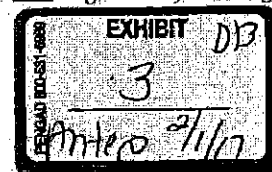
Thank you,
Nancy

Nancy Sifton, CPA
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TAB 3

17	1,011,222	2,152,721	2,152,721	Hor. Marcellus	69,332	535,522	20,000	26,000	466,225	1,101,222
18	803,248	1,863,344	1,863,344	Hor. Marcellus	54,678	586,240	81,367	81,367	370,851	803,248
19	870,276	1,820,002	1,820,002	Hor. Marcellus	46,573	574,594	78,134	78,134	349,028	870,276
20	214,888	2,456,097	2,456,097	Hor. Marcellus	106,958	773,208	106,958	106,958	214,888	2,456,097
21	243,816	33,318	33,318	Hor. Marcellus	38,672	33,318	7,971	7,971	243,816	33,318
22	247,511	398,204	398,204	Hor. Marcellus	13,541	33,967	8,307	8,307	180,296	247,511
23	334,830	885,780	885,780	Hor. Marcellus	13,598	87,755	22,082	22,082	258,413	334,830
24	437,132	1,091,121	1,091,121	Hor. Marcellus	13,781	85,782	23,584	23,584	437,132	1,091,121
25	1,998,317	8,951,716	8,951,716	Hor. Marcellus	200,224	533,173	494,172	494,172	8,951,716	1,998,317
26	1,467,244	5,622,485	5,622,485	Hor. Marcellus	138,886	443,594	351,735	351,735	1,467,244	5,622,485
27	1,636,845	6,414,544	6,414,544	Hor. Marcellus	138,744	406,150	378,926	378,926	1,636,845	6,414,544
28	693,572	873,228	873,228	Hor. Marcellus	37,255	200,234	31,588	31,588	693,572	873,228
29	322,467	724,060	724,060	Hor. Marcellus	39,087	37,645	6,534	6,534	322,467	724,060
30	106,788	366,935	366,935	Hor. Marcellus	2	30,425	28,400	28,400	106,788	366,935
31	34,845	25,783	25,783	Vert. Marcellus	44,607	25,783	400	400	34,845	25,783
32	13,246	25,783	25,783	Vert. Marcellus	7,769	25,783	117	117	13,246	25,783
33	33,087	36,578	36,578	Vert. Marcellus	28,190	2,315	305	305	33,087	36,578
34	26,255	32,387	32,387	Vert. Marcellus	21,873	2,553	185	185	26,255	32,387
35	25,046	32,387	32,387	Vert. Marcellus	21,873	2,553	185	185	25,046	32,387
36	19,365	13,380	13,380	Vert. Marcellus	13,380	2,781	28	28	19,365	13,380
37	25,632	47,311	47,311	Vert. Marcellus	8,976	2,206	490	490	25,632	47,311
38	9,547	533	533	Vert. Marcellus	3,372	23	3	3	9,547	533
39	7,784	4,565	4,565	Vert. Marcellus	8,653	565	30	30	7,784	4,565
40	33,248	46,730	46,730	Vert. Marcellus	15,889	2,812	158	158	33,248	46,730
41	8,073	26,408	26,408	Vert. Marcellus	7,433	690	8	8	8,073	26,408
42	26,608	65,245	65,245	Vert. Marcellus	7,002	2,439	614	614	26,608	65,245
43	25,608	36,754	36,754	Vert. Marcellus	12,231	2,011	437	437	25,608	36,754
44	20,373	30,988	30,988	Vert. Marcellus	8,285	3,887	268	268	20,373	30,988
45	19,620	30,923	30,923	Vert. Marcellus	8,079	3,887	268	268	19,620	30,923
46	28,052	36,334	36,334	Vert. Marcellus	15,411	3,599	382	382	28,052	36,334
47	16,810	36,334	36,334	Vert. Marcellus	10,315	897	132	132	16,810	36,334
48	44,873	59,210	59,210	Vert. Marcellus	2,822	734	734	734	44,873	59,210
49	33,196	56,783	56,783	Vert. Marcellus	13,481	2,446	524	524	33,196	56,783
50	17,540	31,251	31,251	Vert. Marcellus	16,832	618	38	38	17,540	31,251
51	36,210	24,597	24,597	Vert. Marcellus	2,083	3,235	128	128	36,210	24,597
52	27,387	36,568	36,568	Vert. Marcellus	14,012	1,733	404	404	27,387	36,568
53	21,426	32,686	32,686	Vert. Marcellus	15,056	614	147	147	21,426	32,686
54	36,467	38,538	38,538	Vert. Marcellus	32,323	3,223	838	838	36,467	38,538
55	35,481	51,320	51,320	Vert. Marcellus	17,683	2,104	449	449	35,481	51,320
56	23,489	59,068	59,068	Vert. Marcellus	13,605	2,477	358	358	23,489	59,068
57	16,160	30,597	30,597	Vert. Marcellus	9,795	581	204	204	16,160	30,597
58	26,821	48,481	48,481	Vert. Marcellus	8,138	2,038	256	256	26,821	48,481
59	14,024	38,204	38,204	Vert. Marcellus	10,332	3,777	120	120	14,024	38,204
60	17,172	38,586	38,586	Vert. Marcellus	10,286	3,411	136	136	17,172	38,586
61	22,274	43,698	43,698	Vert. Marcellus	13,740	1,572	38	38	22,274	43,698
62	34,958	37,740	37,740	Vert. Marcellus	15,077	1,354	340	340	34,958	37,740
63	35,768	59,585	59,585	Vert. Marcellus	14,223	2,908	658	658	35,768	59,585
64	36,701	48,648	48,648	Vert. Marcellus	22,443	2,206	402	402	36,701	48,648
65	8,794	11,575	11,575	Vert. Marcellus	7,030	1,556	30	30	8,794	11,575
66	22,392	36,756	36,756	Vert. Marcellus	8,078	3,086	316	316	22,392	36,756
67	26,188	44,407	44,407	Vert. Marcellus	9,922	3,972	500	500	26,188	44,407
68	25,162	32,333	32,333	Vert. Marcellus	15,162	783	46	46	25,162	32,333
69	28,096	40,043	40,043	Vert. Marcellus	1,705	1,705	398	398	28,096	40,043
70	10,348	36,123	36,123	Vert. Marcellus	11,422	1,655	381	381	10,348	36,123
71	24,320	42,913	42,913	Vert. Marcellus	8,854	1,761	288	288	24,320	42,913
72	21,372	45,051	45,051	Vert. Marcellus	18,481	1,538	1	1	21,372	45,051
73	1,457	26,862	26,862	Vert. Marcellus	13,115	2,006	1,457	1,457	1,457	26,862

[illegible]

06.	09.20156285	4701706235	9.367	1.467.577	1.476.944	Hor. Marcellus	29.355	218.424	95.611	145.177	455.066
07.	09.20156286	4701706236	9.664	1.507.120	1.516.784	Hor. Marcellus	27.205	226.114	99.200	149.239	464.062
08.	09.20156287	4701706237	9.195	3.725.594	3.739.729	Hor. Marcellus	79.778	1.110.124	296.421	839.829	1.756.187
09.	09.20156288	4701706238	57.343	2.655.246	2.675.593	Hor. Marcellus	88.468	357.405	302.587	357.548	836.837
10.	09.20156289	4701706239	181.404	4.665.927	4.685.927	Hor. Marcellus	504.731	504.731	436.635	436.635	1.341.876
11.	09.20156290	4701706240	82.842	2.311.974	2.354.856	Hor. Marcellus	139.432	204.550	99.338	355.657	699.182
12.	09.20156291	4701706241	163.179	5.065.565	5.168.934	Hor. Marcellus	61.471	399.146	42.778	355.447	1.374.904
13.	09.20156292	4701706242	4.166	2.591.664	2.545.166	Hor. Marcellus	57.282	755.268	116.522	109.059	1.165.839
14.	09.20156293	4701706243	4.00	3.480.854	3.480.854	Hor. Marcellus	64.245	1.062.582	335.593	325.439	1.605.366
15.	09.20156294	4701706244	86	2.215.065	2.225.351	Hor. Marcellus	65.912	978.640	96.151	109.512	1.052.785
16.	09.20156295	4701706245	73.29	2.530.190	2.537.519	Hor. Marcellus	68.636	706.106	114.705	214.363	1.226.880
17.	09.20156296	4701706246	6.444	2.171.677	2.178.222	Hor. Marcellus	97.315	872.221	87.221	101.201	1.067.652
18.	09.20156297	4701706247	4.18.775	5.311.034	5.323.751	Hor. Marcellus	125.303	872.114	689.578	1.046.269	1.446.755
19.	09.20156298	4701706248	3.233	1.542.385	1.402.634	Hor. Marcellus	36.173	462.431	70.666	144.572	650.260
20.	09.20156299	4701706249	2.806	2.008.198	2.009.002	Hor. Marcellus	86.202	610.362	86.202	167.308	616.676
21.	09.20156300	4701706250	265.478	9.181.087	9.245.935	Hor. Marcellus	236.925	236.266	134.564	309.468	656.842
22.	09.20156301	4701706251	1.078	2.749.069	2.744.923	Hor. Marcellus	182.923	354.923	222.906	289.988	1.059.310
23.	09.20156302	4701706252	2.422	3.756.795	3.759.247	Hor. Marcellus	151.290	2.773.901	166.766	392.405	1.803.992
24.	09.20156303	4701706253	1.744	2.462.197	2.462.197	Hor. Marcellus	207.060	770.264	112.366	225.206	1.316.456
25.	09.20156304	4701706254	1.405	2.901.693	2.903.694	Hor. Marcellus	210.431	504.546	137.078	263.618	1.509.670
26.	09.20156305	4701706255	1.202	2.065.540	2.065.722	Hor. Marcellus	30.837	367.685	116.917	275.360	1.318.908
27.	09.20156306	4701706256	9.98	2.169.595	2.171.579	Hor. Marcellus	48.144	697.598	36.263	202.423	545.472
28.	09.20156307	4701706257	5.06	2.170.423	2.171.548	Hor. Marcellus	57.816	685.545	102.887	206.449	1.040.877
29.	09.20156308	4701706258	150.419	3.481.937	3.562.236	Hor. Marcellus	654.113	23.1397	100.039	265.883	1.017.855
30.	09.20156309	4701706259	3.131.665	2.952.860	3.132.948	Hor. Marcellus	29.862	23.426	316.118	916.917	916.917
31.	09.20156310	4701706260	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
32.	09.20156311	4701706261	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
33.	09.20156312	4701706262	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
34.	09.20156313	4701706263	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
35.	09.20156314	4701706264	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
36.	09.20156315	4701706265	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
37.	09.20156316	4701706266	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
38.	09.20156317	4701706267	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
39.	09.20156318	4701706268	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
40.	09.20156319	4701706269	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
41.	09.20156320	4701706270	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
42.	09.20156321	4701706271	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
43.	09.20156322	4701706272	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
44.	09.20156323	4701706273	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
45.	09.20156324	4701706274	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
46.	09.20156325	4701706275	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
47.	09.20156326	4701706276	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
48.	09.20156327	4701706277	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
49.	09.20156328	4701706278	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
50.	09.20156329	4701706279	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
51.	09.20156330	4701706280	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
52.	09.20156331	4701706281	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
53.	09.20156332	4701706282	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
54.	09.20156333	4701706283	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
55.	09.20156334	4701706284	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
56.	09.20156335	4701706285	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
57.	09.20156336	4701706286	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
58.	09.20156337	4701706287	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
59.	09.20156338	4701706288	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
60.	09.20156339	4701706289	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
61.	09.20156340	4701706290	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
62.	09.20156341	4701706291	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
63.	09.20156342	4701706292	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
64.	09.20156343	4701706293	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
65.	09.20156344	4701706294	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
66.	09.20156345	4701706295	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
67.	09.20156346	4701706296	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
68.	09.20156347	4701706297	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
69.	09.20156348	4701706298	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
70.	09.20156349	4701706299	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
71.	09.20156350	4701706300	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
72.	09.20156351	4701706301	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
73.	09.20156352	4701706302	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
74.	09.20156353	4701706303	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
75.	09.20156354	4701706304	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
76.	09.20156355	4701706305	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
77.	09.20156356	4701706306	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
78.	09.20156357	4701706307	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
79.	09.20156358	4701706308	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
80.	09.20156359	4701706309	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
81.	09.20156360	4701706310	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
82.	09.20156361	4701706311	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
83.	09.20156362	4701706312	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
84.	09.20156363	4701706313	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
85.	09.20156364	4701706314	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	902.305
86.	09.20156365	4701706315	2.312.240	2.952.860	3.132.948	Hor. Marcellus	61.363	40.158	204.910	398.844	

08	69701556105	4701706103	4954521	21485	3985568	1013103	Hos. Marcellus	75498	120345	49217	97166	334070
09	6970156094	4701706094	595598	11438	1421588	1448731	Hos. Marcellus	76074	151888	45416	325214	471092
10	6970156104	4701706104	598854	13489	1354571	1073160	Hos. Marcellus	97806	157293	58499	351073	441796
09	6970156150	4701706100	689774	5256	1560771	1556100	Hos. Marcellus	62321	254441	65171	148393	428435
10	6970156899	4701705698	556086	-	17154550	11541650	Hos. Marcellus	10407	233777	155542	222384	551910
17	7020156648	4701705648	910493	-	1913547	1913547	Hos. Marcellus	31316	481334	215681	414442	817480
17	7020156948	4701705948	984007	-	2013124	2013124	Hos. Marcellus	14391	509307	283681	436168	989213
17	7020156946	4701705946	739668	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020156952	4701705952	739668	10	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020156970	4701705970	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020156978	4701705978	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020156986	4701705986	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020156994	4701705994	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020156996	4701705996	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020156998	4701705998	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020156999	4701705999	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157000	4701706000	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157001	4701706001	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157002	4701706002	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157003	4701706003	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157004	4701706004	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157005	4701706005	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157006	4701706006	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157007	4701706007	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157008	4701706008	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157009	4701706009	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157010	4701706010	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157011	4701706011	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157012	4701706012	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157013	4701706013	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157014	4701706014	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157015	4701706015	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157016	4701706016	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157017	4701706017	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157018	4701706018	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157019	4701706019	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157020	4701706020	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157021	4701706021	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157022	4701706022	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157023	4701706023	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157024	4701706024	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157025	4701706025	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157026	4701706026	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157027	4701706027	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157028	4701706028	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157029	4701706029	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157030	4701706030	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157031	4701706031	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157032	4701706032	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157033	4701706033	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157034	4701706034	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157035	4701706035	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157036	4701706036	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157037	4701706037	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157038	4701706038	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157039	4701706039	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157040	4701706040	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157041	4701706041	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157042	4701706042	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157043	4701706043	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157044	4701706044	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157045	4701706045	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157046	4701706046	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157047	4701706047	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157048	4701706048	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157049	4701706049	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157050	4701706050	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157051	4701706051	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157052	4701706052	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157053	4701706053	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157054	4701706054	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157055	4701706055	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157056	4701706056	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157057	4701706057	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157058	4701706058	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157059	4701706059	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157060	4701706060	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157061	4701706061	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157062	4701706062	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157063	4701706063	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157064	4701706064	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157065	4701706065	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157066	4701706066	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157067	4701706067	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157068	4701706068	850521	-	2013284	2013284	Hos. Marcellus	31320	519297	391597	436168	989213
17	7020157069	4701706069</										

17	17	2020135451	4703055945	3571595	746494	4941	Hor. Marcellus	134848	354799	9324	137070	339237
17	17	0720145538	4703055936	629394	1326383	172800	Hor. Marcellus	172800	344333	12670	270134	339237
17	17	0720145539	4703055937	629394	1326383	172800	Hor. Marcellus	172800	344333	12670	270134	339237
17	17	0920145544	4703055944	490108	927341	327341	Hor. Marcellus	1328456	238456	16471	275474	661293
17	17	0920145545	4703055945	574113	1151715	1151715	Hor. Marcellus	1328456	238456	16471	275474	661293
17	17	0920145546	4703055946	651822	1308356	1308356	Hor. Marcellus	1328456	238456	16471	275474	661293
17	17	0920145547	4703055947	581988	1159516	1159516	Hor. Marcellus	1328456	238456	16471	275474	661293
17	17	0920145548	4703055948	532988	13503345	13503345	Hor. Marcellus	1328456	238456	16471	275474	661293
17	17	0920145549	4703055949	995116	2086436	2086436	Hor. Marcellus	1328456	238456	16471	275474	661293
17	17	0920145550	4703055950	496232	1088436	1088436	Hor. Marcellus	1328456	238456	16471	275474	661293
17	17	0920145551	4703055951	471798	1088436	1088436	Hor. Marcellus	1328456	238456	16471	275474	661293
17	17	0920145552	4703055952	712619	1088436	1088436	Hor. Marcellus	1328456	238456	16471	275474	661293
17	17	0920145553	4703055953	680005	1088436	1088436	Hor. Marcellus	1328456	238456	16471	275474	661293
17	17	0920145554	4703055954	678162	1088436	1088436	Hor. Marcellus	1328456	238456	16471	275474	661293
17	17	0920145555	4703055955	594384	1088436	1088436	Hor. Marcellus	1328456	238456	16471	275474	661293
17	17	0920145556	4703055956	452274	1088436	1088436	Hor. Marcellus	1328456	238456	16471	275474	661293
17	17	0920145557	4703055957	574767	1088436	1088436	Hor. Marcellus	1328456	238456	16471	275474	661293
17	17	0920145558	4703055958	712619	1088436	1088436	Hor. Marcellus	1328456	238456	16471	275474	661293
17	17	0920145559	4703055959	680005	1088436	1088436	Hor. Marcellus	1328456	238456	16471	275474	661293
17	17	0920145560	4703055960	594384	1088436	1088436	Hor. Marcellus	1328456	238456	16471	275474	661293
17	17	0920145561	4703055961	452274	1088436	1088436	Hor. Marcellus	1328456	238456	16471	275474	661293
17	17	0920145562	4703055962	574767	1088436	1088436	Hor. Marcellus	1328456	238456	16471	275474	661293
17	17	0920145563	4703055963	712619	1088436	1088436	Hor. Marcellus	1328456	238456	16471	275474	661293
17	17	0920145564	4703055964	680005	1088436	1088436	Hor. Marcellus	1328456	238456	16471	275474	661293
17	17	0920145565	4703055965	594384	1088436	1088436	Hor. Marcellus	1328456	238456	16471	275474	661293
17	17	0920145566	4703055966	452274	1088436	1088436	Hor. Marcellus	1328456	238456	16471	275474	661293
17	17	0920145567	4703055967	574767	1088436	1088436	Hor. Marcellus	1328456	238456	16471	275474	661293
17	17	0920145568	4703055968	712619	1088436	1088436	Hor. Marcellus	1328456	23			

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01	04201726570	47052706676	3.4436	3.6887248	5.6912187	Hor. Marcellus	372766	1.251652	206148	1,250,906
02	04201726571	47052706677	3.7728	4.124488	4.4262163	Hor. Marcellus	392330	1,441746	117,451	1,378,931
03	03201726485	47051706445	4.7773	4.206388	4.2231133	Hor. Marcellus	84234	301558	403505	1,639,959
04	03201726486	47051706446	5.5144	3.301105	3.3501219	Hor. Marcellus	79166	336198	492774	799186
05	03201726487	47051706447	5.8191	3.31170	3.3501219	Hor. Marcellus	77288	517800	201547	1,319,044
06	02201721184	47048521858	31.082	6.400408	4.451406	Hor. Marcellus	54136	651379	101908	4224739
07	03201726526	47052706678	27.838	4.058462	4.093386	Hor. Marcellus	68463	606439	384538	1,164789
08	05201727358	47050221516	26.137	3.775784	4.209386	Hor. Marcellus	78186	572484	78186	1,695356
09	05201727359	47050221517	26.137	4.338316	4.338316	Hor. Marcellus	30344	375443	375443	1,001334
10	05201727360	47050221518	26.137	4.338316	4.338316	Hor. Marcellus	30344	375443	375443	1,001334
11	03201726571	47051706445	4.7773	4.206388	4.2231133	Hor. Marcellus	84234	301558	403505	1,639,959
12	03201726572	47051706446	5.5144	3.301105	3.3501219	Hor. Marcellus	79166	336198	492774	799186
13	03201726573	47051706447	5.8191	3.31170	3.3501219	Hor. Marcellus	77288	517800	201547	1,319,044
14	02201721184	47048521858	31.082	6.400408	4.451406	Hor. Marcellus	54136	651379	101908	4224739
15	03201726526	47052706678	27.838	4.058462	4.093386	Hor. Marcellus	68463	606439	384538	1,164789
16	05201727358	47050221516	26.137	3.775784	4.209386	Hor. Marcellus	78186	572484	78186	1,695356
17	05201727359	47050221517	26.137	4.338316	4.338316	Hor. Marcellus	30344	375443	375443	1,001334
18	05201727360	47050221518	26.137	4.338316	4.338316	Hor. Marcellus	30344	375443	375443	1,001334
19	03201726571	47051706445	4.7773	4.206388	4.2231133	Hor. Marcellus	84234	301558	403505	1,639,959
20	03201726572	47051706446	5.5144	3.301105	3.3501219	Hor. Marcellus	79166	336198	492774	799186
21	03201726573	47051706447	5.8191	3.31170	3.3501219	Hor. Marcellus	77288	517800	201547	1,319,044
22	02201721184	47048521858	31.082	6.400408	4.451406	Hor. Marcellus	54136	651379	101908	4224739
23	03201726526	47052706678	27.838	4.058462	4.093386	Hor. Marcellus	68463	606439	384538	1,164789
24	05201727358	47050221516	26.137	3.775784	4.209386	Hor. Marcellus	78186	572484	78186	1,695356
25	05201727359	47050221517	26.137	4.338316	4.338316	Hor. Marcellus	30344	375443	375443	1,001334
26	05201727360	47050221518	26.137	4.338316	4.338316	Hor. Marcellus	30344	375443	375443	1,001334
27	03201726571	47051706445	4.7773	4.206388	4.2231133	Hor. Marcellus	84234	301558	403505	1,639,959
28	03201726572	47051706446	5.5144	3.301105	3.3501219	Hor. Marcellus	79166	336198	492774	799186
29	03201726573	47051706447	5.8191	3.31170	3.3501219	Hor. Marcellus	77288	517800	201547	1,319,044
30	02201721184	47048521858	31.082	6.400408	4.451406	Hor. Marcellus	54136	651379	101908	4224739
31	03201726526	4705								

01	0118185479	4701705479	1.881	5144	5244	Conventional	4.009	212	30	250	4392
02	0118185471	4701705471	3.232	3.232	3.232	Conventional	3.232	177	99	121	4243
03	0118185471	4701705471	1.159	1.159	1.159	Conventional	1.159	161	4	71	4257
04	0118185471	4701705471	8.960	8.960	8.960	Conventional	8.960	235	0	230	4285
05	0118185471	4701705471	140	140	140	Conventional	140	19	79	29	4303
06	0118185471	4701705471	740	740	740	Conventional	740	413	49	62	4389
07	0118185471	4701705471	3.627	3.627	3.627	Conventional	3.627	335	21	207	4455
08	0118185471	4701705471	1.710	1.710	1.710	Conventional	1.710	310	30	138	4487
09	0118185471	4701705471	4.541	4.541	4.541	Conventional	4.541	240	28	307	4513
10	0118185471	4701705471	5.870	5.870	5.870	Conventional	5.870	311	31	125	4524
11	0118185471	4701705471	3.246	3.246	3.246	Conventional	3.246	256	44	404	4532
12	0118185471	4701705471	3.462	3.462	3.462	Conventional	3.462	205	300	300	4542
13	0118185471	4701705471	2.372	2.372	2.372	Conventional	2.372	334	24	446	4552
14	0118185471	4701705471	3.553	3.553	3.553	Conventional	3.553	313	31	312	4562
15	0118185471	4701705471	3.50	3.50	3.50	Conventional	3.50	240	0	80	4572
16	0118185471	4701705471	2.24	2.24	2.24	Conventional	2.24	240	20	13	4582
17	0118185471	4701705471	1.612	1.612	1.612	Conventional	1.612	183	33	11	4592
18	0118185471	4701705471	2.272	2.272	2.272	Conventional	2.272	183	41	8	4602
19	0118185471	4701705471	3.432	3.432	3.432	Conventional	3.432	1304	41	41	4612
20	0118185471	4701705471	3.368	3.368	3.368	Conventional	3.368	1304	41	41	4622
21	0118185471	4701705471	10.849	10.849	10.849	Conventional	10.849	1407	48	48	4632
22	0118185471	4701705471	1.994	1.994	1.994	Conventional	1.994	13	1	6	4642
23	0118185471	4701705471	4.556	4.556	4.556	Conventional	4.556	13	6	6	4652
24	0118185471	4701705471	4.184	4.184	4.184	Conventional	4.184	13	6	6	4662
25	0118185471	4701705471	3.786	3.786	3.786	Conventional	3.786	13	6	6	4672
26	0118185471	4701705471	3.786	3.786	3.786	Conventional	3.786	13	6	6	4682
27	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	4692
28	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	4702
29	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	4712
30	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	4722
31	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	4732
32	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	4742
33	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	4752
34	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	4762
35	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	4772
36	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	4782
37	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	4792
38	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	4802
39	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	4812
40	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	4822
41	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	4832
42	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	4842
43	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	4852
44	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	4862
45	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	4872
46	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	4882
47	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	4892
48	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	4902
49	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	4912
50	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	4922
51	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	4932
52	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	4942
53	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	4952
54	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	4962
55	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	4972
56	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	4982
57	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	4992
58	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	5002
59	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	5012
60	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	5022
61	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	5032
62	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	5042
63	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	5052
64	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	5062
65	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	5072
66	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	5082
67	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	5092
68	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	5102
69	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	5112
70	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	5122
71	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	5132
72	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	5142
73	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	5152
74	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	5162
75	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	5172
76	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	5182
77	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	5192
78	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	5202
79	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	5212
80	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	5222
81	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	5232
82	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	5242
83	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	5252
84	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	5262
85	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	5272
86	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	5282
87	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	5292
88	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	5302
89	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	5312
90	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	5322
91	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	5332
92	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	5342
93	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	5352
94	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	5362
95	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	5372
96	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	5382
97	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	5392
98	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	5402
99	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	5412
100	0118185471	4701705471	103	103	103	Conventional	103	13	1	6	5422

County	NDA	AP#	Total MCF	Total Oil Receipt	Total Gas Receipt	Total Receipts	Well Type	LOE & WOE	Compressor	Gathering and	Processing	Transportation	Total Expenses
43	0318188633	4700705439	1,629	-	2,564	2,564	Conventional	\$,553	359	-	10	0	\$,708
09	052005465	4701705485	1,798	-	2,822	2,822	Conventional	10,320	384	-	13	8	30,696
05	0518185466	47021705466	2,112	-	3,350	3,350	Conventional	2,362	437	-	15	10	7,816
04	052005467	4701705467	1,487	-	2,428	2,428	Conventional	7,533	310	-	15	8	9,913
17	0318184852	4703040852	1,339	-	1,712	1,712	Conventional	47,336	242	-	1	1	17,580
06	0518185355	4703040853	3,680	-	4,888	4,888	Conventional	16,479	535	-	8	5	11,155
09	0518185355	4701705355	2,388	-	2,784	2,784	Conventional	4,862	587	-	14	9	8,191
09	0520054506	4701705506	2,144	-	3,908	3,908	Conventional	7,018	507	-	18	12	7,555
08	052005331	4701705331	1,349	-	2,154	2,154	Conventional	4,953	279	-	10	6	5,258
08	052005331	4701705331	2,835	-	4,114	4,114	Conventional	6,573	514	-	16	10	7,147
06	052005285	4701705285	1,367	-	6,776	6,776	Conventional	8,672	862	-	37	23	8,792
09	052005287	4701705287	3,128	-	4,932	4,932	Conventional	5,245	650	-	12	11	5,924
17	052005285	4703040852	6,967	-	18,909	18,909	Conventional	7,154	771	-	21	14	11,061
08	052005545	4701705545	769	-	1,824	1,824	Conventional	4,804	70	-	9	5	5,439
09	0518185403	4701705403	3,404	-	5,542	5,542	Conventional	4,511	718	-	18	12	5,268
08	052005434	4701705434	1,583	-	3,852	3,852	Conventional	6,530	230	-	21	26	7,048
04	0518185420	4701705420	16,118	-	38,171	38,171	Conventional	5,812	2,476	-	224	235	40,864
09	052005430	4701705430	2,345	-	5,897	5,897	Conventional	20,708	308	-	70	47	21,438
09	052005430	4701705430	1,059	-	1,093	1,093	Conventional	5,556	220	-	8	5	5,778
09	052005356	4701705356	763	-	1,220	1,220	Conventional	5,472	161	-	8	5	5,634
08	052005285	4701705285	443	-	2,224	2,224	Conventional	6,600	30	-	0	0	6,630
09	0518185458	4701705458	66	-	134	134	Conventional	5,285	102	-	1	1	5,391
09	0518185900	4701705900	1,159	-	3,130	3,130	Conventional	5,172	122	-	1	1	5,294
09	052005501	4701705501	62	-	159	159	Conventional	4,734	225	-	1	1	4,954
09	052005502	4701705502	1,337	-	3,573	3,573	Conventional	5,433	122	-	1	1	5,555
09	052005503	4701705503	1,387	-	441	441	Conventional	5,433	225	-	1	1	5,555
09	052005504	4701705504	8,455	-	21,887	21,887	Conventional	5,378	1,418	-	135	84	23,301
09	0518185529	4701705529	3,455	-	4,059	4,059	Conventional	5,131	169	-	5	3	5,304
09	0518185507	4701705507	678	-	1,336	1,336	Conventional	5,370	126	-	1	1	5,496
09	052005508	4701705508	753	-	1,470	1,470	Conventional	5,310	126	-	1	1	5,436
09	0518185320	4701705320	986	-	1,981	1,981	Conventional	5,382	265	-	5	3	5,645
09	0518185504	4701705504	11,564	-	19,925	19,925	Conventional	7,177	2,490	-	169	126	22,593
08	052005505	4701705505	88	-	1,822	1,822	Conventional	6,378	18	-	1	1	6,396
09	0518185431	4701705431	1,130	-	1,877	1,877	Conventional	7,475	257	-	2	2	7,734
09	052005535	4701705535	3,012	-	6,334	6,334	Conventional	6,142	495	-	2	2	6,637
09	052005536	4701705536	1,108	-	1,867	1,867	Conventional	5,508	88	-	5	5	5,696
09	0520055474	4701705474	4,445	-	4,300	4,300	Conventional	5,214	89	-	17	11	5,384
09	0520055475	4701705475	6,234	-	7,041	7,041	Conventional	4,739	580	-	17	11	5,384
09	0518185450	4701705450	3,203	-	14,654	14,654	Conventional	7,337	674	-	24	14	12,684
09	0518185451	4701705451	3,203	-	3,232	3,232	Conventional	4,403	132	-	10	11	4,635
09	052005452	4701705452	3,203	-	7,141	7,141	Conventional	7,843	421	-	64	22	10,065
09	052005452	4701705452	56	-	112	112	Conventional	4,885	8	-	3	2	4,895
09	052005585	4701705585	35,357	-	59,007	59,007	Conventional	14,844	6,259	-	202	127	21,230
09	052005512	4701705512	2,576	-	6,334	6,334	Conventional	7,773	301	-	20	10	10,290
09	052005514	4701705514	2,576	-	491	491	Conventional	13	83	-	3	2	13,980
09	052005585	4701705585	15,994	-	37,171	37,171	Conventional	12,452	1,768	-	238	11	16,053
09	052005501	4701705501	15,950	-	39,347	39,347	Conventional	15,038	1,897	-	304	11	17,134
09	052005539	4701705539	1	-	906	906	Conventional	3,085	416	-	6	5	3,501
09	0518185431	4701705431	1	-	1	1	Conventional	4,879	10	-	1	0	4,889
09	0518185431	4701705431	3,480	-	4,504	4,504	Conventional	1,855	639	-	30	19	5,257
09	0518185431	4701705431	2,625	-	4,129	4,129	Conventional	3,312	378	-	30	19	4,475
09	0518185431	4701705431	2,640	-	3,389	3,389	Conventional	2,863	362	-	33	19	3,284
09	0518185431	4701705431	2,139	-	3,355	3,355	Conventional	5,108	471	-	36	22	5,680
09	0518185431	4701705431	4,878	-	13,246	13,246	Conventional	3,884	1,109	-	30	19	4,900
09	0518185431	4701705431	1,245	-	7,113	7,113	Conventional	3,159	867	-	45	27	7,507
09	0518185431	4701705431	1,420	-	5,443	5,443	Conventional	3,239	477	-	30	19	4,219
09	0518185431	4701705431	901	-	2,898	2,898	Conventional	3,835	244	-	32	19	4,151
09	0518185431	4701705431	3,465	-	2,770	2,770	Conventional	3,985	353	-	27	19	4,338
09	0518185431	4701705431	1,715	-	3,087	3,087	Conventional	3,955	465	-	22	19	4,432
09	0518185431	4701705431	1,715	-	5,173	5,173	Conventional	5,714	669	-	42	27	6,451
09	0518185431	4701705431	629	-	2,245	2,245	Conventional	5,455	365	-	42	27	5,754
09	0518185431	4701705431	158	-	465	465	Conventional	2,536	30	-	1	1	2,566
09	0518185431	4701705431	477	-	477	477	Conventional	2,520	80	-	1	1	2,601
09	0518185431	4701705431	459	-	1,704	1,704	Conventional	2,648	2	-	1	1	2,651
09	0518185431	4701705431	1,704	-	1,704	1,704	Conventional	4,151	115	-	63	41	4,393

Craig Griffith

From: Kirsten Evans
Sent: Thursday, August 25, 2016 1:07 PM
To: Amburgey, Jeff A
Cc: Nancy Sifton
Subject: RE: Comments
Attachments: Antero Resources Corporation 2017 TY Operating Expenses.xlsx

Jeff,

Attached please find Antero's 2015 calendar year operating expenses by well and expense type. As previously discussed, Antero reports its expenses at the well level. Also, the transportation costs provided by well reflect only utilized transportation. Antero does not push down its unutilized transportation to the well level in its reporting.

Antero's response to the 2017 tax year valuation variables, dated 8/1/16, provided the average operating expenses as a percent of revenue and the average operating expense per well for certain wells types. Please note that some of the numbers have changed based on further review of the information (see updated summary below). These updates do not change Antero's position that the State's allowance percentages should be increased and the maximum operating expense should be removed.

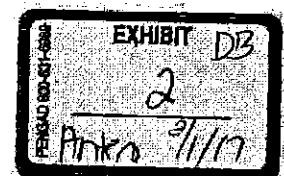
Well Type	Average Operating Expense as Percent of Revenue	Average Operating Expense per Well
Marcellus, Horizontal Wells	36%	\$817,000
Marcellus, Vertical Wells	73%	\$25,000
Horizontal Wells (Other than Marcellus)	47%	\$382,000
Typical Producing Wells	Operating at a loss	\$6,100

Please let me know if you have any questions.

Kirsten

From: Amburgey, Jeff A [mailto:Jeff.A.Amburgey@wv.gov]
Sent: Friday, August 12, 2016 10:17 AM
To: Kirsten Evans
Subject: Comments

Kirsten - Public comments on behalf of Antero Resources have been reviewed by this office. In order to evaluate your proposals we must see any and all back-up documentation. As the Final Variables are due September 1, in order to receive any consideration, I ask that this documentation be in my office by August 25.



TAB 2

Aniero Resources Corporation
Tax Year 7/1/16 - 6/30/17
Tyler County, WV

Account #	# of Wells	API#	API# for Second Well (if applicable)	Property Description	State Appraised Value	Taxpayer Value	Value the Taxpayer Believes to be in Controversy
0120162064	1	095-02064		GRAFF UNIT 1H (10466.1)	4,729,418	2,177,437	1,951,981
0120172200	1	095-02200		INGOT UNIT 1H (11338.1)	4,616,525	2,389,219	2,277,306
0120172201	1	095-02201		INGOT UNIT 2H (11339.1)	3,729,621	1,970,751	1,758,870
0120172202	1	095-02202		WALL UNIT 1H (11340.1)	3,130,243	1,718,823	1,411,420
0120172203	1	095-02203		WALL UNIT 2H (11341.1)	3,096,076	1,703,318	1,392,758
0220162126	1	095-02126		WEIGLE UNIT 1H (10936.1)	14,682,365	6,672,973	8,009,392
0220172215	1	095-02215		WEIGLE UNIT 2H (10688.1)	3,856,102	2,025,979	1,830,123
0520142038	2	095-02038	095-02039	ED ARNOLD UNIT 1H AND ED	8,082,941	4,262,120	3,820,821
0520152067	1	095-02067		SWEENEY UNIT 2H (10274.1)	1,723,648	1,095,064	628,582
0520152068	1	095-02068		SWEENEY UNIT 1H (10273.1)	1,964,871	1,211,715	753,156
0520152078	1	095-02078		THORKILDSON UNIT 1H (1028	1,755,626	1,112,002	643,624
0520152079	1	095-02079		THORKILDSON UNIT 2H (1028	1,709,847	1,089,747	620,100
0520172156	1	095-02156		SILAS UNIT 2H (10514.1)	3,380,670	1,836,827	1,543,843
0520172157	1	095-02157		SILAS UNIT 1H (10515.1)	3,168,669	1,746,615	1,422,054
0520172158	1	095-02158		GLOVER UNIT 1H (10513.1)	3,218,705	1,778,421	1,466,384
0520172159	1	095-02159		GLOVER UNIT 2H (10512.1)	2,758,387	1,566,689	1,189,699
0620162127	1	095-02127		FREELAND UNIT 2H (10587.1)	6,198,215	2,578,206	3,620,009
					71,230,827	36,887,907	34,342,126

January 20, 2017

Mr. Archer

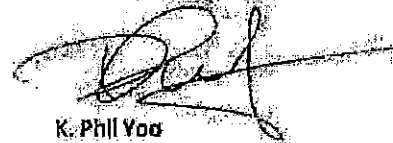
Page 2

Furthermore, please be advised that Antero Resources Corporation elects to have this matter heard in February of 2017 when the County Commission sits as the Board of Equalization and Review.

A copy of this letter is also being provided to the County Assessor and State Tax Commissioner.

Best regards,

Antero Resources Corporation



K. Phil Yoo

Vice President of Accounting and Chief
Accounting Officer

CC: Jackson L. Hayes
Dale Steager
Jeff Amburgey
Jan Mudrinich
Todd Workman
Kirsten Evans
Nancy Sitton
Elizabeth Burg



January 20, 2017

Antero Resources
1615 Wynkoop Street
Denver, CO 80202
Office: 303.357.7310
Fax: 303.357.7315

VIA FACSIMILE/CERTIFIED MAIL TO FOLLOW

Neil Archer
Clerk of the Tyler County Commission
PO Box 66
Middlebourne, WV 26149

Re: Antero Resources Corporation
Notice of Protest and Election to have matter heard by the Board of Equalization and Review
Tax Year 2017

Dear Mr. Archer:

In accordance with W.Va. Code §§ 11-3-23a, 11-3-24 and 11-6K-6, Antero Resources Corporation hereby protests the assessment of its property identified on the attached spreadsheet.

Generally stated, the primary reason for Antero Resources Corporation's filing of this notice of protest is that the assessments of the properties at issue do not reflect the true and actual value of the properties due to the use of inaccurate operating expenses. The Property Tax Division uses an outdated average operating expense that does not represent actual operating expenses for Antero, or the industry as a whole. Furthermore, they are unlawfully applying a maximum operating expense in their value calculation. These two issues combined results in an appraised value that significantly understates actual operating expenses incurred and as a result, the assessed value for the wells is significantly overstated.

Antero Resources Corporation reserves the right to raise additional grounds during the appeal process, including, but not limited to, the ground that the assessment of the properties at issue are not based on the fair market value of the properties. Please note that with respect to each property identified on the attached spreadsheet, the State Appraised Value, the Taxpayer's Value and the Value the Taxpayer Believes to be in Controversy are all indicated.

Neil Archer
January 19, 2017
Page 2

Thank you for your assistance.

Very truly yours,
Stephens & Johnson PLLC



Craig A. Griffith

CC: Jackson L. Hayes
Dale Steager
Jeff Amburgey
Jan Mudrinich
Todd Workman
Kirsten Evans
Nancy Sinton
Elizabeth Burg



Chase Tower, Eighth Floor

P.O. Box 1588

Charleston, WV 25326-1588

(304) 353-8000 (304) 353-8180 Fax

www.steptoehjohnson.com

Writer's Contact Information

304-353-8190/phone

304-353-8181/fax

craig.griffith@steptoehjohnson.com

January 19, 2017

VIA FACSIMILE/CERTIFIED MAIL TO FOLLOW

Neil Archer
Clerk of the Tyler County Commission
P. O. Box 66
Middlebourne, WV 26149

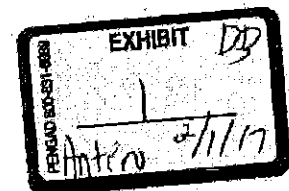
Re: Antero Resources Corporation
Notice of Protest and Election to have matter heard by the Board of Equalization and
Review Tax Year 2017

Dear Mr. Archer:

This firm serves as West Virginia tax counsel to Antero Resources Corporation ("Antero"). Attached for filing on behalf of Antero please find the company's Tax Year 2017 Notice of Protest and Election to have matter heard by the Board of Equalization and Review. Antero is filing protests in Doddridge, Harrison, Ritchie and Tyler counties. If coordination of hearings among the four counties is feasible, it would be appreciated greatly. Due to the complexity of the matter, we request a hearing time of no less than 60 minutes to allow for all testimony to be presented. If possible, please avoid scheduling the hearings for February 21, 2017 through February 23, 2017.

Please contact me if you have any questions regarding this matter or if any further information or actions is required to lodge this appeal and secure a hearing date in February.

A copy of this filing is also being provided to the Assessor and to the Tax Commissioner as indicated below.



TAB 1

Binder

Antero 2017 Property Tax Appeals
Tyler County



29 50:18 2nd 74:18	570 16:4 58 4:14 34:1	
3	6	
3 4:23 11:9,15 12:17 14:2,5 17:16 34:1,2 38:11,12 30 5:9 304 2:12,13,21,22 31 40:19 32 4:21 5:12 33:7 36:20 37:2 33 21:8 55:8,10 34 5:11 35 4:7 3538000 2:12 3538180 2:13 357 14:10 22:20 24:5 36 11:24 12:5 27:14 30:23 32:10,12 33:8 34:19 360 40:22 38 30:22	6 4:3 5:5 20:21 36:23,23,24 48:20,21 54:9 57:17,18 600 16:4 62 4:15 65 29:11 36:16 45:11 68 22:12	
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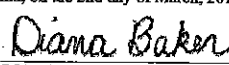
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Page 73 1 I'm not going to object, I do want to point out that the 2 affidavit submitted in lieu of the actual contracts is 3 not the best evidence. And, also, the Hein report, 4 without anybody there to testify, is hearsay. But given 5 that February is very informal, I just want to note on 6 the record that I believe that should be taken into 7 account as to the weight that evidence is given. I have 8 no problem with it being part of the record, but I just 9 want to point that out for the record, it should go to 10 the weight. 11 MR. GRIFFITH: I'll note that the 12 determination of best evidence isn't made by counsel. 13 It's made by the county commission and courts as it 14 winds its way through the system. 15 MR. VINCENT: All right. All right. 16 Hearing nothing else, we'll bring this hearing 17 to an end, and we will, again, as we have told our 18 others today -- we had multiple hearings today -- that 19 we will come forward with a -- with an answer. We do 20 appreciate you guys coming. Thank you so much. 21 * * * 22 (Whereupon, the hearing was concluded at 23 8:28 p.m.) 24 * * *	Page 74 1 THE STATE OF : 2 WEST VIRGINIA : 3 : SS: CERTIFICATE 4 COUNTY OF OHIO : 5 I, DIANA BAKER, Registered Professional 6 Reporter and Notary Public within and for the State of 7 West Virginia, duly commissioned and qualified, do 8 hereby certify that the proceedings within were by me 9 reduced to stenotype; afterwards reduced to 10 Computer-Aided Transcription under my direction and 11 control; that the foregoing is a true and correct 12 transcription of the proceedings within. 13 I do further certify that this proceeding was 14 taken at the time and place in the foregoing caption 15 specified, and was completed without adjournment. 16 I do further certify that I am not a relative, 17 counsel, or attorney of either party, or otherwise 18 interested in the event of this action. 19 I do further certify that the attached 20 transcript meets the requirements set forth within 21 Article 27, Chapter 47 of the West Virginia Code, to 22 the best of my ability. 23 IN WITNESS THEREOF, I have hereunto set my 24 hand and affixed my seal of office at Wheeling, 25 West Virginia, on the 2nd day of March, 2017.  26 DIANA BAKER, Registered 27 Professional Reporter and Notary 28 Public within and for the 29 State of West Virginia 30 My commission expires: 31 May 24, 2021
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19 (Pages 73 to 74)

Page 69 1 A. Yes. 2 Q. When did that practice stop? 3 A. Tax year 2016. 4 Q. Was there any change in the legislative rule 5 that would have precipitated that? 6 A. No, there was not. 7 Q. Any change in code -- the West Virginia code? 8 A. No. 9 Q. What led to that change? 10 A. I believe that it was -- one thing was the 11 time and expense that would be spent on reviewing all 12 those if everyone submitted that in a mass appraisal 13 system. 14 Q. Okay. 15 One last thing about the survey, that 16 calculation. Did you make the decision to go from 150 17 to 175 or was that someone else? 18 A. That was someone else. 19 Q. Okay. 20 And he's not here to testify about how that 21 calculation was performed; correct? 22 A. That is correct. 23 MR. GRIFFITH: Okay. That's all I have. 24 MR. MUDRINICH: Just a couple on	Page 70 1 redirect. 2 * * * 3 REDIRECT EXAMINATION 4 BY MR. MUDRINICH: 5 Q. We talked about the rule. Is there any 6 mention in the rule that a taxpayer has an opportunity 7 to provide actual expenses in lieu of the industry -- 8 A. No, there isn't. 9 Q. And there's some question about the first time 10 that the survey was brought out would have been October 11 of 2016. Did we not have discussions going back with 12 Antero to I believe might have even been 2015, but 13 definitely prior to July 1 of 2016, when the variables 14 were filed, that they had given all these claimed 15 expenses and were sharing them back and forth? 16 A. Yes. 17 Q. So we had -- even without -- not having shown 18 a survey till October, we had already known that they 19 were claiming a lot of additional expenses in excess of 20 what they reported on the survey? 21 A. That is correct. 22 MR. MUDRINICH: Nothing further. 23 * * * 24 RECROSS EXAMINATION
Page 71 1 BY MR. GRIFFITH: 2 Q. Just one thing. Did the tax department reach 3 out to Antero to ask for those additional expenses in 4 recalculating that number or -- 5 A. No. 6 Q. -- did they just throw out their survey and 7 recalculate it based on that? 8 A. Well, they didn't just throw it out. They 9 threw out outliers. You know, when you're doing an 10 average, a lot of times your highs and your lows, that 11 would affect that, and that's what Mr. Amburgey did when 12 he reviewed it. 13 Q. Wouldn't it have been a better practice to 14 maybe reach back out to the industry and have 15 those -- those surveys resubmitted with the actual -- 16 with some of the line items that should have been 17 required for Marcellus wells? 18 A. Could be, but, you know, the rule requires you 19 to do it every five years. 20 Q. Requires you. It doesn't prevent you from 21 doing it more often; correct? 22 A. That is correct. But at that time it was 23 already -- you know, you had already filed the finals. 24 Q. Based on what you've seen from WVONGA, and I	Page 72 1 know you're going to say you would need supporting 2 information, what you have seen from WVONGA and Antero, 3 if that survey was submitted again or circulated again 4 by the tax department with additional line items, the 5 average industry operating expenses per well would be 6 much higher, both your percentage and the cap that you 7 calculate? 8 A. Quite possibly. 9 MR. GRIFFITH: That's all I have. 10 MR. MUDRINICH: Nothing. 11 MR. VINCENT: Do you have anything else 12 from your side? 13 MR. MUDRINICH: We need to do some 14 recordkeeping. We need to move that our appraisal that 15 we've already submitted to them -- 16 MS. HOOVER: Yes. 17 MR. MUDRINICH: -- be made part of the 18 record. 19 MR. GRIFFITH: I think we asked that our 20 exhibits be made part of the record throughout, but to 21 the extent we didn't request on any specific exhibit, we 22 ask that it be submitted. 23 MR. MUDRINICH: I just want to note 24 something for the record about the exhibits. Although

18 (Pages 69 to 72)

Page 65 1 Q. Okay. 2 Well, there's no reason to think that's wrong. 3 A. Right. 4 Q. Did you reach out to Antero to try to validate 5 their operating expenses? I think discussions had 6 already started by that point with Antero and the tax 7 department on the operating expense information. Did 8 he -- did you or Jeff Amburgey that you're aware of 9 reach out to Antero to get -- 10 A. We had multiple meetings prior to that where 11 we had not reached an understanding on their expenses. 12 Q. Okay. 13 And since that time, you would agree that 14 Antero has presented to you some backup data on that 15 operating expense information; correct? 16 A. That we still weren't sure of the point of 17 sale. 18 * * * 19 (Court reporter clarification) 20 * * * 21 A. Point of sale, to know what could be -- 22 BY MR. GRIFFITH: 23 Q. Okay. 24 We have three transaction confirmations, an	Page 66 1 affidavit, and testimony from the vice president of 2 Antero indicating that the point of sale and the 3 delivery point are the same; correct? 4 A. We just read that based on what was in the 5 affidavit. 6 Q. Well, the affidavit is consistent with the 7 transaction confirmation for that particular entity; 8 correct? 9 A. There was -- where it said it was at Sherwood, 10 that was different than the transportation. I don't 11 have a copy in front of me, but... 12 Q. Okay. 13 Well, I think we'll have to agree to disagree 14 on that. I think the affidavit and the transaction 15 confirmation are consistent. 16 But let me ask about the legislative rule. 17 When it talks about average annual industry operating 18 expense, does it talk about one average or does it talk 19 about two averages? 20 A. It just says "average." 21 Q. Why does the tax department make two averages 22 available? 23 A. You have to have a way to place it on each 24 well, and we used the percentage not to exceed the total
Page 67 1 amount. 2 Q. Okay. 3 Some producers get full 20 percent; right? 4 A. That is correct. 5 Q. Some get much less than 20 percent; is that 6 right? 7 A. That is correct. 8 Q. Let me ask you another question about the 9 survey. The prior survey was circulated in 2008, is 10 that right, mostly to conventional producers? 11 A. That was conventional, yes. 12 Q. Would the 2013 survey and the 2008 survey look 13 pretty similar, you think, other than the additional 14 columns for Marcellus producers? 15 A. Actually, there was two surveys in '15. We 16 did one survey just for the conventional wells and we 17 did a separate survey for the Marcellus. 18 Q. Do the two of those look pretty similar as far 19 as the line items? 20 A. Yes. 21 Q. So you would agree that when that 2013 survey 22 was provided to Marcellus producers, that essentially 23 included only the lifting-type expenses, the 24 lease-operating-type expenses associated with typical	Page 68 1 conventional producer wells? 2 A. Right. There were some changes in the 3 instructions because we worked with IOGA on the 4 Marcellus survey and updated some things. And then also 5 then on our cover letter with the expense survey, we put 6 in there, there's a paragraph that says -- we tell them 7 what we're currently using for the expenses and then we 8 say "in order to update the above mentioned operating 9 expense rates that would be applied to your wells for 10 the upcoming tax year 2015 appraisals," you know, 11 "attach a copy of the" -- 12 Q. I think we understand the narrative, I think, 13 as far as you -- you would agree that there aren't any 14 line items on there for transportation or processing 15 expenses; correct? 16 A. Correct. 17 Q. Or typical gathering expression -- and 18 compression expenses? 19 A. Correct. 20 Q. Okay. 21 Talk just a second about the tax department's 22 prior practice of informing taxpayers that they could 23 submit actual operating expense information. Was that 24 done in the past?

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Page 61 1 royalties, and then it has the total expenses. And when 2 you divide those, it gives you a percentage of the 3 income that is for each well, so that would be your 4 average. And then each company has an average expense 5 percentage, and then you have to cap it at the average, 6 which is the -- which you take each person's, what their 7 average expense per well is. 8 Q. So what you refer to as a cap is you're making 9 sure that the mathematical average as computed from the 10 surveys cannot be exceeded? 11 A. Correct. 12 Q. Let's talk -- there was some testimony about 13 what we asked for on the return. And I believe a 14 witness stated that we do not ask for actual operating 15 expenses on the return; is that correct? 16 A. That's correct. We ask for gross receipts, 17 and no operating expenses or taxes are to be deducted. 18 Q. And would that be because we already know it's 19 going to be either, for this year, 175,000 or 20 20 percent -- 21 A. Correct. 22 Q. -- not to exceed 175,000? 23 So we don't need it. 24 A. Right.	Page 62 1 Q. Okay. 2 And you've reviewed all these appraisals? 3 A. Yes. 4 Q. Is it your opinion that the appraisals were 5 performed in accordance with the legislative rule and 6 the accompanying variables required by it? 7 A. Yes. 8 Q. And you believe this is the true and actual 9 value for the wells in accordance with the methodology 10 chosen by the legislature in this mass appraisal system? 11 A. That is correct. 12 MR. MUDRINICH: Nothing further. 13 * * * 14 CROSS - EXAMINATION 15 BY MR. GRIFFITH: 16 Q. I have a couple questions. We've been curious 17 for a while about this \$175,000 amount. How was that 18 determined again? 19 A. When Jeff went back and reviewed 20 the surveys -- 21 Q. Jeff Amburgey? 22 A. Jeff Amburgey. 23 And for one thing, we definitely knew that 24 Antero's was incorrect because they said it was
Page 63 1 incomplete and incorrect, so it was removed. 2 Q. That wasn't said until the October hearings; 3 correct? 4 A. It was said prior to that also that this 5 amount was incorrect. So for '17 we already had had the 6 hearings. In '17, when you reviewed it, we went to 7 October and -- 8 Q. Antero's first hearing was October of '16. 9 A. That was last year. 10 Q. No. Antero's first hearings were October of 11 2016. 12 MR. MUDRINICH: Maybe the rules -- the 13 variables were filed in July 1? 14 THE WITNESS: (Moves head up and down.) 15 MR. MUDRINICH: July 1. So they were 16 reviewed sometime prior to that. That's -- that's not 17 me testifying. That's just -- it had -- to change, it 18 has to be done by -- 19 BY MR. GRIFFITH: 20 Q. So your claim is that you threw out Antero's 21 survey based on Antero approaching you saying the survey 22 was wrong? 23 A. Yes. So what he did is he went and looked 24 at --	Page 64 1 Q. Let me ask you about that. I think the first 2 indication to Antero that the first time they had seen 3 this survey probably since 2014 was during the 4 October 2016 hearings; correct? 5 MR. MUDRINICH: Go ahead. 6 A. I believe it was prior to that. 7 BY MR. GRIFFITH: 8 Q. I think it was submitted -- first submitted as 9 an exhibit by the tax department in the October 2016 10 hearing. So I'm trying to get to how exactly that 11 \$175,000 number was reached. You had information from 12 WVONGA, correct, of actual operating expenses? 13 A. We did have information from WVONGA which was 14 not used because there was no backup data with it. 15 Q. Did you request backup data? 16 A. Yes. Jeff did. 17 Q. Is he here to testify about that? 18 A. No, he is not. 19 Q. Okay. 20 A. But he did. 21 Q. And you're aware that Antero -- you know, 22 we've looked at Exhibit 11 -- Antero's the largest 23 producer in the state; correct? 24 A. Going by the DEP.

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Page 57 1 order for us to get our gas to the spec, we have to 2 process it. 3 MR. GRIFFITH: That's all I have. 4 * * * 5 CROSS - EXAMINATION 6 BY MR. MUDRINICH: 7 Q. Let's stick with that. 8 We don't have any of the actual contracts here 9 today, just this affidavit of what the purchaser 10 required. 11 A. Yep. 12 Q. And on the expense surveys you filled out, you 13 didn't -- were you provided opportunity, for instance, 14 compressor, pumping costs, which I'm going to assume 15 could very well be at post the wellhead -- you didn't 16 have any for horizontal Marcellus? 17 A. Just -- which exhibit was that again? 6? 18 MR. GRIFFITH: Yeah, 6. 19 A. We didn't -- we didn't fill that in because we 20 thought it was lifting costs and compression and 21 pumping, there are no pumping costs related to gas. 22 That would typically be pumping the oil out of the 23 ground into the low pressure well and compression. We 24 didn't have any of that at the well site either.	Page 58 1 BY MR. MUDRINICH: 2 Q. So for all these other expenses, post the well 3 site value claiming here today, you didn't take the 4 opportunity to list in the other expenses that you 5 believe you should be allowed to take? 6 A. No. At that time we didn't understand what 7 the survey was being used for and the other expenses 8 that were listed were all typically lifting costs, and 9 so we didn't think to add the post lifting costs. 10 MR. MUDRINICH: Okay. No further 11 questions for this witness. 12 MR. GRIFFITH: I don't have anything 13 further. 14 MR. MUDRINICH: We need to call Cindi if 15 you don't have any more witnesses. 16 MR. GRIFFITH: No more witnesses. 17 MR. VINCENT: Okay. 18 * * * 19 CYNTHIA HOOVER, 20 being previously duly sworn, was examined and testified 21 as follows: 22 * * * 23 DIRECT EXAMINATION 24 BY MR. MUDRINICH:
Page 59 1 Q. Cindi, can you state your name for the record. 2 A. Cynthia Hoover. 3 Q. And what's your position with the tax 4 department? 5 A. Tax and revenue manager, special property 6 section, primarily involved in the valuation of oil and 7 gas for property tax purposes. 8 Q. Are you the one responsible for the -- 9 producing valuations that are being contested here 10 today? 11 A. That is correct. 12 Q. And did you bring your appraisals here to put 13 in the record? 14 A. Yes. And the county commission has been 15 provided with a copy. 16 Q. Could you briefly explain how you went by 17 computing these appraisals? 18 A. The producer files a return each year by 19 August 1. They list the production for the calendar 20 year preceding the assessment date. We take that income 21 as reported. We first take out 18 months of production 22 because we're taking it to the July 1 assessment date. 23 Then we calculate the expenses based on the average 24 operating expense that is filed in the valuation	Page 60 1 variables. And then it's discounted to present worth 2 based on individual factors for the -- the cap rates. 3 The sum total of all those years is the appraisal notice 4 for the property. 5 Q. Let's talk about that average industry 6 operating expense. How do we come up with 175,000 for 7 this year? 8 A. For this year, due to the fact that in 9 testimony last year Antero stated that their operating 10 expense survey which was used in the prior year to come 11 up with 150,000 was incomplete and inaccurate, we 12 removed that from the calculations and looked at 13 outliers that were either really low or completely too 14 high that would -- and remove those also. 15 Q. So we looked at a lot of other surveys, 16 possibly from people who read the instructions and 17 didn't know what we were asking. You figured all those 18 in when you came up with a mathematical average; is that 19 correct? 20 A. That is correct. 21 Q. What about the 20 percent? Where does that 22 come from? 23 A. When they filed the -- the operating expense 24 form, it asks for the income, the annual revenue net of

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Page 53 1 not reach out. I think that was your testimony -- 2 A. I said that nobody reached out to Antero to my 3 knowledge. 4 Q. And -- but was the statement not also made for 5 WVONGA who is actually the people -- 6 A. I can't speak for WVONGA. 7 Q. So you're recognizing that there's nothing in 8 here that indicates the State did not actually -- 9 A. There's nothing in here to -- 10 Q. So the State could very well have responded to 11 this letter. 12 A. It's possible. 13 MR. MUDRINICH: Okay. That's it. No 14 more questions. 15 MR. GRIFFITH: That's all I have. We 16 have one more witness, Phil Yoo from Antero. 17 * * * 18 PHIL YOO, 19 being previously duly sworn, was examined and testified 20 as follows: 21 * * * 22 DIRECT EXAMINATION 23 BY MR. GRIFFITH: 24 Q. If you could state your name for the record	Page 54 1 and your background. 2 A. I'm Phil Yoo. I'm the chief accounting 3 officer and corporate controller and VP of accounting at 4 Antero Resources. I've been with Antero Resources for 5 just over five years. I've worked in the oil and gas 6 industry for over ten years. I've been a CPA and 7 federal accountant for over 20 years. 8 Q. And Elizabeth, during her testimony -- if we 9 can flip to Exhibit 6 -- discussed the person that 10 filled out the survey. You are that person, so let's 11 walk through what your knowledge was. 12 Let me ask you this: Were you aware of 13 precisely how this information was going to be used by 14 the tax department when we submitted it? 15 A. No, I was not essentially aware of how it was 16 going to be used. 17 Q. And in your review of the survey then and now 18 did it appear to you that the survey sought information 19 pertaining to typical what we'll call lifting expenses 20 for wells? 21 A. Yes, it did. The category of expenses that 22 are listed are typically lifting expenses and just the 23 cost to get the gas out of the ground, not necessarily 24 to get to the point of sale.
Page 55 1 Q. And if there had been specific line items on 2 this survey, gathering and compression, transportation, 3 and processing for the horizontal Marcellus wells, would 4 that have been filled out by Antero? 5 A. Yes, they would have. 6 Q. Okay. 7 Would it be possible -- you know, we have an 8 average there, at the bottom, of \$33,000 per horizontal 9 Marcellus well. Would it be possible for any Marcellus 10 producer to incur only \$33,000 of operating expenses for 11 a producing well? 12 A. Not for a horizontal well. 13 Q. Okay. 14 And let's look at the top, the annual revenue 15 net of royalties for Antero for horizontal Marcellus 16 wells. Calendar year 2013, that was over \$771 million. 17 And then we go down to the bottom, and the total annual 18 expenses for the year were calculated at \$7.7 million. 19 Is that -- would that be possible for any Marcellus 20 producer to produce that much revenue with that little 21 expense? 22 A. No. Absolutely not. That's like 1 percent of 23 revenue. No. 24 Q. Okay.	Page 56 1 And, finally, let's -- let's flip to 2 Exhibit 7, the affidavit from NextEra Energy. That 3 affidavit indicates that Antero does not provide for 4 Free on Board Shipping Point. Is that consistent with 5 contracts that Antero makes with its other producers -- 6 its other purchasers? 7 A. Yes, it is. 8 Q. NextEra also indicates that it does not take 9 ownership or assume responsibility for the natural gas 10 prior to the stated delivery point, and that the stated 11 delivery point in the transaction confirmation is the 12 point of sale for the gas. Again, is that consistent 13 with all of Antero's relationships with its purchasers? 14 A. I believe so. 15 Q. Okay. 16 Finally, NextEra states that the price it pays 17 for a salable product -- that it pays is for a salable 18 product and that Antero incurred the expenses necessary 19 to get the gas to the point of sale, including gathering 20 and compression, transportation, and processing. Is 21 that consistent with Antero's relationship with its 22 other purchasers? 23 A. Yes, it is. In fact, pipelines have very 24 specific specs around the MMBtu content of gas. And

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Page 49 1 it have been mathematically impossible for the tax 2 department to calculate average expenses of -- with 3 \$150,000 cap for '14 through '16 and then \$175,000 for 4 2017? 5 A. Yeah. There would be no mathematical way to 6 get to an average of 175,000. Just if we would say and 7 we know that Antero for 2015 provided data that showed 8 817,000 on average and they're 40 percent, if nobody 9 else participated, you're still going to be half of 10 that, roughly. But there's no mathematical way to get 11 to 175,000. 12 Q. Okay. 13 Let's look at two separate documents here. 14 One, the WVONGA letter, the last page of that. 15 MR. MUDRINICH: What exhibit was that? 16 BY MR. GRIFFITH: 17 Q. It's Exhibit 9. The second to last page, the 18 chart on the last page. And then the Antero-specific 19 response that they provided through WVONGA to assist the 20 tax department in reviewing their tentative valuation 21 variables. Look at the last two sentences, about the 22 last paragraph. Did WVONGA invite the tax department or 23 indicate to the tax department that they would 24 supplement their response with additional information if	Page 50 1 the tax department needed that? 2 A. I'm sorry. Which paragraph? 3 Q. It's the last paragraph of the letter. 4 A. Okay. Yes. They're inviting the tax 5 department to, you know, provide additional data as 6 required for their -- 7 Q. Okay. 8 And in the Antero letter that they provided to 9 the tax department in connection with these tentative 10 that Antero provided directly to the tax department in 11 connection with the tentative valuation variables, same 12 thing in that last paragraph, they indicated to the tax 13 department they would be more than happy to provide 14 additional information that the State may need? 15 A. Yes. It indicates that additional data can be 16 provided as needed. 17 Q. Both those letters are dated -- well, the 18 WVONGA letter is dated July 29, 2016? 19 A. Yes. 20 Q. The letter from Antero is August 1st, 2016? 21 A. Yes. 22 Q. And the tentative -- the final valuation 23 variables came out September 1st, 2017? 24 A. Yes.
Page 51 1 Q. Any indication that the tax department ever 2 reached out to either WVONGA or the tax department to 3 elicit that additional information? 4 A. No indication from Antero's side that they had 5 reached out prior to the final variables. 6 Q. Okay. 7 And let's look at Exhibit 7 real quick. That 8 includes the affidavit that we've discussed. The other 9 transaction confirmations included in that exhibit have 10 different delivery points, is that correct, than what -- 11 than what was included on the -- 12 A. So -- 13 Q. -- on the NextEra document. 14 So the delivery point for EDF is located at 15 the M2-30 Pool. 16 A. South Jersey has the meters, I believe, that 17 are also referenced in NextEra, the 95, the EB95 and 18 EB360, but also they have the TCO meter. 19 Q. Uh-huh. So that's consistent with Antero 20 incurring additional transportation expenses in 21 connection with some of these purchase agreements; 22 correct? 23 A. Yeah. My understanding is TCO is a Dominion 24 transmission meter.	Page 52 1 Q. And the delivery point on a sale, treatment 2 for all of these purchases are the same; is that 3 correct? 4 A. I'm sorry. 5 Q. The way they're treated as far as where they 6 take possession of the gas, as you understand it, is 7 they take delivery of that at the delivery point -- the 8 point of sale and the delivery point are the same? 9 A. Yeah. Antero owns the gas up to the point of 10 sale as indicated in these confirmation tickets. 11 Q. Okay. 12 One last thing about the legislative rule. 13 Anything in that legislative rule that discusses a 14 maximum amount? 15 A. Nothing in the rule that discusses maximum. 16 MR. GRIFFITH: Okay. That's all I have. 17 MR. MUDRINICH: I just have one on 18 redirect. 19 * * * 20 RE CROSS - EXAMINATION 21 BY MR. MUDRINICH: 22 Q. On Exhibit Number 9, the WVONGA letter, do you 23 have anyone here from WVONGA who -- as you say, there's 24 nothing indicated here or Antero has that the State did

13 (Pages 49 to 52)

Page 45 1 10 percent, you're still substantially higher than the 2 \$175,000 cap. That's not -- 3 Q. That would be the \$175,000 mathematical 4 average? 5 A. It's not an average, as indicated in the 6 WVONGA response. For 2015, the average is closer to 7 720,000. 8 Q. That's just a statement in a letter. It 9 doesn't have a breakdown of all the items that went into 10 their claimed direct -- 11 A. It's 65 percent of the 2015 production in the 12 state. 13 Q. But it's just -- it's just a percentage. We 14 don't have a breakdown -- 15 A. It's all the expenses incurred to produce the 16 natural gas. 17 Q. All right. 18 But there's no consensus on whether these are 19 allowable expenses in the rule, correct, because 20 obviously -- 21 A. The rule says all expenses necessary and 22 directly attributable to the production of natural gas, 23 which I believe all the WVONGA participants would attest 24 that those are direct expenses.	Page 46 1 Q. And one can also argue that the rule provides 2 for direct expenses for the production of natural gas 3 which could mean just getting it out of the ground. 4 A. It discusses to the field line point of sale. 5 Q. And we don't know where that's at. 6 A. For Antero, it's either -- for NGL it's after 7 the Sberwood plant, and for transmission, in some cases, 8 it's downstream of the processing facility. 9 Q. Or right there at the processing facility. 10 That's what the affidavit says. 11 A. It has it for one meter. There's multiple 12 meters. 13 Q. You said that Antero tracks expenses at the 14 individual well -- from the individual well base, is 15 that correct? 16 A. Yes. 17 Q. Do we have -- is that included anywhere in 18 these exhibits? 19 A. No. They do not provide well-level expense 20 data. 21 Q. I would just finish up by let's turn to the 22 Hein report, Exhibit Number 13. 23 Now, is there anybody from Hein who prepared 24 this report here today to testify or be subject to
Page 47 1 cross-examination? 2 A. No one from Hein is here today. 3 Q. So this is basically hearsay, for lack of a 4 better term, as being presented here today? 5 A. No. There's a very lengthy write-up to 6 support their appraisal. 7 Q. I don't have anybody that I can question 8 directly about how they performed this appraisal? 9 A. There's no one from Hein here today. 10 Q. And if you would like to -- let's give you 11 some leading questions so you can summarize it. Is the 12 basic difference not to use -- is their use of a 13 20 percent cap rate versus our 15 or whatever it was? 14 Is that -- 15 A. It's one difference. The cap rate is one 16 difference. 17 Q. They have a substantial effect on the variance 18 of values, is that not correct? 19 A. I don't know substantial impact, but it has an 20 impact. 21 MR. MUDRINICH: Okay. I don't have any 22 further questions. 23 * * * 24 REDIRECT EXAMINATION	Page 48 1 BY MR. GRIFFITH: 2 Q. Just a few follow-ups, Elizabeth. Let's flip 3 to Exhibit 11 which shows the DEP Production Report that 4 shows -- 5 A. Yeah. 6 Q. -- kind of the pecking order in the state for 7 horizontal well producers. Where does Antero fall on 8 that list? 9 A. In this exhibit, this is showing the 10 production from years 2013 to 2015 per the DEP, which is 11 Department of Environmental Protection, puts this data 12 out for the public, and for '13 through '15, Antero was 13 at the top in terms of total West Virginia production 14 each year. 15 Q. Okay. 16 Around 40 percent each year? 17 A. Yeah, they were approximately 40 percent. 18 Q. So if the survey that we've referenced in 19 Exhibit 7, I believe, had actually -- 20 A. 6. 21 Q. -- 6 -- had actually included line items for 22 compression and gathering -- 23 A. Transportation. 24 Q. -- transportation, processing expense, would

12 (Pages 45 to 48)

Page 41 1 County, West Virginia." (As read.) 2 A. Okay. 3 Q. Now I'll turn your attention back to the 4 Exhibit 4. I see the Sherwood plant stops right here. 5 MR. GRIFFITH: 5. 6 MR. MUDRINICH: Exhibit 5. Sorry. 7 BY MR. MUDRINICH: 8 Q. This is the delivery point for that contract. 9 A. Uh-huh. 10 Q. So there's no expenses attributable to this 11 end user, according to this affidavit. 12 A. Well, that's just for the one that's -- that 13 particular meter, but there's two meters in the -- 14 Q. Doddridge County. 15 A. -- purchase sale agreement. 16 Q. They're both in Doddridge County. 17 A. But that doesn't indicate that the sales point 18 is immediately directly after the Sherwood plant. 19 Q. If you say that's the delivery point. 20 A. For the -- there's two meters. Just the one 21 particular meter it's saying that. There could be 22 additional transportation costs incurred for either 23 meter. I mean, they're not going to be particularly 24 located right at the facility.	Page 42 1 Q. But they're still in Doddridge County? 2 A. That's what it's indicating. 3 Q. So they're not going to have to go through 4 this big natural gas transmission line. We have all 5 these additional transportation costs. 6 A. This is just -- 7 Q. If it's going to be going through there, 8 they're going to be bearing the cost for that because 9 they've already stated their delivery point in that 10 affidavit is right there. But you want to claim all 11 these -- 12 A. I can't speak to all the details of the 13 physical location of the meters, but this is just one 14 particular purchase sale document for a multitude of 15 agreements that Antero has. Regardless, the point of 16 sale is much further, miles away, from the well site, so 17 Antero is incurring costs to get the well to the sales 18 point. 19 Q. So the affidavit, number 5, "The Contract does 20 not provide for Free on Board Shipping Point, and NE 21 does not take ownership or assume responsibility for the 22 natural gas prior to the stated delivery point," which, 23 at least for some of it, is at that Sherwood facility. 24 So there should not be anything post that Antero's
Page 43 1 paying for, correct, close to that Sherwood plant? 2 A. I can't speak to the exact cutoff between -- 3 regardless, the point is that the sales point is miles 4 from the well site and Antero's incurring substantial 5 expenses to get it out to the sales point. 6 Q. Even though the -- at the Sherwood plant, 7 which I'm sure is not -- the meter at the Sherwood 8 plant, I'm sure, is not miles away from the Sherwood 9 plant, but the only expenses they would be incurring for 10 that stuff would be these gathering line and compression 11 fees; correct? 12 A. And processing. At least. 13 Q. Okay. 14 Let's talk a little bit more about these 15 expenses you claim are direct expenses which should be 16 allowed. Sticking with this Exhibit Number 5, Antero 17 owns the wells; correct? Well 1? Well 2? 18 A. Yes. 19 Q. And the well line? 20 A. Yes, they own it. 21 Q. What about the gathering line? 22 A. Primarily third parties own the gathering 23 line. 24 Q. And, of course, the Sherwood processing plant,	Page 44 1 that's owned by somebody else? 2 A. A third party, yes. 3 Q. And these transmission lines above and, of 4 course, the pipeline, hydrocarbon mix, they don't own 5 that either? 6 A. Correct. 7 Q. Have you done a survey -- when you come up 8 with these expenses, did you look at the leases that 9 the -- Antero has to see if these are all Antero's 10 expense or if they're recouping some of these post -- 11 what I call post-production, post-wellhead expenses, 12 recouping them from the royalty owner? In other words, 13 is the royalty owner sharing in the cost of these 14 expenses thus that this total burden of the expenses 15 they're claiming is not falling on Antero? 16 A. I personally haven't reviewed the lease 17 agreements. My understanding is some expenses are 18 shared with royalty owners. Royalty owners typically, 19 at most, would have about 12 1/2 percent ownership, and 20 so that would be, at most, the amount of expense shared. 21 Q. So as far as I know, out of these numbers, 22 some of these figures, there may be some recoupment from 23 royalty owners? 24 A. There may be, but if you would carve out, say,

11 (Pages 41 to 44)

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1 So -- and when the tax department receives
2 these surveys and they use them, the 32,994 is going to
3 go in there as an average expense for this producer.
4 You may have another one with 200,000 average expense
5 and various other ones. And if you take and total up
6 what's reported as an average expense and then just get
7 the mathematical average, you come up with the exact
8 language in the rule of average industry operating
9 expenses.
10 A. The legislative rule talks about expenses
11 necessary and directly attributable to the production of
12 natural gas. This survey does not include expenses such
13 as gathering, compression, processing.
14 Q. I see compression and pumping costs on there.
15 They had them for vertical Marcellus, but they did not
16 have them for horizontal Marcellus.
17 A. The survey is more indicative of lease
18 operating expenses and so it was not apparent to the
19 person completing the survey that those additional
20 expenses should be included.
21 Q. And if they also had a list of other expenses
22 not in the above which provides a person who is filling
23 out the survey to list other expenses they thought
24 should be included.

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1 included in that average of 544,000, which is still
2 substantially higher than the 175,000 in the State
3 model. And, so, carving out just the horizontal
4 Marcellus wells, their average operating expense is more
5 in line with 817,000.
6 Q. Then this is 1.153 million?
7 A. That was back when they initially participated
8 with WVONGA in the survey, and then they refined the
9 numbers when completing the tax year '17 return to be
10 the 817,000. At the time of the survey, Antero was in
11 the process of completing their tax year '17 filing and
12 still working through the data. So Antero was
13 forthcoming with the State in providing more accurate
14 data.
15 Q. You will agree with me, though, that both in
16 the WVONGA letter or comments -- I'll call it letter --
17 and Antero's comments or letter, there's no breakdown
18 provided of what this 1 million -- 1.153 million
19 consists of, X amount for transportation, X amount for
20 gathering, X --
21 A. That level of detail was not provided but --
22 Q. Okay.
23 A. -- those level -- you know, all the expenses
24 that are direct and necessary as per the legislative

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1 A. I can't speak to what happened when the person
2 completed the survey, but I will point out that this was
3 in 2013. The additional WVONGA data for 2015, Antero
4 participated in that, and that was indicating, on
5 average, \$720,000.
6 Q. That's just the statement in the letter that
7 WVONGA filed as a comment?
8 A. Right. And then based on that, Jeff Amburgey
9 had requested individual data from participants, and
10 Antero participated in that as well. That was in
11 Exhibit 3.
12 Q. Did you -- yeah, there it is. Exhibit 3.
13 And Antero participated. And, again, we just
14 got this lump sum. They have an average. Let's talk
15 about Marcellus horizontal wells. They have an average
16 operating expense per well of 1,153,000; correct?
17 A. Uh-huh.
18 Q. Let's turn your attention to Exhibit 5. And
19 if I'm reading this correctly, that's the start.
20 A. Right.
21 Q. You've got an average operating expense cost
22 per well of 544,000 according to your methodology.
23 A. Well, Exhibit 5 is all of Antero's wells for
24 2015. So there are non-horizontal Marcellus wells

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1 statute were included in the survey.
2 Q. Turn your attention to Exhibit Number 7.
3 These are the pricing agreements. The affidavit, let's
4 turn our attention to this. You don't have the actual
5 contract. This is just an affidavit of what the
6 purchaser is understanding.
7 A. The physical purchase sale contract is not
8 included in the exhibit.
9 Q. Okay.
10 So for what it's worth, we don't have the best
11 evidence. We just have an affidavit. But I still want
12 to talk about the affidavit.
13 A. Okay.
14 Q. But we don't have the actual contract.
15 A. We don't. Not in this exhibit.
16 Q. -- I'm curious. Let's look at affidavit
17 statement number 4. "The attached 'Transaction
18 Confirmation' dated July 23rd, 2013, demonstrate the
19 delivery period is November 1, 2013, through October 3,
20 2016, the quantity delivered is 100,000 dekatherms
21 daily, and delivery points are the Dominion
22 Transmission, Inc., Meter 360 or the Dominion
23 Transmission, Inc., Meter EB 95 (also known as the
24 Sherwood Processing Facility) both located in Doddridge

10 (Pages 37 to 40)

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Page 33 1 appraisal firm. Antero had also retained them for their 2 tax year 2016 appeals. Similar to their 2016 values, 3 Hein used an income approach using a discounted cash 4 flow to convert the future estimated net cash flow into 5 a present value. 6 Hein indicates for tax year 2017 Tyler wells 7 to be valued at 32.9 million compared to the Antero 8 field number of 36.8 million. 9 Q. Okay. 10 You know what -- they used -- did Hein use the 11 same operating expense information that the Altus Group 12 and Antero used in coming up with the values? 13 A. Yes. So Hein uses Antero's actual operating 14 expense. They also did some validation with other 15 producers and reports showing that Antero's actual 16 operating expenses are comparable to other producers in 17 the area. 18 Q. They also used a slightly different production 19 decline rate; is that correct? 20 A. Yes. The State uses a regionally grouped 21 decline that would include Tyler and other neighboring 22 counties. Hein is using more accounting-specific 23 declines. And so the State and Tyler is using declines 24 of 52 percent in Year 1, 23 percent in Year 2, and	Page 34 1 18 percent in Year 3. And, later, Hein's at 58 percent, 2 Year 1; 28 percent, Year 2; 9 percent, Year 3 and later. 3 Q. And then also there was a capitalization rate 4 differential between the State's 16 percent and Hein 5 uses 20 percent there; right? 6 A. Yes. Hein uses 20 percent. They're of the 7 opinion that the cap rate at 20 percent is accounting 8 for the risk premium for Antero. 9 Q. And I said "finally" a second ago, but, 10 actually, "finally" is now. Exhibit 12, if you could 11 walk us through this. This is a calculation that Altus 12 Group did on behalf of Antero, for lack of a better 13 term, with a compromised taxpayer value. If you could 14 walk us through that exhibit and how we got to the 15 numbers in that exhibit. 16 A. Okay. Antero appealed the tax year 2017 17 State-appraised value of 71.2 million. That's in the 18 first column here. Antero believes that the values 19 indicated based on the appeal of 36.8 million as well as 20 the Hein appraisal are more indicative of fair market 21 value. However, if we were to work within the State's 22 mass appraisal system and employ the 20 percent of 23 revenue for operating expense but remove the cap from 24 that model, we would come up with an appraised value of
Page 35 1 55 million. 2 We discussed this with representatives from 3 Antero and believe that this could be a reasonable 4 solution within the mass appraisal but also recognize 5 that this is not indicative of the fair market value for 6 these wells in Tyler County. 7 MR. GRIFFITH: Okay. That's all I have 8 for this witness. 9 * * * 10 CROSS - EXAMINATION 11 BY MR. MUDRINICH: 12 Q. Okay. 13 Are you familiar with the legislative rule 14 regarding how the State is to value -- 15 A. Yes. 16 Q. -- natural gas? 17 A. Yes, I'm familiar with (inaudible.) 18 THE COURT REPORTER: I'm sorry. I can't 19 hear you. 20 THE WITNESS: I'm sorry. 21 A. Yes, I'm familiar with legislative rule 22 110-1J. 23 BY MR. MUDRINICH: 24 Q. And are you familiar with the section	Page 36 1 requiring the State to conduct an expense survey every 2 five years and determine the average industry operating 3 expenses per well? 4 A. Yes, I am familiar with that. 5 Q. And that's where the 150, now it's additional 6 175,000, comes from that survey? 7 A. My understanding is it comes from the survey. 8 Nowhere in the legislative rule, though, does it 9 indicate that there should be a cap employed. 10 Q. Let's talk about that a little bit. The 11 language in the rule says the average annual industry 12 operating expenses shall be deducted from the working 13 interest. Is an average a mathematical number? 14 A. It is a mathematical number. And as testified 15 earlier, the WVONGA number was 720,000, and that 16 represented 65 percent of 2015 West Virginia production. 17 So there's no mathematical way that we could get 18 \$175,000 on average. 19 Q. One of these exhibits is a survey that was 20 filed by Antero that showed, I believe, 32,000, 21 something like that, average expenses per well. I can't 22 remember what exhibit number it was. 23 A. 6. 6. 24 Q. 6.

9 (Pages 33 to 36)

Page 29 1 WVONGA to the tax department. It's a response to the 2 public comments that were solicited by the tax 3 department for 2017; correct? 4 A. Correct. 5 So the tentative values came out for 2017. 6 Horizontal Marcellus were proposed at 150,000 or 7 20 percent of revenue for horizontal Marcellus. WVONGA 8 is an industry group of producers; primarily have 9 Marcellus wells in West Virginia. And they collectively 10 pool their members to respond to the variables. About 11 65 percent of the total production in West Virginia for 12 2015 was included in this response. 13 Q. Okay. 14 And they included some information at the 15 bottom of page 1 that talks about the precipitous drop 16 in prices. Actually, let me see what it is. 17 A. It's the last part. 18 Q. Yeah. The last -- the last sentence of the 19 first -- the last paragraph. Discuss if that's 20 consistent with your knowledge of the industry and the 21 work you've done on behalf of natural gas clients in 22 West Virginia. 23 A. Yes. The horizontal Marcellus variables 24 particularly have remained unchanged. They've been	Page 30 1 unchanged in tax year 2013 and from 2014 through the 2 proposed 2017 have remained unchanged. 3 Q. Okay. 4 Let's just take a brief look at Exhibit 10 5 which is information from the U.S. Energy Information 6 Administration. I think we can focus on the graph at 7 the top of the first page there which shows pricing 8 information from 1998 to 2016. Consistent with what 9 you've seen in the industry? 10 A. Yes. Particularly, gas prices in 2008 were 11 hovering around \$9 per MMBtu and in 2015 around \$2.4 12 per MMBtu. 13 Q. And let's flip back to the WVONGA letter. On 14 page 2 they've got a couple of charts there that -- that 15 show percentages and actual expenses for horizontal 16 Marcellus and Utica wells. Pretty consistent with what 17 Antero calculated for calendar year 2015? 18 A. Yes. So the chart in the middle is 19 representative of the -- the participants from WVONGA 20 for Marcellus horizontal wells. They are indicating, 21 rather than the 20 percent as a percent of revenue, it's 22 more in line with 38 percent based on 2015 data, and 23 Antero's number was around 36 percent with 2015 revenue 24 data.
Page 31 1 Q. Okay. 2 And then the average actual expense in dollar 3 amounts that WVONGA lists? 4 A. Yeah. So the average per-well expense, WVONGA 5 had indicated for 2015, on average, their horizontal 6 Marcellus was 720,000 and Antero's on average per well 7 is 817,000. 8 Q. Okay. 9 You would agree that the comments admitted by 10 WVONGA are consistent with Antero's claims here today; 11 correct? 12 A. Yeah. This -- this is supporting Antero's 13 data. 14 Q. Okay. 15 And based on -- you know, we refer to the 16 valuation variables that the tax department circulated 17 for tax year 2017. Any change made to those valuation 18 variables for horizontal Marcellus wells? 19 A. So after the tentative variables, the final 20 variables came out. And for horizontal Marcellus, 21 the percent of revenue remained unchanged at 20 percent 22 They did increase the per-well cap to -- from 150,000 to 23 175,000. 24 Q. Okay.	Page 32 1 Let's flip to Exhibit 1 quickly just to show 2 the difference in what Antero originally calculated for 3 their Marcellus wells in Tyler County versus what the 4 State's appraised value was. 5 A. So the appeal exhibit lists 18 individual 6 wells in Tyler County. The State's appraised value for 7 tax year '17 is 71.2 million. Antero is of the opinion 8 that their value, if we would employ within the State's 9 appraisal system, but instead of the 20 percent revenue 10 operating expense, used 36 percent, which is supported 11 based on Antero's actual operating expense for 2015, w 12 would come up with an appraised value of 36.8 million 13 Q. Okay. 14 And that's with no cap; correct? 15 A. That would be without a cap. 16 Q. Okay. 17 Finally, let's -- let's take a look at 18 Exhibit 13 which is a -- an appraisal and a report that 19 was submitted by -- given to Antero by Hein & 20 Associates. Discuss your knowledge of that appraisal 21 and what methodology was used by Hein and what value 22 they came up with through their -- through their 23 appraisal. 24 A. So Hein is an independent third-party

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Page 25 1 statements for South Jersey Resources, EDF Trading North 2 America, and NextEra. 3 In the confirmation statements, each one 4 identifies that -- the delivery of gas at a specific 5 sales rocter in that all of the operating expenses that 6 we're claiming Antero incurs has -- they've incurred 7 those expenses prior to these delivery points and these 8 confirmation statements. 9 Q. Take just a second to look at the delivery 10 points for NextEra Energy which indicates two separate 11 delivery points, one being the ETC Northeast Pipeline in 12 Doddridge County and the other being the Sherwood 13 Facility, Delivery Point 2. And I don't think we really 14 need testimony on that, but it kind of leads into our 15 questions on this affidavit. Discuss that affidavit and 16 what it -- what it details. 17 A. The affidavit is providing additional 18 information around the confirmation statement. It 19 indicates that per the purchase sale contract between 20 Antero and NextEra, that the delivery points are the 21 point of sale for natural gas. It also indicates that 22 the contract does not provide free on-board shipping in 23 that Antero owns the gas up to the sales point. And it 24 also indicates that NextEra's paying a price for the gas	Page 26 1 as a salable product and that Antero incurs all of the 2 expenses necessary to get the gas to the sales point, 3 including compression, processing, and transportation. 4 Q. And those are precisely the expenses that 5 Antero are claiming they should be able to -- should be 6 applied to their gross receipts; correct? 7 A. That's correct. 8 Q. Let's move on to Exhibit 8. You can be brief 9 on this. This is the tax department's valuation 10 variables. Just discuss briefly what the -- and I think 11 you referenced this throughout the hearing, but what the 12 tax department's operating expenses from Marcellus -- 13 horizontal Marcellus wells are and their variables and 14 how those compared to what you see for Antero 15 industrywide. 16 A. So in Exhibit 8, the first grouping of 17 variables were the tentative proposed variables. The 18 State comes out every year and then affords taxpayers an 19 opportunity to opine on whether the variables are 20 appropriate or not. In particular, looking at the 21 operating expense variables for tax year '17, the State 22 had originally proposed that for horizontal Marcellus, 23 the operating expense be 20 percent of the revenue, not 24 to exceed 150,000, which was consistent with the prior
Page 27 1 tax years 2014 through 2016. 2 Q. Okay. 3 And we've referenced Exhibit 5. Would you 4 agree that these valuation variables don't really 5 account for some of the expenses listed on that exhibit 6 which included compression -- gathering and compression 7 and transportation and processing expenses? 8 A. Yes. The 150,000 as demonstrated on Exhibit 5 9 would cover Antero's expenses for LOE and some of their 10 gathering and compression but not all. It wouldn't 11 cover processing or transportation. 12 Q. Okay. 13 Discuss the reason for the variance between 14 Antero's operating expense percentage of 36 percent and 15 the percentage allowed by the tax department for 2017, 16 the 20 percent? 17 A. So for tax year 2017 it's based off of 2015 18 gas price, whereas tax year '16 is based off of 2014 gas 19 price. And as previously mentioned, gas prices dropped 20 significantly from 2014 to 2015, about 45 to 50 percent. 21 The operating expenses, however, don't fluctuate with 22 the prices, and Antero has continued to incur 23 substantial operating expenses year over year. And so 24 as a percent of just the revenue, with the gas prices	Page 28 1 dropping, the percent of revenue would go up as a 2 result. 3 Q. Okay: 4 Have you received any feedback from the 5 department -- tax department to indicate that Antero is 6 improperly categorizing any of the expenses that it 7 claims should be applied to those gross revenues? 8 A. No. We worked tax year 2016 in particular 9 providing a lot of substantial documentation to support 10 Antero's operating expenses, and the tax department 11 didn't reject any of the type of expenses claimed. 12 Q. Okay. 13 So is it fair to say that the tax department's 14 issue seemed to be based entirely on the amounts claimed 15 and not -- not on the categories that are being claimed? 16 A. That appears to be the case. 17 Q. Okay. 18 Let's look at Exhibit 9. There are two 19 documents in there. Both of these are from trade 20 organizations that represent the oil and gas industry. 21 The first is from IOGA West Virginia which is probably 22 more pertinent to vertical and typical-producing wells. 23 So let's flip to the second one which is from WVONGA 24 Discuss what's included in that -- in that letter from

7 (Pages 25 to 28)

Page 21 1 A. So the survey lists costs that are typical for 2 just lease operating expenses. Again, these would be 3 expenses incurred directly at the well site. And the 4 person that completed the survey put amounts wherever 5 there was an itemized expense listed. For horizontal 6 Marcellus, for this year, they listed 7.7 million of 7 total horizontal Marcellus expenses, and, on average, 8 about 33,000 per well. 9 Q. Which is consistent -- somewhat consistent 10 with the \$41,000 of typical lease operating expenses 11 included on this diagram? 12 A. Yeah. It's comparable to the 2015 data. 13 Q. Were there any line items for gathering, 14 compression, or processing or transportation? 15 A. Let me go back to it. No specific line items 16 for gathering, processing, and transportation are 17 listed. 18 Q. So this would be typical for a more 19 conventional well, the types of expenses listed here? 20 A. That's correct. 21 Q. Okay. 22 Let's move on to gathering and compression, if 23 you want to continue to walk me through the expense 24 information.	Page 22 1 A. All right. So flipping back to Exhibit 5. 2 The numbers at the bottom in red, the next group are 3 labeled "Gathering and Compression." These are expenses 4 Antero incurs to transport both the gas and the natural 5 gas liquids blend from the well to the processing 6 facility. For 2015 Antero incurred 168.9 million; on 7 average, \$257,000 per well. 8 The next item in the exhibit is the processing 9 expense, and this is an expense incurred by Antero that 10 they paid for to get the natural gas liquids separated 11 from the gas at the Sberwood plant. For 2015, Antero 12 incurred 44.4 million; on average, \$68,000. 13 The next group of expenses labeled 14 "Transportation" are expenses incurred to move the gas 15 from the processing facility to the point of sale via a 16 natural gas transmission line. Antero incurred 17 117.1 million in total; on average, 178,000 per well for 18 transportation for 2015. 19 And in total, for all their wells, they 20 incurred 357.2 million for 2015; on average, 544,000. 21 And wanted to point out that that is for all of Antero's 22 wells. We're talking about Antero's horizontal 23 Marcellus wells, and so those wells, on average, were 24 817,000.
Page 23 1 Q. For calendar year 2015? 2 A. Yeah. 3 Q. Okay. 4 Just address briefly Antero's decision to 5 continue processing NGLs. 6 A. To -- to get the gas to pipeline quality, the 7 gas -- a lot of the horizontal Marcellus wells' gas has 8 a wet gas component in it. And it -- to be pipeline 9 quality in a natural gas transmission line, it has to be 10 processed to separate that natural gas liquid. So they 11 must incur that processing cost. 12 Q. Okay. 13 You discussed 967 million of revenues. When 14 you account for the 18-month decline, those revenues are 15 more like 524 million; is that right? 16 A. Yes. So in the model, the model takes the 17 revenue per well and declines it out 18 months, so that 18 would be comparable to 524 -- 19 Q. And the tax department allowed about 20 73 million of expenses? 21 A. Correct. 22 Q. Okay. 23 So in your estimation, the State is saying 24 that Antero could produce \$524 million in revenues by	Page 24 1 only spending \$73 million? 2 A. That's what the model would indicate. As 3 we're demonstrating in this exhibit, Antero incurred a 4 substantially higher amount of operating expenses, 5 357 million. The \$175,000 cap that they're 6 implementing -- that's not in the -- in the legislative 7 code anywhere -- that's not even going to cover -- it's 8 going to cover some of the LOE and some of the gathering 9 and compression. 10 Q. And we discussed tracking of expenses. Just 11 discuss Antero's -- briefly Antero's methodology for 12 recordkeeping for the operating expenses of these wells. 13 A. They maintain all of their operating expenses 14 at a well level and distribute it to each well. 15 Q. Okay. 16 And let's move on to Exhibit 7 and have that 17 admitted into evidence as well. This includes 18 transaction confirmations from three companies as well 19 as an affidavit on the back there. Discuss those 20 confirmations and what they -- what they demonstrate. 21 A. These are three separate -- they're referred 22 to confirmation statements and they're as a result of a 23 purchase and sale agreement with three individual third 24 parties. In this exhibit we've included confirmation

6 (Pages 21 to 24)

Page 17	Page 18
1 In this example, these are all horizontal Marcellus 2 wells producing in the same tax year. Their revenue's 3 different, so we have a well ranging from \$1 million to 4 \$7 million in one year, and that would just be as a 5 result of the production of each individual well. 6 The column that's labeled "State Working 7 Interest Expenses, Prior to Cap at 20 Percent" is 8 showing what the percent -- what the operating expense 9 would be for each well at 20 percent without that 10 \$175,000 cap. So at a million dollars, that well's 11 getting \$119,000, whereas the \$7 million well is getting 12 \$833,000 in the State's model. 13 The following column is showing you what the 14 State's actually allowing in their model. So the very 15 first well wasn't at the cap, so it's getting 119,000. 16 But the wells that receive revenue anywhere from 3- to 17 7 million are capped at 175,000. And so, therefore, 18 their percentages, the more revenue that they generate, 19 the lower percent of operating expense they're getting. 20 So the \$7 million well is only receiving 4 percent. 21 Q. And you would agree that it's not atypical for 22 an Antero well to reach that 5 million or \$7 million 23 threshold? 24 A. Yeah. These were actually -- these examples	1 were driven off of Antero's data. 2 Q. Okay. 3 State's returns. What does it say about 4 operating expenses? Are taxpayers to include that on 5 the return or are they expressly told not to include 6 that on the return that's submitted to the department? 7 A. The taxpayers are to not include any operating 8 expenses, and they're to report their data at gross 9 numbers. 10 Q. Okay. 11 By "data," you mean receipts; correct? 12 A. Revenue data, yes. 13 Q. Right. 14 In your experience, and you indicated that you 15 worked as a tax manager for an operator for at least ten 16 years, has the tax department in the past been willing 17 to consider actual operating expense information? 18 A. Yes. Going back to the administrative notices 19 that they publish on an annual basis from 20 two-thousand -- tax year 2015 they welcomed producers to 21 submit actual operating expenses. 22 Q. Okay. 23 Did they do that in an official document or 24 was it something a little bit more informal?
Page 19	Page 20
1 A. It was through their official tax 2 administrative notice that comes out every year. 3 Q. Okay. 4 So when did that change? 2016? '17? 5 A. For tax year 2016 it was left off of that 6 administrative notice. 7 Q. Okay. 8 The tax department's often focused on tracking 9 expenses to particular wells whenever a taxpayer claims 10 actual operating expense information. Is that something 11 that Antero does? 12 A. Yes. Antero tracks their expenses at a well 13 level. 14 Q. Let's move on to Exhibit 5 which is a diagram 15 that was put together to show Antero's receipts for 16 calendar year 2015 which is embedded in the 2017 values. 17 Can you discuss this diagram in regards to natural gas 18 sales included in the exhibit and kind of walk us 19 through the receipts -- the gross receipts information? 20 A. At the top of the exhibit are the revenue 21 numbers that corresponded to Antero's return filing for 22 tax year '17. They report both natural gas liquids 23 revenue and natural gas revenue. The \$46 million is the 24 natural gas liquids revenue. This sales point is right	1 after the processing facility called Sherwood, and 2 that's the point of sale for Antero. The \$921 million 3 is the natural gas revenue Antero received, and that 4 point of sale is after the natural gas transmission 5 line. 6 Q. And this is for not just the horizontal 7 Marcellus wells. This is for all Antero wells? 8 A. This would be for all of Antero's wells for 9 tax year '17. 10 Q. Okay. 11 And let's discuss the operating expense 12 information included at the bottom of that sheet, the 13 numbers that are in red there. 14 A. Yeah. The first number in red is labeled 15 "LOE," which is Lease Operating Expense, and these are 16 operating expenses that are typically incurred right at 17 the well site. For Antero, for 2015, they incurred 18 26.8 million of lease operating expenses at average well 19 cost of 41,000 per well. 20 Q. And let's pause right -- real quick and just 21 flip to Exhibit 6 which is a survey that Antero provided 22 to the tax department in 2014. Can you review that 23 document for us and tell us what the calculation of 24 expenses per well is based on that survey?

5 (Pages 17 to 20)

Page 13	Page 14
1 well for the horizontal Marcellus. This e-mail was to 2 object to the valuation of -- proposed in the tentative 3 as a result of that cap which is not in the legislative 4 rule. Antero's actual operating expense, as indicated 5 in a prior exhibit, is, on average, 817,000 per well, 6 and so their value is grossly overstated as a result of 7 the outgoing expense being grossly understated. 8 Q. Okay. 9 Let's move on to Exhibit 4, and we'll have 10 that admitted into evidence as well. 11 Discuss the State's valuation process of 12 producing oil and natural gas properties based on the 13 calculation included on that first sheet and then you 14 can move on to describing the second sheet in that 15 exhibit as well. 16 A. The first sheet is just to demonstrate the 17 model that the State uses for each well to come up with 18 their valuation every year. It's a discount cash flow 19 model, which they're using a net income amount to 20 discount into the future to determine what their current 21 value is today. I want to point out the shaded boxes 22 there in blue to the left are the State's published 23 decline rates that they've determined in this region the 24 wells are going to decline according to these three	1 percentages. 2 The blue numbers in the middle, the \$3 million 3 and the \$500,000, is the gross revenue for this example 4 well that would have been reported. These two -- the 5 \$3 million would have been then discounted based on 6 those decline rates at 1.785 million. Then they would 7 apply the 20 percent operating expense percent not to 8 exceed 175,000 in this working cost box here. And in 9 this example, this well was being capped -- if the 10 20 percent was applied, it would be 357,000, not 11 175,000. I just want to point out that the weighting of 12 the operating expense happens in the earlier years on 13 the well in that it's tied to revenue, when, in reality, 14 the operating expense doesn't fluctuate with revenue; 15 fluctuates with volume. 16 Q. Just to clarify, this is just a sample well. 17 This isn't necessarily Tyler County specific; is that 18 correct? 19 A. Correct. This is just a sample. 20 Q. So I think the decline rates in Tyler are a 21 little bit different -- 22 A. Yeah. This was just to get a sense as to how 23 the model works. 24 Q. Okay.
Page 15	Page 16
1 And if you want to move on to the second sheet 2 and walk us through that. 3 A. The second sheet, there's two groupings of 4 data. The grouping at the top is an example again, and 5 this example is trying to demonstrate the impact of the 6 gas price on a well's valuation year over year. So in 7 this example we chose years 2013 through 2015, and we 8 kept the production the same just so that we can isolate 9 the impact of the gas price. You'll see that the gas 10 price in 2013 was roughly \$4 and dropped significantly 11 in 2015 to \$2.25 per BTU. The corresponding revenue 12 after the pricing also drops as a result of the pricing. 13 The column labeled "State Working Interest 14 Expense, Prior to Cap at 20 Percent" is demonstrating 15 what the operating expense would be for each well in 16 each of these particular years without the cap of 17 175,000 for 2017 and 150,000 in prior years. The 18 following column is indicating what the actual 19 State-permitted expense is, and then corresponding 20 percentages are showing what the State actually allowed 21 for these particular years. Wanted to point out that 22 nothing changed in this example but for the gas price. 23 And the well in 2015 is receiving lower operating 24 expense relative to the prior two years, whereas the	1 only thing that's changed is the gas price. 2 And, again, operating expenses are primarily 3 consistent year over year. The very last column they 4 range from 600- to 570,000. And the operating expense 5 wouldn't fluctuate because they're tied to volume, not 6 to pricing. 7 Q. Okay. 8 So in your estimation, certain wells -- 9 certain Marcellus wells will get that full 20 percent 10 while others will get less than that 20 percent; 11 correct? 12 A. That's correct. 13 Q. Would it be fair to say that the State's model 14 penalizes any Marcellus producer that elects to increase 15 its revenues by incurring additional expenses to gather 16 and compress that gas, process it, transport it to the 17 point of sale? 18 A. That's correct. 19 Q. Okay. 20 A. You want me to talk about the mill? 21 Q. Okay. 22 A. Still working off of this sheet, there's 23 another example on here, and this example is showing the 24 impact of the \$175,000 expense cap in the State's model

4 (Pages 13 to 16)

Page 9 1 MR. GRIFFITH: Okay. Our first witness 2 will be Elizabeth Burg from the Altus Group. I think 3 she's been sworn in. 4 * * * 5 ELIZABETH BURG, 6 being previously duly sworn, was examined and testified 7 as follows: 8 * * * 9 DIRECT EXAMINATION 10 BY MR. GRIFFITH: 11 Q. Elizabeth, can you discuss your background, 12 including your experience with natural resource property 13 tax issues? 14 A. I have a bachelor of science degree in 15 accounting. I worked for a producer in Appalachia for 16 ten years as their property tax manager. And I 17 currently am employed with Altus Group as a senior 18 consultant where we specialize in oil and gas. 19 Q. And discuss just briefly Antero's operations 20 here in West Virginia. 21 A. Antero is an active horizontal -- drilling a 22 lot of horizontal Marcellus wells in the area. 23 Currently they operate about 700 wells, primarily 24 horizontal Marcellus wells.	Page 10 1 Q. Okay. 2 Why did Antero appeal its 2017 values in Tyler 3 County? 4 A. Antero appealed their horizontal Marcellus oil 5 and gas assessments. The assessments are to be valued 6 at fair market value. That's the value that would be 7 sold if a third party were to purchase it in the open 8 market. The method the State employed to determine the 9 fair market value is in that income/discounted cash flow 10 method of valuation, and in that model, they take gross 11 revenue and reduce it for operating expenses. We 12 believe the State has acted outside their legal 13 authority by employing an operating expense cap in their 14 model. They're overvaluing Antero's wells as a result. 15 The State, in their model, uses a 20 percent 16 of revenue not to exceed 175,000 per well operating 17 expense. This -- this amount is grossly understated as 18 we'll show in the evidence. Antero's actual operating 19 expense is much greater than 175,000 cap. 20 And, also, mathematically it will be 21 impossible to get an average Marcellus horizontal 22 \$175,000 average cap when you look at Antero's total 23 West Virginia market share, along with the survey 24 responses from WVONGA.
Page 11 1 Q. Okay. 2 To your knowledge -- you discussed the 3 legislative rule. That was -- was that promulgated and 4 passed before the Marcellus industry came into the 5 state? 6 A. Yes. The legislative rule has been in place 7 for several years. 8 Q. Okay. 9 Let's take a look at Exhibits 2 and 3 and have 10 those admitted into evidence. 11 We'll start with -- with Number 2 which is 12 operating expense information that was provided to the 13 tax department's property tax division director in 14 August of 2016. If you could discuss what was included 15 in that e-mail, and then we'll move on to Exhibit 3. 16 A. Exhibit 2 was an e-mail Altus sent on Antero's 17 behalf for Antero's actual operating expense for the 18 2015 calendar year which is the data used for the 2017 19 assessment. 20 In the middle of the exhibit, you'll see a 21 box, and I want to point out the very first item in this 22 box, the "Marcellus, Horizontal Well," the data that was 23 provided to the State indicated that as a percent of 24 revenue, Antero's actual operating expense is 36 percent	Page 12 1 for the 2015 time frame and 817,000 per well. 2 Q. Okay. 3 The increase in percentage, I think in 2016 4 that percentage is 23 percent. What was that a result 5 of, 23 to 36 percent? 6 A. So the gas prices from 2014 to 2015 dropped 7 significantly, almost 50 percent, so when the State's 8 taking the operating expense as a percent of revenue, 9 the -- in Antero's case, their expenses didn't increase 10 significantly, but their revenue did decrease as a 11 result of the gas price, so the percentage will increase 12 as a result. 13 Q. Are you aware of any response to this from the 14 tax department when it was provided? 15 A. No. The tax department did not respond. 16 Q. Okay. 17 Let's move on to Exhibit 3. This is related 18 to the tentative appraised values that Antero received 19 from the tax department in late November, early 20 December. Discuss what was provided pursuant to that 21 e-mail. 22 A. So Antero received their tentative proposed 23 2017 tax values, and in the valuation, the State was 24 capping the average operating expense as \$175,000 per

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1 INDEX (Cont.) 2 EXHIBITS (Cont.) 3 IDENTIFIED ADMITTED 4 Antero Exhibit 5 19 72 5 Antero Exhibit 6 20 72 6 Antero Exhibit 7 24 24 7 Antero Exhibit 8 26 72 8 Antero Exhibit 9 28 72 9 Antero Exhibit 10 30 72 10 Antero Exhibit 11 48 72 11 Antero Exhibit 12 34 72 12 Antero Exhibit 13 32 72 13 State Exhibit 1 72 72 14 15 16 17 18 19 20 21 22 23 24	1 * * * 2 PROCEEDINGS 3 * * * 4 MR. VINCENT: We'll call this next 5 hearing session at 7:05, and as always, Michelle will 6 swear in those who will be testifying this evening. 7 * * * 8 (Whereupon, the witnesses were duly sworn.) 9 * * * 10 MR. VINCENT: All right. You guys ready 11 to proceed? 12 MR. GRIFFITH: I can start. 13 * * * 14 OPENING STATEMENT 15 * * * 16 MR. GRIFFITH: My name is Craig Griffith. 17 I'm with Steptoe & Johnson here on behalf of Antero 18 Resources. And I think at least two of the 19 commissioners were here in October when we went through 20 the same process for tax year 2016. We'll try to be a 21 little briefer, a little tighter this time, because I 22 think the commissioners have heard some of this 23 information. 24 The purpose of the hearing is to address the
Page 7	Page 8
1 tax department's methodology in resulting assessed 2 values of Antero's producing natural gas wells. They 3 have 18 Marcellus wells taxed for 2017 in Tyler County. 4 Antero believes that the tax department's operating 5 expense allowance fails to consider all expenses 6 necessary to get its gas to the point of sale and that 7 Antero should have been allowed to claim a higher amount 8 of operating expenses for each well than what was 9 ultimately permitted by the tax department, and by 10 limiting those expenses, the value of those wells is 11 overstated for tax year 2017. The tax department was 12 presented with operating expense information by Antero 13 showing what those -- what those numbers should have 14 been for operating expenses, which the tax department 15 rejected and instead used their 20 percent average or 16 \$175,000 cap for each well. 17 We believe that using the default operating 18 expenses affects Antero disproportionately as compared 19 to most other producers since Antero sells its gas miles 20 away from its well sites in order to maximize the 21 revenues for those wells, yet it disallowed the expenses 22 that are necessary to generate that additional revenue, 23 including gathering and compression expenses, 24 transportation expenses, and processing expenses.	1 The tax department benefits from the 2 additional revenue generated by Antero, but it is 3 refusing to recognize the significant amount of 4 additional expense that Antero incurs to increase those 5 revenues. 6 That's all I have. 7 MR. VINCENT: Okay. 8 Do you guys have any -- would you like to let 9 them go or do you have anything -- 10 MR. MUDRINICH: Just a brief opening 11 statement. 12 * * * 13 OPENING STATEMENT 14 * * * 15 MR. MUDRINICH: I assume they will 16 testify that we performed these appraisals in accordance 17 with the legislative rule and the variables that are 18 filed with the Secretary of State's office as authorized 19 by the legislative rule, and they were truly the same as 20 any other Marcellus -- I think they were in the 21 Marcellus -- any other Marcellus horizontal well 22 producer in the state. 23 MR. VINCENT: With that, we'll start with 24 the evidence.

2 (Pages 5 to 8)

Page 1	Page 2
1 IN RE: 2 3 ALTUS GROUP/ANTERO CORPORATION 4 ASSESSMENT APPEAL 5 6 7 8 9 * * * 10 HEARING 11 BEFORE: Tyler County Board of Equalization and Review 12 DATE: Wednesday, February 1, 2017 13 TIME: 7:05 p.m. - 8:28 p.m. 14 * * * 15 16 Tyler County Courthouse 17 121 Main Street 18 Middlebourne, West Virginia 26149 19 20 * * * 21 22 Whereupon, the above-referenced matter came 23 on for hearing and the proceedings were as follows: 24	1 APPEARANCES: 2 3 Board of Equalization and Review members: 4 Eric Vincent, President 5 Charles Smith, Vice President 6 John F. Stender 7 8 On behalf of Antero Resources: 9 CRAIG A. GRIFFITH, Esquire 10 Steptoe & Johnson, PLLC, 707 Virginia Street, East, 11 17th Floor, Charleston, West Virginia 25301 12 Telephone: (304) 353-8000 13 Fax: (304) 353-8180 14 E-mail: craig.griffith@steptoe-johnson.com 15 16 On behalf of the State of West Virginia, 17 State Tax Department, Property Tax Division: 18 JAN P. MUDRINICH, Esquire 19 State of West Virginia, State Tax Department, 124 State 20 Street, Second Floor, Charleston, West Virginia 25301 21 Telephone: (304) 558-3940 22 Fax: (304) 558-1843 23 E-mail: Jan.P.Mudrinich@wv.gov 24
Page 3	Page 4
1 APPEARANCES (Cont.): 2 3 ALSO PRESENT: 4 Lisa Jackson - Tyler County Assessor's Office 5 Stephanie Miller - Tyler County Assessor's Office 6 Jessica Turner - Tyler County Assessor's Office 7 Elizabeth Burg, Senior Consultant, Altus Group 8 Phil Yoo, Vice President - Accounting, Chief 9 Accounting Officer, Corporate Controller, Antero 10 Resources 11 Cynthia R. Hoover, Tax & Revenue Manager, 12 West Virginia State Tax Department 13 14 Michelle Forester, Court Reporter 15 16 Diana Baker, Court Reporter 17 18 19 20 21 22 23 24	1 INDEX 2 WITNESS PAGE 3 Opening Statement by Mr. Griffith..... 6 4 Opening Statement by Mr. Mudrinich..... 8 5 ELIZABETH BURG 6 Direct Examination by Mr. Griffith..... 9 7 Cross-Examination by Mr. Mudrinich..... 35 8 Redirect Examination by Mr. Griffith..... 48 9 Recross-Examination by Mr. Mudrinich..... 52 10 PHIL YOO 11 Direct Examination by Mr. Griffith..... 53 12 Cross-Examination by Mr. Mudrinich..... 57 13 CYNTHIA HOOVER 14 Direct Examination by Mr. Mudrinich..... 58 15 Cross-Examination by Mr. Griffith..... 62 16 Redirect Examination by Mr. Mudrinich..... 70 17 Recross-Examination by Mr. Griffith..... 71 18 19 EXHIBITS 20 IDENTIFIED ADMITTED 21 Antero Exhibit 1 32 72 22 Antero Exhibit 2 11 11 23 Antero Exhibit 3 12 11 24 Antero Exhibit 4 13 13

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MAR 17 2017

Candy L. Warner
Tyler Co. Circuit Clerk

EXHIBIT

A

Subject:
Reported:

Figure 1

Answer: The first twelve months of working interest receipts for wells that began production during 2015 is provided below (Columns 1 and 2). We are requesting the 2015 calendar year. Please note that twelve months of working interest receipts is not yet available for some first year wells. Where twelve months of interest receipts for the first year then 3.4 months of reoperated wells that began producing during the first 8 months of 2015, the last month of well completion is 8 months.

City	PAID Acc #	API	County	Initial Production Date	Days to Production	2015 Gas Working Receipts, \$1 Reported by Amoco	2015 Oil Working Interest Receipts, \$1 Reported by Amoco	2015 Gas Receipts, \$1 Reported by Amoco	2015 Oil Receipts, \$1 Reported by Amoco	2015 Gas Receipts, \$1 Reported by Amoco	2015 Oil Receipts, \$1 Reported by Amoco
9	0020176571	4701706377	DeKalb	2/4/2015	27	3,581,805	770,407	4,110,771	3,581,805	770,407	4,110,771
9	0020176568	4701706384	DeKalb	2/7/2015	316	5,748,281	803,128	5,940,409	5,748,281	803,128	5,940,409
9	0020176575	4701706375	DeKalb	2/9/2015	326	4,546,284	378,975	5,126,271	4,546,284	378,975	5,126,271
9	0020176570	4701706370	DeKalb	2/9/2015	230	3,712,734	38,069	4,300,815	3,712,734	38,069	4,300,815
9	0020176572	4701706372	DeKalb	2/4/2015	311	3,299,706	5,621	3,656,640	3,299,706	5,621	3,656,640
9	0020176570	4701706370	DeKalb	2/2/2015	331	1,932,929	4,402	2,113,197	1,932,929	4,402	2,113,197
9	0020176568	4701706370	DeKalb	1/29/2015	337	2,734,418	182,852	3,048,291	2,734,418	182,852	3,048,291
9	0020176574	4701706374	DeKalb	1/20/2015	336	2,897,278	42,738	3,266,254	2,897,278	42,738	3,266,254
9	0020176569	4701706369	DeKalb	1/24/2015	342	3,866,277	184,908	4,247,394	3,866,277	184,908	4,247,394
9	0020176565	4701706365	DeKalb	1/13/2015	343	5,576,884	101,783	5,725,026	5,576,884	101,783	5,725,026
9	0020176576	4701706376	DeKalb	1/16/2015	348	3,384,842	31,454	3,805,057	3,384,842	31,454	3,805,057
9	0020176570	4701706370	DeKalb	1/13/2015	350	4,988,453	169,551	5,500,429	4,988,453	169,551	5,500,429
9	0020176571	4701706371	DeKalb	1/17/2015	353	4,585,230	2,402	5,071,990	4,585,230	2,402	5,071,990
9	0020176573	4701706373	DeKalb	3/27/2015	364	3,232,705	466,137	4,860,638	3,232,705	466,137	4,860,638
9	0020176577	4701706377	DeKalb	3/27/2015	364	3,232,705	5,071	3,172,287	3,232,705	5,071	3,172,287

Anteio Resource Corporation
2017 TV 17/1/16 Ben Boreif
WV:Wolke That's Started? Production, In 2015

Notes: The first twelve months of working hours receipts for weeks that began production during 2015 is two weeks less than the first twelve months of working hours receipts for weeks that began production during 2014. The first twelve months of working hours receipts for weeks that began production during 2015 is two weeks less than the first twelve months of working hours receipts for weeks that began production during 2014.

CP	NDA Act #	API	County	Initial production Date	Days in Production	Wing Re Re
43	032017042	4708510047 Rchb		12/12/2015	17	
43	032017044	4708510164 Rchb		12/15/2015	17	
43	032017049	4708510183 Rchb		12/16/2015	18	
43	032017051	4708510195 Rchb		12/16/2015	18	
43	032017052	4708510198 Rchb		11/27/2015	35	
43	032017053	4708510198 Rchb		11/27/2015	35	
43	032017054	4708510198 Rchb		11/27/2015	35	
43	032017055	4708510198 Rchb		11/27/2015	35	
43	032017056	4708510198 Rchb		11/27/2015	35	
43	032017057	4708510198 Rchb		11/27/2015	35	
43	032017058	4708510198 Rchb		11/27/2015	35	
43	032017059	4708510198 Rchb		11/27/2015	35	
43	032017060	4708510198 Rchb		11/27/2015	35	
43	032017061	4708510198 Rchb		11/27/2015	35	
43	032017062	4708510198 Rchb		11/27/2015	35	
43	032017063	4708510198 Rchb		11/27/2015	35	
43	032017064	4708510198 Rchb		11/27/2015	35	
43	032017065	4708510198 Rchb		11/27/2015	35	
43	032017066	4708510198 Rchb		11/27/2015	35	
43	032017067	4708510198 Rchb		11/27/2015	35	
43	032017068	4708510198 Rchb		11/27/2015	35	
43	032017069	4708510198 Rchb		11/27/2015	35	
43	032017070	4708510198 Rchb		11/27/2015	35	
43	032017071	4708510198 Rchb		11/27/2015	35	
43	032017072	4708510198 Rchb		11/27/2015	35	
43	032017073	4708510198 Rchb		11/27/2015	35	
43	032017074	4708510198 Rchb		11/27/2015	35	
43	032017075	4708510198 Rchb		11/27/2015	35	
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August 1, 2016



West Virginia State Tax Department
Property Tax Division
Attention: Jeff Amburgey
P.O. Box 2389
Charleston, West Virginia 25328-2389

Antero Resources
1615 Wynkoop Street
Denver, CO 80202
Office: 303.357.7310
Fax: 303.357.7315

RE: Public Comment Concerning Property Valuation Variables for the 2017 Tax Year

Dear Mr. Amburgey:

Pursuant to the letter from Mr. Markovich to Secretary Tennant dated June 30, 2016, this letter serves to provide you with our comments on the tentative natural resource property valuation variables specifically related to gas wells, for the 2017 tax year.

Specifically, our concerns regarding these variables relate to the following:

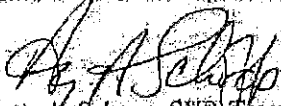
Operating Expenses: Based on a detailed review of actual operating expenses incurred in West Virginia by Antero Resources during the 2015 calendar year, we believe that the tentative maximum operating expenses per well, as well as the percentage of revenue allowances as published by the State of West Virginia are understated. Actual annualized operating expenses incurred as a percentage of revenue, and as an average per well are as follows:

Well Type	Average Operating Expense as Percent of Revenue	Average Operating Expense per Well
Marcellus, Horizontal Wells	44%	\$1,153,000
Horizontal Wells (Other than Marcellus)	73%	\$25,000
Typical Producing Wells	Operating at a loss	\$6,100

Consistent with recent discussions regarding the 2016 tax year, we believe that the State's use of actual operating expenses is the most accurate method of valuing the tax wells. Absent the ability to use actual data, at minimum the State's allowance percentages should be increased to be more consistent with actual data provided, and the maximum operating expense should be removed entirely. Without adjustment of these variables, the State is drastically overstating the value of Antero's property in West Virginia.

We respectfully request that the State modify these variables, based on the information provided above, for use in its appraisal of gas wells for property tax purposes for the 2017 tax year. We would be happy to discuss our comments with and/or provide additional information that the State may need. Please feel free to contact our tax agent, Kirsten Evans at (410) 568-0733.

Sincerely,
Antero Resources Corporation

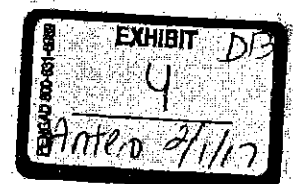

Alvin A. Schopp, SVP, Treasurer and Chief Administrative Officer

cc: Kirsten Evans, Altus Group US, Inc.

TAB 4

WV Tax Department's Value Calculation for Year 2 (Well)
2017 Tax Year

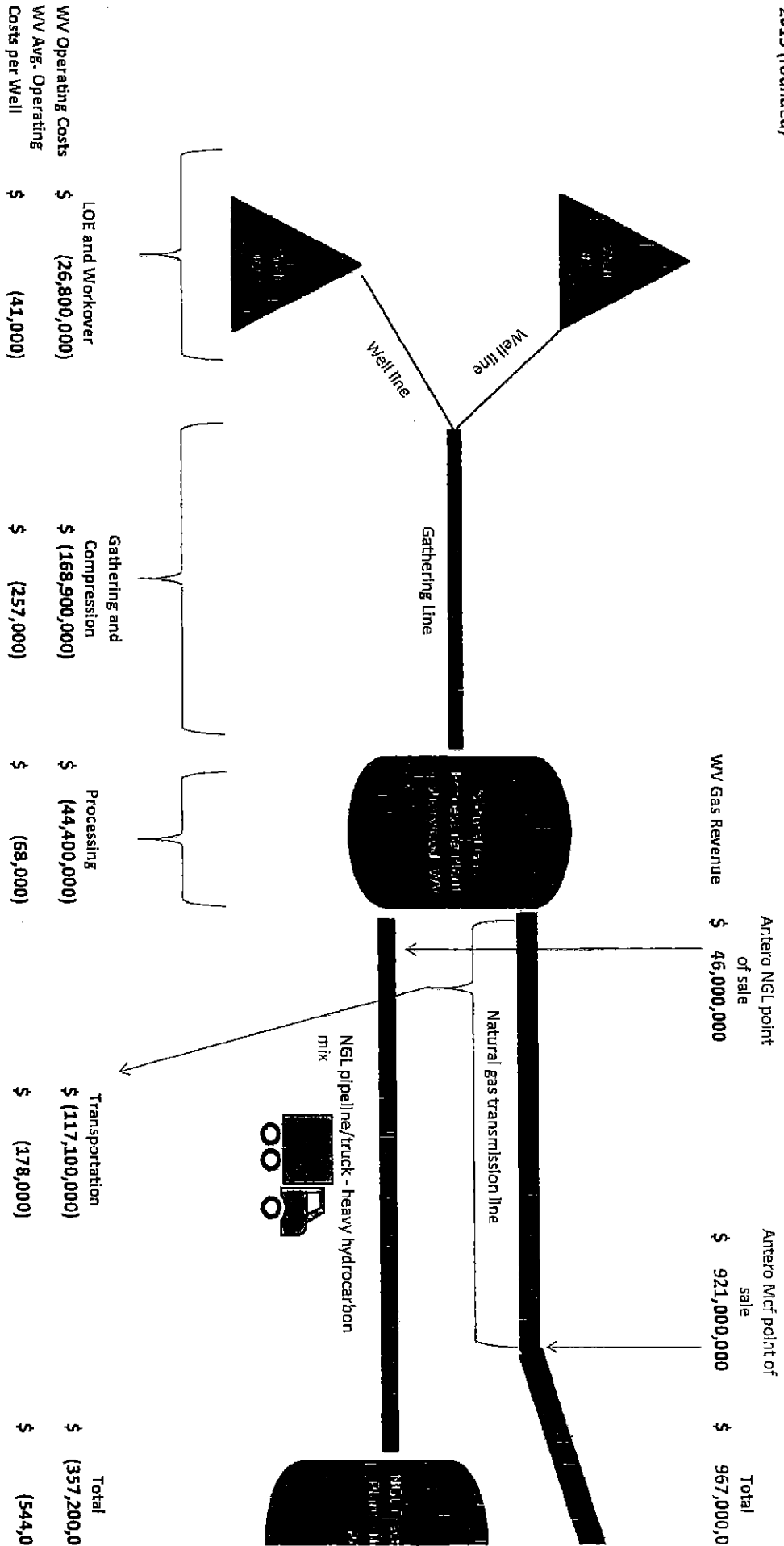
NATURAL OIL/GAS DEMONSTRATION APPRAISAL... FLUSH WELL (Year 2)									
DECLINE RATES		2015		GAS INCOME	OIL INCOME	GAS CAP IN		OIL CAP INC	
YR 1	59%	WRK INT	\$	3,000,000	\$	\$	1,785,000	\$	
YR 2	29%	ROY INT	\$	500,000	\$	\$	297,500	\$	
YR 3+	23%								
TY2017 WORKING INT									
YEAR	WRK INT INC	WRK COST	NET INC	% FCTR(16.0)	DIS INC	YEAR	ROY INT INC	% FCTR(16.0)	DIS INC
1	\$ 1,785,000	\$ 175,000	\$ 1,610,000	0.928477	\$ 1,494,848	1	\$ 297,500	0.928477	\$ 278,222
2	\$ 1,374,450	\$ 175,000	\$ 1,199,450	0.800411	\$ 960,053	2	\$ 229,075	0.800411	\$ 183,354
3	\$ 1,058,327	\$ 175,000	\$ 883,327	0.690009	\$ 808,503	3	\$ 178,388	0.690009	\$ 121,709
4	\$ 814,811	\$ 175,000	\$ 639,811	0.584838	\$ 380,842	4	\$ 135,819	0.584838	\$ 80,780
5	\$ 627,482	\$ 175,000	\$ 452,482	0.512789	\$ 232,028	5	\$ 104,580	0.512789	\$ 53,828
6	\$ 483,181	\$ 175,000	\$ 308,181	0.442060	\$ 136,226	6	\$ 80,527	0.442060	\$ 35,598
7	\$ 372,034	\$ 175,000	\$ 197,034	0.381088	\$ 75,087	7	\$ 62,008	0.381088	\$ 23,829
8	\$ 286,468	\$ 175,000	\$ 111,468	0.328522	\$ 36,819	8	\$ 47,744	0.328522	\$ 15,686
9	\$ 220,579	\$ 175,000	\$ 45,579	0.283208	\$ 12,908	9	\$ 36,783	0.283208	\$ 10,412
10	\$ 169,848	\$ 175,000	\$ -	0.244146	\$ -	10	\$ 28,308	0.244146	\$ -
11	\$ 130,781	\$ 175,000	\$ -	0.210470	\$ -	11	\$ 21,797	0.210470	\$ -
12	\$ 100,702	\$ 175,000	\$ -	0.181440	\$ -	12	\$ 16,784	0.181440	\$ -
13	\$ 77,540	\$ 175,000	\$ -	0.158414	\$ -	13	\$ 12,923	0.158414	\$ -
14	\$ 59,708	\$ 175,000	\$ -	0.134840	\$ -	14	\$ 9,851	0.134840	\$ -
15	\$ 45,974	\$ 175,000	\$ -	0.118241	\$ -	15	\$ 7,862	0.118241	\$ -
16	\$ 35,400	\$ 175,000	\$ -	0.100208	\$ -	16	\$ 5,900	0.100208	\$ -
17	\$ 27,258	\$ 175,000	\$ -	0.086388	\$ -	17	\$ 4,543	0.086388	\$ -
18	\$ 20,988	\$ 175,000	\$ -	0.074471	\$ -	18	\$ 3,498	0.074471	\$ -
19	\$ 16,181	\$ 175,000	\$ -	0.064199	\$ -	19	\$ 2,894	0.064199	\$ -
20	\$ 12,444	\$ 175,000	\$ -	0.055344	\$ -	20	\$ 2,074	0.055344	\$ -
21	\$ 9,582	\$ 175,000	\$ -	0.047710	\$ -	21	\$ 1,597	0.047710	\$ -
22	\$ 7,378	\$ 175,000	\$ -	0.041128	\$ -	22	\$ 1,230	0.041128	\$ -
23	\$ 5,891	\$ 175,000	\$ -	0.035458	\$ -	23	\$ 947	0.035458	\$ -
24	\$ 4,374	\$ 175,000	\$ -	0.030588	\$ -	24	\$ 729	0.030588	\$ -
25	\$ 3,388	\$ 175,000	\$ -	0.028350	\$ -	25	\$ 561	0.028350	\$ -
26	\$ 2,594	\$ 175,000	\$ -	0.022715	\$ -	26	\$ 432	0.022715	\$ -
27	\$ 1,897	\$ 175,000	\$ -	0.019582	\$ -	27	\$ 333	0.019582	\$ -
28	\$ 1,538	\$ 175,000	\$ -	0.016881	\$ -	28	\$ 256	0.016881	\$ -
29	\$ 1,184	\$ 175,000	\$ -	0.014553	\$ -	29	\$ 197	0.014553	\$ -
30	\$ 912	\$ 175,000	\$ -	0.012548	\$ -	30	\$ 152	0.012548	\$ -
31	\$ 702	\$ 175,000	\$ -	0.010815	\$ -	31	\$ 117	0.010815	\$ -
32	\$ 541	\$ 175,000	\$ -	0.009323	\$ -	32	\$ 80	0.009323	\$ -
33	\$ 418	\$ 175,000	\$ -	0.008037	\$ -	33	\$ 59	0.008037	\$ -
34	\$ 321	\$ 175,000	\$ -	0.006928	\$ -	34	\$ 53	0.006928	\$ -
35	\$ 247	\$ 175,000	\$ -	0.005973	\$ -	35	\$ 41	0.005973	\$ -
36	\$ 190	\$ 175,000	\$ -	0.005149	\$ -	36	\$ 32	0.005149	\$ -
37	\$ 146	\$ 175,000	\$ -	0.004439	\$ -	37	\$ 24	0.004439	\$ -
38	\$ 113	\$ 175,000	\$ -	0.003827	\$ -	38	\$ 19	0.003827	\$ -
39	\$ 87	\$ 175,000	\$ -	0.003299	\$ -	39	\$ 14	0.003299	\$ -
40	\$ 67	\$ 175,000	\$ -	0.002844	\$ -	40	\$ 11	0.002844	\$ -



Impact of Gas Price on State Allowed Operating Expense						
Year 3+ Horizontal Marcellus Wells						
Calendar Year	Avg. MCF per Well	Avg. Gas Price	Revenue	State Working Interest Expenses, Prior to Cap (20%)	State Allowed Operating Expense	State Allowed Operating Expenses as a % of WI Revenue
2013	600,000	3.99	2,394,275	236,734	150,000	13%
2014	600,000	4.22	2,530,650	250,218	150,000	12%
2015	600,000	2.25	1,347,993	133,283	133,283	20%
Note > State allowed operating expenses are tied to revenue, which do not accurately account for the amount of operating expenses incurred because actual operating expenses do not fluctuate with price. The example above shows that the State allowed operating expenses applied to the same amount of produced volumes for the 2013-2015 calendar years varies based on gas price, however, the average operating expenses was consistent year to year.						
Impact of \$175,000 Cap on State Allowed Operating Expense						
Year 2 Horizontal Marcellus Wells						
Gas Working Interest Receipts	State Working Interest Expenses, Prior to Cap (20%)	State Allowed Operating Expenses	State Allowed Operating Expenses as a % of WI Revenue			
1,000,000	119,000	119,000	20%			
3,000,000	357,000	175,000	10%			
5,000,000	595,000	175,000	6%			
7,000,000	833,000	175,000	4%			
Note > State allowed operating expenses for Horizontal Marcellus Wells for 2017 Tax Year are 20% of Revenue capped at \$175,000. By capping the allowed operating expenses at the lesser of 20% of working interest revenue of \$175,000, the Tax Department treats similarly situated tax payers differently. The cap of \$175,000 only adversely affects tax payers that have wells over a certain revenue threshold.						

TAB 5

Antero Resources Corporation
 Simple Diagram of Natural Gas Sales Including Natural Gas Liquid Processing & Fractionation
 2015 (rounded)



Note: All of the amounts are based on the original TYZQ17 WV Oil and Gas Return and do not contemplate annualization for new wells. The average operating cost per well is a straight average cost based on WV Oil and Gas Return for Antero.

TAB 6



STATE OF WEST VIRGINIA

Department of Revenue
State Tax Department

Earl Ray Tomblin
Governor

Mark W. Matkovich
State Tax Commissioner

April 10, 2014

Producers of Marcellus and/or other Horizontal Wells

RE: Marcellus and/or other Horizontal Wells Operating Expenses Survey

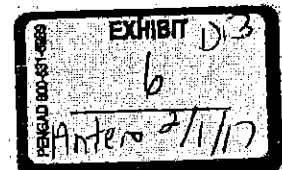
As you are aware, each summer prior to August 1st, your office is required to file a West Virginia Oil and Gas Producer/Operator Return for the wells that you have in West Virginia. The production and income data involved in these returns is utilized to arrive at an appraised value for each of the royalty owner's interest in the oil/gas rights and for your working interests.¹ In determining the appraised value for the working interest for each well, this office reduces the working interest income that you identify by an estimated² operating expenses amount. Presently that amount for Marcellus wells is 30% of your working interest income (maximum \$30,000 per well) for vertical wells and 20% of your working interest income (maximum \$150,000 per well) for horizontal wells. The remaining amount is then capitalized over the remaining life of the well³ which creates the working interest appraisal.

In order to update the above mentioned operating expense rate(s) that will be applied to your wells for the upcoming Tax Year 2015 appraisals (which involves the income and production for calendar year 2013), this office has attached a copy of the Oil & Gas Operating Expenses Survey for Calendar Year 2013.

I would like to request that you review this survey and provide us with the necessary information on your wells. Please note, that for use in the TY 2015 appraisals, this office must receive copies of the completed survey on or before May 16, 2014.

¹ Under Legislative Rule Title 110, Series 1J, Section 3.13, this value involves not only your interest in the remaining oil/gas but the machinery and equipment in and about the well and all other personal property used in oil/gas production from the well to the field-line point of sale.
² If you have supplied operating expenses for those wells in the required format, that data will be considered.
³ Life of well is determined annually and is influenced by income of the well and the decline rate for the formation(s) involved in production.

Property Tax Division
P.O. Box 2389
Charleston, WV 25328-2389
Phone 304-538-3940 FAX 304-538-1843



Producers of Marcellus and other horizontal wells

April 10, 2014

Page Two

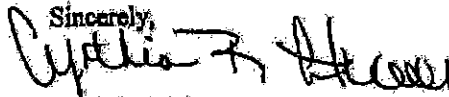
Please mail, email or fax the completed survey to:

Address: West Virginia State Tax Department
Property Tax Division
Special Properties Section
P. O. Box 1345
Charleston, WV 25325-1345.

Email: clndlr.hoover@wv.gov

FAX: 304-558-1843

Should you have any questions, please feel free to contact me at any of the above or at 304-558-1077.

Sincerely,

Cynthia R. Hoover
Tax & Revenue Manager
Special Properties Section
Property Tax Division

CRH/ch

Attachments (2)
Survey Form
Instructions

Hoover, Cindi R

From: Phil Yoo <pyoo@anteroresources.com>
Sent: Thursday, May 15, 2014 5:08 PM
To: Hoover, Cindi R
Subject: West Virginia Oil & Gas Operating Expenses Survey
Attachments: SAccounting14051515031.pdf; SAccounting14051515030.pdf

Ms. Hoover,

Please find attached our response to your Oil & Gas Operating Expenses Survey.

Please contact me if you have any questions. Thank you.

K. Phil Yoo, CPA
Chief Accounting Officer & Corporate Controller
Antero Resources
1615 Wynkoop Street
Denver, CO 80202
Work: (303) 357-7364
Mobile: (720) 239-3916
www.anteroresources.com

Confidential

Marcellus Vertical and Horizontal and Other Horizontal
for Calendar Year 2013

Please submit information to:

Special Properties Section
WV Dept. of Revenue
Property Tax Division
PO Box 1345
Charleston, WV 25325-1345

Company Name: ANTEKO RESOURCES CORPORATION Contact Person: Phil Yoo

Per Series 11, Title 110, State Tax Commission Legislative Rule for Valuation of Producing & Reserve Oil & Natural Gas for Ad Valorem Property Tax Purposes:

3.14: "Operating Expenses" means only those ordinary expenses which are directly related to the maintenance and production of natural gas and/or oil. These expenses do not include extraordinary expenses, depreciation, ad valorem taxes, capital expenditures, or expenditures relating to vehicles or other tangible personal property not permanently used in the production of natural gas or oil.

	Vertical Marcellus	Horizontal Marcellus	Horizontal Other-Please Explain
Annual Revenue Net of Royalties:	592,359	771,773,728	
Annual Expenses:			
Direct Expenses:			
Well Tending Costs:	779,246	2,150,545	
Additional Supplies:	160,075	669,194	
Churning:	76,274	189,627	
Compressor/Pumping Costs:	8,562		
Electrical Costs:	67,027		
Other Expenses:	23,654	152,561	
	115,168	308,092	
Other Operating (3rd Party) Costs:			
Swabbing, Service Rig:		6267	
Waste Disposal (e.g. Prod. Fluid):	205,954	3,816,612	
Roadway-Maint. & ROW:	316,134	552,588	
Pipeline-Maint. & ROW:			
	522,088	431,568	
Indirect Operating Costs:			
Environmental/Safety Costs:	119,919	292,473	
Insurance:			
Bookkeeping/Revenue Distrib.			
Overhead:			
	163,725	735,590	
Other Expenses Not in the above:			
List:			
	1752,096	7739,063	
Total Annual Expenses for the Year:			
Plug & Abandonment Expenses/Well			
Number of Wells in above data:	261	226	

**Send if horizontal and different than Marcellus.

Suggestion: Show totals for all wells. Direct Expenses above are based on a per well situation.

6272 32,994

nothing
given

TAB 7



EDF Trading North America, LLC

GAS TRANSACTION CONFIRMATION

Date Generated: **February 22, 2013**

Contract: ARAC0111119

1. BUYER: EDF Trading North America, LLC	SELLER: Antares Resources Appalachia Corporation	BASE CONTRACT DATE: January 11 2011	TRADE DATE: February 22 2013
--	--	---	--

2. TRANSACTION DETAILS:

Transaction	Start Date	End Date	Quantity	Commodity Price (Settle in US Dollars)	Service Quality (let, Firm, or EFP)	Del. Point	Del. Point
1779885 / 2078575	January 01 2014	December 31 2016	30,000 MMSTB/Daily	See Section 3.1	Firm	IN 240 FCB	IN 240 FCB

3. SPECIAL PROVISIONS, INCLUDING PRICE DETAILS (if any):

3.1

NY New York Mercantile Exchange, Inc. Henry Hub Natural Gas Last Day Financial Future

* pricing details: removed

4. CONTACT INFORMATION:

EDF Trading North America, LLC ("Company") 4700 W. Sam Houston Pkwy N Suite 250 Houston, Texas U.S.A. 77041 Attention: Gas Confirmations Telephone No. 281-853-1783 Fax No. 281-853-1034 Marketing Rep: Welch, Jeff	Antares Resources Appalachia Corporation ("Customer") 1825 17th Street, Suite 300 Denver, Colorado U.S.A. 80202 Attention: Sherry Anderson Telephone No. 303-387-7148 Fax No. 303-387-7112 Marketing Rep: Justin Fowler
--	---

E: Please sign this Confirmation and return it to EDF Trading North America, LLC via fax or email (gas.involvinghouston@EDFTrading.com). This Confirmation is subject to the Base Contract between Buyer and Seller referenced above. The terms of this Transaction Confirmation are binding unless disputed in writing within 2 Business Days of receipt unless otherwise specified in the Base Contract.

EDF Trading North America, LLC

Antares Resources Appalachia Corporation

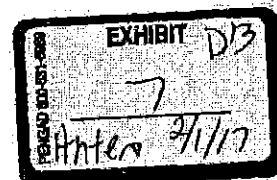
Russell Schneider, VP and Treasurer

2/27/13
Authorized Signature

This fax is intended only for the addressee and may contain information that is legally privileged, confidential and/or exempt from disclosure under applicable law. Any review, retransmission, dissemination or other use of, or taking of any action in reliance upon, this information by persons or entities other than the intended recipient is prohibited. If you have received this communication in error, or are not the named recipient(s), please immediately notify the sender.

4700 W. Sam Houston Pkwy N
Suite 250, Houston, Texas 77041, U.S.A.
281-853-1783 Fax 281-853-1034

Page 1 of 1





*pages not related to delivery
pt were removed.
Pricing also removed

TRANSACTION CONFIRMATION

This Transaction Confirmation (the "Confirmation") is by and between **NextEra Energy Power Marketing, LLC ("NEPM")** and Antero Resources Corporation ("Antero"). NEPM and Antero shall be referred to individually as a "Party" and together as the "Parties". This Confirmation confirms the terms and conditions of the transaction (the "Transaction") entered into between the Parties on the Trade Date specified below. The terms of this Transaction are as follows:

Trade Date: July 26, 2013

Buyer: NEPM

Seller: Antero

Effective Date:

The date on which Buyer notifies Seller in writing that it has the necessary Gas transportation capacity (the "Transportation") to move the Gas. It is Buyer's intention to procure all transportation at the earliest possible time. However, it is understood by the Parties that the procurement of Gas Transportation by Buyer is a necessary precondition to this Confirmation coming into effect. Buyer is actively pursuing the acquisition of such Transportation and will use commercially reasonable efforts to secure all such Transportation within ninety (90) days of the Trade Date (the "Transportation Acquisition Date"). The Parties understand that state and/or federal regulatory approval and other matters might delay the acquisition of the Transportation and agree that the Transportation Acquisition Date shall be extended as reasonably needed.



Beginning Date:

November 1, 2013

Termination Date:

October 31, 2016

Term:

The period of time between the Beginning Date and the Termination Date

Commodity:

Natural Gas

Transactions Type:

Firm Purchase and Sale

Total Daily Quantity:

100,000 Dth/Day

Delivery Point(s):

Dominion Transmission, Inc. ("Dominion") Meter EB 360 (also known as ETC Northeast Pipeline [TL-360]) located in Doddridge County, West Virginia ("Delivery Point 1"). All Gas shall be delivered to Delivery Point 1 during the Term, unless Buyer and Seller mutually agree in writing by amending this Confirmation to include Delivery Point 2 (as described below) and the use of Delivery Point is approved by Dominion.

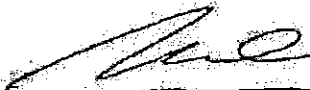
~~Delivery Point 2 shall be Dominion Meter EB 0957 (also known as Sherwood [TL-360])~~

Price:

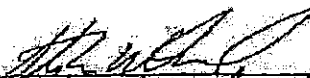
The Price shall be the price per MMBtu quoted for the relevant month in *Platts Inside FERC's Gas Market Report* under the headings "Prices of Spot Gas Delivered to Pipelines, [Month] 1 (\$/MMBtu)," "Dominion Transmission Inc.," "Appalachia," and "Index" (the "Dominion South Point Index")



NEXTERA ENERGY POWER
MARKETING, LLC

By: 
Name: _____
Title: _____
Mark P. Anderson
Vice President
Asst. Secretary
Nextera Energy
Power Marketing, LLC

ANTERO RESOURCES
CORPORATION

By: 
Name: _____
Title: _____
Steven R. Anderson
V.P. Business Development
J&F
MMA



Transaction Confirmation

This Transaction Confirmation (Confirmation) is entered into the 15th day of November, 2013 as a supplement to the NAESB executed by South Jersey Resources Group, LLC (Buyer) and Antero Resources Appalachian Corporation ("Seller" or "Antero") on 10/1/2010. This Confirmation shall serve as Exhibit A to the NAESB and unless specifically revised herein, the terms of the NAESB shall remain in full force and effect.

Terms

Delivery Period: January 1, 2014 thru December 31, 2014

Delivery Point: ~~Antero Resources~~

Volume: 50,000 Dth/d

Service: Seller may nominate gas as daily priced or first of the month priced gas and will do so monthly at least 5 working days before the start of the month. Buyer will nominate from these delivery points on a secondary basis.

* pricing details removed

Pricing: For first of the month gas,
gas,

and for daily priced

In the event that the seller fails to timely nominate gas as daily priced or first of the month priced as set forth above, all gas for the applicable month shall be deemed as priced

Credit Support: South Jersey Industries Parental Guarantee for South Jersey Resources Group. Antero Credit with NAESB standards if required.

Antero Resources Appalachian Corp.

By: Mark D. Meuz

Name: Mark D. Meuz
Vice-President

Title: _____

Date: 11-15-2013

South Jersey Resources Group, LLC

By: Greg Nuzzo

Name: Greg Nuzzo

Title: SVP

Date: 11/15/13

**TRANSACTION CONFIRMATION
FOR IMMEDIATE DELIVERY**

Date: 20-May-13

Transaction Confirmation #: 305298

This Transaction Confirmation is Subject to the Base Contract between Seller and Buyer dated

The terms of this Transaction Confirmation are binding unless disputed in writing within 2 Business Days of receipt unless otherwise specified in the base contract.

BUYER	South Jersey Resources Group 2360 Airport Freeway Suite 505 Bedford, TX 76022	SELLER	Antero Resources Appalachian Resour 1625 17th Street Suite 300 Denver CO 80202
Attn:	Ken Barr	Attn:	Sherry Anderson
Phone:	609-561-9000	Phone:	
Fax:	609-704-1304	Fax:	303-825-3112

Price per DTH:

* pricing details removed

Delivery Period: Begin: 1/1/2014 End: 1/31/2014

Contract Type: Firm

Contract Quantity: 50000 MMBtus/Day

Delivery Point: TCO Port Gas

Special Conditions: Details contained in Signed confirmation

This confirmation is a complete and binding agreement between the parties to the transaction. In the case of any conflict between the terms of the master buy/sell agreement (if any) and this confirmation, the terms set forth in this confirmation shall take precedence. Both parties understand that commitments and/or expenditures are being made in reliance upon agreement to this transaction. Absent written notice to the contrary within two (2) business days, these terms will be deemed to correctly reflect your agreement to this transaction. This transaction confirmation will be sufficient for all purposes to evidence a binding agreement between the parties.

BUYER	Nick Turner	SELLER	Sherry Anderson
By:		By:	
Title:		Title:	
Date:		Date:	

AFFIDAVIT

STATE OF FLORIDA,
COUNTY OF PALM BEACH, TO WIT:

Michael Toal, being first duly sworn, deposes and says:

1. On August 11, 2011, Antero Resources Corporation ("Antero") and NextEra Energy Power Marketing, LLC (now known as NextEra Energy Marketing, LLC and hereinafter referred to as "NEM") entered into a Base Contract for Sale and Purchase of Natural Gas (the "Contract") pursuant to which Antero agrees to sell natural gas to NEM.
2. In connection with the Contract, Antero and NEM occasionally enter into "Transaction Confirmations."
3. The "Transaction Confirmations" include information pertaining to the delivery period, quantity of gas to be delivered, delivery point and pricing.
4. The attached "Transaction Confirmation," dated July 26, 2013, demonstrates that the delivery period is November 1, 2013 through October 31, 2016, the quantity to be delivered is 100,000 Dth/day, and that the delivery points are the Dominion Transmission, Inc. Meter EB 360 (also known as ETC Northeast Pipeline), or the Dominion Transmission, Inc. Meter EB 095 (also known as the Sherwood Processing Facility), both located in Doddridge County, West Virginia. The pricing details are redacted, since that information is proprietary as between Antero and NEM.
5. The Contract does not provide for Free on Board Shipping Point, and NEM does not take ownership of or assume responsibility for the natural gas prior to the stated delivery points.
6. Pursuant to the Contract and the attached "Transaction Confirmation," the EB 360 or EB 095 delivery points are the points of sale for the natural gas, and NEM takes ownership of and assumes responsibility for the natural gas at the EB 360 or EB 095 delivery points.
7. The price that NEM agrees to pay for the natural gas reflects the purchase price for a saleable product, i.e., Antero has incurred all expenses that are necessary to get the gas to

the delivery points, including gathering and compression, processing and transportation
(as necessary).

And further the affiant saith naught.

none given

NextEra Energy Marketing, LLC

Name Michael Toal

Title Vice President

NextEra Energy

Taken, subscribed and sworn to before me this 20th day of January, 2017. My
commission expires: _____

Linda Carol Jones

Notary Public

(NOTARIAL SEAL)



TAB 8



STATE OF WEST VIRGINIA

Department of Revenue
State Tax Department

Earl Ray Tomblin
Governor

Mark W. Matkovich
State Tax Commissioner

September 1, 2016

The Honorable Natalie Tennant
Secretary of State
Building L, Suite 157-K
State Capitol
Charleston, West Virginia 25305

Dear Secretary Tennant:

Attached are final natural resource property valuation variables for the 2017 Tax Year that have been developed by the State Tax Department for use in appraising oil and gas, managed timberland, coal and other natural resource properties for ad valorem tax purposes.

In accordance with requirements of §§ 110 CSR 1-I, 1-J, and 1-K, tentative variables were made available for public comments on June 30, 2016. The Department received nine comments on the tentative variables. One comment related to the valuation of coal and three comments related to reserve oil and gas values and 5 related to the expenses allowed in the valuation of producing oil and gas wells. The information supplied for coal and reserve oil and gas did not result in any change to the tentative variables. The oil and gas comments resulted in adjustments to the operating expenses allowed in the valuation of producing oil and gas wells. Additionally, the prices for Metallurgical and Steam coal were updated based upon information that was unavailable on June 30.

The final valuation variables are being filed for inclusion in the State Register.

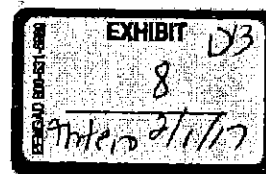
Sincerely,


Mark W. Matkovich
State Tax Commissioner

MWM/faj

Attachment

cc: All County Assessors



OIL AND GAS PROPERTIES ANALYSIS

Tax Year 2017

September 1, 2016
Mark W. Matkovich
State Tax Commissioner
Department of Revenue

OIL AND GAS

TY 2017

Capitalization Rate Analysis and Results

In developing a capitalization rate for use in valuing specific income-producing properties, consideration is given to the three approaches generally employed in estimating a discount rate. As a matter of practicality, the Bands-of-Investment and Summation Technique approaches are utilized in establishing discount rates for producing oil and gas properties. Data for analysis has been derived in accordance with current Legislative Rule Title 110, Series 73.

Safe Rate: (3-Month Constant Maturity Interest Rates)

January December 2016

0.053%

Risk Rate: (Interest differential between Loan Rate and 3-Month Constant Maturity Interest Rates)**Loan Rate:**

2015

5.280%

*Prime plus .2%

Risk Rate:

5.207%

Equity: (Differential between Equity Rates and 3-Month Constant Maturity Interest Rates)**Equity Rate:**

2015

 $(12.25\% / (1 - .37)) - 0.053\%$ **Risk Rate:**

19.391%

**Value Line Investment Survey Analysis

Composite Risk Rate: Loan and Equity Rates weighted by industry estimated capital structure**Equity Rate:**

2015

12.6042%

Debt Rate:

1.892%

Composite Risk

15.188%

Notes: Debt/Equity Ratio

Debt

35%

Equity

65%

**Effective severance tax adjustment

0.99

Non Liquidity Rate: Interest differential between 3-month Constant Maturity Interest Rates and a 1-year Constant Maturity Interest Rates which reflects a reasonable time necessary to sell active property.

January December 2015

1yr T Bill

0.322%

90 day T Bill

0.053%

Non Liquidity Rate

0.269%

Management Rate: Charges for the management of investment portfolios

Fixed Rate (by Rule)

0.600%

Property Tax Rate: Sixty percent (60%) of State average Class III property tax rate

2015

60% of 2.14

1.314%

Inflation Rate

January December 2015

0.730%

Capitalization Rate

Since the valuation of oil and gas property is predicated on a three year production, the capitalization rate will be considered in a similar manner:

	2011	2012	2013
Inflation Rate	-0.730%	-0.760%	-1.500%
Safe Rate	0.053%	0.033%	0.050%
Composite Risk Rate	15.186%	14.869%	14.534%
Non Liquidity Rate	0.269%	0.088%	0.074%
Management Rate	0.500%	0.500%	0.500%
Property Tax Rate	1.313%	1.314%	1.314%
Total	18.592%	15.564%	15.080%
	50.000%	33.333%	16.667%
	8.298%	5.188%	2.513%
			15.897%

Capitalization Rate Rounded to:

16.0%

MULTIPLIERS FOR 16.0% MID-YEAR LIFE (ANNUALLY)

YEAR		YEAR	
1	0.928437	21	0.047710
2	0.800411	22	0.041129
3	0.690009	23	0.035458
4	0.594836	24	0.030586
5	0.512788	25	0.026350
6	0.442060	26	0.022715
7	0.381086	27	0.019582
8	0.328522	28	0.016881
9	0.283208	29	0.014553
10	0.243148	30	0.012546
11	0.208470	31	0.010813
12	0.178440	32	0.009323
13	0.153414	33	0.008037
14	0.133480	34	0.006928
15	0.118241	35	0.005973
16	0.100208	36	0.005148
17	0.088366	37	0.004439
18	0.074471	38	0.003827
19	0.064188	39	0.003299
20	0.055944	40	0.002844

Decline Rates for Natural Gas and Oil Formations: Central				
Central: Braxton, Clay, Fayette, Nicholas, Webster				
Code	Formation	Year 1	Year 2	Year 3+
12	Alexander, Benson	-0.31	-0.20	-0.10
14	Benson	-0.48	-0.08	-0.08
16	Benson, Balfourn*	-0.45	-0.16	-0.12
17	Gordon*	-0.30	-0.07	-0.07
18	Big Injun	-0.34	-0.13	-0.13
19	Big Injun, Big Lime	-0.36	-0.13	-0.13
22	Big Lime	-0.34	-0.34	-0.13
26	Ravenscliff	-0.40	-0.40	-0.25
93	4th Sand	-0.42	-0.32	-0.08
94	50 Foot	-0.34	-0.26	-0.07
95	Injun/Weir	-0.51	-0.26	-0.09
96	Maxton	-0.70	-0.27	-0.08
109	Trenton/Deeper*	-0.41	-0.22	-0.09
110	Marcellus *	-0.41	-0.22	-0.09
9	Exception (Median)	-0.41	-0.22	-0.09
10	Non-Filler	-0.30	-0.07	-0.07

* New Formation(s) involved in recent production. These will be valued with the Exception Rates until decline information is available.

Decline Rates for Natural Gas and Oil Formations: East				
East: Berkeley, Grant, Greenbrier, Hampshire, Hardy, Jefferson, Mineral, Monroe, Morgan, Pendleton, Pocahontas, Preston, Randolph, Summers, Tucker				
Code	Formation	Year 1	Year 2	Year 3 +
1	Oriskany	-0.30	-0.30	-0.19
14	Benson	-0.31	-0.17	-0.12
20	Benson +	-0.44	-0.20	-0.08
21	Benson, Fifth	-0.29	-0.28	-0.09
32	Brallier +	-0.48	-0.20	-0.05
33	Elk, Benson	-0.39	-0.21	-0.08
34	Elk, Benson, Riley	-0.53	-0.19	-0.05
35	Elk, Benson, Riley +	-0.38	-0.19	-0.11
36	Elk, Benson, Balltown	-0.34	-0.18	-0.11
37	Elk, Alexander, Benson	-0.50	-0.07	-0.07
38	Elk, Alexander, Benson +	-0.40	-0.16	-0.16
39	Hunterville	-0.31	-0.31	-0.14
40	Fox, Haverty	-0.36	-0.21	-0.15
93	4th Sand	-0.42	-0.32	-0.08
94	50 Foot	-0.34	-0.26	-0.07
95	Injun/Weir	-0.51	-0.26	-0.09
96	Maxton	-0.70	-0.27	-0.08
110	Marcellus	-0.59	-0.22	-0.17
111	Utica*	-0.59	-0.22	-0.17
9	Exception (Median)	-0.41	-0.22	-0.10
10	Non-Filler	-0.29	-0.07	-0.05

*New Formation(s) Involved in recent production. These will be valued with the Marcellus Rates until decline information is available.

Decline Rates for Natural Gas and Oil Formations North				
North Brooke, Hancock, Marshall, Ohio, Tyler, Wezel				
Code	Formation	Year 1	Year 2	Year 3 +
11	Gordon	-0.47	-0.31	-0.09
13	Alexander, Benson, Riley	-0.26	-0.16	-0.15
15	Benson, Riley	-0.18	-0.16	-0.06
93	4th Sand	-0.42	-0.32	-0.08
94	50 Foot	-0.34	-0.26	-0.07
95	Injun/Weir	-0.51	-0.26	-0.09
96	Maxton	-0.70	-0.27	-0.08
97	Coalbed Methane (Vertical)	-0.23	-0.08	-0.05
110	Marcellus	-0.52	-0.23	-0.18
111	Utica*	-0.52	-0.23	-0.18
9	Exception (Median)	-0.39	-0.23	-0.08
10	Non-Filer	-0.18	-0.16	-0.06

*New Formation(s) involved in recent production. These will be valued with the Marcellus Rates until decline information is available.

Decline Rates for Natural Gas and Oil Formations, North Central				
North Central: Barbour, Doddridge, Gilmer, Harrison, Lewis, Marion, Monongalia, Taylor, Upshur				
Code	Formation	Year 1	Year 2	Year 3 +
11	Gordon	-0.41	-0.14	-0.12
12	Alexander, Benson	-0.37	-0.19	-0.11
13	Alexander, Benson, Riley	-0.40	-0.28	-0.05
14	Benson	-0.31	-0.17	-0.12
15	Benson, Riley	-0.34	-0.17	-0.14
18	Big Injun	-0.38	-0.16	-0.13
21	Benson, Fifth	-0.31	-0.20	-0.14
28	Weir	-0.34	-0.34	-0.07
29	Weir +	-0.28	-0.28	-0.23
33	Elk, Benson	-0.34	-0.16	-0.11
34	Elk, Benson, Riley	-0.42	-0.27	-0.08
37	Elk, Alexander, Benson	-0.49	-0.23	-0.08
38	Elk, Alexander, Benson +	-0.38	-0.20	-0.12
40	Fox, Haverly	-0.46	-0.16	-0.08
50	Rhinestreet	-0.28	-0.09	-0.03
57	Alexander, Benson, Balltown	-0.39	-0.26	-0.08
58	Alexander	-0.35	-0.20	-0.10
59	Alexander +	-0.39	-0.22	-0.10
60	Alexander, Benson, Riley +	-0.39	-0.35	-0.12
61	Balltown	-0.35	-0.20	-0.10
62	Balltown, Speechley	-0.28	-0.22	-0.10
63	Balltown, Speechley +	-0.30	-0.13	-0.10
64	Benson, Balltown, Speechley	-0.28	-0.22	-0.09
65	Benson, Bradford	-0.37	-0.20	-0.10
66	Benson, Balltown	-0.29	-0.23	-0.11
67	Benson, Riley +	-0.38	-0.14	-0.10
68	Benson, Speechley	-0.30	-0.22	-0.14
69	Brallier, Elk	-0.42	-0.20	-0.13
70	Brallier	-0.40	-0.22	-0.15
71	Deeper/Onondaga or Oriskany/Helderberg	-0.24	-0.24	-0.03
72	Elk, Alexander	-0.42	-0.22	-0.09
73	Elk, Benson +	-0.38	-0.20	-0.12
74	Elk	-0.43	-0.12	-0.10
75	Elk, Riley	-0.60	-0.35	-0.17
76	Fox +	-0.46	-0.16	-0.09
77	Haverly, Elk, Benson (No Alexander)	-0.35	-0.16	-0.16
78	Haverly	-0.45	-0.15	-0.15
79	Riley	-0.44	-0.22	-0.10
80	Speechley	-0.30	-0.18	-0.08
81	Alexander, Benson, Speechley	-0.39	-0.24	-0.10
82	Haverly, Elk, Alexander	-0.47	-0.14	-0.14
85	Fifth, Oil	-0.45	-0.25	-0.22
87	Bayard, All	-0.30	-0.20	-0.05
88	Fifth	-0.29	-0.18	-0.12
89	Fifth +	-0.25	-0.15	-0.13
90	Gordon, Injun All	-0.41	-0.23	-0.23
91	Squaw	-0.37	-0.31	-0.08
92	Injun +	-0.34	-0.22	-0.22
93	4th Sand	-0.42	-0.32	-0.08
94	50 Foot	-0.34	-0.26	-0.07
95	Injun/Veir	-0.51	-0.26	-0.09
98	Maxton	-0.70	-0.27	-0.08
97	Coalbed Methane (Vertical)	-0.23	-0.08	-0.05
98	Coalbed Methane (Horizontal)	-0.05	-0.05	-0.32
109	Trenton/Deeper *	-0.38	-0.21	-0.11
110	Marcellus	-0.59	-0.29	-0.23
111	Utica**	-0.59	-0.29	-0.23
9	Exception (Median)	-0.38	-0.21	-0.11
10	Non-Filer	-0.23	-0.03	-0.03

*New Formation(s) involved in recent production. These will be valued with the Exception Rates until decline information is available.

**New Formation(s) involved in recent production. These will be valued with the Marcellus Rates until decline information is available.

Decline Rates for Natural Gas and Oil Formations: North West				
North West: Pleasant, Ritchie, Wood				
Code	Formation	Year 1	Year 2	Year 3 +
2	Huron, Rhinestreet	-0.41	-0.28	-0.07
4	Huron	-0.42	-0.24	-0.14
5	Huron, Shales above Huron	-0.38	-0.25	-0.14
8	Berea	-0.31	-0.19	-0.15
11	Gordon	-0.38	-0.10	-0.10
12	Alexander, Benson (No Riley)	-0.34	-0.23	-0.10
13	Alexander, Benson, Riley	-0.32	-0.20	-0.10
14	Benson	-0.19	-0.19	-0.10
44	Rhinestreet, Huron, Shallow Shale	-0.43	-0.28	-0.11
47	Alexander, Riley, (No Benson)	-0.41	-0.05	-0.05
48	Rhinestreet, Alexander, Benson, Riley	-0.31	-0.24	-0.10
49	Weir, Squaw, Big Injun	-0.27	-0.17	-0.07
50	Rhinestreet	-0.40	-0.27	-0.27
51	Rhinestreet +	-0.36	-0.21	-0.10
52	All Upper Devonian (Undiv)	-0.48	-0.33	-0.19
53	Huron, Chemung	-0.35	-0.11	-0.09
54	Huron, Hampshire, Pocono	-0.12	-0.12	-0.11
55	Upper Devonian (Above Huron)	-0.46	-0.33	-0.23
56	Chemung, Sands, Riley, Bradford, Balltown, Speechley, Warren (No Benson or Alexander)	-0.28	-0.18	-0.10
83	Huron Oil	-0.74	-0.44	-0.40
93	4th Sand	-0.42	-0.32	-0.08
94	50 Foot	-0.34	-0.26	-0.07
95	Injun/Weir	-0.51	-0.26	-0.09
96	Maxton	-0.70	-0.27	-0.08
109	Trenton/Deeper *	-0.39	-0.23	-0.13
110	Marcellus	-0.46	-0.29	-0.23
111	Utica**	-0.46	-0.29	-0.23
9	Exception (Median)	-0.39	-0.23	-0.13
10	Non-Filer	-0.12	-0.05	-0.06

*New Formation(s) involved in recent production. These will be valued with the Exception Rates until decline information is available.

**New Formation(s) involved in recent production. These will be valued with the Marcellus Rates until decline information is available.

Decline Rates for Natural Gas and Oil Formations—South				
South: McDowell, Mercer, Raleigh, Wyoming				
Code	Formation	Year 1	Year 2	Year 3 +
8	Berea	-0.34	-0.15	-0.15
22	Big Lime	-0.31	-0.19	-0.07
23	Big Lime, Maxton	-0.31	-0.19	-0.07
24	Big Lime, Ravencloft	-0.29	-0.29	-0.17
25	Berea +	-0.37	-0.12	-0.08
26	Ravencloft	-0.40	-0.08	-0.07
28	Weir	-0.44	-0.20	-0.10
29	Weir +	-0.28	-0.21	-0.08
30	Weir, Big Lime	-0.37	-0.19	-0.13
42	Maxton, Ravencloft	-0.40	-0.08	-0.07
93	4th Sand	-0.42	-0.32	-0.08
94	50 Foot	-0.34	-0.26	-0.07
95	Injun/Weir	-0.51	-0.26	-0.09
96	Maxton	-0.27	-0.13	-0.09
97	Coalbed Methane (Vertical)	0.03	0.10	-0.05
98	Coalbed Methane (Horizontal)	-0.05	-0.05	-0.32
110	Marcellus*	-0.36	-0.19	-0.09
9	Exception (Median)	-0.36	-0.19	-0.09
10	Non-Filer*	-0.23	-0.08	-0.05

* New Formation(s) involved in recent production. These will be valued with the Exception Rates until decline information is available.

Decline Rates for Natural Gas and Oil Formations: South Central				
South Central: Boone, Kanawha				
Code	Formation	Year 1	Year 2	Year 3 +
3	Devonian Shale	-0.23	-0.08	-0.05
4	Huron	-0.31	-0.15	-0.04
8	Berea	-0.23	-0.14	-0.09
18	Big Injun	-0.29	-0.25	-0.12
27	Huron Shales above Huron	-0.21	-0.08	-0.05
28	Weir	-0.30	-0.21	-0.14
29	Weir +	-0.31	-0.25	-0.09
31	Devonian Shales +	-0.27	-0.07	-0.05
86	Big Injun Oil	-0.19	-0.18	-0.10
93	4th Sand	-0.42	-0.32	-0.08
94	50 Foot	-0.34	-0.26	-0.07
95	Injun/Weir	-0.51	-0.26	-0.09
96	Maxton	-0.70	-0.27	-0.08
109	Trenton/Deeper*	-0.33	-0.19	-0.08
110	Marcellus*	-0.33	-0.19	-0.08
9	Exception (Median)	-0.33	-0.19	-0.08
10	Non-Filer	-0.19	-0.07	-0.04

* New Formation(s) involved in recent production. These will be valued with the Exception Rates until decline information is available.

Decline Rates for Natural Gas and Oil Formations: South West				
South West: Cabell, Lincoln, Logan, Mingo, Wayne				
Code	Formation	Year 1	Year 2	Year 3+
3	Devonian Shale	-0.31	-0.15	-0.04
8	Berea	-0.36	-0.11	-0.11
18	Big Injun	-0.38	-0.22	-0.04
22	Big Lime	-0.19	-0.19	-0.19
43	Berea, Big Lime	-0.18	-0.18	-0.18
93	4th Sand	-0.42	-0.32	-0.08
94	50 Foot	-0.34	-0.26	-0.07
95	Injun/Weir	-0.51	-0.26	-0.09
96	Maxton	-0.70	-0.27	-0.08
108	Trenton/Deeper*	-0.38	-0.22	-0.10
110	Marcellus*	-0.38	-0.22	-0.10
9	Exception (Median)	-0.38	-0.22	-0.10
10	Non-Filer	-0.18	-0.11	-0.04

* New Formation(s) Involved in recent production. These will be valued with the Exception Rates until decline information is available.

Decline Rates for Natural Gas and Oil Formations: West Central				
West Central: Calhoun, Roane, Wirt				
Code	Formation	Year 1	Year 2	Year 3 +
2	Huron, Rhinestreet	-0.49	-0.11	-0.06
4	Huron	-0.33	-0.22	-0.14
27	Huron, Shales above Huron	-0.42	-0.23	-0.12
44	Rhinestreet, Huron, Shallow Shale	-0.51	-0.14	-0.11
45	Devonian Shale, Pocono	-0.25	-0.17	-0.12
46	Pocono	-0.29	-0.25	-0.12
84	Big Injun, Oil	-0.41	-0.41	-0.11
93	4th Sand	-0.42	-0.32	-0.08
94	50 Foot	-0.34	-0.26	-0.07
95	Injun/Weir	-0.51	-0.26	-0.09
96	Maxton	-0.70	-0.27	-0.08
109	Trenton/Deeper *	-0.42	-0.24	-0.10
110	Marcellus *	-0.42	-0.24	-0.10
9	Exception (Median)	-0.42	-0.24	-0.10
10	Non-Filer	-0.25	-0.11	-0.06

* New Formation(s) involved in recent production. These will be valued with the Exception Rates until decline information is available.

Decline Rates for Natural Gas and Oil Formations: West				
West: Jackson, Mason, Putnam				
Code	Formation	Year 1	Year 2	Year 3 +
1	Oriskany	-0.40	-0.40	-0.29
2	Huron, Rhinestreet	-0.13	-0.12	-0.03
3	Devonian Shale	-0.31	-0.15	-0.04
4	Huron	-0.29	-0.14	-0.05
5	Huron, Shales above Huron	-0.38	-0.15	-0.06
6	Huron, Berea	-0.29	-0.08	-0.08
7	Berea, Devonian Shale	-0.08	-0.08	-0.08
8	Berea	-0.36	-0.16	-0.16
93	4th Sand	-0.42	-0.32	-0.08
94	50 Foot	-0.34	-0.26	-0.07
95	Injun/Weir	-0.51	-0.26	-0.09
96	Maxton	-0.70	-0.27	-0.08
109	Trenton/Deeper *	-0.35	-0.20	-0.09
110	Marcellus *	-0.35	-0.20	-0.09
9	Exception (Median)	-0.35	-0.20	-0.09
10	Non-Filer	-0.08	-0.08	-0.08

* New Formation(s) involved in recent production. These will be valued with the Exception Rates until decline information is available.

Industry Operating Expense Survey and Results

This component was determined through a review of responses to a survey distributed by the State Tax Department to producers of all oil and natural gas wells producing in West Virginia and through use of other market data.

GAS

- % Working Interest Expenses for Typical Producing Well	=	45%
- Maximum Operating Expenses	=	\$5,000
- Coal Bed Methane Vertical Wells Expenses	=	\$9,000

OIL

- % Working Interest Expenses for Typical Producing Well	=	35%
- Maximum Operating Expenses	=	\$5,750
- Maximum Enhanced Operating Expenses	=	\$9,000

MARCELLUS/UTICA

- % Working Interest Expenses for Vertical Producing Well	=	30%
- Maximum Operating Expenses	=	\$30,000
- % Working Interest Expenses for Horizontal Producing Well	=	20%
- Maximum Operating Expenses	=	\$175,000

HORIZONTAL WELLS (OTHER THAN MARCELLUS/UTICA AND COAL BED METHANE)

- % Working Interest Expenses for Horizontal Producing Well	=	30%
- Maximum Operating Expenses	=	\$20,000

Minimum Working Interest Appraisal = \$500 per well.

Flat Rate Royalty Multiplier = 5.75

Home Use Only Wells:

Appraised at \$500 per well

Industrial Use Only Wells:*

MCF usage X \$2.62/MCF

BBL usage X \$48.66/BBL

*(Also includes Department of Environmental Protection reported wells.)

Non-Filer Valuations

Working Interest	=	150% of previous year's appraisal
Royalty Interest	=	90% of previous year's appraisal

Valuation

The previously discussed variables are used to establish a future income stream converted to present worth through application of a capitalization rate. The sum of the discounted future net income per year represents a reasonable estimate of market value.

Lease Rate/Term Survey and Results

The non-producing property value for each county is determined by multiplying the average delay rental by a factor, which represents the average lease term under present economic conditions.

As a result of higher lease terms being inversely proportional to the value of oil and gas (thus counties with little leasing or production activities reflect inflated values) and with the volatile nature of county activity, necessary adjustments in the review have been made.

A compilation of lease terms produced a statewide average of 5 years. This term (5 years) was applied to all county lease rates and compared to the appraisal rates derived from calculations using individual county data as well as regional data. The resulting calculations were reviewed and considered in the assignment of an appraisal rate per acre.

The appraisal rate/acre amounts shown on the next page are preliminary figures, which may change if additional lease data is received. These rates have been applied to all county magisterial districts with either producing wells, lease activity within the past 5 years or both. Tax districts void of activity within the past 5 years have been assigned the minimum value per acre.

OIL & GAS RESERVE RATES FOR TY 2017			
COUNTY	CO #	DISTRICT #	TY2017 \$/AC
BARBOUR	1	1	\$60.00
		2	\$1.00
		3	\$60.00
		4	\$60.00
		5	\$60.00
		6	\$1.00
		7	\$60.00
		8	\$60.00
		9	\$60.00
		10	\$60.00
		11	\$60.00
BERKELEY	2	1	\$1.00
		2	\$1.00
		3	\$1.00
		4	\$1.00
		5	\$1.00
		6	\$1.00
		7	\$1.00
		8	\$1.00
BOONE	3	1	\$20.00
		2	\$1.00
		3	\$1.00
		4	\$20.00
		5	\$20.00
		6	\$20.00
		7	\$1.00
		8	\$20.00
		9	\$1.00
BRAXTON	4	1	\$20.00
		2	\$1.00
		3	\$1.00
		4	\$1.00
		5	\$20.00
		6	\$20.00
		7	\$20.00
		8	\$1.00
BROOKE	5	1	\$1.00
		2	\$1.00
		3	\$100.00
		4	\$100.00
		5	\$1.00
		6	\$1.00
		7	\$1.00
		8	\$1.00

OIL & GAS RESERVE RATES FOR TY 2017			
COUNTY	CO #	DISTRICT #	TY2017 \$/AC
CABELL	6	1	\$25.00
		2	\$1.00
		3	\$25.00
		4	\$25.00
		5	\$1.00
		6	\$1.00
		7	\$1.00
		8	\$25.00
		9	\$1.00
		10	\$25.00
CALHOUN	7	1	\$30.00
		2	\$1.00
		3	\$30.00
		4	\$30.00
		5	\$30.00
		6	\$30.00
CLAY	8	1	\$20.00
		2	\$1.00
		3	\$20.00
		4	\$20.00
		5	\$20.00
		6	\$20.00
DODDRIDGE	9	1	\$90.00
		2	\$90.00
		3	\$90.00
		4	\$90.00
		5	\$90.00
		6	\$90.00
		7	\$90.00
		8	\$90.00
		9	\$1.00
FAYETTE	10	1	\$20.00
		2	\$20.00
		3	\$20.00
		4	\$1.00
		5	\$1.00
		6	\$1.00
		7	\$1.00
		8	\$1.00
		9	\$1.00
		10	\$1.00
		11	\$1.00
		12	\$1.00
		13	\$1.00

OIL & GAS RESERVE RATES FOR TY 2017			
COUNTY	CO #	DISTRICT #	TY2017 \$/AC
GILMER	11	1	\$25.00
		2	\$25.00
		3	\$25.00
		4	\$1.00
		5	\$1.00
		6	\$25.00
GRANT	12	1	\$1.00
		2	\$1.00
		3	\$1.00
		4	\$1.00
		5	\$1.00
GREENBRIER	13	1	\$1.00
		2	\$1.00
		3	\$1.00
		4	\$1.00
		5	\$1.00
		6	\$1.00
		7	\$1.00
		8	\$1.00
		9	\$1.00
		10	\$1.00
		11	\$1.00
		12	\$1.00
		13	\$1.00
		14	\$1.00
		15	\$1.00
		16	\$1.00
		17	\$1.00
		18	\$1.00
HAMPSHIRE	14	1	\$1.00
		2	\$1.00
		3	\$1.00
		4	\$1.00
		5	\$1.00
		6	\$1.00
		7	\$1.00
		8	\$1.00
		9	\$1.00
		10	\$1.00
HANCOCK	15	1	\$25.00
		2	\$1.00
		3	\$25.00
		4	\$25.00
		5	\$1.00
		6	\$1.00

OIL & GAS RESERVE RATES FOR TY 2017			
COUNTY	CO #	DISTRICT #	TY2017 \$/AC
HARDY	16	1	\$1.00
		2	\$1.00
		3	\$1.00
		4	\$1.00
		5	\$1.00
		6	\$1.00
HARRISON	17	1	\$90.00
		2	\$1.00
		3	\$1.00
		4	\$1.00
		5	\$90.00
		6	\$1.00
		7	\$90.00
		8	\$1.00
		9	\$90.00
		10	\$1.00
		11	\$90.00
		12	\$90.00
		13	\$1.00
		14	\$90.00
		15	\$90.00
		16	\$1.00
		17	\$1.00
		18	\$90.00
		19	\$1.00
		20	\$90.00
		21	\$1.00
JACKSON	18	1	\$40.00
		2	\$40.00
		3	\$1.00
		4	\$40.00
		5	\$1.00
		6	\$40.00
		7	\$40.00
JEFFERSON	19	1	\$1.00
		2	\$1.00
		3	\$1.00
		4	\$1.00
		5	\$1.00
		6	\$1.00
		7	\$1.00
		8	\$1.00
		9	\$1.00
		10	\$1.00

OIL & GAS RESERVE RATES FOR TY 2017			
COUNTY	CO #	DISTRICT #	TY 2017 \$/AC
KANAWHA	20	1	\$30.00
		2	\$1.00
		3	\$30.00
		4	\$1.00
		5	\$1.00
		6	\$1.00
		7	\$1.00
		8	\$1.00
		9	\$1.00
		10	\$1.00
		11	\$1.00
		12	\$1.00
		13	\$1.00
		14	\$1.00
		15	\$30.00
		16	\$30.00
		17	\$1.00
		18	\$1.00
		19	\$30.00
		20	\$1.00
		21	\$1.00
		22	\$1.00
		23	\$30.00
		24	\$30.00
		25	\$30.00
		26	\$1.00
		27	\$1.00
		28	\$30.00
		29	\$1.00
		30	\$1.00
		31	\$1.00
LEWIS	21	1	\$35.00
		2	\$35.00
		3	\$35.00
		4	\$35.00
		5	\$1.00
		6	\$35.00
		7	\$1.00
		8	\$1.00
		9	\$1.00
LINCOLN	22	1	\$25.00
		2	\$25.00
		3	\$1.00
		4	\$25.00
		5	\$25.00
		6	\$25.00
		7	\$25.00
		8	\$25.00
		9	\$25.00
		10	\$1.00

OIL & GAS RESERVE RATES FOR TY 2017			
COUNTY	CO #	DISTRICT #	TY2017 \$/AO
LOGAN	23	1	\$15.00
		2	\$15.00
		3	\$15.00
		4	\$15.00
		5	\$1.00
		6	\$1.00
		7	\$1.00
		8	\$15.00
		9	\$1.00
MARION	24	1	\$1.00
		2	\$90.00
		3	\$1.00
		4	\$1.00
		5	\$1.00
		6	\$1.00
		7	\$1.00
		8	\$1.00
		9	\$90.00
		10	\$1.00
		11	\$90.00
		12	\$90.00
		13	\$1.00
		14	\$1.00
		15	\$1.00
		16	\$90.00
		17	\$1.00
		18	\$90.00
		19	\$90.00
		20	\$1.00
		21	\$1.00
		22	\$1.00
MARSHALL	25	1	\$1.00
		2	\$1.00
		3	\$100.00
		4	\$100.00
		5	\$100.00
		6	\$1.00
		7	\$100.00
		8	\$1.00
		9	\$100.00
		10	\$1.00
		11	\$1.00
		12	\$100.00
		13	\$100.00
		14	\$100.00
		15	\$100.00
		16	\$1.00

OIL & GAS RESERVE RATES FOR TY 2017			
COUNTY	CO #	DISTRICT #	FY2017 \$/AC
MASON	26	1	\$1.00
		2	\$26.00
		3	\$26.00
		4	\$25.00
		5	\$25.00
		6	\$25.00
		7	\$1.00
		8	\$1.00
		9	\$1.00
		10	\$25.00
		11	\$1.00
		12	\$1.00
		13	\$1.00
		14	\$26.00
		15	\$25.00
		16	\$25.00
MCDOWELL	27	1	\$20.00
		2	\$1.00
		3	\$20.00
		4	\$20.00
		5	\$1.00
		6	\$20.00
		7	\$1.00
		8	\$1.00
		9	\$1.00
		10	\$1.00
		11	\$20.00
		12	\$1.00
		13	\$20.00
		14	\$1.00
		15	\$1.00
		16	\$1.00
MERCER	28	1	\$1.00
		2	\$15.00
		3	\$1.00
		4	\$1.00
		5	\$1.00
		6	\$15.00
		7	\$1.00
		8	\$1.00
		9	\$15.00
		10	\$1.00
		11	\$15.00

OIL & GAS RESERVE RATES FOR TY 2017			
COUNTY	CO #	DISTRICT #	TY2017 \$/AC
MINERAL	29	1	\$1.00
		2	\$1.00
		3	\$1.00
		4	\$1.00
		5	\$1.00
		6	\$1.00
		7	\$1.00
		8	\$1.00
		9	\$1.00
		10	\$1.00
		11	\$1.00
MINGO	30	1	\$1.00
		2	\$1.00
		3	\$20.00
		4	\$20.00
		5	\$20.00
		6	\$20.00
		7	\$20.00
		8	\$1.00
		9	\$20.00
		10	\$20.00
		11	\$20.00
		12	\$1.00
MONONGALIA	31	1	\$30.00
		2	\$1.00
		3	\$30.00
		4	\$30.00
		5	\$30.00
		6	\$1.00
		7	\$30.00
		8	\$30.00
		9	\$1.00
		10	\$1.00
		11	\$1.00
		12	\$1.00
		13	\$1.00
		14	\$1.00
		15	\$1.00
		16	\$1.00
		17	\$1.00
		18	\$30.00
		19	\$1.00

OIL & GAS RESERVE RATES FOR TY 2017			
COUNTY	CO #	DISTRICT#	TY2017 \$/AC
MONROE	32	1	\$1.00
		2	\$1.00
		3	\$1.00
		4	\$1.00
		5	\$1.00
		6	\$1.00
		7	\$1.00
		8	\$1.00
		9	\$1.00
MORGAN	33	1	\$1.00
		2	\$1.00
		3	\$1.00
		4	\$1.00
		5	\$1.00
		6	\$1.00
		7	\$1.00
		8	\$1.00
NICHOLAS	34	1	\$1.00
		2	\$15.00
		3	\$15.00
		4	\$15.00
		5	\$1.00
		6	\$1.00
		7	\$15.00
		8	\$1.00
		9	\$1.00
OHIO	34	1	\$1.00
		2	\$1.00
		3	\$100.00
		4	\$100.00
		5	\$1.00
		6	\$100.00
		7	\$1.00
		8	\$1.00
		9	\$1.00
		10	\$1.00
PENDLETON	35	1	\$1.00
		2	\$10.00
		3	\$1.00
		4	\$1.00
		5	\$1.00
		6	\$1.00
		7	\$10.00

OIL & GAS RESERVE RATES FOR TY 2017			
COUNTY	CO #	DISTRICT #	TY2017 \$/AC
PLEASANT	37	1	\$45.00
		2	\$45.00
		3	\$45.00
		4	\$45.00
		5	\$45.00
		6	\$1.00
		7	\$45.00
		8	\$45.00
POCAHONTAS	38	1	\$1.00
		2	\$1.00
		3	\$1.00
		4	\$1.00
		5	\$1.00
		6	\$1.00
		7	\$1.00
		8	\$1.00
PRESTON	39	1	\$30.00
		2	\$30.00
		3	\$30.00
		4	\$30.00
		5	\$30.00
		6	\$30.00
		7	\$1.00
		8	\$30.00
		9	\$1.00
		10	\$30.00
		11	\$1.00
		12	\$1.00
		13	\$1.00
		14	\$1.00
		15	\$1.00
		16	\$1.00
		17	\$1.00
		18	\$1.00
		19	\$1.00
		20	\$1.00
PUTNAM	40	1	\$25.00
		2	\$25.00
		3	\$1.00
		4	\$25.00
		5	\$1.00
		6	\$1.00
		7	\$1.00
		8	\$25.00
		9	\$1.00
		10	\$25.00
		11	\$25.00
		12	\$25.00
		13	\$1.00

OIL & GAS RESERVE RATES FOR TY 2017			
COUNTY	CO #	DISTRICT #	TY2017 \$/AC
RALEIGH	41	1	\$20.00
		2	\$20.00
		3	\$1.00
		4	\$1.00
		5	\$20.00
		6	\$1.00
		7	\$20.00
		8	\$20.00
		9	\$20.00
		10	\$1.00
		11	\$20.00
		12	\$20.00
RANDOLPH	42	1	\$20.00
		2	\$20.00
		3	\$1.00
		4	\$20.00
		5	\$1.00
		6	\$1.00
		7	\$1.00
		8	\$1.00
		9	\$1.00
		10	\$20.00
		11	\$20.00
		12	\$1.00
		13	\$1.00
		14	\$1.00
		15	\$1.00
		16	\$20.00
		17	\$1.00
		18	\$1.00
RITCHIE	43	1	\$70.00
		2	\$1.00
		3	\$70.00
		4	\$1.00
		5	\$70.00
		6	\$1.00
		7	\$70.00
		8	\$1.00
		9	\$1.00
		10	\$70.00

OIL & GAS RESERVE RATES FOR TY 2017			
COUNTY	CO #	DISTRICT #	TY2017 \$/AO
ROANE	44	1	\$35.00
		2	\$35.00
		3	\$35.00
		4	\$35.00
		5	\$1.00
		6	\$35.00
		7	\$35.00
		8	\$1.00
		9	\$35.00
SUMMERS	45	1	\$1.00
		2	\$1.00
		3	\$1.00
		4	\$1.00
		5	\$10.00
		6	\$1.00
		7	\$1.00
TAYLOR	46	1	\$1.00
		2	\$1.00
		3	\$90.00
		4	\$90.00
		5	\$90.00
		6	\$90.00
		7	\$90.00
TUCKER	47	1	\$20.00
		2	\$20.00
		3	\$1.00
		4	\$1.00
		5	\$20.00
		6	\$1.00
		7	\$1.00
		8	\$1.00
		9	\$20.00
		10	\$1.00
		11	\$20.00
		12	\$1.00

OIL & GAS RESERVE RATES FOR TY 2017			
COUNTY	CO.#	DISTRICT#	TY2017 \$/AG
TYLER	48	1	\$80.00
		2	\$80.00
		3	\$1.00
		4	\$90.00
		5	\$90.00
		6	\$90.00
		7	\$1.00
		8	\$1.00
		9	\$1.00
		10	\$90.00
UPSHUR	49	1	\$70.00
		2	\$70.00
		3	\$1.00
		4	\$70.00
		5	\$70.00
		6	\$70.00
		7	\$70.00
WAYNE	50	1	\$20.00
		2	\$20.00
		3	\$1.00
		4	\$1.00
		5	\$1.00
		6	\$1.00
		7	\$1.00
		8	\$20.00
		9	\$20.00
		10	\$20.00
		11	\$1.00
		12	\$20.00
WEBSTER	51	1	\$1.00
		2	\$1.00
		3	\$1.00
		4	\$15.00
		5	\$15.00
		6	\$15.00
		7	\$1.00

OIL & GAS RESERVE RATES FOR TY 2017			
COUNTY	CD #	DISTRICT #	TY2017 \$/AC
WEITZEL	52	1	\$90.00
		2	\$90.00
		3	\$90.00
		4	\$90.00
		5	\$90.00
		6	\$1.00
		7	\$1.00
		8	\$90.00
		9	\$1.00
		10	\$1.00
		11	\$1.00
		12	\$90.00
		13	\$1.00
WIRT	53	1	\$35.00
		2	\$35.00
		3	\$35.00
		4	\$1.00
		5	\$35.00
		6	\$35.00
		7	\$35.00
		8	\$35.00
WOOD	54	1	\$40.00
		2	\$40.00
		3	\$40.00
		4	\$40.00
		5	\$1.00
		6	\$40.00
		7	\$40.00
		8	\$40.00
		9	\$40.00
		10	\$1.00
		11	\$40.00
		12	\$40.00
		13	\$1.00
		14	\$1.00
WYOMING	55	1	\$20.00
		2	\$20.00
		3	\$20.00
		4	\$20.00
		5	\$20.00
		6	\$1.00
		7	\$20.00
		8	\$1.00
		9	\$1.00
		10	\$20.00

**MANAGED TIMBER
PROPERTY ANALYSIS**

Tax Year 2017

September 1, 2016
Mark W. Matkovich
State Tax Commissioner
Department of Revenue

MANAGED TIMBERLAND APPRAISAL RATES **TAX YEAR 2017**

(based on market 2011-2015)

Rates Per Acre

Class II Parcels

	<u>Grade 1</u>	<u>Grade 2</u>	<u>Grade 3</u>
Region 1	\$205	\$140	\$50
Region 2	\$200	\$140	\$50
Region 3	\$265	\$175	\$50
Region 4	\$270	\$185	\$55
Region 5	\$205	\$140	\$50

Class III/IV Parcels

	<u>Grade 1</u>	<u>Grade 2</u>	<u>Grade 3</u>
Region 1	\$225	\$160	\$75
Region 2	\$225	\$160	\$75
Region 3	\$240	\$155	\$75
Region 4	\$245	\$165	\$75
Region 5	\$225	\$150	\$75

Region 1 = Brooke, Cabell, Hancock, Jackson, Marshall, Mason, Ohio, Pleasants, Putnam, Tyler, Wetzel, and Wood Counties

Region 2 = Braxton, Calhoun, Clay, Doddridge, Gilmer, Harrison, Lewis, Marion, Monongalia, Ritchie, Roane, Taylor, and Wirt Counties

Region 3 = Barbour, Greenbrier, Monroe, Nicholas, Pendleton, Pocahontas, Preston, Randolph, Tucker, Upshur, and Webster Counties

Region 4 = Berkeley, Grant, Hampshire, Hardy, Jefferson, Mineral and Morgan Counties

Region 5 = Boone, Fayette, Kanawha, Lincoln, Logan, McDowell, Mercer, Mingo, Raleigh, Summers, Wayne, and Wyoming Counties

Harvest Volumes per Acre

Harvest Interval

Grades

	<u>35 yrs.</u>	<u>45 yrs.</u>	<u>55 yrs.</u>	<u>80 yrs.</u>	<u>Total</u>
1 - Site Index 75 or more	4.6 cords 1.5 Mbf	— —	2.6 cords 4.4 Mbf	3.3 cords 8.6 Mbf	10.5 cords 14.5 Mbf
2 - Site Index 65 - 75	3.3 cords 1.0 Mbf	— —	7.0 cords 3.2 Mbf	4.8 cords 5.6 Mbf	14.9 cords 9.7 Mbf
3 - Site Index less than 65	— —	3.1 cords 0.8 Mbf	— —	15.4 cords 3.7 Mbf	18.5 cords 4.5 Mbf

Managed Timberland Statistics

Estimation of Required Rate of Return: Class II Rates

A. Safe Rate of Return (5 Year T-Bill Rate)

Year	Rate	WIA %	WIA Rate
2015	1.6282	26.67%	0.4078
2014	1.8410	33.33%	0.5489
2013	1.1726	13.33%	0.1563
2012	0.7608	6.67%	0.0507
2011	1.5225	20.00%	0.3045

3.465 %

B. Nonliquidity Rate

(12 Month T-Bills vs. 3 Month T-Bills)

Year	Rate	WIA %	WIA Rate
2015	0.2683	33.33%	0.0894
2014	0.0883	26.67%	0.0235
2013	0.0793	20.00%	0.0147
2012	0.1292	13.33%	0.0172
2011	0.1817	6.67%	0.0121

0.167 %

C. Risk Rate (30 yr T-bills vs. 5 yr T-bills)

Year	Rate	WIA %	WIA Rate
2015	1.3417	13.33%	0.1748
2014	1.6982	26.67%	0.4532
2013	2.2758	20.00%	0.4562
2012	2.1800	33.33%	0.7198
2011	2.3883	6.67%	0.1593

1.962 %

D. Management Factor of 0.5%

0.500 %

E. Property Tax Component

(80% of Class II Rate)

Year	Rate	WIA %	WIA Rate
2015	0.714	33.33%	0.2380
2014	0.714	26.67%	0.1904
2013	0.708	20.00%	0.1416
2012	0.714	13.33%	0.0952
2011	0.708	6.67%	0.0472

0.712 %

F. Inflation Rate

(Bureau of Labor Statistics)

Year	Rate	WIA %	WIA Rate
2015	0.730	33.33%	0.2433
2014	0.760	26.67%	0.2027
2013	1.500	20.00%	0.3000
2012	1.700	13.33%	0.2266
2011	3.000	6.67%	0.2001

(1.173) %

TOTAL REQUIRED RATE OF RETURN (REAL)

3.625 %

LESS: PROPERTY TAX COMPONENT

(0.712) %

TOTAL DISCOUNT COMPONENT

2.913 %

Stumpage Prices:

	<u>Sawtimber</u>	<u>Pulpwood</u>
Stumpage Price Adjustment Factor	0.00%	1.85%

SAWTIMBER	Current \$/MBF	1.0000 \$/MBF at age	1.0000 \$/MBF at age	1.0000 \$/MBF at age	1.0000 \$/MBF at age
		35	45	55	60
Region 1	181.34	181.34	181.34	181.34	181.34
Region 2	172.92	172.92	172.92	172.92	172.92
Region 3	239.28	239.28	239.28	239.28	239.28
Region 4	235.49	235.49	235.49	235.49	235.49
Region 5	190.59	190.59	190.59	190.59	190.59

PULPWOOD	\$/Cbrd	1.0995 \$/cd at age	2.2818 \$/cd at age	2.7407 \$/cd at age	4.3339 \$/cd at age
		35	45	55	60
Region 1	8.64	18.23	19.49	23.41	37.02
Region 2	6.73	12.79	16.38	18.46	29.18
Region 3	5.13	9.75	11.71	14.07	22.24
Region 4	8.10	15.39	18.49	22.21	35.12
Region 5	5.77	10.65	13.18	16.81	25.00

Management Costs:

Region	\$/acre (1)
1	3.17
2	3.17
3	3.17
4	3.17
5	3.17
State	

Tax Rates:

Effective Federal Income Tax Rate	35.00%
Effective WV State Income Tax Rate (8.5% * (1-.35))	4.23%
Effective WV Severance Tax Rate (1.5% * (1-.35))	0.98%

Yield (Volumes) (80 year rotation)

Productivity Grades	Site Index	Yield - MBF	Yield - Cords
Grade I	75 or more	14.8	10.6
Grade II	65-74	9.7	14.9
Grade III	less than 65	4.8	18.8

Managed Timberland Statistics

Estimation of Required Rate of Return: Class III & IV Blended Rates

A. Safe Rate of Return (5 Year T-Bill Rate)

Year	Rate	W/A %	W/A Rate
2015	1.5292	26.67%	0.4078
2014	1.6410	33.33%	0.6469
2013	1.1725	13.33%	0.1563
2012	0.7808	6.67%	0.0507
2011	1.5225	20.00%	0.3045

1.468 %

B. Nonliquidity Rate: (12 Month T-Bills vs. 3 Month T-Bills)

Year	Rate	W/A %	W/A Rate
2015	0.2683	33.33%	0.0894
2014	0.0883	26.67%	0.0235
2013	0.0733	20.00%	0.0147
2012	0.1292	13.33%	0.0172
2011	0.1817	6.67%	0.0121

0.167 %

C. Risk Rate (30 yr T-Bills vs. 10 yr T-Bills)

Year	Rate	W/A %	W/A Rate
2015	1.3117	13.33%	0.1746
2014	1.8982	26.67%	0.4632
2013	2.2758	20.00%	0.4652
2012	2.1800	33.33%	0.7199
2011	2.3983	6.67%	0.1593

1.962 %

D. Management Factor of 0.5%

0.500 %

E. Property Tax Component (80% of Blended III&IV Rates)

Year	Rate	W/A %	W/A Rate
2015	1.314	33.33%	0.4360
2014	1.314	26.67%	0.3504
2013	1.314	20.00%	0.2628
2012	1.326	13.33%	0.1769
2011	1.326	6.67%	0.0884

1.316 %

F. Inflation Rate: (Bureau of Labor Statistics)

Year	Rate	W/A %	W/A Rate
2015	0.730	33.33%	0.2433
2014	0.760	26.67%	0.2027
2013	1.500	20.00%	0.3000
2012	1.700	13.33%	0.2289
2011	3.000	6.67%	0.2001

(1.173) %

TOTAL REQUIRED RATE OF RETURN (REAL)

4.228 %

LESS: PROPERTY TAX COMPONENT

(1.316)

TOTAL DISCOUNT COMPONENT

2.913 %

Stumpage Prices:

Stumpage Price Adjustment Factor Sawtimber: Pulpwood:
0.00% 1.86%

Region	Current \$/MBF	1.0000	1.0000	1.0000	1.0000
		\$/MBF at age: 35	\$/MBF at age: 45	\$/MBF at age: 55	\$/MBF at age: 80
Region 1	181.34	181.34	181.34	181.34	181.34
Region 2	172.92	172.92	172.92	172.92	172.92
Region 3	239.28	239.28	239.28	239.28	239.28
Region 4	235.49	235.49	235.49	235.49	235.49
Region 5	190.59	190.59	190.59	190.59	190.59

Region	\$/Cord	1.8995	2.2816	2.7497	4.9939
		\$/cord at age: 35	\$/cord at age: 45	\$/cord at age: 55	\$/cord at age: 80
Region 1	8.54	16.23	18.49	23.41	37.02
Region 2	6.73	12.76	15.36	18.45	29.18
Region 3	6.13	9.76	11.71	14.07	22.24
Region 4	8.10	15.39	18.49	22.21	35.42
Region 5	5.77	10.96	13.18	15.94	25.00

Management Costs:

Region	\$/acre (1)
1	3.17
2	3.17
3	3.17
4	3.17
5	3.17

State:

Tax Rates:

Effective Federal Income Tax Rate	35.00%
Effective WV State Income Tax Rate (6.5% * (1-.35))	4.23%
Effective WV Severance Tax Rate (1.5% * (1-.35))	0.98%

Yield (Volume) (80 year rotation)

Timberland		Yield - MBF	Yield - Cords
Productivity Grades	Site Index		
Grade I	75 or more	14.6	10.6
Grade II	65-74	9.7	14.9
Grade III	less than 65	4.8	18.8

West Virginia Wgt/Avg Managed Timberland Stumpage Prices

REGION 1 - Sawlumber

Year	Volume	\$/MBF	W/A%	\$/MBF
2015	12,581.80	192.85	33.33%	64.28
2014	12,182.08	178.34	28.87%	47.02
2013	10,017.77	177.45	20.00%	35.49
2012	12,828.13	188.58	13.33%	24.87
2011	11,185.24	144.89	8.67%	9.68
	67,585.02			181.34

REGION 1 - Pulpwood

Year	Volume	\$/CORD	W/A%	\$/CORD
2015	7,218.90	16.03	33.33%	5.01
2014	484.40	5.40	28.87%	1.44
2013	6,102.20	2.98	20.00%	0.59
2012	45,387.00	6.42	13.33%	0.88
2011	48.10	9.67	8.67%	0.64
	59,220.60			8.54

REGION 2 - Sawlumber

Year	Volume	\$/MBF	W/A%	\$/MBF
2015	26,487.65	175.25	33.33%	58.42
2014	22,001.80	182.47	28.87%	48.66
2013	25,898.80	177.79	20.00%	35.66
2012	28,640.88	149.01	13.33%	18.87
2011	12,839.41	158.28	8.67%	10.42
	112,868.59			172.82

REGION 2 - Pulpwood

Year	Volume	\$/CORD	W/A%	\$/CORD
2015	42,883.30	5.97	33.33%	1.99
2014	2,188.10	3.04	28.87%	1.34
2013	119,278.40	12.83	20.00%	2.57
2012	22,647.40	2.88	13.33%	0.38
2011	5,238.20	8.78	8.67%	0.45
	192,193.40			6.73

REGION 3 - Sawlumber

Year	Volume	\$/MBF	W/A%	\$/MBF
2015	135,887.80	207.12	33.33%	69.04
2014	91,487.44	280.52	28.87%	74.81
2013	161,387.70	278.63	20.00%	55.13
2012	111,920.80	201.57	13.33%	28.88
2011	102,218.30	201.45	8.67%	13.43
	602,971.84			239.28

REGION 3 - Pulpwood

Year	Volume	\$/CORD	W/A%	\$/CORD
2015	184,907.30	3.85	33.33%	1.28
2014	170,738.30	3.52	28.87%	0.95
2013	163,197.40	7.78	20.00%	1.58
2012	183,132.60	6.38	13.33%	0.88
2011	159,040.70	7.34	8.67%	0.49
	851,014.30			6.13

REGION 4 - Sawtimber

Year	Volume	\$/MBF	W/A%	\$/MBF
2015	8,844.42	223.42	33.33%	74.47
2014	6,020.90	303.88	28.67%	81.04
2013	12,820.20	211.47	20.00%	42.29
2012	4,808.73	198.47	13.33%	25.80
2011	15,517.51	178.40	8.67%	11.89
	44,811.76			235.49

REGION 4 - Pulpwood

Year	Volume	\$/CORD	W/A%	\$/CORD
2015	8,137.40	7.22	33.33%	2.41
2014	7,766.20	8.16	28.67%	2.18
2013	15,488.80	8.32	20.00%	1.68
2012	7,382.20	9.81	13.33%	1.28
2011	21,074.10	8.84	8.67%	0.58
	57,847.90			8.10

REGION 5 - Sawtimber

Year	Volume	\$/MBF	W/A%	\$/MBF
2015	97,714.40	180.16	33.33%	53.38
2014	21,881.40	285.86	28.67%	70.82
2013	31,859.00	198.20	20.00%	39.64
2012	10,887.06	198.69	13.33%	18.48
2011	24,760.43	122.43	8.67%	8.18
	126,882.28			190.59

REGION 5 - Pulpwood

Year	Volume	\$/CORD	W/A%	\$/CORD
2015	2,889.50	4.05	33.33%	1.35
2014	10,191.40	6.18	28.67%	1.85
2013	18,282.80	7.13	20.00%	1.43
2012	8,298.30	8.93	13.33%	0.92
2011	8,432.30	6.28	8.67%	0.42
	48,102.10			6.77

COAL PROPERTIES ANALYSIS

Tax Year 2017

September 1, 2016
Mark W. Matkovich
State Tax Commissioner
Department of Revenue

COAL CAPITALIZATION RATE

Capitalization Rate Analysis and Results

In developing a capitalization rate for use in valuing specific income-producing properties, consideration is given to the three approaches generally employed in estimating a discount rate. As a matter of practicality, the Bands-of-Investment and Summation Technique approaches are utilized in establishing discount rates for active coal. Data for analysis has been derived in accordance with current Legislative Rule Title 110, Series 1.

Sale Rate:	90 day Treasury Bill	Sale Rate:
January - December 2015		0.053%
January - December 2014		0.033%
January - December 2013		0.058%

Risk Rate: Interest differential between Loan Rate and 90 day Treasury Bill

Loan Rate:	Debt Risk Rate:
2015 5.25%	5.207%
2014 5.25%	5.217%
2013 5.25%	5.182%
Prime plus 2%	

Equity: Differential between Equity Rates and 90 day Treasury Bill

Equity Rate:	Equity Risk Rate:
2015 $(14.75\% / (1 - .30)) - 0.053$	21.036%
2014 $(16.50\% / (1 - .30)) - 0.033$	22.110%
2013 $(13.25\% / (1 - .30)) - 0.058$	18.971%

* Value Line Investment Survey Analysis

Composite Risk Rate:	Loan and Equity Rates weighted by industry estimated capital structure		
Equity Rate:	Debt Rate:	Composite Risk:	
2015 13.675%	1.822%	15.497%	
2014 15.477%	1.565%	17.042%	
2013 11.322%	2.077%	13.399%	
Note: Debt/Equity Ratio:	Debt: 35%	Equity: 65%	

Non Liquidity Rate: Interest differential between a 90 day Treasury Bill and a 1 year Treasury Bill which reflects a reasonable time necessary to sell active property.

		1yr T. Bill	90 day T. Bill	Non Liquidity Rate
January - December 2015		0.322%	0.053%	0.269%
January - December 2014		0.121%	0.033%	0.088%
January - December 2013		0.132%	0.058%	0.074%

Management Rate: Charges for the management of investment portfolios.

Fixed Rate (by Rule) 0.500%

Inflation Rate:

January - December 2015	0.730%
January - December 2014	0.760%
January - December 2013	1.500%

Capitalization Rate:

Since the valuation of active coal property is predicated on a three year production average, the capitalization rate is considered in a similar manner.

	2015	2014	2013
Inflation Rate:	0.730%	0.760%	1.500%
Sale Rate:	0.053%	0.033%	0.058%
Composite Risk Rate:	15.497%	17.042%	13.399%
Non Liquidity Rate:	0.269%	0.088%	0.074%
Management Rate:	0.500%	0.500%	0.500%
Total:	15.589%	18.903%	12.531%

Three Year Average: 15.008%

Rounded for:

15.00%

CAPITALIZATION RATE - 15.0%

MULTIPLIERS:

	%		%
1YR	0.933	9YR	5.177
2YR	1.743	10YR	5.382
3YR	2.448	11YR	5.613
4YR	3.062	12YR	5.813
5YR	3.598	13YR	5.967
6YR	4.058	14YR	6.138
7YR	4.482	15YR	6.227
8YR	4.912		

COAL

Price and Royalty Rate Analysis

The development of royalty rates for the various categories of mines and markets involves information collection and review from a variety of sources. Coal lease rates have been derived from transaction information provided by county producers, assessors, tax auditors, and by individual lessors/lessees involved in the specific transaction. The prices for mined coal, as per 110-C3R (1), have been calculated from information provided by the WV Public Service Commission and U.S. Energy Information Administration concerning power plant fuel purchases. Prices provided by producers as part of tax filing and from data obtained from market summaries are included for comparison. Because a large portion of the data used in this analysis is, by law, considered confidential, only a summary of the results are published.

COAL SALE PRICES CY2016 FOR TY2017 APPLICATION

GRAND SUMMARY ALL SOURCES 201	STEAM SPOT	STEAM TERM	NET
PSC	\$54.82	\$54.03	
FERD	\$51.10	\$60.84	
Active Return Summary		\$52.05 52.1 MM tons	\$74.80 23.6 MM tons
Coal Market Publication (Platts)		\$46.88 CAPP (12/1/57) Barge	
		\$48.65 PGH+ (10/3) Rail	
		\$87.58 Low Vol HCC	

STATE STEAM PRICE (SPOT Market)	\$58.14 FERD & PSC, 3 YR AVE
STATE NET PRICE	\$74.80 Active Return, 1 YR

2015 WYBSC Tons reported in millions	Spot Sales 6,112,303	Term Sales 13,291,895	Total 19,404,198
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COAL TY2017 ROYALTY RATES	2013 1YR		2014 2YR		2013 3YR		2012 4YR		2011 5YR	
	%S	%D	%S	%D	%S	%D	%S	%D	%S	%D
TOTAL RECORDS	447	452	1,447	908	1,354	558	1,809	2,758	1,677	2,241
SUM OF PERCENT	2904.85	2327.95	8,889.07	4,695.26	8,087.84	3,313.93	11,881.88	14,583.03	8,924.28	11,781.08
STRAIGHT AVERAGE	6.59	5.16	6.13	5.18	5.97	5.53	6.23	5.32	5.32	4.99
MEDIAN	6.00	5.00	6.00	5.00	5.00	5.00	6.00	5.13	5.00	5.00
WEIGHTED AVERAGE (by Mine)	6.30	5.10	6.34	5.48	6.58	5.04	6.46	6.24	6.27	5.72
TENTATIVE RATE DEEP (%)	5.69									
TENTATIVE RATE SURFACE (%)	6.51									

ROYALTY RATE CALCULATIONS

Steam Coal/ Deep Mine	\$58.19	per ton X	5.69%	\$3.31	per ton
Metallurgical Coal/ Deep Mine	\$74.80	per ton X	5.69%	\$4.24	per ton
Steam Coal/ Surface Mine	\$58.19	per ton X	6.81%	\$3.96	per ton
Metallurgical Coal/ Surface Mine	\$74.80	per ton X	6.81%	\$5.09	per ton

Explanation of Reserve Coal Valuation

The RCVM consists of a computer model, which utilizes a database consisting of coal beds and characteristics, property locations, mine locations, sales, transportation, etc., for the entire state. An extensive algorithm calculates in-place tonnage, expected time of mining and present value for all the mineable coal on every property.

There are, therefore, no set "rates" available on reserve coal under the Rule. The RCVM values on each property will not be available until all data has been entered, after October 15 of each year. Please refer to the State Register, Legislative Rules, Title 110, Series 11 for details of the process.

Title 110, Series 11
Valuation of Active and Reserve Coal Property for Ad Valorem Property Tax Purposes

The above Legislative Rule was modified during the 2005 Legislative Session requiring biennial (every other year) updating of the geostatistical basis for several valuation factors used in the Reserve Coal Valuation Model. To satisfy that requirement, maps and data files concerning the Market Interest Factor, the Market Mineability Factor, the Use Conflict Factor and the Environmental Factor have been revised for Tax Year 2016. Preliminary research has been conducted to determine the effects of the factors on coal valuation. The results are as follows:

Market Interest Factor

This is the relationship between transactions (sales, leases, prospects, permit applications, etc.) and mining as it relates to properties and locations. Trans_Ct is the number of transactions counted within the radius.

Radius = 5 miles

If Trans_Ct > 20 Then TransFactor = 20

If Trans_Ct < 20 And Trans_Ct > 10 Then TransFactor = 40

Else TransFactor = 80

Market Mineability Factor

This is the relationship between property location and mining through time. Determining feature is count of mines within the radius.

Radius = 2.5 miles

Surface Mines: Sminc

Deep Mines: Dminc

Bottom Mines: Bminc

Historic Mines: Hminc

Current Mines: Cminc

To assign MineFactor:

If Cminc > 0 Then MineFactor = 20

If Cminc = 0 And (Sminc > 0 Or Bminc > 0) Then MineFactor = 40

Else MineFactor = 80

Use Conflict Factor

This is the relationship between oil & gas well drilling and mining as it relates to property location. Well Density is in wells per square mile.

WellDensity < 5 Then WellFactor = 0

WellDensity > 5 And WellDensity < 10 Then WellFactor = 20

WellDensity > 10 And WellDensity < 20 Then WellFactor = 40

WellDensity > 20 Then WellFactor = 80

Environmental Factor

This is the relationship of known environmental hazards and impediments to the likelihood of mining occurring at this location. The rates are compiled from maps and represent densities of problems mapped.

EnvRate < 20 or Null Then EnvFactor = 0

EnvRate > 20 and EnvRate < 40 Then EnvFactor = 20

EnvRate > 40 and EnvRate < 80 Then EnvFactor = 40

EnvRate > 80 Then EnvFactor = 80

**OTHER MINED MINERAL
PROPERTY ANALYSIS**

Tax Year 2017

September 1, 2016
Mark W. Matkovich
State Tax Commissioner
Department of Revenue

OTHER MINED MINERALS CAPITALIZATION RATE

Capitalization Rate Analysis and Results

In developing a capitalization rate for use in valuing specific income-producing properties, consideration is given to the three approaches generally employed in estimating a discount rate. As a matter of practicality, the Bands-of-Investment and Summation Technique approaches are utilized in establishing discount rates for active coal. Data for analysis has been derived in accordance with current Legislative Rule Title 110, Series 1A.

Safe Rate	90 day Treasury Bills	Safe Rate
January-December	2015	0.053%
January-December	2014	0.033%
January-December	2013	0.058%

Risk Rate	Interest Differential between Loan Rate and 90 day Treasury Bills	Debt Risk Rate
Loan Rate		
2015	5.26%	5.207%
2014	5.26%	5.217%
2013	5.25%	5.192%
	Prime plus 2%	

Equity	Differential between Equity Rates and 90 day Treasury Bills	Equity Risk Rate
Equity Rate		
2015	(11.75%/(1-.30))-0.053%	16.733%
2013	(11.75%/(1-.30))-0.033%	16.783%
2012	(11.75%/(1-.30))-0.058%	10.728%
	* Value Line Investment Survey Analysis	

Composite Risk Rate	Loan and Equity Rates weighted by industry estimated capital structure	
Equity Rate	Debt Rate	Composite Risk
2015	10.040%	12.123%
2014	10.082%	12.136%
2013	10.037%	12.114%
Note: Debt/Equity Ratio	Debt: 40%	Equity: 60%

Non-Liquidity Rate: Interest differential between 90-day Treasury Bills and a 1-year Treasury Bill which reflects a reasonable time necessary to sell active property.

Non-Liquidity Rate	1yr T.Bill	90 d T.Bill	Non-Liquidity Rate
January-December	2015	0.322%	0.053%
January-December	2014	0.121%	0.033%
January-December	2013	0.132%	0.058%

Management Rate: Charges for the management of investment portfolios.
Fixed Rate (by Rule): 0.500%

Inflation Rate		
January-December	2015	0.790%
January-December	2014	0.780%
January-December	2013	1.500%

Property Tax Rate	60% percent (60%) of State average Class III property tax rates	
January-December	2015	60% of 2.190 = 1.314%
January-December	2014	60% of 2.190 = 1.314%
January-December	2013	60% of 2.190 = 1.314%

Capitalization Rate: Since the valuation of other mined minerals property is predicated on a three-year production average, the capitalization rate is considered in a similar manner.

	2015	2014	2013
Intuition Rate	-0.730%	-0.760%	-1.500%
Safe Rate	0.053%	0.033%	0.058%
Composite Risk Rate	12.123%	12.136%	12.114%
Non-Liquidity Rate	0.289%	0.088%	0.074%
Management Rate	0.500%	0.500%	0.500%
Property Tax Rate	1.314%	1.314%	1.314%
Total	13.529%	13.314%	12.560%

Three-Yr Average: 13.134% Rounded to: 13.10%

CAPITALIZATION RATE: 13.10%

MULTIPLIERS:	%	%
1YR	0.940	0YR 3.437
2YR	1.772	10YR 5.748
3YR	2.507	11YR 6.022
4YR	3.157	12YR 6.265
5YR	3.730	13YR 6.480
6YR	4.240	14YR 6.688
7YR	4.689	15YR 6.837
8YR	5.088	

OTHER MINED MINERALS

ROYALTY RATE SURVEY

The determination of royalty rates for other mined minerals within the state of West Virginia is dependent upon the availability of leasehold information. Since this information is limited, the Department has chosen to review data for the most recent thirty year period. A summary of this review is shown below in order to protect the confidentiality of parties involved.

RESOURCE	DATA SOURCES	AVERAGE ROYALTY	MEDIAN ROYALTY	TY2017 RATE
LIMESTONE	15	\$0.22	\$0.20	\$0.22
SANDSTONE	8	\$0.31	\$0.25	\$0.30
CLAY/SHALE	34	\$0.12	\$0.10	\$0.11
SAND/GRAVEL	10	\$0.35	\$0.40	\$0.40
SALT BRINE	1	N/A	N/A	\$0.10

RESERVE VALUES

	number of sales	\$/AC
LIMESTONE	5	\$3,000.00
SANDSTONE	8	\$2,300.00
CLAY/SHALE	16	\$850.00
SAND/GRAVEL	6	\$4,000.00
SALT	2	\$1,140.00



STATE OF WEST VIRGINIA

Department of Revenue
State Tax Department

Earl Ray Tomblin
Governor

Mark W. Matkovich
State Tax Commissioner

June 30, 2016

The Honorable Natalio Tennant
Secretary of State
Building 1, Suite 157-K
State Capitol
Charleston, West Virginia 25305

Dear Secretary Tennant:

Attached are tentative natural resource property valuation variables for the 2017 Tax Year that have been developed by the State Tax Department for use in appraising coal, oil, natural gas, managed timberland and other natural resource properties for ad valorem tax purposes.

The State Tax Department will accept written public comments on all variables until August 1, 2016. Final valuation variables will be filed on or before September 1, 2016.

Public comments concerning the attached variables should be forwarded to the following address:

West Virginia State Tax Department
Property Tax Division
Attention: Jeff Amburgey
P. O. Box 2389
Charleston, West Virginia 25328-2389

Sincerely,


Mark W. Matkovich
State Tax Commissioner

MWM/jal

Attachment

100-100-30-1-2

OIL AND GAS PROPERTIES ANALYSIS

Tax Year 2017

June 30, 2016
Mark W. Matkovich
State Tax Commissioner
Department of Revenue

OIL AND GAS**TY 2017****Capitalization Rate Analysis and Results:**

In developing a capitalization rate for use in valuing specific income-producing properties, consideration is given to the three approaches generally employed in estimating a discount rate. As a matter of practicality, the Bands-of-Investment and Summation Technique approaches are utilized in establishing discount rates for producing oil and gas properties. Data for analysis has been derived in accordance with current Legislative Rule Title 110, Series 1J.

Safe Rate (3-Month Constant Maturity Interest Rates)
January December 2015

0.053%

Risk Rate (Interest differential between Loan Rate and 3-Month Constant Maturity Interest Rates)

Loan Rate***Risk Rate**

2015

5.280%

5.287%

*Prime plus 2%

Equity (Difference between Equity Rates and 3-Month Constant Maturity Interest Rates)

Equity Rate****Risk Rate**

2015

 $(12.25\% / (1 + .37)) - 0.053\%$

19.584%

**Value Line Investment Survey Analysis

Composite Risk Rate

Loan and Equity Rates weighted by industry estimated capital structure

Equity Rate**Debt Rate****Composite Risk**

2015

12.8042%

1.822%

18.188%

Notes: Debt/Equity Ratio

Debt

35%

Equity

65%

***Effective severance tax adjustment

0.65

Non-Liquidity Rate

Interest differential between 3-month Constant Maturity Interest Rates and a 1 year Constant Maturity Interest Rates which reflects a reasonable time necessary to sell active property.

1yr T Bill**90 day T Bill****Non-Liquidity Rate**

January

December

2015

0.822%

0.053%

0.288%**Management Rate**

Charges for the management of investment portfolios.

Fixed Rate (by Rule)

0.500%**Property Tax Rate**

Sixty percent (60%) of State average Class III property tax rate.

2015

60% of 2.19

1.314%**Inflation Rate**

January

December

2015

0.730%

Capitalization Rate:

Since the valuation of oil and gas property is predicated on a three year production, the capitalization rate will be considered in a similar manner.

	2015	2014	2013
Inflation Rate	-0.730%	-0.760%	-1.500%
Safe Rate	0.053%	0.033%	0.058%
Composite Risk Rate	15.186%	14.389%	14.634%
Non-Liquidity Rate	0.260%	0.086%	0.074%
Management Rate	0.500%	0.500%	0.500%
Property Tax Rate	1.314%	1.314%	1.314%
Total	16.582%	15.584%	16.030%
	50.000%	33.333%	16.667%
	9.298%	5.188%	2.313%
			15.897%

Capitalization Rate Rounded to:

16.00%

MULTIPLIERS FOR 16.0% MID-YEAR LIFE (ANNUALLY)

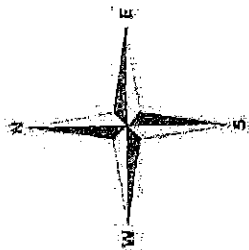
YEAR		YEAR	
1	0.828477	21	0.047710
2	0.800441	22	0.041129
3	0.890909	23	0.035458
4	0.594538	24	0.030686
5	0.512789	25	0.028350
6	0.442080	26	0.022714
7	0.381086	27	0.019582
8	0.328522	28	0.016881
9	0.283209	29	0.014553
10	0.244148	30	0.012646
11	0.210470	31	0.010815
12	0.181440	32	0.009323
13	0.156414	33	0.008037
14	0.134840	34	0.006928
15	0.115241	35	0.005973
16	0.100208	36	0.005149
17	0.086388	37	0.004439
18	0.074471	38	0.003825
19	0.664188	39	0.003298
20	0.055344	40	0.002844

Oil and Natural Gas Decline Rate Regions

Region

- Central
- East
- North
- North Central
- North West
- South
- South Central
- South West
- West Central
- West

Map labels: HALL, BRADLEY, PLEASANTS, WOOD, RITCHIE, CAREY, LINCOLN, WAYNE, WING, LORAIN, WYOMING, RALEIGH, MCDOWELL, MERCER.



Region

Central
East
North
North Central
North West
South
South Central
South West
West Central
West

Decline Rates for Natural Gas and Oil Formations: Central				
Central: Braxton, Clay, Fayette, Nicholas, Webster				
Code	Formation	Year 1	Year 2	Year 3 +
12	Alexander, Benson	-0.31	-0.20	-0.10
14	Benson	-0.48	-0.08	-0.08
16	Benson, Balltown*	-0.45	-0.16	-0.12
17	Gordon +	-0.30	-0.07	-0.07
18	Big Injun	-0.34	-0.13	-0.13
19	Big Injun, Big Lime	-0.36	-0.13	-0.13
22	Big Lime	-0.34	-0.34	-0.13
26	Ravencloft	-0.40	-0.40	-0.25
93	4th Sand	-0.42	-0.32	-0.08
94	50 Foot	-0.34	-0.26	-0.07
95	Injun/Weir	-0.51	-0.26	-0.09
96	Maxton	-0.70	-0.27	-0.08
109	Trenton/Deeper *	-0.41	-0.22	-0.09
110	Marcellus *	-0.41	-0.22	-0.09
111	Utica*	-0.41	-0.22	-0.09
9	Exception (Median)	-0.41	-0.22	-0.09
10	Non-Filed	-0.30	-0.07	-0.07

* New Formation(s) involved in recent production. These will be valued with the Exception Rates until decline information is available.

Decline Rates for Natural Gas and Oil Formations: East				
East: Berkeley, Grant, Greenbrier, Hampshire, Hardy, Jefferson, Mineral, Monroe, Morgan, Pendleton, Pocahontas, Preston, Randolph, Summers, Tucker				
Code	Formation	Year 1	Year 2	Year 3 +
1	Oriskany	-0.30	-0.30	-0.19
14	Benson	-0.31	-0.17	-0.12
20	Benson +	-0.44	-0.20	-0.08
21	Benson, Fifth	-0.29	-0.28	-0.09
32	Brallier +	-0.48	-0.20	-0.05
33	Elk, Benson	-0.39	-0.21	-0.08
34	Elk, Benson, Riley	-0.53	-0.19	-0.05
35	Elk, Benson, Riley +	-0.36	-0.19	-0.11
36	Elk, Benson, Balltown	-0.34	-0.18	-0.11
37	Elk, Alexander, Benson	-0.50	-0.07	-0.07
38	Elk, Alexander, Benson +	-0.40	-0.16	-0.16
39	Hunterville	-0.31	-0.31	-0.14
40	Fox, Haverly	-0.36	-0.21	-0.15
93	4th Sand	-0.42	-0.32	-0.08
94	50 Foot	-0.34	-0.26	-0.07
95	Injun/Weir	-0.51	-0.26	-0.09
96	Maxton	-0.70	-0.27	-0.08
110	Marcellus	-0.59	-0.22	-0.17
111	Utica*	-0.59	-0.22	-0.17
9	Exception (Median)	-0.41	-0.22	-0.10
10	Non-Filer	-0.29	-0.07	-0.05

*New Formation(s) involved in recent production. These will be valued with the Marcellus Rates until decline information is available.

Decline Rates for Natural Gas and Oil Formations: North				
North: Brooke, Hancock, Marshall, Ohio, Tyler, Wetzel				
Code	Formation	Year 1	Year 2	Year 3 +
11	Gordon	-0.47	-0.31	-0.09
13	Alexander, Benson, Riley	-0.26	-0.16	-0.16
15	Benson, Riley	-0.18	-0.16	-0.08
93	4th Sand	-0.42	-0.32	-0.08
94	50 Foot	-0.34	-0.26	-0.07
95	Injun/Wetzel	-0.51	-0.26	-0.09
96	Maxton	-0.70	-0.27	-0.08
97	Coalbed Methane (Vertical)	-0.23	-0.08	-0.05
110	Marcellus	-0.52	-0.23	-0.18
111	Utica*	-0.52	-0.23	-0.18
9	Exception (Median)	-0.39	-0.23	-0.08
10	Non-Filler	-0.18	-0.16	-0.06

*New Formation(s) involved in recent production. These will be valued with the Marcellus Rates until decline information is available.

Decline Rates for Natural Gas and Oil Formations: North Central				
North Central: Barbour, Doddridge, Gilmer, Harrison, Lewis, Marion, Monongalia, Taylor, Upshur				
Code	Formation	Year 1	Year 2	Year 3 +
11	Gordon	-0.41	-0.14	-0.12
12	Alexander, Benson	-0.37	-0.19	-0.11
13	Alexander, Benson, Riley	-0.40	-0.28	-0.05
14	Benson	-0.31	-0.17	-0.12
15	Benson, Riley	-0.34	-0.17	-0.14
18	Big Injun	-0.36	-0.16	-0.13
21	Benson, Fifth	-0.31	-0.20	-0.14
28	Weir	-0.34	-0.34	-0.07
29	Weir +	-0.28	-0.28	-0.23
33	Elk, Benson	-0.34	-0.16	-0.11
34	Elk, Benson, Riley	-0.42	-0.27	-0.08
37	Elk, Alexander, Benson	-0.49	-0.23	-0.08
38	Elk, Alexander, Benson +	-0.38	-0.20	-0.12
40	Fox, Haverly	-0.46	-0.16	-0.08
50	Rhinestreet	-0.28	-0.03	-0.03
57	Alexander, Benson, Balltown	-0.39	-0.26	-0.08
58	Alexander	-0.35	-0.20	-0.10
59	Alexander +	-0.39	-0.22	-0.10
60	Alexander, Benson, Riley +	-0.39	-0.35	-0.12
61	Balltown	-0.36	-0.20	-0.10
62	Balltown, Speechley	-0.28	-0.22	-0.10
63	Balltown, Speechley +	-0.30	-0.13	-0.10
64	Benson, Balltown, Speechley	-0.28	-0.22	-0.09
66	Benson, Bradford	-0.37	-0.20	-0.10
66	Benson, Balltown	-0.29	-0.23	-0.11
67	Benson, Riley +	-0.38	-0.14	-0.10
68	Benson, Speechley	-0.30	-0.22	-0.14
69	Brallier, Elk	-0.42	-0.20	-0.13
70	Brallier	-0.40	-0.22	-0.15
71	Deeper/Onondaga or Oriskany/Helderberg	-0.24	-0.24	-0.03
72	Elk, Alexander	-0.42	-0.22	-0.09
73	Elk, Benson +	-0.38	-0.20	-0.12
74	Elk	-0.43	-0.12	-0.10
75	Elk, Riley	-0.60	-0.35	-0.17
76	Fox +	-0.46	-0.18	-0.09
77	Haverly, Elk, Benson (No Alexander)	-0.35	-0.16	-0.16
78	Haverly	-0.45	-0.15	-0.15
79	Riley	-0.44	-0.22	-0.10
80	Speechley	-0.30	-0.18	-0.09
81	Alexander, Benson, Speechley	-0.39	-0.24	-0.10
82	Haverly, Elk, Alexander	-0.47	-0.14	-0.14
85	Fifth, Oil	-0.45	-0.25	-0.22
87	Bayard All	-0.30	-0.20	-0.05
88	Fifth	-0.29	-0.18	-0.12
89	Fifth +	-0.25	-0.15	-0.13
90	Gordon, Injun All	-0.41	-0.23	-0.23
91	Squaw	-0.37	-0.31	-0.06
92	Injun +	-0.34	-0.22	-0.22
93	4th Sand	-0.42	-0.32	-0.08
94	50 Foot	-0.34	-0.26	-0.07
95	Injun/Weir	-0.51	-0.26	-0.09
96	Maxton	-0.70	-0.27	-0.08
97	Coalbed Methane (Vertical)	-0.23	-0.08	-0.05
98	Coalbed Methane (Horizontal)	-0.05	-0.05	-0.32
109	Trenton/Deeper *	-0.38	-0.21	-0.11
110	Marcellus	-0.59	-0.29	-0.23
111	Utica**	-0.59	-0.29	-0.23
9	Exception (Median)	-0.38	-0.21	-0.11
10	Non-Filer	-0.23	-0.03	-0.03

*New Formation(s) involved in recent production. These will be valued with the Exception Rates until decline information is available.

**New Formation(s) involved in recent production. These will be valued with the Marcellus Rates until decline information is available.

Decline Rates for Natural Gas and Oil Formations: North West

North West: Pleasants, Ritchie, Wood

Code	Formation	Year 1	Year 2	Year 3+
2	Huron, Rhinestreet	-0.41	-0.28	-0.07
4	Huron	-0.42	-0.24	-0.14
5	Huron, Shales above Huron	-0.39	-0.25	-0.14
8	Berea	-0.31	-0.15	-0.15
11	Gordon	-0.36	-0.10	-0.10
12	Alexander, Benson (No Riley)	-0.34	-0.23	-0.10
13	Alexander, Benson, Riley	-0.30	-0.20	-0.10
14	Benson	-0.19	-0.19	-0.10
44	Rhinestreet, Huron, Shallow Shale	-0.43	-0.28	-0.11
47	Alexander, Riley, (No Benson)	-0.41	-0.05	-0.05
48	Rhinestreet, Alexander, Benson, Riley	-0.31	-0.24	-0.10
49	Weir, Squaw, Big Injun	-0.27	-0.17	-0.07
50	Rhinestreet	-0.40	-0.27	-0.27
51	Rhinestreet *	-0.36	-0.21	-0.10
52	All Upper Devonian (Undiv)	-0.48	-0.33	-0.19
53	Huron, Chemung	-0.35	-0.11	-0.09
54	Huron, Hampshire, Pocono	-0.12	-0.12	-0.11
55	Upper Devonian (Above Huron)	-0.46	-0.33	-0.23
56	Chemung Sands - Riley, Bradford, Balltown, Speechley, Warren (No Benson or Alexander)	-0.28	-0.18	-0.10
83	Huron Oil	-0.74	-0.44	-0.40
93	4th Sand	-0.42	-0.32	-0.08
94	50' Foot	-0.34	-0.26	-0.07
95	Injun/Weir	-0.51	-0.26	-0.09
96	Maxton	-0.70	-0.27	-0.08
109	Trenton/Deeper *	-0.35	-0.23	-0.13
110	Marcellus	-0.46	-0.29	-0.23
111	Utica**	-0.48	-0.29	-0.23
9	Exception (Median)	-0.39	-0.23	-0.13
10	Non-Filer	-0.12	-0.05	-0.05

*New Formation(s) involved in recent production. These will be valued with the Exception Rates until decline information is available.

**New Formation(s) involved in recent production. These will be valued with the Marcellus Rates until decline information is available.

Decline Rates for Natural Gas and Oil Formations: South				
South: McDowell, Mercer, Raleigh, Wyoming				
Code	Formation	Year 1	Year 2	Year 3 +
8	Berea	-0.34	-0.15	-0.15
22	Big Lime	-0.31	-0.19	-0.07
23	Big Lime, Maxton	-0.31	-0.19	-0.07
24	Big Lime, Ravencloft	-0.29	-0.29	-0.17
25	Berea +	-0.37	-0.12	-0.08
26	Ravencloft	-0.40	-0.08	-0.07
28	Weir	-0.44	-0.20	-0.10
29	Weir +	-0.28	-0.21	-0.08
30	Weir, Big Lime	-0.37	-0.19	-0.13
42	Maxton, Ravencloft	-0.40	-0.08	-0.07
93	4th Sand	-0.42	-0.32	-0.08
94	50 Foot	-0.34	-0.26	-0.07
95	Injun/Weir	-0.51	-0.26	-0.09
96	Maxton	-0.27	-0.13	-0.09
97	Coalbed Methane (Vertical)	0.03	0.10	-0.05
98	Coalbed Methane (Horizontal)	-0.05	-0.05	-0.32
110	Marcellus *	-0.36	-0.19	-0.09
111	Utica*	-0.36	-0.19	-0.09
9	Exception (Median)	-0.36	-0.19	-0.09
10	Non-Filer	-0.23	-0.08	-0.05

Decline Rates for Natural Gas and Oil Formations: South Central

South Central: Boone, Kanawha

Code	Formation	Year 1	Year 2	Year 3 +
3	Devonian Shale	-0.23	-0.08	-0.05
4	Huron	-0.31	-0.15	-0.04
8	Berea	-0.23	-0.14	-0.09
18	Big Injun	-0.29	-0.25	-0.12
27	Huron, Shales above Huron	-0.21	-0.08	-0.05
28	Weir	-0.30	-0.21	-0.14
29	Weir *	-0.31	-0.25	-0.09
31	Devonian Shales *	-0.27	-0.07	-0.05
86	Big Injun-Oil	-0.19	-0.18	-0.10
93	4th Sand	-0.42	-0.32	-0.08
94	50 Foot	-0.34	-0.26	-0.07
95	Injun/Weir	-0.51	-0.26	-0.09
96	Maxton	-0.70	-0.27	-0.08
109	Trenton/Deeper *	-0.33	-0.19	-0.08
110	Marcellus *	-0.33	-0.19	-0.08
111	Ulica *	-0.33	-0.19	-0.08
9	Exception (Median)	-0.33	-0.19	-0.08
10	Non-Filer	-0.19	-0.07	-0.04

Decline Rates for Natural Gas and Oil Formations: South West				
South West: Cabell, Lincoln, Logan, Mingo, Wayne				
Code	Formation	Year 1 [*]	Year 2	Year 3 +
3	Devonian Shale	-0.31	-0.15	-0.04
8	Berea	-0.38	-0.11	-0.11
18	Big Injun	-0.38	-0.22	-0.04
22	Big Lime	-0.19	-0.19	-0.19
43	Berea, Big Lime	-0.18	-0.18	-0.18
93	4th Sand	-0.42	-0.32	-0.08
94	50 Foot	-0.34	-0.26	-0.07
95	Injun/Weir	-0.51	-0.26	-0.09
96	Maxton	-0.70	-0.27	-0.08
109	Trenton/Deeper *	-0.38	-0.22	-0.10
110	Marcellus *	-0.38	-0.22	-0.10
111	Utica *	-0.38	-0.22	-0.10
9	Exception (Median)	-0.38	-0.22	-0.10
10	Non-Filer	-0.18	-0.11	-0.04

* New Formation(s) involved in recent production. These will be valued with the Exception Rates until decline information is available.

Decline Rates for Natural Gas and Oil Formations: West Central				
West Central: Calhoun, Roane, Wirt				
Code	Formation	Year 1	Year 2	Year 3 +
2	Huron, Rhinestreet	-0.49	-0.11	-0.06
4	Huron	-0.33	-0.22	-0.14
27	Huron, Shales above Huron	-0.42	-0.23	-0.12
44	Rhinestreet, Huron, Shallow Shale	-0.51	-0.14	-0.11
45	Devonian Shale, Pocono	-0.25	-0.17	-0.12
46	Pocono	-0.29	-0.25	-0.12
84	Big Injun, Oil	-0.41	-0.41	-0.11
93	4th Sand	-0.42	-0.32	-0.08
94	50 Foot	-0.34	-0.26	-0.07
95	Injun/Weir	-0.51	-0.28	-0.09
96	Maxton	-0.70	-0.27	-0.08
109	Trenton/Deeper *	-0.42	-0.24	-0.10
110	Marcellus *	-0.42	-0.24	-0.10
111	Utica *	-0.42	-0.24	-0.10
9	Exception (Median)	-0.42	-0.24	-0.10
10	Non-Filer	-0.25	-0.11	-0.06

* New Formation(s) involved in recent production. These will be valued with the Exception Rates until decline information is available.

Decline Rates for Natural Gas and Oil Formations: West

West: Jackson, Mason, Putnam

Code	Formation	Year 1	Year 2	Year 3 +
1	Oriskany	-0.40	-0.40	-0.29
2	Huron, Rhinestreet	-0.13	-0.12	-0.03
3	Devonian Shale	-0.31	-0.15	-0.04
4	Huron	-0.29	-0.14	-0.05
5	Huron, Shales above Huron	-0.36	-0.15	-0.06
6	Huron, Berea	-0.29	-0.08	-0.08
7	Berea, Devonian Shale	-0.08	-0.08	-0.08
8	Berea	-0.36	-0.16	-0.16
93	4th Sand	-0.42	-0.32	-0.08
94	50 Foot	-0.34	-0.26	-0.07
95	Injun/Weir	-0.51	-0.26	-0.09
96	Maxton	-0.70	-0.27	-0.08
109	Trenton/Deeper *	-0.36	-0.20	-0.09
110	Marcellus *	-0.35	-0.20	-0.09
111	Utica *	-0.35	-0.20	-0.09
9	Exception (Median)	-0.35	-0.20	-0.09
10	Non-Filer	-0.08	-0.08	-0.03

Industry Operating Expense Survey and Results

This component was determined through a review of responses to a survey distributed by the State Tax Department to producers of all oil and natural gas wells producing in West Virginia and through use of other market data.

GAS

- % Working Interest Expenses for Typical Producing Well	=	30%
- Maximum Operating Expenses	=	\$5,000
- Coal Bed Methane, Vertical Wells Expenses	=	\$9,000

OIL

- % Working Interest Expenses for Typical Producing Well	=	35%
- Maximum Operating Expenses	=	\$5,750
- Maximum Enhanced Operating Expenses	=	\$9,000

MARCELLUS/UTICA

- % Working Interest Expenses for Vertical Producing Well	=	30%
- Maximum Operating Expenses	=	\$30,000

- % Working Interest Expenses for Horizontal Producing Well	=	20%
- Maximum Operating Expenses	=	\$150,000

HORIZONTAL WELLS (OTHER THAN MARCELLUS/UTICA AND COAL BED METHANE)

- % Working Interest Expenses for Horizontal Producing Well	=	30%
- Maximum Operating Expenses	=	\$20,000

Minimum Working Interest Appraisal = \$500 per well

Flat Rate Royalty Multiplier = 5.75

Home Use Only Wells:

Appraised at \$500 per well

Industrial Use Only Wells:*

MCF usage X \$ 2.62/MCF

BBL usage X \$48.66/BBL

*(Also includes Department of Environmental Protection reported wells.)

Non-Filer Valuations

Working Interest = 150% of previous year's appraisal

Royalty Interest = 90% of previous year's appraisal

Valuation

The previously discussed variables are used to establish a future income stream converted to present worth through application of a capitalization rate. The sum of the discounted future net income per year represents a reasonable estimate of market value.

Lease Rate/Term Survey and Results

The non-producing property value for each county is determined by multiplying the average delay rental by a factor, which represents the average lease term under present economic conditions.

As a result of higher lease terms being inversely proportional to the value of oil and gas (thus counties with little leasing or production activities reflect inflated values) and with the volatile nature of county activity, necessary adjustments in the review have been made.

A compilation of lease terms produced a statewide average of 5 years. This term (5 years) was applied to all county lease rates and compared to the appraisal rates derived from calculations using individual county data as well as regional data. The resulting calculations were reviewed and considered in the assignment of an appraisal rate per acre.

The appraisal rate/acre amounts shown on the next page are preliminary figures, which may change if additional lease data is received. These rates have been applied to all county magisterial districts with either producing wells, lease activity within the past 5 years or both. Tax districts void of activity within the past 5 years have been assigned the minimum value per acre.

OIL & GAS RESERVE RATES FOR TY 2017			
COUNTY	CO #	DISTRICT #	TY2017 \$/AC
BARBOUR	1	1	\$60.00
		2	\$1.00
		3	\$60.00
		4	\$60.00
		5	\$60.00
		6	\$1.00
		7	\$60.00
		8	\$60.00
		9	\$60.00
		10	\$60.00
		11	\$60.00
BERKELEY	2	1	\$1.00
		2	\$1.00
		3	\$1.00
		4	\$1.00
		5	\$1.00
		6	\$1.00
		7	\$1.00
		8	\$1.00
BOONE	3	1	\$20.00
		2	\$1.00
		3	\$1.00
		4	\$20.00
		5	\$20.00
		6	\$20.00
		7	\$1.00
		8	\$20.00
		9	\$1.00
BRAXTON	4	1	\$20.00
		2	\$1.00
		3	\$1.00
		4	\$1.00
		5	\$20.00
		6	\$20.00
		7	\$20.00
		8	\$1.00
BROOKE	5	1	\$1.00
		2	\$1.00
		3	\$100.00
		4	\$100.00
		5	\$1.00
		6	\$1.00
		7	\$1.00
		8	\$1.00

OIL & GAS RESERVE RATES FOR TY 2017			
COUNTY	CD #	DISTRICT #	TY2017 \$/AC
CABELL	6	1	\$25.00
		2	\$1.00
		3	\$25.00
		4	\$25.00
		5	\$1.00
		6	\$1.00
		7	\$1.00
		8	\$25.00
		9	\$1.00
		10	\$25.00
CALHOUN	7	1	\$30.00
		2	\$1.00
		3	\$30.00
		4	\$30.00
		5	\$30.00
		6	\$30.00
CLAY	8	1	\$20.00
		2	\$1.00
		3	\$20.00
		4	\$20.00
		5	\$20.00
		6	\$20.00
DODDRIDGE	8	1	\$90.00
		2	\$90.00
		3	\$90.00
		4	\$90.00
		5	\$90.00
		6	\$90.00
		7	\$90.00
		8	\$90.00
		9	\$1.00
FAYETTE	10	1	\$20.00
		2	\$20.00
		3	\$20.00
		4	\$1.00
		5	\$1.00
		6	\$1.00
		7	\$1.00
		8	\$1.00
		9	\$1.00
		10	\$1.00
		11	\$1.00
		12	\$1.00
		13	\$1.00

OIL & GAS RESERVE RATES FOR TY 2017			
COUNTY	CO #	DISTRICT #	TY2017 \$/AG
GILMER	11	1	\$25.00
		2	\$25.00
		3	\$25.00
		4	\$1.00
		5	\$1.00
		6	\$25.00
GRANT	12	1	\$1.00
		2	\$1.00
		3	\$1.00
		4	\$1.00
		5	\$1.00
GREENBRIER	13	1	\$1.00
		2	\$1.00
		3	\$1.00
		4	\$1.00
		5	\$1.00
		6	\$1.00
		7	\$1.00
		8	\$1.00
		9	\$1.00
		10	\$1.00
		11	\$1.00
		12	\$1.00
		13	\$1.00
		14	\$1.00
		15	\$1.00
		16	\$1.00
		17	\$1.00
		18	\$1.00
HAMPSHIRE	14	1	\$1.00
		2	\$1.00
		3	\$1.00
		4	\$1.00
		5	\$1.00
		6	\$1.00
		7	\$1.00
		8	\$1.00
		9	\$1.00
		10	\$1.00
HANGOCK	15	1	\$25.00
		2	\$1.00
		3	\$25.00
		4	\$25.00
		5	\$1.00
		6	\$1.00

OIL & GAS RESERVE RATES FOR TY 2017			
COUNTY	CO #	DISTRICT #	TY2017 \$/AC
HARDY	16	1	\$1.00
		2	\$1.00
		3	\$1.00
		4	\$1.00
		5	\$1.00
		6	\$1.00
HARRISON	17	1	\$90.00
		2	\$1.00
		3	\$1.00
		4	\$1.00
		5	\$90.00
		6	\$1.00
		7	\$90.00
		8	\$1.00
		9	\$90.00
		10	\$1.00
		11	\$90.00
		12	\$90.00
		13	\$1.00
		14	\$90.00
		15	\$90.00
		16	\$1.00
		17	\$1.00
		18	\$90.00
		19	\$1.00
		20	\$90.00
		21	\$1.00
JACKSON	18	1	\$40.00
		2	\$40.00
		3	\$1.00
		4	\$40.00
		5	\$1.00
		6	\$40.00
		7	\$40.00
JEFFERSON	19	1	\$1.00
		2	\$1.00
		3	\$1.00
		4	\$1.00
		5	\$1.00
		6	\$1.00
		7	\$1.00
		8	\$1.00
		9	\$1.00
		10	\$1.00

OIL & GAS RESERVE RATES FOR TY 2017			
COUNTY	CO #	DISTRICT #	TY2017 \$/AC
KANAWHA	20	1	\$30.00
		2	\$1.00
		3	\$20.00
		4	\$1.00
		5	\$1.00
		6	\$1.00
		7	\$1.00
		8	\$1.00
		9	\$1.00
		10	\$1.00
		11	\$1.00
		12	\$1.00
		13	\$1.00
		14	\$1.00
		15	\$30.00
		16	\$30.00
		17	\$1.00
		18	\$1.00
		19	\$30.00
		20	\$1.00
		21	\$1.00
		22	\$1.00
		23	\$30.00
		24	\$30.00
		25	\$30.00
		26	\$1.00
		27	\$1.00
		28	\$30.00
		29	\$1.00
		30	\$1.00
		31	\$1.00
LEWIS	21	1	\$35.00
		2	\$35.00
		3	\$35.00
		4	\$35.00
		5	\$1.00
		6	\$35.00
		7	\$1.00
		8	\$1.00
		9	\$1.00
LINCOLN	22	1	\$25.00
		2	\$25.00
		3	\$1.00
		4	\$25.00
		5	\$25.00
		6	\$25.00
		7	\$25.00
		8	\$25.00
		9	\$25.00
		10	\$1.00

OIL & GAS RESERVE RATES FOR TY 2017			
COUNTY	CO.#	DISTRICT#	TY2017 \$/AC
LOGAN	23	1	\$15.00
		2	\$15.00
		3	\$15.00
		4	\$15.00
		5	\$1.00
		6	\$1.00
		7	\$1.00
		8	\$15.00
		9	\$1.00
MARION	24	1	\$1.00
		2	\$90.00
		3	\$1.00
		4	\$1.00
		5	\$1.00
		6	\$1.00
		7	\$1.00
		8	\$1.00
		9	\$90.00
		10	\$1.00
		11	\$90.00
		12	\$90.00
		13	\$1.00
		14	\$1.00
		15	\$1.00
		16	\$90.00
		17	\$1.00
		18	\$90.00
		19	\$90.00
		20	\$1.00
		21	\$1.00
		22	\$1.00
MARSHALL	25	1	\$1.00
		2	\$1.00
		3	\$100.00
		4	\$100.00
		5	\$100.00
		6	\$1.00
		7	\$100.00
		8	\$1.00
		9	\$100.00
		10	\$1.00
		11	\$1.00
		12	\$100.00
		13	\$100.00
		14	\$100.00
		15	\$100.00
		16	\$1.00

OIL & GAS RESERVE RATES FOR TY 2017			
COUNTY	CO #	DISTRICT #	TY2017 \$/AC
MASON	26	1	\$1.00
		2	\$25.00
		3	\$25.00
		4	\$25.00
		5	\$25.00
		6	\$25.00
		7	\$1.00
		8	\$1.00
		9	\$1.00
		10	\$25.00
		11	\$1.00
		12	\$1.00
		13	\$1.00
		14	\$25.00
		15	\$25.00
		16	\$25.00
MC DOWELL	27	1	\$20.00
		2	\$1.00
		3	\$20.00
		4	\$20.00
		5	\$1.00
		6	\$20.00
		7	\$1.00
		8	\$1.00
		9	\$1.00
		10	\$1.00
		11	\$20.00
		12	\$1.00
		13	\$20.00
		14	\$1.00
		15	\$1.00
		16	\$1.00
MERCER	28	1	\$1.00
		2	\$15.00
		3	\$1.00
		4	\$1.00
		5	\$1.00
		6	\$15.00
		7	\$1.00
		8	\$1.00
		9	\$15.00
		10	\$1.00
		11	\$15.00

OIL & GAS RESERVE RATES FOR TY 2017			
COUNTY	CO #	DISTRICT #	TY2017 \$/AC
MINERAL	29	1	\$1.00
		2	\$1.00
		3	\$1.00
		4	\$1.00
		5	\$1.00
		6	\$1.00
		7	\$1.00
		8	\$1.00
		9	\$1.00
		10	\$1.00
		11	\$1.00
MINGO	30	1	\$1.00
		2	\$1.00
		3	\$20.00
		4	\$20.00
		5	\$20.00
		6	\$20.00
		7	\$20.00
		8	\$1.00
		9	\$20.00
		10	\$20.00
		11	\$20.00
		12	\$1.00
MONONGALIA	31	1	\$30.00
		2	\$1.00
		3	\$30.00
		4	\$30.00
		5	\$30.00
		6	\$1.00
		7	\$30.00
		8	\$30.00
		9	\$1.00
		10	\$1.00
		11	\$1.00
		12	\$1.00
		13	\$1.00
		14	\$1.00
		15	\$1.00
		16	\$1.00
		17	\$1.00
		18	\$30.00
		19	\$1.00

OIL & GAS RESERVE RATES FOR TY 2017			
COUNTY	CO #	DISTRICT #	TY2017 \$/AC
MONROE	32	1	\$1.00
		2	\$1.00
		3	\$1.00
		4	\$1.00
		5	\$1.00
		6	\$1.00
		7	\$1.00
		8	\$1.00
		9	\$1.00
MORGAN	33	1	\$1.00
		2	\$1.00
		3	\$1.00
		4	\$1.00
		5	\$1.00
		6	\$1.00
		7	\$1.00
		8	\$1.00
NICHOLAS	34	1	\$1.00
		2	\$15.00
		3	\$15.00
		4	\$15.00
		5	\$1.00
		6	\$1.00
		7	\$15.00
		8	\$1.00
		9	\$1.00
OHIO	35	1	\$1.00
		2	\$1.00
		3	\$100.00
		4	\$100.00
		5	\$1.00
		6	\$100.00
		7	\$1.00
		8	\$1.00
		9	\$1.00
		10	\$1.00
PENDLETON	36	1	\$1.00
		2	\$10.00
		3	\$1.00
		4	\$1.00
		5	\$1.00
		6	\$1.00
		7	\$10.00

OIL & GAS RESERVE RATES FOR TY 2017			
COUNTY	CO #	DISTRICT #	TY2017 \$/AC
PLEASANTS	37	1	\$46.00
		2	\$46.00
		3	\$45.00
		4	\$46.00
		5	\$46.00
		6	\$1.00
		7	\$46.00
		8	\$45.00
POCAHONTAS	38	1	\$1.00
		2	\$1.00
		3	\$1.00
		4	\$1.00
		5	\$1.00
		6	\$1.00
		7	\$1.00
		8	\$1.00
PRESTON	39	1	\$30.00
		2	\$30.00
		3	\$30.00
		4	\$30.00
		5	\$30.00
		6	\$30.00
		7	\$1.00
		8	\$30.00
		9	\$1.00
		10	\$30.00
		11	\$1.00
		12	\$1.00
		13	\$1.00
		14	\$1.00
		15	\$1.00
		16	\$1.00
		17	\$1.00
		18	\$1.00
		19	\$1.00
		20	\$1.00
PUTNAM	40	1	\$25.00
		2	\$25.00
		3	\$1.00
		4	\$25.00
		5	\$1.00
		6	\$1.00
		7	\$1.00
		8	\$25.00
		9	\$1.00
		10	\$25.00
		11	\$25.00
		12	\$25.00
		13	\$1.00

OIL & GAS RESERVE RATES FOR TY 2017			
COUNTY	CO #	DISTRICT #	TY2017 S/AG
RALEIGH	41	1	\$20.00
		2	\$20.00
		3	\$1.00
		4	\$1.00
		5	\$20.00
		6	\$1.00
		7	\$20.00
		8	\$20.00
		9	\$20.00
		10	\$1.00
		11	\$20.00
		12	\$20.00
RANDOLPH	42	1	\$20.00
		2	\$20.00
		3	\$1.00
		4	\$20.00
		5	\$1.00
		6	\$1.00
		7	\$1.00
		8	\$1.00
		9	\$1.00
		10	\$20.00
		11	\$20.00
		12	\$1.00
		13	\$1.00
		14	\$1.00
		15	\$1.00
		16	\$20.00
		17	\$1.00
		18	\$1.00
RITCHIE	43	1	\$70.00
		2	\$1.00
		3	\$70.00
		4	\$1.00
		5	\$70.00
		6	\$1.00
		7	\$70.00
		8	\$1.00
		9	\$1.00
		10	\$70.00

OIL & GAS RESERVE RATES FOR TY 2017			
COUNTY	CO #	DISTRICT #	TY2017 \$/AC
ROANE	44	1	\$35.00
		2	\$35.00
		3	\$35.00
		4	\$35.00
		5	\$1.00
		6	\$38.00
		7	\$35.00
		8	\$1.00
		9	\$35.00
SUMMERS	45	1	\$1.00
		2	\$1.00
		3	\$1.00
		4	\$1.00
		5	\$10.00
		6	\$1.00
		7	\$1.00
TAYLOR	46	1	\$1.00
		2	\$1.00
		3	\$90.00
		4	\$90.00
		5	\$90.00
		6	\$90.00
		7	\$90.00
TUCKER	47	1	\$20.00
		2	\$20.00
		3	\$1.00
		4	\$1.00
		5	\$20.00
		6	\$1.00
		7	\$1.00
		8	\$1.00
		9	\$20.00
		10	\$1.00
		11	\$20.00
		12	\$1.00

[illegible]

OIL & GAS RESERVE RATES FOR TY 2017			
COUNTY	CO #	DISTRICT #	TY2017 \$/AC
WETZEL	52	1	\$90.00
		2	\$90.00
		3	\$90.00
		4	\$90.00
		5	\$90.00
		6	\$1.00
		7	\$1.00
		8	\$90.00
		9	\$1.00
		10	\$1.00
		11	\$1.00
		12	\$90.00
		13	\$1.00
WIRT	53	1	\$35.00
		2	\$35.00
		3	\$35.00
		4	\$1.00
		5	\$35.00
		6	\$35.00
		7	\$35.00
		8	\$35.00
WOOD	54	1	\$40.00
		2	\$40.00
		3	\$40.00
		4	\$40.00
		5	\$1.00
		6	\$40.00
		7	\$40.00
		8	\$40.00
		9	\$40.00
		10	\$1.00
		11	\$40.00
		12	\$40.00
		13	\$1.00
		14	\$1.00
WYOMING	55	1	\$20.00
		2	\$20.00
		3	\$20.00
		4	\$20.00
		5	\$20.00
		6	\$1.00
		7	\$20.00
		8	\$1.00
		9	\$1.00
		10	\$20.00

**MANAGED TIMBER
PROPERTY ANALYSIS**

Tax Year 2017

June 30, 2016
Mark W. Matkovich
State Tax Commissioner
Department of Revenue

MANAGED TIMBERLAND APPRAISAL RATES

TAX YEAR 2017

(based on market 2011-2016)

Rates Per Acre

Class II Parcels

	<u>Grade 1</u>	<u>Grade 2</u>	<u>Grade 3</u>
Region 1	\$205	\$140	\$50
Region 2	\$200	\$140	\$50
Region 3	\$265	\$175	\$50
Region 4	\$270	\$185	\$55
Region 5	\$205	\$140	\$50

Class III/IV Parcels

	<u>Grade 1</u>	<u>Grade 2</u>	<u>Grade 3</u>
Region 1	\$225	\$150	\$75
Region 2	\$225	\$150	\$75
Region 3	\$240	\$155	\$75
Region 4	\$245	\$165	\$75
Region 5	\$225	\$150	\$75

Region 1 = Brooks, Cabell, Hancock, Jackson, Marshall, Mason, Ohio, Pleasants, Putnam, Tyler, Wetzel, and Wood Counties

Region 2 = Braxton, Calhoun, Clay, Doddridge, Gilmer, Harrison, Lewis, Marion, Monongalia, Ritchie, Roane, Taylor, and Wirt Counties

Region 3 = Barbour, Greenbrier, Monroe, Nicholas, Pendleton, Pocahontas, Preston, Randolph, Tucker, Upshur, and Webster Counties

Region 4 = Berkeley, Grant, Hampshire, Hardy, Jefferson, Mineral and Morgan Counties

Region 5 = Boone, Fayette, Kanawha, Lincoln, Logan, McDowell, Mercer, Mingo, Raleigh, Summers, Wayne, and Wyoming Counties

Harvest Volumes per Acre

Harvest Interval Grades

	<u>35 yrs.</u>	<u>45 yrs.</u>	<u>55 yrs.</u>	<u>80 yrs.</u>		<u>Total</u>
1 - Site Index 75 or more	4.6 cords 1.5 Mbf	-- --	2.8 cords 4.4 Mbf	3.3 cords 8.6 Mbf		10.5 cords 14.5 Mbf
2 - Site Index 65-75	3.3 cords 1.0 Mbf	-- --	7.0 cords 3.2 Mbf	4.6 cords 5.5 Mbf		14.9 cords 9.7 Mbf
3 - Site Index less than 65	-- --	3.1 cords 0.8 Mbf	-- --	15.4 cords 3.7 Mbf		18.5 cords 4.5 Mbf

Managed Timberland Statistics

Estimation of Required Rate of Return: Class II Rates

A. Safe Rate of Return (5 Year T-Bill Rate)

Year	Rate	W/A %	W/A Rate
2015	1.5292	25.87%	0.4078
2014	1.6410	33.33%	0.5469
2013	1.1728	13.33%	0.1863
2012	0.7608	6.67%	0.0507
2011	1.5228	20.00%	0.3045

1.486 %

B. Nonliquidity Rate

(12 Month T-Bills vs. 3 Month T-Bills)

Year	Rate	W/A %	W/A Rate
2015	0.2883	33.33%	0.0884
2014	0.0883	26.67%	0.0239
2013	0.0733	20.00%	0.0147
2012	0.1292	13.33%	0.0172
2011	0.1817	6.67%	0.0121

0.187 %

C. Risk Rate (30 yr T-Bills vs 5 yr T-Bills)

Year	Rate	W/A %	W/A Rate
2015	1.3117	13.33%	0.1748
2014	1.6992	26.67%	0.4632
2013	2.2768	20.00%	0.4552
2012	2.1808	33.33%	0.7199
2011	2.3883	6.67%	0.1593

1.962 %

D. Management Factor of 0.5%

0.500 %

E. Property Tax Component

(60% of Class II Rate)

Year	Rate	W/A %	W/A Rate
2015	0.714	33.33%	0.2380
2014	0.714	26.67%	0.1904
2013	0.708	20.00%	0.1416
2012	0.714	13.33%	0.0952
2011	0.708	6.67%	0.0472

0.792 %

F. Inflation Rate

(Bureau of Labor Statistics)

Year	Rate	W/A %	W/A Rate
2015	0.730	33.33%	0.2433
2014	0.760	26.67%	0.2027
2013	1.500	20.00%	0.3000
2012	1.700	13.33%	0.2266
2011	3.000	6.67%	0.2001

(1.173) %

TOTAL REQUIRED RATE OF RETURN (REAL)

3.828 %

LESS: PROPERTY TAX COMPONENT

(0.712)

TOTAL DISCOUNT COMPONENT

2.913 %

Stumpage Prices:

	<u>Sawtimber</u>	<u>Pulpwood</u>
Stumpage Price Adjustment Factor	0.00%	1.85%

		1,000	1,000	1,000	1,000
<u>SAWTIMBER</u>	Current	\$/MBF at age	\$/MBF at age	\$/MBF at age	\$/MBF at age
Region	\$/MBF	35	45	55	80
Region 1	181.34	181.34	181.34	181.34	181.34
Region 2	172.92	172.92	172.92	172.92	172.92
Region 3	239.28	239.28	239.28	239.28	239.28
Region 4	235.49	235.49	235.49	235.49	235.49
Region 5	190.59	190.59	190.59	190.59	190.59

		1,8995	2,2816	2,7407	4,3839
<u>PULPWOOD</u>		\$/cd at age	\$/cd at age	\$/cd at age	\$/cd at age
Region	\$/Cord	35	45	55	80
Region 1	8.54	18.23	18.49	23.41	37.02
Region 2	8.78	12.78	18.36	18.45	29.18
Region 3	5.13	9.75	11.71	14.07	22.24
Region 4	8.10	18.39	18.49	22.21	35.12
Region 5	5.77	10.96	13.18	18.81	25.00

Management Costs:

Region	\$/acre (1)
1	3.17
2	3.17
3	3.17
4	3.17
5	3.17
State	

Tax Rates:

Effective Federal Income Tax Rate	35.00%
Effective WV State Income Tax Rate (6.5% * (1-35))	4.23%
Effective WV Severance Tax Rate (1.5% * (1-35))	0.98%

Yield (Volumes) (80 year rotation)

Timberland	Site Index	Yield - MBF	Yield - Cord
Productivity Grades			
Grade I	75 or more	14.5	10.5
Grade II	66-74	9.7	14.8
Grade III	less than 65	4.5	18.5

Managed Timberland Statistics

Estimation of Required Rate of Return: Class III & IV Blended Rates

A. Safe Rate of Return (5 Year T-Bill Rate)

Year	Rate	W/A %	W/A Rate
2015	1.6292	26.67%	0.4079
2014	1.6410	33.33%	0.5468
2013	1.1725	13.33%	0.1563
2012	0.7608	6.67%	0.0307
2011	1.5225	20.00%	0.3045

1.465 %

B. Nonliquidity Rate

(12 Month T-Bills vs. 3 Month T-Bills)

Year	Rate	W/A %	W/A Rate
2015	0.2683	33.33%	0.0894
2014	0.0889	26.67%	0.0235
2013	0.0739	20.00%	0.0147
2012	0.1292	13.33%	0.0172
2011	0.1817	6.67%	0.0121

0.157 %

C. Risk Rate (30-yr T-Bills vs. 5-yr T-bills)

Year	Rate	W/A %	W/A Rate
2015	1.3117	13.33%	0.1748
2014	1.6992	26.67%	0.4532
2013	2.2758	20.00%	0.4552
2012	2.1680	33.33%	0.7199
2011	2.3869	6.67%	0.1593

1.952 %

D. Management Factor of 0.5%

0.500 %

E. Property Tax Component

(60% of Blended III&IV Rates)

Year	Rate	W/A %	W/A Rate
2015	1.314	33.33%	0.4380
2014	1.314	26.67%	0.3504
2013	1.314	20.00%	0.2628
2012	1.328	13.33%	0.1768
2011	1.328	6.67%	0.0884

1.316 %

F. Inflation Rate

(Bureau of Labor Statistics)

Year	Rate	W/A %	W/A Rate
2015	0.730	33.33%	0.2433
2014	0.760	26.67%	0.2027
2013	1.500	20.00%	0.3000
2012	1.700	13.33%	0.2266
2011	3.000	6.67%	0.2061

(1.173) %

TOTAL REQUIRED RATE OF RETURN (REAL)

4.229 %

LESS: PROPERTY TAX COMPONENT

(1.316)

TOTAL DISCOUNT COMPONENT

2.913 %

Stumpage Prices:

	<u>Sawtimber</u>	<u>Pulpwood</u>
Stumpage Price Adjustment Factor	0.00%	1.85%

		1,0000	1,0000	1,0000	1,0000
SAWTIMBER	Current	\$/MBF at age	\$/MBF at age	\$/MBF at age	\$/MBF at age
Region	\$/MBF	35	45	55	60
Region 1	181.34	181.34	181.34	181.34	181.34
Region 2	172.92	172.92	172.92	172.92	172.92
Region 3	239.28	239.28	239.28	239.28	239.28
Region 4	235.49	235.49	235.49	235.49	235.49
Region 5	190.59	190.59	190.59	190.59	190.59

		1,8888	2,2818	2,7407	4,3339
PULPWOOD	\$/cd at age	\$/cd at age	\$/cd at age	\$/cd at age	\$/cd at age
Region	\$/cd at age	35	45	55	60
Region 1	8.54	18.23	19.49	23.41	37.02
Region 2	6.73	12.70	16.38	18.46	28.15
Region 3	5.13	9.75	11.71	14.07	22.24
Region 4	8.10	15.39	18.49	22.21	35.12
Region 5	0.77	10.96	13.18	15.81	25.00

Management Costs:

Region	S/acres (1)
1	3.17
2	3.17
3	3.17
4	3.17
5	3.17
State	

Tax Rates:

Effective Federal Income Tax Rate:	35.00%
Effective WV State Income Tax Rate: $(6.5\% * (1 - 35))$:	4.23%
Effective WV Severance Tax Rate: $(1.5\% * (1 - 35))$:	0.98%

Yield (Volumes) (80 year rotation)

Timberland Productivity Grades	Site Index	Yield - MBF	Yield - Cords
Grade I	75 or more	14.5	10.5
Grade II	65-74	9.7	14.9
Grade III	less than 65	4.5	18.5

West Virginia Wgt/Avg Managed Timberland Stumpage Prices

REGION 1 - Sawtimber

Year	Volume	\$/MBF	W/A%	\$/MBF
2015	12,561.80	192.85	33.33%	64.28
2014	12,162.06	176.34	26.67%	47.02
2013	19,017.77	177.46	20.00%	35.49
2012	12,628.15	186.56	13.33%	24.87
2011	11,195.24	144.89	6.67%	9.88
	67,565.02			181.34

REGION 1 - Pulpwood

Year	Volume	\$/CORD	W/A%	\$/CORD
2015	7,218.90	15.03	33.33%	5.01
2014	464.40	5.40	26.67%	1.44
2013	6,102.20	2.98	20.00%	0.59
2012	48,387.00	6.42	13.33%	0.85
2011	48.10	0.87	6.67%	0.64
	59,220.60			8.34

REGION 2 - Sawtimber

Year	Volume	\$/MBF	W/A%	\$/MBF
2015	26,487.85	175.25	33.33%	58.42
2014	22,001.80	182.47	26.67%	48.88
2013	26,898.85	177.79	20.00%	35.56
2012	25,840.98	148.01	13.33%	18.87
2011	12,639.41	158.26	6.67%	10.42
	112,866.69			172.82

REGION 2 - Pulpwood

Year	Volume	\$/CORD	W/A%	\$/CORD
2015	42,883.30	5.97	33.33%	1.99
2014	2,168.10	5.04	26.67%	1.34
2013	119,279.40	12.83	20.00%	2.57
2012	22,847.40	2.85	13.33%	0.38
2011	5,235.20	6.78	6.67%	0.45
	192,193.40			8.73

REGION 3 - Sawtimber

Year	Volume	\$/MBF	W/A%	\$/MBF
2016	135,967.80	207.12	33.33%	69.04
2014	91,467.44	280.52	26.67%	74.81
2013	161,387.70	275.63	20.00%	55.13
2012	111,920.60	201.57	13.33%	26.88
2011	102,218.30	201.45	6.67%	13.43
	602,971.84			239.28

REGION 3 - Pulpwood

Year	Volume	\$/CORD	W/A%	\$/CORD
2016	184,907.30	3.85	33.33%	1.28
2014	170,796.30	3.57	26.67%	0.99
2013	163,187.40	7.78	20.00%	1.66
2012	183,132.60	6.39	13.33%	0.85
2011	159,040.70	7.34	6.67%	0.48
	851,014.30			5.13

REGION 4 - Sawtimber

Year	Volume	\$/MBF	WIA%	\$/MBF
2015	6,644.42	223.42	33.33%	74.47
2014	5,820.00	303.89	26.67%	81.04
2013	12,820.20	211.47	20.00%	42.29
2012	4,808.73	193.47	13.33%	25.80
2011	15,517.51	176.40	6.67%	11.89
	44,811.76			238.49

REGION 4 - Pulpwood

Year	Volume	\$/CORD	WIA%	\$/CORD
2015	6,137.40	7.22	33.33%	2.41
2014	7,765.20	8.18	26.67%	2.18
2013	15,488.60	8.32	20.00%	1.66
2012	7,382.20	9.61	13.33%	1.29
2011	21,074.10	8.64	6.67%	0.58
	67,847.50			8.10

REGION 5 - Sawtimber

Year	Volume	\$/MBF	WIA%	\$/MBF
2015	37,714.40	160.16	33.33%	53.38
2014	21,681.40	265.95	26.67%	70.92
2013	31,859.00	198.20	20.00%	39.64
2012	10,887.05	138.63	13.33%	18.48
2011	24,780.43	122.43	6.67%	8.18
	128,882.28			190.59

REGION 5 - Pulpwood

Year	Volume	\$/CORD	WIA%	\$/CORD
2015	2,889.80	4.05	33.33%	1.35
2014	10,191.40	6.19	26.67%	1.65
2013	18,202.60	7.13	20.00%	1.43
2012	8,208.30	6.93	13.33%	0.92
2011	6,432.30	6.28	6.67%	0.42
	46,102.10			5.77

COAL PROPERTIES ANALYSIS

Tax Year 2017

June 30, 2016
Mark W. Matkovich
State Tax Commissioner
Department of Revenue

COAL CAPITALIZATION RATE

Capitalization Rate Analysis and Results:

In developing a capitalization rate for use in valuing specific income-producing properties, consideration is given to the three approaches generally employed in estimating a discount rate. As a matter of practicality, the Bands-of-Investment and Summation Technique approaches are utilized in establishing discount rates for active coal. Data for analysis has been derived in accordance with current Legislative Rule TUG 110, Series 11.

<u>Safe Rate:</u>	<u>90 day Treasury Bills:</u>	<u>Safe Rate:</u>	
January:	December:	2016	0.063%
January:	December:	2014	0.033%
January:	December:	2013	0.068%

Risk Rate:	Interest differential between Loan Rate and 90 day Treasury Bills:	Debt Risk Rate:
Loan Rate:		
2015	5.26%	5.207%
2014	5.25%	5.217%
2013	5.25%	5.192%
	*Prime plus 2%	

Equity:	Differential between Equity Rates and 90 day Treasury Bills:	Equity Risk Rate:
Equity Rate:		
2015	(14.75%/(1-.30))-0.053	21.038%
2014	(15.50%/(1-.30))-0.033	22.110%
2013	(13.25%/(1-.30))-0.058	18.871%
	** Value Line Investment Survey Analysis:	

Composite Risk Rate:	Loan and Equity Rates, weighted by industry estimated capital structure:	
Equity Rate:	Debt Rate:	Composite Risk:
2015: 13.875%	1.822%	15.497%
2014: 15.477%	1.585%	17.042%
2013: 11.922%	2.077%	13.399%
Note: Debt/Equity Ratio	Debt 35%	Equity 65%

Non Liquidity Rate: Interest differential between a 90-day Treasury Bill and a 1-year Treasury Bill which reflects a reasonable time necessary to sell active property.

		1Yr T Bill	90 d T Bill	Non Liquidity Rate	
January:	December:	2016	0.322%	0.059%	0.269%
January:	December:	2014	0.121%	0.033%	0.088%
January:	December:	2013	0.132%	0.058%	0.074%

Management Rate: Charges for the management of investment portfolios.
Fixed Rate (by Rule) 0.500%

<u>Inflation Rate</u>			
January:	December:	2015	0.730%
January:	December:	2014	0.760%
January:	December:	2013	1.800%

Capitalization Rate: Since the valuation of active coal property is predicated on a three-year production average, the capitalization rate is considered in a similar manner.

	2015	2014	2013
Inflation Rate:	-0.730%	-0.760%	-1.800%
Safe Rate:	0.053%	0.033%	0.068%
Composite Risk Rate	15.497%	17.042%	13.399%
Non Liquidity Rate	0.269%	0.088%	0.074%
Management Rate:	0.500%	0.500%	0.500%
Total:	15.583%	16.993%	12.531%

Three Yr Average: 15.008 (Rounded to: 15.00%)

CAPITALIZATION RATE - 15.0%			
MULTIPLIERS:		%	%
1YR:	0.933	9YR:	9.117
2YR:	1.743	10YR:	5.382
3YR:	2.448	11YR:	5.813
4YR:	3.082	12YR:	5.813
5YR:	3.595	13YR:	5.987
6YR:	4.058	14YR:	6.138
7YR:	4.462	15YR:	6.271
8YR:	4.812		

COAC

Price and Royalty Rate Analysis

The development of royalty rates for the various categories of mines and markets involves information collection and review from a variety of sources. Coal lease sales have been derived from transaction information provided by county producers, assessors, tax auditors, and by individual lessors/lessees involved in the specific transaction. The prices for mined coal, as per 110-CSR-11, have been calculated from information provided by the WV Public Service Commission and U.S. Energy Information Administration concerning power plant fuel purchases. Prices provided by producers as part of tax filing and from data obtained from market summaries are included for comparison. Because a large portion of the data used in this analysis is, by law, considered confidential, only a summary of the results are published.

WVPSG Fuel Purchases for 2015 was not available at the time of this publication.

COAL SALE PRICES BY 2015 FOR TY2017 APPLICATION

GRAND SUMMARY ALL SOURCES 2015	STEAM SPOT	STEAM TERM	MET
PSG	na	na	
FERC	\$44.10	\$60.84	
Active Return Summary		\$56.62 55.0 MM Tons	\$82.95 3.1 MM Tons
Coal Market Publication (Platts)		\$48.09 CAP (12/1/57) Barge	
		\$46.65 PGH (13/3) Rail	
			\$87.84 Low Vol (HCC)

STATE STEAM PRICE (SPOT Market)	\$58.88 FERC 4 PSG 3-YR AVE
STATE MET PRICE	\$87.65 Active Return 1 YR

2015 WVPSG Tons Reported (in millions)	Spot Sales	Term Sales	Total
	na	na	na

COAL TY2017 ROYALTY RATES	2015		2014		2013		2012		2011	
	1YR		2YR		3YR		4YR		5YR	
	%S	%D	%S	%D	%S	%D	%S	%D	%S	%D
TOTAL RECORDS:	447	452	1,447	905	1,354	599	1,908	2,759	1,677	2,241
SUM of PERCENT	2904.86	2327.95	8,889.07	4,698.25	8,097.34	3,313.93	11,861.68	14,883.03	8,824.28	11,181.05
STRAIGHT AVERAGE	6.50	5.15	6.13	5.19	5.92	5.53	6.23	5.32	5.32	4.99
MEDIAN	6.00	6.00	6.00	5.00	5.00	5.00	6.00	5.13	5.00	5.00
WEIGHTED AVERAGE (by Mine)	6.50	6.10	6.34	5.48	5.68	5.64	6.45	6.28	6.27	5.72
TENTATIVE RATE DEEP (%)	5.89									
TENTATIVE RATE SURFACE (%)	6.64									

ROYALTY RATE CALCULATIONS

Steam Coal Deep Mine	\$56.66	per ton X	5.89%	=	\$3.35	per ton
Metallurgical Coal Deep Mine	\$87.86	per ton X	6.68%	=	\$5.88	per ton
Steam Coal Surface Mine	\$58.88	per ton X	6.61%	=	\$3.89	per ton
Metallurgical Coal Surface Mine	\$87.65	per ton X	6.64%	=	\$5.79	per ton

Explanation of Reserve Coal Valuation

The RCVM consists of a computer model, which utilizes a database consisting of coal beds and characteristics, property locations, mine locations, sales, transportation, etc., for the entire state. An extensive algorithm calculates in-place tonnage, expected time of mining and present value for all the mineable coal on every property.

There are, therefore, no set "rates" available on reserve coal under the Rule. The RCVM values on each property will not be available until all data has been entered, after October 15 of each year. Please refer to the State Register, Legislative Rules, Title 110, Series II for details of the process.

Title 110, Series 41
Valuation of Active and Reserve Coal Property for Ad Valorem Property Tax Purposes

The above Legislative Rule was modified during the 2005 Legislative Session requiring biennial (every other year) updating of the geostatistical basis for several valuation factors used in the Reserve Coal Valuation Model. To satisfy that requirement, maps and data files concerning the Market Interest Factor, the Market Mineability Factor, the Use Conflict Factor and the Environmental Factor have been revised for Tax Year 2015. Preliminary research has been conducted to determine the effects of the factors on coal valuation. The results are as follows:

Market Interest Factor

This is the relationship between transactions (sales, leases, prospects, permit applications, etc.) and mining as it relates to properties and locations. Trans_CI is the number of transactions counted within the radius.

Radius = 5 miles

If Trans_CI >= 20 Then TransFactor = 20

If Trans_CI < 20 And Trans_CI >= 10 Then TransFactor = 40

Else TransFactor = 80

Market Mineability Factor

This is the relationship between property location and mining, through time. Determining feature is count of mines within the radius.

Radius = 2.5 miles

Surface Mines: Surface

Deep Mines: Drilling

Boom Mines: Drilling

Historic Mines: On-line

Current Mines: On-line

To assign MineFactor

If On-line > 0 Then MineFactor = 20

If On-line = 0 And (Drilling > 0 Or Drilling > 0) Then MineFactor = 40

Else MineFactor = 80

Use Conflict Factor

This is the relationship between oil & gas well drilling and mining as it relates to property location. Well density is in wells per square miles.

WellDensity < 5 Then WellFactor = 0

WellDensity >= 5 And WellDensity < 10 Then WellFactor = 20

WellDensity >= 10 And WellDensity < 20 Then WellFactor = 40

WellDensity >= 20 Then WellFactor = 80

Environmental Factor

This is the relationship of known environmental hazards and impediments to the likelihood of mining occurring at this location. The rates are compiled from maps and represent densities of problems mapped.

EnvRate <= 20 or Null Then EnvFactor = 0

EnvRate > 20 and EnvRate <= 40 Then EnvFactor = 20

EnvRate > 40 and EnvRate <= 80 Then EnvFactor = 40

EnvRate >= 80 Then EnvFactor = 80

**OTHER MINED MINERAL
PROPERTY ANALYSIS**

Tax Year 2017

June 30, 2016
Mark W. Matkovich
State Tax Commissioner
Department of Revenue

OTHER MINED MINERALS CAPITALIZATION RATE

Capitalization Rate Analysis and Results

In developing a capitalization rate for use in valuing specific income-producing properties, consideration is given to the three approaches generally employed in estimating a discount rate. As a matter of practicality, the Bands-of-Investment and Summation Technique approaches are utilized in establishing discount rates for active coal. Data for analysis has been derived in accordance with current Legislative Rule Title 110, Series 1K.

Safe Rate	90 day Treasury Bill:		Safe Rate
January	December	2015	0.053%
January	December	2014	0.033%
January	December	2013	0.058%

Risk Rate	Interest differential between Loan Rate and 90-day Treasury Bill:	
Loan Rate:	Debt Risk Rate:	
2015	5.26%	5.207%
2014	5.25%	5.217%
2013	5.25%	5.152%
	Prime plus 2%	

Equity:	Differential between Equity Rates and 90-day Treasury Bill:	
Equity Rate:	Equity Risk Rate:	
2015	$[11.75\% / (1 - .30)] - 0.053$	16.753%
2014	$[11.75\% / (1 - .30)] - 0.033$	16.753%
2013	$[11.75\% / (1 - .30)] - 0.058$	16.728%
	** Value Line Investment Survey Analysis:	

Composite Risk Rate		Loan and Equity Rates weighted by industry estimated capital structure:	
	Equity Rate	Debt Rate	Composite Risk
2015	10.040%	2.083%	12.123%
2014	10.032%	2.087%	12.139%
2013	10.037%	2.077%	12.114%
Note: Debt/Equity Ratio		Debt 40%	Equity 60%

<u>Non-Liquidity Rate:</u>		Interest differential between 90 day Treasury Bill and a 1 year Treasury Bill which reflects a reasonable time necessary to sell active property.			
		1-yr T. Bill:	90-day T. Bill:	Non-Liquidity Rate:	
January:	December	2015	0.322%	0.053%	0.269%
January:	December	2014	0.121%	0.033%	0.088%
January:	December	2013	0.132%	0.058%	0.074%

Management Rate	Charges for the management of investment portfolio:	
Fixed Rate (by Rule):	0.500%	

Inflation Rates			
January	December	2013	0.730%
January	December	2014	0.760%
January	December	2013	1.500%

<u>Property Tax Rate:</u>	<u>Sixty percent (60%) of State average Class III property tax rates:</u>		
January	December	2015	60% of 2.190 = 1.314%
January	December	2014	60% of 2.190 = 1.314%
January	December	2013	60% of 2.190 = 1.314%

Capitalization Rate:	Since the valuation of other mined mineral property is postulated on a three year production average, the capitalization rate is considered in a similar manner:		
	2015	2014	2013
Inflation Rate:	-0.730%	-0.760%	-1.500%
Safe Rate:	0.053%	0.033%	0.058%
Composite Risk Rate:	12.123%	12.139%	12.114%
Non-Liquidity Rate:	0.269%	0.088%	0.074%
Management Rate:	0.500%	0.500%	0.500%
Property Tax Rate:	1.314%	1.314%	1.314%
Total:	13.520%	13.314%	12.560%

Three-Yr Average: 13.134% Rounded to: 13.10%

CAPITALIZATION RATE - 13.10%

MULTIPLIERS:	%	%
1YR	0.940	9YR 5.437
2YR	1.772	10YR 5.748
3YR	2.507	11YR 6.022
4YR	3.137	12YR 6.268
5YR	3.731	13YR 6.480
6YR	4.240	14YR 6.668
7YR	4.688	15YR 6.837
8YR	5.088	

OTHER MINED MINERALS

ROYALTY RATE SURVEY

The determination of royalty rates for other mined minerals within the state of West Virginia is dependent upon the availability of leasehold information. Since this information is limited, the Department has chosen to review data for the most recent thirty year period. A summary only of this review is shown below in order to protect the confidentiality of parties involved.

RESOURCE	DATA SOURCES	AVERAGE ROYALTY	MEDIAN ROYALTY	TY2017 RATE
LIMESTONE	15	\$0.22	\$0.20	\$0.22
SANDSTONE	8	\$0.31	\$0.25	\$0.30
CLAY/SHALE	34	\$0.12	\$0.10	\$0.11
SAND/GRAVEL	10	\$0.35	\$0.40	\$0.40
SALT BRINE	1	N/A	N/A	\$0.10

RESERVE VALUES

	number of sales	\$/AC
LIMESTONE	5	\$3,000.00
SANDSTONE	8	\$2,300.00
CLAY/SHALE	16	\$850.00
SAND/GRAVEL	6	\$4,000.00
SALT	2	\$1,140.00

TAB 9

August 1, 2016

West Virginia State Tax Department
Property Tax Division
Attention: Jeff Amburgey
P.O. Box 2389
Charleston, WV 25328-2389

Dear Mr. Amburgey,

The Independent Oil and Gas Association of West Virginia, Inc. (IOGAWV) is hereby filing comments to the tentative natural resource property valuation variables for 2017 Tax Year.

West Virginia Code §11-3-1(a), as amended, states that: "All property, except public service businesses assessed pursuant to article six of this chapter, shall be assessed annually as of July 1 at sixty percent of its true and actual value; that is to say, at the price for which the property would sell if voluntarily offered for sale by the owner thereof, upon the terms as the property, the value of which is sought to be ascertained, is usually sold, and not the price which might be realized if the property were sold at a forced sale."

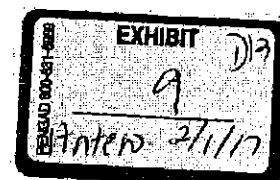
The Tax Commissioner has chosen the use of an "income approach" as the most appropriate method for the valuation of oil and natural gas properties as set forth in the Tax Commissioner's "Administrative Notice 2016-02, State Tax Commissioner's Statement Concerning Primary Reliance on the Income Approach to Value for Appraisals of Producing and Reserve Coal, Producing Oil and Gas, and Producing Other Mined Minerals Pursuant to §§ 110 CSR 11-4, 1J-4 and 1K-4". Administrative Notice 2016-02, states, in part, that, "The income approach to value is based upon the assumption that a property is worth the future income, discounted to present worth, that it will generate for a prospective buyer".

The use of the "income approach" to valuation requires the appraiser to consider realistic operating expenses to determine net cash flow as the basis for calculating "true and actual value". The method of calculating operating expenses for oil and gas wells as set forth in the State Tax Department's proposed valuation variables for Tax Year 2017 would result in grossly understated expenses, and further resulting in appraised values which would greatly exceed "true and actual value".

WV CSR §110-1J-4.1 of the Legislative Rule of the State Tax Department regarding Valuation of Producing and Reserve Oil and Natural Gas for Ad Valorem Property Tax Purposes, states that the value of oil and/or natural gas producing property shall be determined through the process of applying a yield capitalization model to the net receipts (gross receipts less royalties paid less operating expenses) for the working interest. Rule 4.1 would seem to require the deduction of actual operating expenses from the gross receipts. Rule 4.3 in that section does state that the Tax Commissioner shall every 5 years, determine the average industry operating expenses per well which will be deducted from working interest gross receipts.

The Tax Commissioner, in the last 10 years, has conducted surveys regarding operating expenses of all wells in 2007, 2009, 2013, and 2014. In addition, in 2013, a survey specifically for Marcellus wells was conducted and in 2014 a survey for Marcellus wells and horizontal wells other than Marcellus was conducted.

Although surveys have been used several times over the last 10 years, the State Tax Department continues its decades-old practice of basing annual operating expenses for conventional gas wells at:



30% of gross revenues with a cap of \$5,000 and for oil wells at 35% with a cap of \$5,750. In the last 10 years natural gas and oil prices have been extremely volatile. That volatility resulted in the dramatic changes in allowable expenses under the current valuation procedures. Those allowable expenses are not reflective of actual operating expenses.

By way of demonstration, the following is a table of published index prices for Appalachian gas delivered to the two primary pipelines in West Virginia, Columbia Gas Transmission and Dominion Transmission, Inc., showing average annual gas prices and the allowable expense per mcf of produced gas utilizing the State Tax Department's proposed expense allowance:

Year	Columbia		Dominion *	
	Index \$/Mcf	Exp @ 30%	Index \$/Mcf	Exp @ 30%
2007	\$7.1242	\$2.1373	\$7.2200	\$2.1660
2008	\$9.3858	\$2.8158	\$9.5292	\$2.8588
2009	\$4.1758	\$1.2528	\$4.2692	\$1.2808
2010	\$4.5267	\$1.3580	\$4.5867	\$1.3760
2011	\$4.1367	\$1.2410	\$4.1983	\$1.2595
2012	\$2.7933	\$0.8380	\$2.7850	\$0.8355
2013	\$3.6525	\$1.0958	\$2.8867	\$0.8660
2014	\$4.3650	\$1.3095	\$2.7383	\$0.8215
2015	\$2.5533	\$0.7660	\$0.8842	\$0.2653

(* Note: The Dominion Index prices for 2013, 2014 and 2015 reflect deductions for "Gateway Firm", which most producers delivering to Dominion are obligated to pay.)

In years of peak prices (2007, 2008) excessive expenses were not a factor, due to the \$5,000 expense cap. However, as prices have cratered, the 30% methodology does not reflect actual operating expenses. Whenever expenses are understated, appraised and assessed values are overstated, resulting in unfair property tax assessments.

To further demonstrate that the 30% expensed methodology is not appropriate, suppose a producer has two very similar wells that each produce 10 mcf/day, with one well delivering gas to Columbia and the other well delivering gas to Dominion, subject to Gateway transportation expenses. Using the proposed methodology, allowable expenses would be determined as follows:

	Columbia	Dominion
Mcf/Day	10	10
Days/Year	365	365
Annual Mcf	3650	3650
Gas Price - 2015	\$2.5533	\$0.8842
Total Revenues	\$9,319.67	\$3,227.21
30% Expenses	\$2,795.90	\$968.16

It is simply impossible to operate any oil and gas well in West Virginia for \$968 per year (or \$80 per month). It would be extremely difficult to operate a well for \$2,795.90 per year (\$233 per month) unless the well produced no fluid and required very minimal maintenance. These expenses do not reflect real costs, and, therefore, cannot be used to determine "true and actual value" as required under West Virginia Code §11-3-1(a). The proposed methodology is flawed, and will result in inconsistent and incorrect calculations of expenses, and inaccurate appraised values.

Costs to operators for such things as wages, health insurance expenses, gasoline for trucks, etc., have dramatically increased since 2007. However, in 2007 and 2008 a well making 10 mcf/day would have

generated in excess of \$25,000 in gross revenues, and allowable expenses (\$7,500) would have been capped at \$5,000 for ad valorem tax calculation purposes. However, as demonstrated above, allowable expenses for that same well for Tax Year 2017 would be just \$2,795, if the well delivered gas on the Columbia system, and just \$968.18 if the well was connected to Dominion and subject to Gateway charges. This is not realistic.

The appropriate mechanism to provide for accurate deductions of well operating expenses is to allow the submission of actual operating expenses as Rule 4.1 seems to require. Rule 4.3 provides for a mechanism (an average based on survey results) that the Tax Department could use to estimate if and when a producer does not provide actual operating expenses in a suitable format to be used in a yield capitalization model.

The State Tax Department has issued Administrative Notices regarding the valuation variable of oil and gas operating expenses in 2014, 2015, and 2016. In 2014, the notice stated that if a producer's ordinary expenses exceeded the stated maximums, then the Tax Department would accept and review documentation on wells for the previous three years provided by the producer as long as submitted on or before August 1st. The 2015 Administrative Notice repeated that option for producer submission of three years of actual operating expenses. However, the 2016 Notice does not even mention that option and IOGAWV has been informed that the Tax Department will not consider or review actual expenses submitted due to lack of personnel to have that accomplished. Entering data from Producer/Operator returns into the State Tax Department's evaluation system is a significant task. It would appear that the average Producer/Operator return has at least 40 data items to enter. Some returns, with extensively fractured royalty ownership, have hundreds of data items (names, addresses, percentages, royalty revenue, etc.) Adding "operating expense" would add just one more data item (likely a four-digit integer), which would be insignificant when considered in the context of the entire data entry operation.

IOGAWV believes that the Tax Department is required by Rule 4.1 to deduct actual operating expenses if accurate verifiable data is provided by the producer. In the absence of such data, if expenses are to be based on a percentage of gross revenues, it would seem appropriate to have a "floor" on operating expenses, recognizing that many legitimate operating costs are not in any way related to gross revenues. To ensure the most accurate appraisal possible, IOGAWV requests the Tax Commissioner to only use actual expenses whenever possible and to only use estimated operating expenses when actuals are not timely submitted.

IOGAWV gathered some samples of well revenue and operating expenses and it showed that the only solution for non-conventional wells is to be able to submit actual operating costs for fair property tax valuation. The current formula at 20% of revenue limited to \$150,000 per year for operating costs does not fit for any non-conventional wells.

Based on the sample wells IOGAWV finds the following recommendations to be appropriate:

- Non-conventional wells be allowed to submit actual operating costs for proper valuation in all cases.
- Conventional wells with flush production be allowed to submit actual operating costs but that would have to be done for all flush production wells submitted in that year.
- Other conventional wells will be part of the normal valuation formula with operating costs at 30% and a maximum of \$5,000 for natural gas but be allowed a minimum in that formula of \$2,500 per year operating costs.
- The minimum value for property tax purposes for a well will be \$500 which is the value assessed for home use wells.

- Conventional Oil wells be allowed a minimum of \$7,500 per year operating costs and also be able to submit actual operating costs for flush production years.

The State Tax Department needs to recognize that during these times of historic low natural gas commodity prices (the lowest in history, when adjusted for inflation), many wells in the State will be operating at a loss until prices recover. Considering recent market conditions, it could be argued that such wells are a liability, not an income producing asset, and have no "true and actual value". Whenever it can be shown that actual allowable expenses exceed production revenues net of royalties, IOGAWV suggests that such wells should be valued at the Minimum Working Interest Appraisal Rate of \$500 (as stated in the 2017 valuation variables).

IOGAWV appreciates the opportunity to file comments on this important matter and looks forward to the response.

Respectfully,

IOGA OF WEST VIRGINIA



Donald B. Nestor, Member
Finance and Taxation Committee

SPILMAN THOMAS & BATTLE
ATTORNEYS AT LAW

Dale W. Stenger
304.340.1692
e-mail: dstenger@spilmanlaw.com

July 29, 2016

RECEIVED

Via Hand Delivery

JUL 29 2016

West Virginia State Tax Department
Property Tax Division
Attention Jeff Amburgey, Director, Property Tax Division
1124 Smith Street
Charleston, WV 25301

State Tax Department
Property Tax Division

Re: Tentative Natural Resource Property Valuation Variables for 2017 Tax Year

Dear Director Amburgey:

The West Virginia Oil and Natural Gas Association (WVONGA) appreciates the opportunity to comment on the Tentative Natural Resource Property Valuation Variables for the 2017 Tax Year dated June 30, 2016. Our comments are limited to the tentative variables affecting the oil and natural gas industry.

WVONGA is a trade association that serves West Virginia's extensive oil and gas industry. WVONGA members operate in virtually every county in West Virginia. Its members employ thousands of people across the state, having payrolls totaling hundreds of millions of dollars annually. Its members have a cumulative investment of nearly \$10 billion in West Virginia, own about 20,000 oil and gas wells, have more than 15,000 miles of pipeline crisscrossing the state, and provide oil and natural gas to roughly 300,000 West Virginia homes and businesses.

In response to the recently published variables, WVONGA surveyed its members as to their actual operating expenses incurred in West Virginia. Responses received cover 65% of the total gas production and approximately 11,000 of the over 40,000 active wells in West Virginia for the 2015 calendar year. WVONGA's primary concerns with the published variables relate to the Working Interest Expense Allowance and the Maximum Operating Expenses allowed for typically producing wells and horizontal Marcellus wells.

Based on a review of the State's published variables, these two variables have remained unchanged, with the exception of the introduction of Marcellus/Utica and Horizontal well categories, since before tax year 2010 (2008 calendar year production). Conversely, the price of natural gas has decreased 66% during that same time period which includes a 28% decline since 2012 when the Marcellus group was added to the 2013 tax year variables.

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West Virginia North Carolina Pennsylvania Virginia

West Virginia State Tax Department
Property Tax Division
Attention Jeff Amburgey, Director, Property Tax Division
July 29, 2016
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While revenue has been declining for the industry's producers, operating expenses have not. By calculating an allowance for operating expense using the same variables as when gas was at a higher rate per MCF, the State is significantly understating actual operating expenses for the working interest portion of the tax calculation.

It also appears the State's maximum operating expense allowance fails to acknowledge all expenses needed to get natural gas to a salable state. Allowable expenses should not only include lease operating expenses, but also gathering, compression, processing, and transportation charges. The processing charges are especially prevalent for the Marcellus wells where wet gas needs to be processed before it can be sold for distribution, and are incurred, on average, at 17% of revenue. Compression can be upwards of 30% of revenue, depending on whether a company is vertically integrated or otherwise owns its own system.

The data collected from WVONGA members related to operating expense as a percentage of revenue, and average expenditure per well has been aggregated below for your consideration:

Well Type	State Working Interest Expense Allowance	Average WVONGA Participant Operating Expense as % of Revenue
Marcellus/Utica, Horizontal Wells	20%	38%
Typical Producing Wells	30%	41%

Well Type	Allowed Expense	WVONGA Average of Actual Expense
Marcellus/Utica, Horizontal Wells	\$150,000	\$720,000

In the State's calculation, the expense allowance and the maximum work together to determine the appropriate operating expense allowance to use in the discounted cash flow calculation. Unless the State addresses both of these variables, the values assigned to the gas wells for the 2017 tax year will be grossly overstated.

Additionally, WVONGA requests that the State revise the operating expense calculation for wells where both oil and gas are produced. When wells reach the maximum operating expense allowances for oil and gas, the State applies a weighted average approach to the maximum operating expense allowance.

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Property Tax Division
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As seen in the example provided below, a well that produces oil and gas at a level that reaches the maximum allowances is actually afforded a lesser operating expense allowance than a well that just produces gas at the same level. We suggest that, instead of a weighted average maximum, the State use a combined maximum in these cases.

Example:

	Gas WI Revenue	Oil WI Revenue	State OpEx Allowance Prior to Maximums	State OpEx Maximum
Gas Only Well	900,000	0	180,000	150,000
Gas & Oil Well	900,000	100,000	275,000	135,575

As the above industry data indicates, the maximum allowances as a percentage of working interest revenue and fixed dollar caps being employed by the State in its valuations is inappropriate as neither adequately reflects actual expenses being incurred by the industry to get produced gas to its point of sale. Accordingly, we believe that both should be eliminated for purposes of property tax valuation.

WVONGA recognizes that under Article X, §1 of the Constitution, all property not exempt from taxation is subject to ad valorem property taxation that must be equal and uniform through the State and no one species of property from which a tax may be collected may be taxed higher than any other species of property of equal value, except as otherwise provided in the Constitution. This means that oil and natural gas property may not be subject to ad valorem property taxation policies and formulas that discriminate against, or in favor of, oil and natural gas real and personal property.

WVONGA is disappointed that the expense percentages and caps included in the 2017 tentative variable for oil and natural gas continue to be low when compared with actual expenses incurred by well operators. WVONGA realizes that the expense percentages and caps are determined by the State Tax Department from surveys of well operators conducted every five years and from other sources not known to WVONGA.

The last survey was made in 2014, and the next survey is scheduled to be made in 2019. This suggests that the survey made prior to the 2014 survey was made in 2009. The attached

West Virginia State Tax Department
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Attention Jeff Amburgey, Director, Property Tax Division
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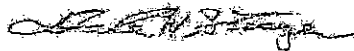
spreadsheet shows that the expense percentages and caps on expenses have, except in the case of horizontal wells, remained the same since tax year 2009. Beginning with tax year 2014, Marcellus and Utica horizontal wells have been treated differently than vertically drilled wells. However, even these numbers are unrealistically low.

WVONGA and its members believe that the allowable expenses and the caps on expenses set forth in the tentative 2017 natural resource variables for oil and natural gas properties are unrealistically low and, unless appropriately adjusted, will result in oil and gas wells being over valued for 2017 ad valorem property taxation in violation of the "Equal and Uniform" taxation clause in Article X, § 1 of the Constitution.

We appreciate the opportunity to comment on the tentative variables. This response is intended to work with the State toward a more reasonable mass appraisal of gas producing properties for property tax purposes, but should not deny Taxpayers from being afforded an opportunity to further work with the State based on their individual facts and circumstances. We respectfully request the right to seasonably supplement the response with other information that may be of benefit to the Department and would be happy to discuss the issues with you at your convenience. Please do not hesitate to contact me if you have any questions about these comments or wish to discuss them.

Respectfully submitted,

Spilman Thomas and Battle, PLLC



Dale W. Steager
Counsel for WVONGA

DWS/ljr
Enclosure

cc: Kevin Ellis, Chairman of WVONGA's Board of Directors

8678994 (19087.1)

OIL AND GAS VARIABLES FOR PROPERTY TAX PURPOSE

	Tentative 2017	Final 2016	Final 2015	Final 2014	Final 2013	Final 2012	Final 2011	Final 2010	Final 2009
CAPITALIZATION RATE	10.00%	15.30%	14.00%	14.70%	14.70%	15.90%	16.00%	16.70%	15.10%
GAS									
- % Working Interest Expenses For Typical Producing Well	30%	30%	30%	30%	30%	30%	30%	30%	30%
- Maximum Operating Expenses	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000	\$5,000
- Coal Bed Methane, Vertical Wells Expenses	\$9,000	\$9,000	\$9,000	\$9,000	\$9,000	\$9,000	\$9,000	\$9,000	\$9,000
OIL									
- % Working Interest Expenses For Typical Producing Well	35%	35%	35%	35%	35%	35%	35%	35%	35%
- Maximum Operating Expenses	\$5,750	\$5,750	\$5,750	\$5,750	\$5,750	\$5,750	\$5,750	\$5,750	\$5,750
- Maximum Enhanced Operating Expenses	\$9,000	\$9,000	\$9,000	\$9,000	\$9,000	\$9,000	\$9,000	\$9,000	\$9,000
MARCELLUS/UTICA									
- % Working Interest Expenses For Vertical Producing Well	30%	30%	30%	30%	N/A	N/A	N/A	N/A	N/A
- Maximum Operating Expenses	\$30,000	\$30,000	\$30,000	\$30,000	\$30,000	N/A	N/A	N/A	N/A
- % Working Interest Expenses For Horizontal Producing Well	20%	20%	20%	20%	N/A	N/A	N/A	N/A	N/A
- Maximum Operating Expenses	\$150,000	\$150,000	\$150,000	\$150,000	N/A	N/A	N/A	N/A	N/A
HORIZONTAL WELLS (OTHER THAN MARCELLUS/UTICA AND COAL BED METHANE)									
- % Working Interest Expenses For Horizontal Producing Well	30%	30%	30%	N/A	N/A	N/A	N/A	N/A	N/A
- Maximum Operating Expenses	\$20,000	\$20,000	\$20,000	N/A	N/A	N/A	N/A	N/A	N/A
Minimum Working Interest Appraisal	\$500 per well	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500
Flat Rate Royalty Multiplier	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75	5.75
Home Use Only Wells: Appraised at	\$500 per well	\$500	\$500	\$500	\$500	\$500	\$500	\$500	\$500/well
Industrial Use Only Wells: Appraised at	MCF usage X \$2.62/MCF BBL usage X \$48.66/BBL	X \$4.39/MCF X \$93.26	X \$3.73/MCF X \$97.98	X \$2.66/MCF X \$94.05	X \$3.95/MCF X \$94.88	X \$4.16/MCF X \$79.48	X \$3.71/MCF X \$81.66/BBL	X \$8.07/MCF X \$89.67/BBL	X \$6.39/MCF X \$72.52/BBL
*(Also includes Department of Environmental Protection reported wells.)									
Non-Filer Valuations									
Working Interest	=	150% of previous year's appraisal	Same	Same	Same	Same	Same	Same	Same
Royalty Interest	=	90% of previous year's appraisal	Same	Same	Same	Same	Same	Same	Same

Attachment to WVONGA letter of July 2, 2016

TAB 10



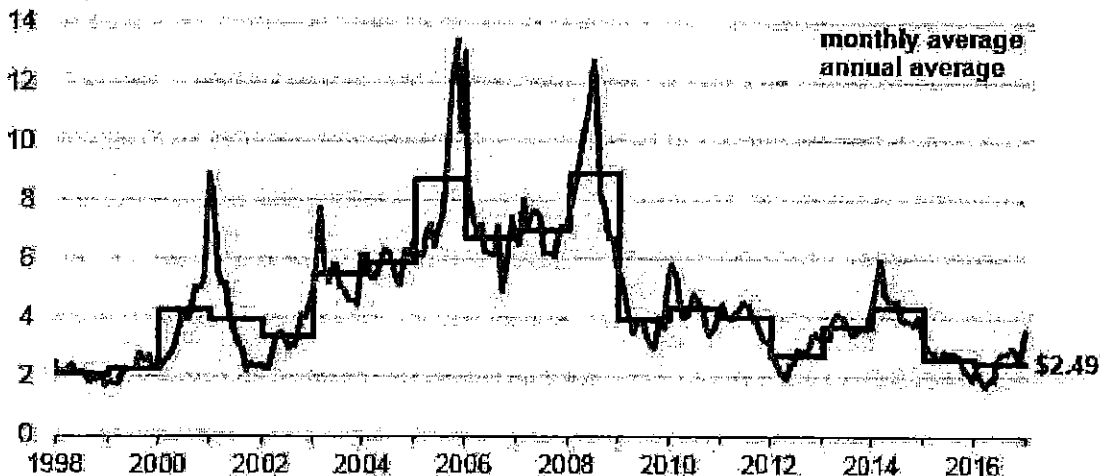
U.S. Energy Information
Administration

Today in Energy

January 13, 2017

Natural gas prices in 2016 were the lowest in nearly 20 years

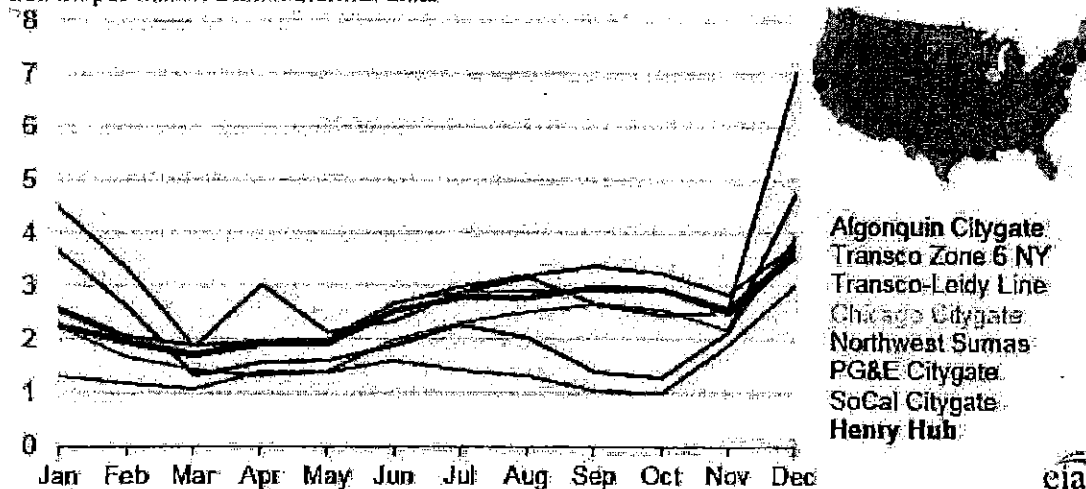
Monthly and annual average natural gas spot price at Henry Hub (1997–2016)
dollars per million British thermal unit



Source: U.S. Energy Information Administration, based on Natural Gas Intelligence

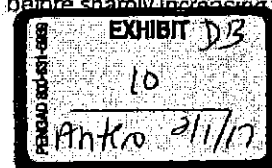
Natural gas spot prices in 2016 averaged \$2.49 per million British thermal units (MMBtu) at the national benchmark Henry Hub, the lowest annual average price since 1999. The monthly average price fell below \$2.00/MMBtu from February through May, but later increased, ending the year at an average of \$3.58/MMBtu in December. Warmer-than-normal temperatures for most of the year and changing natural gas demand were the main drivers of natural gas prices in 2016.

Monthly average natural gas spot prices at key trading hubs, 2016 dollars per million British thermal units



Source: U.S. Energy Information Administration, based on Natural Gas Intelligence

Natural gas prices in U.S. regional markets were volatile in 2016. In the first quarter of the year, much warmer-than-normal winter temperatures and large amounts of natural gas in storage caused prices to decrease. Prices began to gradually increase in late spring, with increased natural gas demand from multiple sectors and decreasing natural gas production, before sharply increasing at the end of the year with the onset of cold temperatures in mid-December.

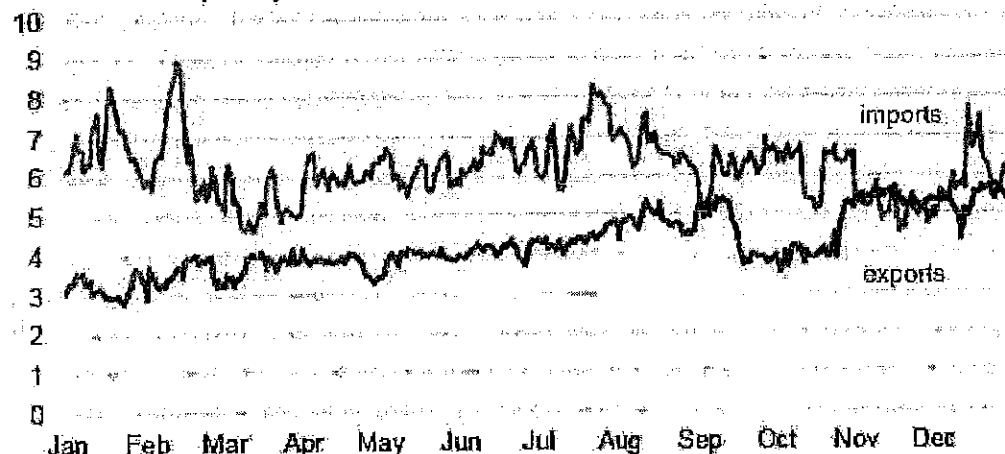


In the Northeast, where natural gas pipeline capacity is often constrained, cold weather can cause monthly average prices at hubs such as Algonquin Citygate (near Boston) and Transco Zone 6 NY (New York) to spike. Although this happened in 2016, new pipeline capacity and increased natural gas production in the Appalachian Basin, along with warmer-than-usual winter weather, contributed to price spikes that were considerably lower than in previous years.

Because of warm weather, natural gas consumption in the residential and commercial sectors in 2016 declined 7% and 4%, respectively, from the previous year. Warmer winter temperatures also limited natural gas storage withdrawals. As a result, natural gas storage inventories were at or near record levels throughout most of the year and reached a record 4,047 billion cubic feet (Bcf) for the week ending November 11.

Despite the overall decrease in residential and commercial demand in 2016, late-year increases in these sectors and increased demand from other sources contributed to increasing natural gas prices later in the year. In 2016, natural gas surpassed coal as the primary fuel used for power generation in the United States, supplying an estimated 34% of the nation's electricity, compared with 30% for coal. Electric power generation in 2016 used an average of 27.6 billion cubic feet per day (Bcf/d), exceeding the previous high of 26.3 Bcf/d in 2015.

U.S. net imports and exports of natural gas in 2016 billion cubic feet per day



Source: U.S. Energy Information Administration, based on Point Logic Energy

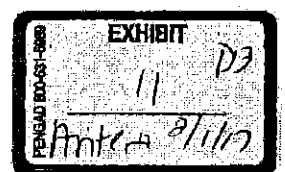
In November 2016, the United States became a net exporter of natural gas on a monthly basis for the first time since 1957, based on data from PointLogic. This was supported by infrastructure improvements—including natural gas pipelines and facilities for liquefying natural gas for export—that enabled suppliers to meet increasing demand from foreign markets.

U.S. pipeline exports to Mexico continued to grow throughout 2016, making up 87% of all U.S. natural gas exports. In May 2016, the Sabine Pass liquefaction terminal began commercial operations in the Gulf Coast to export liquefied natural gas (LNG). The expansion of the Panama Canal in July 2016 further aided export ability by reducing time and transportation costs to key markets in Asia and the west coast of South America.

Despite growing demand in the electric power sector and export markets, low demand for space heating and low prices resulted in lower natural gas production in 2016. Based on preliminary data, EIA estimates natural gas marketed production to average 77.5 Bcf/d in 2016, 1.3 Bcf/d less than in 2015 and the first annual decline since 2005. The number of active natural gas drill rigs continued a multi-year decline, reaching 132 by the end of 2016, down 19% from the year-ago count. However, production has not fallen as sharply as the number of active rigs, as producers have continued to make gains in drilling efficiency.

Principal contributors: Kristen Teal, Jason Upchurch

TAB 11

[illegible]

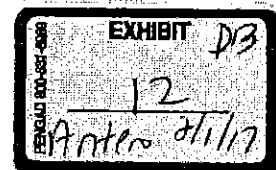
DEP Production Report
2015 Calendar Year Production
Horizontal Wells Only

Horizontal Well Indicator	Horizontal				
Row Labels	Count of API	Sum of GAS PRODUCTION N_TOTAL	Average Production per Well	% of Marcellus Production	Average Operating Expenses Per Well
ANTERO RESOURCES CORPORATION	455	439,302,636	965,500	39%	817,000
EQT PRODUCTION COMPANY	618	191,040,463	309,127		
SWN PRODUCTION COMPANY, LLC	289	116,258,698	402,279		
NOBLE ENERGY, INC.	122	99,157,024	812,762		
ASCENT RESOURCES-MARCELLUS, LLC	46	42,064,105	914,437		
STONE ENERGY CORPORATION	111	40,967,150	369,073		
JAY-BEE OIL & GAS	43	33,671,598	783,060		
CNX GAS COMPANY LLC	46	32,040,011	696,522	3%	630,000
GASTAR EXPLORATION INC.	77	24,299,343	315,576		
TRANS ENERGY, INC.	32	23,578,855	736,839		
MOUNTAINEER KEYSTONE, LLC	43	20,270,988	471,418		
NORTHEAST NATURAL ENERGY LLC	21	18,451,803	878,657		
STATOIL USA ONSHORE PROPERTIES, INC.	22	13,614,301	618,832		
XTO ENERGY, INC.	36	10,941,782	303,938		
CHEVRON APPALACHIA, LLC	27	6,879,589	254,800		
PDC MOUNTAINEER LLC	4	5,796,218	1,449,055		
TRIANA ENERGY, LLC	11	4,916,632	446,967		
ANTERO RESOURCES BLUESTONE LLC	5	2,946,851	589,370		
CONSOL GAS COMPANY	18	2,235,221	124,179		
WACO OIL & GAS CO INC	11	1,400,009	127,274		
HARD ROCK EXPLORATION, INC.	54	1,139,587	21,103		
CHESAPEAKE APPALACHIA, L.L.C.	19	690,935	36,365		
MOUNTAIN V OIL & GAS, INC.	7	544,833	77,833		
ENERPLUS RESOURCES (USA) CORPORATION	3	443,012	147,671		
TENASKA RESOURCES, LLC	5	404,158	80,832		
ENERGY CORPORATION OF AMERICA	18	265,735	14,763		
EXCO RESOURCES (PA), LLC	12	181,504	15,125		
NYTIS EXPLORATION COMPANY, LLC	11	166,199	15,109		
CABOT OIL & GAS CORPORATION	18	107,645	5,980		
CUNNINGHAM ENERGY, LLC	6	61,405	10,234		
TUG FORK DEVELOPMENT	1	30,482	30,482		
NORTHSTAR ENERGY CORPORATION	2	24,123	12,062		
BUCKEYE OIL PRODUCING CO	4	18,228	4,557		
HORIZON ENERGY CORPORATION	2	9,167	4,584		
RESERVE OIL & GAS, INC.	2	8,812	4,406		
DOMINION TRANSMISSION INC	1	8,518	8,518		
DURST OIL & GAS CO., INC.	1	7,821	7,821		
BASE PETROLEUM, INC.	1	5,365	5,365		
STALNAKER ENERGY CORPORATION	2	4,634	2,317		
QUALITY NATURAL GAS, LLC	1	3,138	3,138		
TAPO ENERGY, INC.	1	2,983	2,983		
ABARTA OIL & GAS COMPANY	1	2,714	2,714		
TERM ENERGY CORP.	1	2,070	2,070		
LIPPIZAN PETROLEUM, INC.	2	1,936	968		
ENERVEST OPERATING L.L.C.	6	1,893	316		
HG ENERGY, LLC	1	1,391	696		
P & C OIL & GAS, INC.	1	1,251	1,251		
YOST HERITAGE INC.	1	98	98		
DIVERSIFIED RESOURCES, INC.	1	25	25		
EXCO RESOURCES (WV), INC.	3	-	-		
BRC OPERATING COMPANY, LLC	8	-	-		
COW RUN LTD LIABILITY COMPANY	1	-	-		
Grand Total	2,235	1,133,972,939			

TAB 12

Antero Resources Corporation
Tax Year 7/1/16 - 6/30/17
Tyler County, WV

Account #	# of Wells	API#	API# for Second Well (if applicable)	Property Description	State Appraised Value	Taxpayer Value	Value the Taxpayer Believes to be in Controversy	Value if Operating Expense Cap Removed
0120162064	1	095-02064		GRAFF UNIT 1H (10466.1)	4,129,418	2,177,437	1,951,981	3,217,690
0120172200	1	095-02200		INGOT UNIT 1H (11338.1)	4,616,525	2,339,219	2,277,306	3,485,202
0120172201	1	095-02201		INGOT UNIT 2H (11339.1)	3,729,621	1,970,751	1,758,870	2,960,690
0120172202	1	095-02202		WALL UNIT 1H (11340.1)	3,130,243	1,718,823	1,411,420	2,591,804
0120172203	1	095-02203		WALL UNIT 2H (11341.1)	3,096,076	1,703,318	1,392,758	2,565,676
0220162126	1	095-02126		WEIGLE UNIT 1H (10936.1)	14,682,365	6,672,973	8,009,392	9,629,197
0220172215	1	095-02215		WEIGLE UNIT 2H (10688.1)	3,856,102	2,025,979	1,830,123	3,049,601
0520142038	2	095-02038	095-02039	ED ARNOLD UNIT 1H AND ED	8,082,941	4,262,120	3,820,821	6,353,082
0520152067	1	095-02067		SWEENEY UNIT 2H (10274.1)	1,723,646	1,095,064	628,582	1,648,990
0520152068	1	095-02068		SWEENEY UNIT 1H (10273.1)	1,964,871	1,211,715	753,156	1,828,380
0520152078	1	095-02078		THORKILDSON UNIT 1H (1028	1,755,626	1,112,002	643,624	1,676,959
0520152079	1	095-02079		THORKILDSON UNIT 2H (1028	1,709,847	1,089,747	620,100	1,643,348
0520172156	2	095-02156		SILAS UNIT 2H (10514.1)	3,380,870	1,836,827	1,543,843	2,805,996
0520172157	1	095-02157		SILAS UNIT 1H (10515.1)	3,168,669	1,746,615	1,427,054	2,668,037
0520172158	1	095-02158		GLOVER UNIT 1H (10513.1)	3,246,805	1,778,421	1,468,384	2,712,248
0520172159	1	095-02159		GLOVER UNIT 2H (10512.1)	2,759,387	1,568,689	1,189,598	2,389,574
0620162127	1	095-02127		FREELAND UNIT 2H (10587.1)	6,198,215	2,578,206	3,620,009	3,784,977
					71,230,027	36,887,907	34,342,120	55,012,290



TAB 13

IN THE MATTER OF THE ASSESSED VALUE OF CERTAIN OIL AND NATURAL GAS
PRODUCING PROPERTIES LOCATED IN TYLER COUNTY, WEST VIRGINIA FOR THE 2017
TAX YEAR

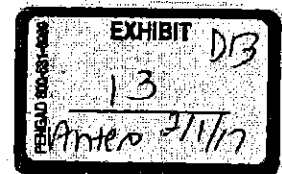
And In Re:

TYLER COUNTY TAX ASSESSOR,

ANTERO RESOURCES CORPORATION, TAXPAYER,

Expert Report of James Harden
January 31, 2017

Highly Confidential



Introduction

1. I have been retained by Altus Group US Inc. ("Altus") to assist in assessing the fair market value of certain producing oil and natural gas properties of Antero Resources Corporation ("Antero" or the "Taxpayer") in connection with the Taxpayer's appeal of the tax commissioner of the West Virginia State Tax Department, Property Tax Division 2017 assessed value of natural resource properties.
2. The opinions expressed in this matter are my own, and my compensation is not contingent upon the content of my testimony or the outcome of this matter. This report reflects my opinions as of the date of this report and documents received to date. Should additional information be provided, I reserve the right to amend and/or supplement this report. My opinion is based upon a reasonable probability unless otherwise noted.
3. All capitalized terms not defined herein shall have the meaning ascribed in Title 110 Legislative Rule Series 1J Valuation of Producing and Reserve Oil and Natural Gas for Ad Valorem Property Tax Purposes.

Professional Biography and Qualifications

4. I am a Principal and the National Valuation Leader for Hein & Associates, LLP, a Certified Professional Geologist and hold the American Society of Appraisers' Accredited Senior Appraiser ("ASA") certification in Oil and Gas Valuation. I have been involved in all aspects of the oil and gas business since 1980, including working on drilling rigs, owning an oil and gas production company, working for Texaco Inc., and was Global Oil & Gas Valuation Leader for Ernst & Young. I have performed hundreds of valuations in the oil and gas industry for a wide variety of purposes ranging from financial reporting, assorted tax matters, mergers and acquisitions, and expert testimony.
5. All work by myself and my staff was performed on an hourly basis. My curriculum vitae with expert testimony experience is attached as Exhibit A.

Highly Confidential

Antero Resources¹

Company Overview

6. Antero Resources Corporation ("Antero" or the "Taxpayer"), an independent oil and natural gas company, acquires, explores, and develops natural gas, natural gas liquids, and oil properties in the United States. As of December 31, 2015, the company had 569,000 net acres of oil and gas properties located in the Appalachian Basin in West Virginia, Ohio, and Pennsylvania. The company was formerly known as Antero Resources Appalachian Corporation and changed its name to Antero Resources Corporation in June 2013. Antero Resources Corporation was founded in 2002 and is headquartered in Denver, Colorado. Antero Resources Corporation is a subsidiary of Antero Resources Investment LLC.

Tyler County Oil and Natural Gas Properties

7. Subject to this assessment, the Taxpayer holds approximately 18 horizontal wells with an average working interest of approximately 83%. Production from the 18 wells began as early back as October of 2012 to as recent as November of 2015. The wells are gas weighted (approximately 77% gas) and target the Marcellus Shale. Additional information about the Marcellus Shale gas play can be found in the Industry section of this report.

The State Tax Commissioner's Office²

Powers and Duties of the State of West Virginia's Tax Commissioners Office

8. Before I discuss the valuation methodology employed by the State, it is important to discuss the governing body which establishes the Office of the Tax Commissioner and lays out the appointment, powers, and duties of the state tax commissioner ("Tax Commissioner") with respects to implementing, monitoring, and enforcing the policy and procedures for assessing and collecting real and personal property tax.
9. W.Va. Code §11-1 (the "Code") establishes the Office of the Tax Commissioner and defines the powers and duties of the individuals appointed as the West Virginia Tax Commissioner ("Tax Commissioner"). In particular, Article 11 of the Code states, "It shall be the duty of the tax commissioner to see that the laws concerning the assessment and collection of all taxes and levies, whether of the state or of any county, district or municipal corporation thereof, are faithfully enforced. The Code further establishes

¹ Information referenced herein was obtained from S&P CapitalIQ.

² Information and, in some cases, direct excerpts in this section were obtained from <http://www.legis.state.wv.us/wv/>.

that the Tax Commissioner shall be responsible for determining the methods of valuation for both real and personal property. Specifically, W.Va. Code §§11-1C-10(b)(1) states, "[T]he state tax commissioner shall value all industrial property in the state at its fair market value within three years of the approval date of the plan for industrial property required . . . The commissioner shall thereafter maintain accurate values for all such property. The tax commissioner shall forward each industrial property appraisal to the county assessor of the county in which that property is located and the assessor shall multiply each such appraisal by sixty percent and include the resulting assessed value in the land book or the personal property book, as appropriate for each tax year. The commissioner shall supply support data that the assessor might need to evaluate the appraisal.

Valuation Methodology Used by the State Tax Commissioner

Defined Terms

10. The following section outlines the methodology used by the State Tax Commissioner to assess the Fair Market Value of producing oil and gas properties. Included below are key terms and definitions for certain terms used by the State. The following defined terms are listed in alphabetical order. For a more comprehensive list of defined terms used by the State, please refer to Title 110 Legislative Rule, Series 1J.

- **"Average Industry Operating Expenses"** - The Tax Commissioner shall every five years, determine the Average Annual Industry Operating Expenses per well. The Average Annual Industry Operating Expenses shall be deducted from working interest gross receipts to develop an income stream for application of a yield capitalization procedure.
- **"Average Industry Production Decline Rates"** - The Tax Commissioner shall every five years derive and report the average industry production decline rates by reviewing well production records of various State agencies along with data provided by companies and individuals.
- **"Capitalization Rate"** means a rate used to convert an estimate of income to an estimate of market value. A single statewide capitalization rate for oil and natural gas shall be determined annually by the Tax Commissioner through the use of generally accepted methods. The rate shall be based on the assumption of a declining-terminal, non-inflating income series. The capitalization rate used to value oil and natural gas shall be developed through consideration of: (1) a discount rate determined by the summation technique, and (2) a property tax component.

Highly Confidential

- **"Discount Component"** means a rate reflecting a provision for returning to an investor a sum of money equal to the aggregate of the anticipated return-on-investment over the economic life of an investment. The discount component is composed of the following five subcomponents: (i) safe rate (ii) risk rate (iii) non-liquidity rate, (iv) management rate, and (v) inflation rate.
- **"Flush Production"** means the production of oil and/or natural gas from any well on an oil and/or natural gas property with an initial production date that is two calendar years or less prior to the July 1st assessment date.
- **"Gross Receipts"** means total income received from production on any well, at the field line point of sale, during a calendar year before subtraction of any royalties and/or expenses.
- **"Inflation Rate"** means Nominal interest rates, including the "safe rate" (defined below) are higher than real rates by an amount representing expectation of future inflation; however, net annual income from oil and natural gas property is to be estimated assuming level future royalties (no inflation). The capitalization rate shall be a real rate, net of expectation of inflation. The inflation rate shall be estimated through analysis of the most recent calendar year's urban consumer price index as determined by the U.S. Department of Labor, Bureau of Labor Statistics. The weighted average (sum of year's digits) rate will be used from the data of the three calendar year periods prior to the July 1 assessment date.
- **"Management Rate"** means a rate reflecting a return to an investor for the management of similar investment portfolios. The Management Rate represents the cost of managing the investment, not the cost of managing the oil and natural gas property. Because the Management Rate has historically been one-half of one percent (0.5%) of the value of investment portfolios, for purposes of determining the discount component the Management rate shall be one-half of one percent (0.5%).
- **"Natural Gas Producing Property"** means the property from which natural gas has been produced or extracted at any time during the calendar year preceding the July 1 assessment date. Natural gas producing property includes the interest or interests underlying an area of up to one hundred twenty-five acres of surface per well for property with active wells on the parcel.
- **"Nonliquidity Rate"** means a rate reflecting a return to an investor representing the loss of interest on an investment arising from the time required to sell the investment. The Nonliquidity Rate shall be developed through an annual survey to determine a reasonable estimate of time that oil and natural gas properties, when exposed to the market for sale, remain on the market. The time determined in this manner shall be used to identify United States Constant Maturity Treasury Yields with similar time differentials in excess of thirteen

week United States Constant Maturity Treasury Yields. The interest differential between these securities shall be used to represent the Nonliquidity Rate. For example, if it is determined that oil and natural gas property remains on the market for an average of nine months (39 weeks) before being sold, the nonliquidity rate shall be derived by taking the rate on one (1) year United States Constant Maturity Treasury Yields minus the rate on 13-week United States Constant Maturity Treasury Yields. The rate used will be a weighted average (sum of years digits) of the data from the three (3) calendar year periods prior to the July 1 assessment date.

- **"Non-Producing or Shut-in Well"** means a well, which due to the producer's decisions, market reasons and/or product performance, was non-productive during the entire most recent calendar year preceding the July 1st assessment date.
- **"Oil and/or Natural Gas, Non-producing Property"** means properties that were not engaged in production during the previous assessment year period of July 1st through June 30th. This category includes any acreage that has been shut-in for the entire year.
- **"Oil Producing Property"** means property from which oil has been produced or extracted at any time during the calendar year preceding the July 1 assessment date. Oil producing property includes the interest or interests underlying an area of up to forty acres of surface per well with one or more active well(s) on the parcel.
- **"Operating Expenses"** means only those ordinary expenses which are directly related to the maintenance and production of natural gas and/or oil. These expenses do not include extraordinary expenses, depreciation, ad valorem taxes, capital expenditures or expenditures relating to vehicles or other tangible personal property not permanently used in the production of natural gas or oil.
- **"Property Tax Component"** means a rate reflecting a provision for returning to an investor a sum of money equal to property taxes paid over the economic life of an investment. The Property Tax Component shall be estimated by multiplying the assessment rate by the prior tax year's statewide average for Class III property. At the present time, research indicates that royalty rates on oil and natural gas include a component for property tax, with no additional compensation from the producer. As a result, the Property Tax Component shall be used in the capitalization rate; however, if this described general practice changes and property taxes are paid as additional compensation, the use of this component shall be deleted. The rate used will be a weighted average (sum of year's digits) of the data from the three tax year periods prior to the July 1 assessment date.

- **"Recapture Component"** means a rate reflecting a provision for returning to an investor a sum of money equal to his or her investment.
- **"Risk Rate"** means a rate reflecting a return to an investor necessary to attract capital to an investment containing a possible loss of principal and/or interest. The relative degree of risk of an investment in oil and natural gas property is difficult to determine from published interest rates. Interest rates required on loans for acquisition and/or development of oil and natural gas properties shall be calculated by adding two percent to the Prime Interest Rate charged by banks as published in the Economic Indicators Prepared By The Council Of Economic Advisors For The Joint Economic Committee for the three (3) calendar years immediately prior to the July 1 assessment date. The loan rate shall be compared to quarterly interest rates offered on thirteen week United States Constant Maturity Treasury Yields for the same three calendar years period. The weighted average (sum of year's digits) difference between the two, combined with bands-of-investment analysis, shall be used as a basis to estimate the risk rate.
- **"Royalty Interest"** means a fractional interest in oil and/or natural gas production that is not subject to development costs or operating expenses and extends undiminished over the life of the property. Typically, it is retained by the oil and/or natural gas rights owner or lessor.
- **"Safe Rate"** means a rate reflecting a return to an investor on an investment which has little, if any, likelihood of loss of principal or of loss in anticipated return on investment.
- **"Settled Production"** means the production of oil and/or natural gas from all wells on a property with an initial production date that is more than two calendar years prior to the July 1st assessment date.
- **"Sum of the Years digit"** means the weighted average that will be used in the calculations. For a 3 year weighted average, the sum of the year's digit method places the first year at 50%, the second year at 33.33% and the third year at 16.67%.
- **"Summation Discount Component"** means a discount rate expressed as the aggregate of a safe rate, risk rate, nonliquidity rate, and management rate, adjusted for inflation.
- **"Well"** means any shaft or hole sunk, drilled, bored or dug into the earth or into underground strata for the extraction of oil or gas.
- **"Working interest"** means the fractional interest in oil and/or natural gas production subject to development and operating expenses and owned by the leaseholder and/or operator.

Valuation Methodology Overview

11. The value of Oil and/or Natural Gas Producing Property is determined through the process of applying a Yield Capitalization Model to the Net Receipts (Gross Receipts, less Royalties paid, less Operating Expenses for a Working Interest and a Yield Capitalization Model applied to the gross royalty payments for their royalty interest. Where ownership is split through a lease or royalty arrangement, different values are determined for the Working Interest and the Royalty Interest. If the Well has been in production for less than 12 months during the first calendar year of production, or during the first calendar year of production after being shut-in during the previous calendar year, the Gross Receipts and Royalties are annualized prior to the process of applying a Yield Capitalization Rate.
12. Of note, and as discussed herein, my findings and conclusions contrast significantly from those of the State. It can be shown that the delta between the concluded Fair Market Value arrived at through my analysis and the assessed value calculated by the State can be attributed to (i) differences in the selection and application of oil and natural gas decline curves, (ii) differences in the application of actual versus "one size fits all" ceiling on operating expense assumption, and (iii) methodology selection for calculating the appropriate rate used to discount the expected future cash flows of an investment with this risk profile.

Findings and Methodology

Application of Fair Market Value

13. Based on my experience, the most commonly accepted premise of value is Fair Market Value ("FMV"). Courts typically consider the FMV or what would be the fairly equivalent value of the property, taking into consideration all of the specific circumstances of each case affecting the value of the asset. The American Society of Appraisers ("ASA") defines FMV as: "[a]n opinion expressed in terms of money, at which the property would change hands between a willing buyer and a willing seller, neither being under any compulsion to buy or to sell and both having reasonable knowledge of relevant facts, as of a specific date."^{3, 4}
14. Further, per West Virginia Code § 11-3-1 (a) "all property shall be assessed at the price for which the property would sell if voluntarily offered for sale by the owner thereof, upon the terms as the property,

³ <http://www.appraisers.org/Disciplines/Machinery-Technical-Specialties/fmts-appraiser-resources/DefinitionsOfValue>.

⁴ IRS Revenue ruling 59-60.

the value of which is sought to be ascertained, is usually sold, and not the price which might be realized, if the property were sold at a forced sale."

Valuation Approach

15. In determining the Fair Market Value of the Taxpayer's producing oil and natural gas properties, I relied on the Income Approach, more specifically, the Discounted Cash Flow ("DCF") method, a widely used and accepted valuation method. Per the 2016 Society of Petroleum Evaluation Engineers Thirty Fifth Annual Survey of Parameters used in Property Evaluations, it is reported that 144 out of the 177 market participants surveyed (76%), reported using the DCF as their preferred method for evaluation oil and gas properties.

16. The DCF method of the Income Approach focuses on the income-producing capability of the asset or business being assessed. The underlying premise of this approach is that the value of an asset or business can be measured by the present worth of the net economic benefit (cash receipts less cash outlays) to be received over the life of the subject asset. The steps followed in applying this approach include estimating the expected cash flows attributable to the asset over its life and converting these cash flows to present value through "discounting." The discounting process uses a rate of return, which accounts for both the time value of money and investment risk factors. Finally, the present value of the cash flows over the life of the asset are totaled to arrive at the Fair Market Value of the asset.

Valuation of the Producing Oil & Gas Wells

Overview

17. Due to the inherent nature of oil and gas properties, and in particular, producing oil and gas properties, I utilized the Income Approach, specifically the Discounted Cash Flow ("DCF") method, in our Fair Market Value assessment of the Taxpayer's oil and gas wells. For reference purposes, Exhibit I reflects the results of our DCF analyses as of July 1, 2016.⁵

Sources of Information

18. We were provided with historic production and operating financial data which served as the foundation of the cash flow forecast for this analysis. The data provided consisted of gross production volumes, revenues, and all operating costs incurred by the Taxpayer on a well by well basis for the 18 month period ending June 30, 2016. In addition, the provided data contained descriptive information

⁵ The analysis reflected in Exhibit I was conducted for the 2017 tax year.

identifying each well's unique identifiers, county and district location, date of first production, well configuration, producing formation, field name, well depth and lateral length, etc.. We relied on the unique well level information during our decline curve analysis which was used to develop our decline curve assumptions.

Production Decline Curve Analysis

19. In order to estimate the future production of oil and gas volumes, curve parameters must be developed that best characterize the decline in production over time. We collected the production data for all Antero oil and gas wells drilled in West Virginia using Drillinginfo⁶, a subscription based and widely used data source for the oil and gas industry. We grouped wells by county and normalized the production streams by initial production date. We averaged all normalized production and plotted rate versus time, then generated a best fit curve for the average curve. Each curve for the separate counties was approximated using 3 exponential curves for different stages in the life of an oil and gas well; year one, year two, and year 3 until the economic limit.

Projected Revenues

20. In order to estimate revenues in the first period of our forecast (2018 tax year), we applied our Year 1 production decline rate to the gross (8/8's) revenues corresponding to the most recent 12 month period preceding the July 1st assessment date. The revenue results of this calculation served as the basis for forecasting all future revenues. In Year 2 (2019 tax year) of our forecast, revenue calculated in Year 1 was multiplied by our estimated production decline factor for Year 2. For all periods thereafter, revenues from the preceding period were multiplied by our calculated long-term production decline factor ("Terminal Decline Factor").

Operating Expenses

21. Given the unique production behavior of a particular oil and gas formation, coupled with the existing infrastructure in place to get production volumes to market, obtaining actual operating expenses is crucial to accurately assessing the fair market value of a given well. Further, in keeping with the States definition of Operating Expense⁷ "... only those ordinary expenses which are directly related to the maintenance and production of natural gas and/or oil ..." do not include extraordinary expenses, depreciation, ad valorem taxes, capital expenditures or expenditures relating to vehicles or other tangible personal property not permanently used in the production of natural gas or oil.⁸ we reviewed

⁶ Drillinginfo is a subscription based service for oil and gas production data. See www.drillinginfo.com

⁷ Per Subsection 3.2 of Title 110 Legislative Rule, Series II "Valuation of Producing and Reserve Oil and Natural Gas for Ad Valorem Property Tax Purposes"

historic Operating Expense data of publicly traded upstream oil and gas companies with producing assets located in or near the same West Virginia counties as that of the Taxpayer in order to identify ordinary vs. extraordinary Operating Expenses from a market participants' view point. For further detail behind the Operating Expense assumptions we relied upon, please refer to the section "Comparison of the State's Methodology" provided in later sections of this report.

Discount Rate

22. In estimating the appropriate discount rate for discounting the expected cash flows of an investment of this risk profile, we relied calculated the per-tax weighted average cost of capital ("WACC"). The WACC is a market based weighted average of the cost of debt and cost of equity and as such, we relied on financial data of publicly traded guideline company financial data when developing our assumptions to be used in our discount rate analysis. In developing the cost of equity, we relied on the Capital Asset Pricing Model ("CAPM"), which attempts to measure the systemic risks based on the Company's relationship with the market (i.e. typically against the S&P 500 Index). In my experience, CAPM is the most widely used method of estimating a discount rate when valuing a business enterprise or asset. The discount rate I utilized was 20%. Exhibit 4 reflects our discount rate analysis as of July 1, 2016. The following section discusses our selection of publicly traded guideline companies.

Guideline Comparable Company Selection

23. Selecting companies that are comparable to Debtors is critical in determining an indication of value. One of the initial screening criteria included all publically traded United States oil and gas exploration and production companies operating oil and gas reserves in West Virginia. That selection criteria led us to choosing the following companies as comparable to Debtors:

- Antero Resources Corporation (NYSE:AR)
- Chesapeake Energy Corporation (NYSE:CHK)
- CONSOL Energy Inc. (NYSE:CNX)
- Cabot Oil & Gas Corporation (NYSE:COG)
- Carrizo Oil & Gas Inc. (NasdaqGS:CRZO)
- Eclipse Resources Corporation (NYSE:ECR)
- EQT Corporation (NYSE:EQT)
- Noble Energy, Inc. (NYSE:NBL)

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- Range Resources Corporation (NYSE:RRC)
- Stone Energy Corp. (NYSE:SGY)

Economic and Industry Factors

24. Valuation analyses are typically accompanied by a detailed examination of the current economic and industry conditions. The intent is to identify the general direction of the economy, survey the general industry sentiment regarding future outlook, and to identify any specific risks that could impact the future value of an investment. To reduce any biased opinions, the following economic and industry overview is generally referenced from publically accessible sources that were available at or before the Valuation Date.

General Economic Overview

25. Although real gross domestic product is reported to have increased at a sluggish rate in the first quarter of 2016, the available data for the second quarter point to a noticeable step-up in the pace of growth. On average, consumer spending so far this year appears to be expanding at a moderate pace, supported by solid income gains and the ongoing effects of the increases in wealth and the declines in oil prices of the past two years. Fiscal policy at all levels of government is now modestly boosting economic activity after exerting a considerable drag in recent years. One area of concern, however, is the softening in business fixed investment in recent quarters even beyond those sectors most directly affected by the plunge in energy prices. In addition, the weakness of exports--following the significant appreciation of the dollar over the past two years and the subdued pace of foreign economic growth--continues to hold back overall output growth.

26. After having raised the target range for the federal funds rate to between 1/4 and 1/2 percent last December, the Committee maintained that target range over the first half of the year. The Committee's decisions to leave the stance of policy unchanged were supported by its assessments earlier in the year that global economic and financial developments posed risks to the economic outlook and that growth in economic activity appeared to have slowed. In June, the Committee noted that recent information indicated that the pace of improvement in the labor market had slowed, while growth in economic activity appeared to have picked up. In addition, the Committee's policy stance so far this year reflected its expectation that inflation would remain low in the near term, in part due to earlier declines in energy prices and in the prices of non-energy imports. The Committee stated that its accommodative stance of

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policy is intended to support further improvements in labor market conditions and a return to 2 percent inflation.

U.S. Upstream Exploration and Production Industry⁸

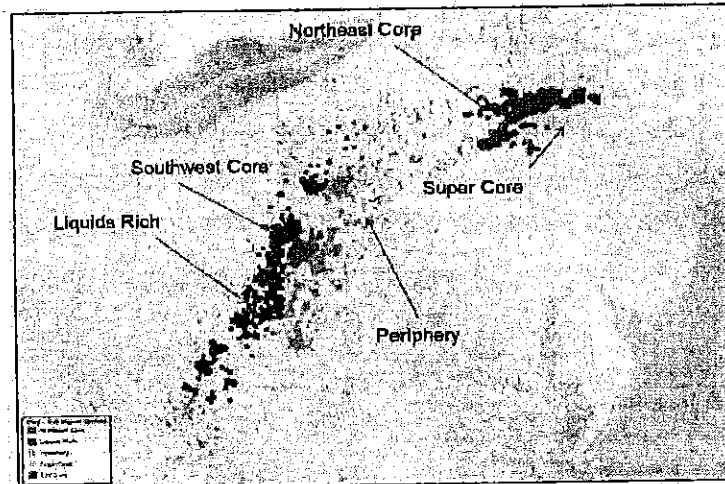
27. Due to unforeseen global market conditions, global oil prices began to plunge in the fall of 2014 and have since remained at depressed levels.⁹
28. Domestic production of oil and gas has steadily increased in the five years to 2016, and industry operators have positioned themselves to continue performing strongly in the five years to 2021 when prices rise. Though the industry remains exposed to global commodity price fluctuations, IBISWorld expects that the industry will continue to profit from its highly lucrative operations. Nevertheless, industry revenue is expected to decline 18.4% in 2016 due to persistently low oil and gas prices.
29. In the five years to 2016, industry revenue is expected to decrease at an annualized rate of 7.4% to total \$202.5 billion. The industry includes several very large, globalized companies that engage in all steps of the oil and gas production process, from exploration to refining; it is these companies that have benefited the most from the emergence of hydraulic fracturing and horizontal drilling techniques. Furthermore, the United States has been seeking to lessen its reliance on foreign sources of oil and gas, most notably those in the Middle East. By reducing exposure to foreign political events and pressure, domestic operators are expected to perform strongly as US-produced oil and gas resources increasingly meet domestic demand.
30. The future of oil and gas is expected to increasingly hinge on improvements to drilling technology and techniques. As industry operators deplete their reserves, it becomes necessary to improve efficiency and minimize waste. Industry operators replenish their reserves through either acquisitions or exploration. The number of industry operators is expected to increase, as previously uneconomical resources have become accessible. In the five years to 2021, IBISWorld expects industry revenue to expand at an annualized rate of 18.1% to total \$466.1 billion. This growth rate, however, is inflated by the anticipated decline in 2016, with 2016 revenue less than half of its 2014 level. Improving technology is anticipated to assist operators in meeting environmental concerns and maximize well efficiency; as a result, IBISWorld expects industry companies will be able to continue operating profitably and successfully in the United States.

⁸ Source: U.S. Federal Reserve System, as prepared at the Federal Reserve Bank of Philadelphia and based on information collected on or before January 4, 2016.

⁹ www.eia.gov.

Upstream Exploration and Production Industry of West Virginia

31. The Marcellus gas play, located in the mountains of Pennsylvania and West Virginia, includes areas with wet and dry gas. Five sub-plays were identified based on high performance variations and depths in the formation. This includes: Liquids Rich, Southwest Core, Periphery, Super Core, and Northeast Core.



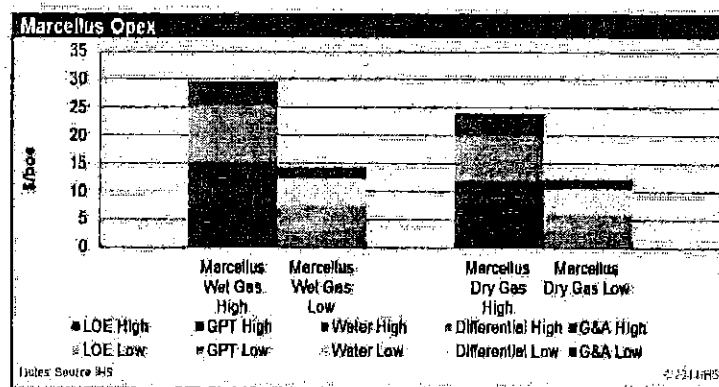
32. Drilling within all sub-plays has leveled off in the past three years. Production began in 2007 and has ramped up quickly to nearly 16 Bcf/day, making it by far the largest gas play in North America. As a result of this run-up in production, the Marcellus serves an over supplied gas market which precipitated drops in gas price and increased pressure to reduce the number of wells being drilled in the play.
33. Much of the value derived from the Marcellus is from NGL sales, mainly from the Liquids Rich gas area where current drilling is most active. NGLs are processed locally and are either shipped to the Gulf Coast or are marketed locally. Lack of processing and transportation infrastructure is being overcome by new and projected capacity. Production is expected to continue to grow there significantly and thus more infrastructure will be needed. The Marcellus benefits from being fairly close to market. However, logistically infrastructure is still lacking and transport fees are high. Also, water disposal is extremely expensive, averaging over \$5/bbl in some areas.¹⁰ Water disposal fees in other regions in the US typically range from a few cents per bbl. to +/- \$1.00 per bbl. of disposed water.

¹⁰ U.S. Energy Information Administration. *Trends in U.S. Oil and Natural Gas Upstream Costs*. March 2016.

34. Marcellus gas infrastructure is quite substantial, but there is a supply glut in nearby hubs. Reaching the Gulf Coast markets is more complicated. However there is sufficient capacity to move production south to fetch better prices than the local differential affords. Gas marketing is based on a series of complicated arrangements that potentially allocate production to many different nodes and destinations. Dry gas in the Marcellus rarely requires processing as its raw production can meet pipeline specifications. Few companies benefit from vertical integration. Furthermore, gathering and processing is almost a monopoly as most of the capacity is owned by one company. Fees for long haul transport of NGL's are very high since production must be trucked to Mont Belvieu. Ethane production in this play is injected into the gas line maxing out the thermal content limit for pipelines. Transportation differentials are so high that recovered ethane often becomes a net cost. There are alternatives for Ethane in this play as Edmonton can receive production through a specialized Ethane pipeline.

	Units	Marcellus Wet Gas High	Marcellus Wet Gas Low	Marcellus Dry Gas High	Marcellus Dry Gas Low
Gas Gathering	\$/mcf	0.60	0.50	0.60	0.50
Gas Processing	\$/mcf	0.60	0.35	n/a	n/a
Short Transportation Oil	\$/bbl	n/a	n/a	n/a	n/a
Long Transportation Gas	\$/mcf	1.40	0.70	1.40	0.70
Long Transportation Oil	\$/bbl	11.00	8.00	11.00	8.00

35. Operating costs are highly variable in the Marcellus. According to HIS, operating costs can range from \$2.06 to \$4.93 per mcf. This wide range is driven by geology, location, well performance and operator efficiency. Overall, this play offers both very high and very low operating costs rates.



Comparison with the States Methodology

36. As previously stated, I have concluded that the difference between the concluded Fair Market Value arrived at through my analysis and the assessed value calculated by the State can be attributed to (i) differences in the selection and application of oil and natural gas decline curves, (ii) differences in the application of actual versus capped "one size fits all" operating expense assumption, and (iii) methodology selection for calculating the appropriate rate used to discount the expected future cash flows of an investment with this risk profile. The following is a discussion of those differences:

Production Decline Curve Assumption

37. The state of West Virginia surveys operating companies in order to determine the decline curve parameters of various oil and gas reservoirs. This approach is too general to be used in estimating the future production of an individual operators' oil and gas wells. This is because not all oil and gas reserves are created equal. Estimated ultimate recovery (EUR) can vary greatly between wells that are in close proximity. Each operator has different investment criteria that influences their investment decisions. Oil and gas leases can contain different qualities of acreage and each operator develops this acreage according to their own engineering insight. Our estimations of Antero's future oil and gas production have been developed using Antero production data, not those of a competing operator.

38. The state of West Virginia bucketed the survey results by region. Each region encompasses multiple counties. Reservoir characteristics can vary drastically over the distance of just a few miles, leading this approach to be an inaccurate representation of the Marcellus play within a particular county. For example, both Lewis and Upshur counties are listed as part of the North Central region according to the state. We performed an EUR analysis of all wells in Lewis and Upshur counties and found that a Lewis County Marcellus gas well is roughly 833 MMcf. The average EUR for an Upshur County Marcellus gas well is nearly twice as much at 1,511 MMcf. Although these counties are adjacent to one another, the reservoir characteristics yield very different results.

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39. See the table below for a comparison of our decline parameters versus the state of West Virginia.

Marcellus Decline Comparison						
County	Year 1		Year 2		Year 3+	
	WV	Hein	WV	Hein	WV	Hein
Tyler	-52%	-58%	-23%	-28%	-18%	-9%

40. It is important to point out from the above table that the decline rates I relied on for Years 1 & 2 are significantly higher in most cases. However, given the long life of Marcellus reserves, we have taken a more conservative approach when applying terminal decline rates. As shown in the above table, in all cases, our terminal decline rates are shallower which, when applied, has the effect of producing incremental value in the form of revenue, when compared to the State.

Operating Expense Assumption

41. As discussed previously, we reviewed historic operating expense data of the Taxpayer and other publicly traded oil and gas companies that operate in the Marcellus Shale. The purpose of this analysis was to establish if the expenses reported by the Taxpayer were "ordinary" and to ensure we were not burdening a well with expenses related to inefficiencies in production or extraordinary.
42. The results of our analysis and conclusion of actual operating expenses of the Taxpayer contrasts starkly with that of the State. Given the burden of the State tax commissioner of assessing all oil and natural gas properties located in the State, we agree that a mass appraisal system would be the most effective method for assessing and assigning value to said properties. However, although we commend the State on its work in surveying market participants in order to establish Operating Expense variables, the process of applying these variables to every oil and natural gas producing property suggests that all oil and natural gas wells are created equal. This assumption is inherently incorrect as reservoir characteristics, production profiles, and technologies used to extract hydrocarbons differ across fields.
43. The following table shows the Operating Expense variable the State developed to apply to horizontal Marcellus wells for the 2017 tax year.

MARCELLUS	
% W.T. Expenses - Horizontal	20%
Max. Operating Expenses	\$175,000

The above Operating Expenses used by the State do not accurately capture the actual cost to extract hydrocarbons in the Marcellus Shale. When comparing Antero's Operating Expenses for Tyler County to the above listed Operating Expense Variable provided by the State, we note that in terms of LOE

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alone, excluding gathering and compression ("G&C"), processing, and transportation, Antero's annual cost ranged between \$49,500 and \$147,000, which is in line with the State's reported variable. However, adding G&C, processing, and transportation, we noted Antero's total Operating Expense exceeds the State's allowable cost dramatically. In the table below, we have calculated the Taxpayer's Operating Expenses by category on a \$/Mcf basis.

Antero Actual 2017 Tax Year Operating Expenses (\$/Mcf)					
County	LOE	G&C	Processing	Transport	Total OPEX
Tyler	\$0.04	\$0.42	\$0.38	\$0.34	\$1.19

In order to assess the reasonableness of Antero's Operating Expenses, we have surveyed various public data sources in order to identify ordinary Marcellus Operating Expenses. The following table was taken from the Energy Information Administration's *Trends in U.S. Oil and Natural Gas Upstream Costs*. As can be seen, Antero's gathering, compression, and processing costs on a \$/Mcf basis is in line with

	Units	Marcellus Wet Gas High	Marcellus Wet Gas Low	Marcellus Dry Gas High	Marcellus Dry Gas Low
Gas Gathering	\$/mcf	0.60	0.50	0.60	0.50
Gas Processing	\$/mcf	0.60	0.35	n/a	n/a
Short Transportation Oil	\$/bbl	n/a	n/a	n/a	n/a
Long Transportation Gas	\$/mcf	1.40	0.70	1.40	0.70
Long Transportation Oil	\$/bbl	11.00	8.00	11.00	8.00

market participant costs.

Discount Rate Methodology

44. In previous sections of this report, I discussed our reliance a per-tax weighted average cost of capital ("WACC") when estimating the appropriate discount rate for discounting the expected cash flows of an investment of this risk profile. I further define the WACC to be a market based weighted average of the cost of debt and cost of equity which is developed based on financial data of publicly traded guideline companies. Similarly, in estimating their selected discount rate, the State relied on the "Band of Investment" method which is viewed as being synonymous to a WACC.

45. The general components of a discount rate can be summarized below:

- **Inflation rate:** the annual rate of price change for a basket of consumer goods. Inflation is normally measured by the Consumer Price Index for All Urban Consumers (CPI-U), calculated by the United States Bureau of Labor Statistics. The inflation rate is the most basic component of a discount rate. An investor's rate of return must equal the rate of inflation just to break even in real dollar terms.

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- **Risk-free component:** A return to compensate the investor for a loss of liquidity. This component can also be defined as the risk-free rate minus the inflation rate. The risk-free rate is made up of the inflation rate plus a return to reimburse the investor for a loss of liquidity and is measured by the yield to maturity on federal government securities with a maturity period comparable to the investment under consideration (oil or gas reserves in this case).
 - **General risk premium:** A return to compensate the investor for assuming diversified company-wide risk. For property tax purposes, appraisers traditionally estimate the value of individual mineral reserves, not the value of oil companies. Individual reserves are riskier than the stock and debt of an entire company. Companies can spread their risk over many individual mineral reserves and often over several kinds of assets. This asset diversification reduces the company's risk and, as a result, the WACC derived from company financial data is usually lower than an individual producing property's discount rate. However, the WACC is always higher than the risk-free rate. This increase in the rate is a general risk premium to reward investors for assuming the diversified company-wide risk.
 - **Property-specific risk premium:** A return that compensates the investor for assuming the unique risks associated with a particular mineral producing property. Investors demand a premium above the WACC to compensate them for this individual property risk. For certain high-risk properties, this premium can be quite high.
46. The basic premise behind calculating a WACC is that investors can create a risk/reward profile that fits their individual risk preferences through diversification. Because our analysis focuses on assessing the Fair Market Value of an individual oil or natural gas well or property, we need to account for the fact that lack of diversification increases the risk of an investment and an investor would need to be compensated for such risk. As such, we have added an additional risk adjustment of 100 basis points to our WACC to account for the fact that we are appraising a non-diversified investment (single well) and the unadjusted WACC has this diversification benefit inherent within it.

47. In continuing with the discussion of accounting for and quantifying risks specific to a particular investment (in this case, a single producing oil and gas well), we have identified several other risk factors for which required an adjustment to capture and that which the State failed to identify. The following table lists the additional property-specific risks we identified and the resulting adjustment we made to our discount rate¹¹.

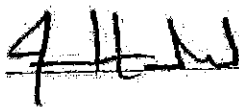
Oil & Gas Property Specific Risks	WACC Adjustment (Basis Points)
Single Completion Risk	100
Limited Production History	100
Steep Production Decline	100
Total	300

Conclusion

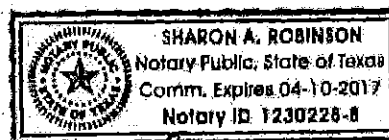
1. For detail of my analysis of the Fair Market Value of these oil and gas wells, please see Exhibits 1 through 4.

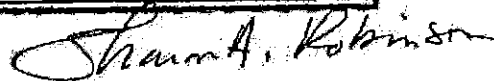
* * * * *

My analyses and opinions are based on the information provided to me as of the date of this report. Should new information become available, I reserve the right to supplement or amend this report as necessary.



James Harden, ASA





¹¹ Adjustments to the calculated WACC for property-specific risks were obtained from the Texas Comptroller of Public Accounts 2014 Property Tax Study: Discount Rate Range for Oil and Gas Properties, August 2015.

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EXHIBIT A
CURRICULUM VITAE
OF
JAMES HARDEN

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James Harden is a Principal and the Business Valuation Leader at Hein & Associates. He has spent his entire thirty year career in various facets of the energy industry. He is one of a handful of professionals globally that holds the American Society of Appraisers' Senior Appraiser certification ("ASA") in Oil and Gas Valuation.

In his 30-year career, he has led hundreds of energy-sector valuations in North and South America, Africa, Russia, Eastern and Western Europe, Middle East and Southeast Asia. Jim's work has supported mergers and acquisitions, financial reporting and purchase price allocations, Federal, state and local and international tax, insurance, solvency opinions, bankruptcy and as expert witness on valuation of pipelines, terminals, refineries, chemical plants, gas processing facilities and oil and gas reserves.

His clients have included major and independent oil and gas companies, midstream MLP's, independent oil refiners, petrochemical companies, onshore and offshore drillers and oilfield service companies, mining companies, gas storage operators, LNG operators, and ammonia and ethanol manufacturers.

Jim has also served energy clients as an expert witness before U.S. Federal Court, U.S. Bankruptcy courts in Delaware, District courts and state tax boards and other tax tribunals, testifying on valuations of oil and gas reserves, gas gathering and processing facilities, oil refineries, and crude and product terminals. As well, he has represented oil and gas companies before the IRS and state, local and international tax authorities.

His professional experience includes serving as the Global Oil and Gas Valuation Leader at Ernst & Young, as a Director at Berkeley Research Group, Texaco Inc., and as a partner in an oil and gas exploration and production company operating in Kansas.

EDUCATION, CERTIFICATIONS AND MEMBERSHIPS

Jim has dual BS degrees from Ft. Hays State University and an MBA from LeTourneau University. He is a Senior Member of the American Society of Appraisers (ASA - Certified in Technical Valuations - Oil and Gas) and a member of the Society of Petroleum Engineers. He has been named a "Who's Who in Energy" by the Houston Business Journal.

MIDSTREAM, DOWNSTREAM AND PETROCHEMICAL EXPERIENCE

His consulting services to the midstream, downstream and petrochemical sectors have included refinery, petrochemical and terminal valuations, useful life and depreciated replacement cost analysis, transaction multiples analysis, valuation of gas processing agreements, valuation of permits and emission credits, product inventory assessments, cost-of-capital and discount rate studies, crude and product supply contracts, general partnership and limited partnership equity valuations, and strategic transaction valuations for global crude and product terminal owners.

- ✓ Dozens of pipeline engagements for midstream MLP's. Assignments included purchase price allocations, partnership contributions and dropdowns, §704(b) book-ups, GP and LP stock acquisitions, pipeline and gas processing remaining life studies and intangible asset valuations. This included valuation of some of the largest pipelines in the US.
- ✓ Valuation of more than 60 global oil refineries for tax and financial reporting purchase price allocations, Federal and international tax structuring and litigation purposes.
- ✓ Valuation of several world-class petrochemical plants in the North America, Asia and Europe. Products included olefins and aromatics, intermediates and fine/specialty chemicals.
- ✓ Valuation of large crude and refined product pipelines and associated storage terminals in the US, Canada, Central and South America, Europe, Asia and Russia.
- ✓ Valuation of multi-billion dollar GP acquisitions. Analyses included possible distribution splits based upon growth forecasting using dividend discount modeling and Monte Carlo simulations.
- ✓ Valuation and market study of sell-side options of large coastal international crude and product terminal to assist major oil company client. Sensitivities included discount rate analyses of potential buyer capital structures, growth scenarios by product type and capex requirement analysis using Monte Carlo simulation.
- ✓ Valuation of gas processing agreements for purchase price allocation purposes. Agreements included keep-whole, fee-based, percent-of-proceeds arrangements and hybrid arrangements.
- ✓ Right-of-way valuations of pipelines and gathering systems.
- ✓ Valuation of global LNG terminals.
- ✓ Valuation of more than a dozen ethanol facilities for tax and financial reporting and litigation purposes.
- ✓ Anhydrous ammonia and ammonium nitrate facilities in the US, Caribbean and Canada.
- ✓ Valuation of more than 200,000 miles of onshore and offshore gas gathering systems.
- ✓ Gas reserve supply analysis for gas processing plants and gathering systems.
- ✓ Cost-of-capital modeling for MLP's using both CAPM and yield analysis.
- ✓ Replacement cost and depreciation studies of gas gathering systems, gas processing plants and field and station compression facilities.
- ✓ Valuation of gas processing plants in US and Canada.
- ✓ Valuation of more than a dozen gas salt dome and depleted-reservoir storage facilities in US and Canada.
- ✓ Valuation of line-fill and cushion gas on pipelines and gas storage facilities.
- ✓ Valuation of all global midstream and downstream assets (pipelines, terminals, 40+ refineries) of a super-major oil company for §861 tax purposes.
- ✓ Expert witness regarding value of gas gathering, gas processing plants, refineries and product terminals.
- ✓ Valuation of ethanol facilities in for purposes that included bankruptcy, tax and financial reporting.
- ✓ Valuation of coal mines in US and Eastern Europe. Valuations included both reserves and mining equipment.
- ✓ Valuation of coal, gas-fired and hydro-electric power generation facilities.

UPSTREAM OIL AND GAS EXPERIENCE

Jim's upstream valuation exploration and production valuation experience includes hundreds of valuations of oil and gas reserves throughout the United States and in dozens of other countries for mergers and acquisitions, Federal and international tax, financial reporting, bankruptcy and litigation purposes. Some of the North American fields he has worked in include Prudhoe Bay, Gulf of Mexico, Hugoton Gas Field, Central Kansas Uplift, and the Permian Basin. Some of his experience includes:

- ✓ Oil and gas asset valuations and business enterprise (equity) valuations of oil and gas companies, including analyses around market discount rates, transaction multiples, price forecasting and reserve bookings.
- ✓ As co-owner of an independent oil and gas company, performed all phases of oil and gas operations, including leasing, exploration, drilling, well completions and artificial stimulations, operating and lease accounting, and buying and selling of oil and gas working and royalty interests.
- ✓ Valuation of hundreds of thousands of acres of developed and undeveloped mineral acres, including shale gas reserves in Eagle Ford, Barnett, Utica and Marcellus shale.
- ✓ Valuation of ownership rights including complex overriding royalties, back-in carried working interests, volumetric production payments and preferred stock exchanges.
- ✓ Valuation due diligence for large public employee fund of large equity investment into Western Oklahoma Granite Wash, Cleveland and Tonkawa plays.
- ✓ Valuation of North and South American, Asian and African oil and gas reserves for major oil companies. Most of this work also entailed analysis and modeling of various PSC's and tax and concession arrangements.
- ✓ Performed expert testimony in US Federal court (Houston) on value of producing and non-producing oil and gas reserves in South Texas. Client was a major independent oil and gas company.
- ✓ Valuation of production equipment of more than 4,000 producing oil and gas wells and equipment for federal tax purposes.
- ✓ Analysis of intangible drilling costs (IDC's) involving turn-key drilling partnerships.
- ✓ Valuation of working interests in more than one hundred Barnett Shale gas wells for litigation purposes.
- ✓ Valuation of an oil and gas company in Colombia. Reserves included developed and undeveloped leases.
- ✓ Valuation of oil and gas reserves for bankruptcies, including shallow water Gulf of Mexico oil and gas company with value in excess of \$300 million.
- ✓ Valuation of private oil and gas partnerships for tax purposes, including one with more than 1,400 operated oil and gas wells, and over 1,000 overriding royalty interests.
- ✓ Due diligence of oil and gas transactions including analysis of reservoir decline, gas gathering and processing agreements, price hedges, lease operating expenses, and projected capex.

OILFIELD SERVICES EXPERIENCE

- ✓ Valuation of oil and gas service equipment and technology, ranging from commodity tool rentals, completion rigs and fracking equipment to seismic technology, seamless threading, logging, and other downhole tools and applications.

*Carizzo Oil and Gas, Inc.
Fair Value of Certain Oil and Gas Assets Acquired from Sanchez Energy
Corporation*

- ✓ Several valuations for clients of more than 250 offshore drilling rigs in Gulf of Mexico, South America, North Sea, West Africa, Middle East and Southeast Asia for purposes such as acquisitions, purchase price allocations, US and international tax structuring. Rigs valued included jack-ups, semi-submersibles and drillships.
- ✓ Valuations of hundreds of land drilling rigs (up to 3,000 horsepower) and completion/workover rigs in more than a dozen countries in North and South America, Central and Eastern Europe, Russia and Asia.
- ✓ Inspected offshore drilling rigs in Sea of Thailand, Gulf of Mexico, Singapore and North Sea.
- ✓ Developed valuation model to forecast dayrates and utilization for offshore drilling rigs using regression analysis of historical oil prices, correlated to dayrates and utilization by rig class, competitive growth and asset attrition and contract terms.
- ✓ Analysis of drilling contracts, renewal and dayrate probability, and commodity price effect on forecast.
- ✓ Represented client before IRS valuation engineers on value of offshore drilling rigs.
- ✓ Valuation of offshore oil and gas production facilities in Gulf of Mexico, West Africa, North Sea and Southeast Asia. Assets included fixed platforms, FPSO's and subsea oil and gas production facilities.
- ✓ Damage analysis for independent that declared force majeure on semi-submersible drilling rig in GOM.
- ✓ Market value studies of new and used onshore and offshore drilling rigs using transaction analysis.
- ✓ Business enterprise valuations of drilling and oilfield service companies.
- ✓ Damage analysis of force majeure on semi-submersible drilling rig in GOM.
- ✓ Business enterprise valuations of drilling and oilfield service companies.
- ✓ Analysis of Intangible drilling costs (IDC's) involving turn-key drilling partnerships.

EXPERT WITNESS AND VALUATION FOR LEGAL MATTERS

- ✓ US Bankruptcy Court (Delaware) – Expert witness regarding value of a crude and product terminal at a Gulf Coast refinery.
- ✓ US Bankruptcy Court (Delaware) – Expert witness regarding value of refinery.
- ✓ District Court (Oklahoma City) – Expert witness regarding value of gas processing plants and associated gas gathering pipeline networks.
- ✓ Kansas State Board of Tax Appeals – Expert witness representing on the value of a Midcontinent crude refinery.
- ✓ US District Court (California) – Expert witness regarding value of Midwestern ethanol plant.
- ✓ US District Court (Kansas) – Expert witness regarding value of chemical company.
- ✓ Valuation expert on bankruptcy matter involving oil and gas reserves in Gulf of Mexico.
- ✓ US Federal Court (Texas) – Expert witness regarding value of developed and undeveloped reserves of large oil and gas fields in South Texas.
- ✓ US District Court (Texas) – Expert witness regarding value of non-operated working interests in Barnett Shale.
- ✓ US District Court (Illinois) – Expert witness regarding agriculture and steel economics.
- ✓ State Tax Appeals – Expert witness regarding Alaska North Slope oil and gas developments.

- ✓ Represented clients in Federal, state and local tax negotiations on several occasions regarding oil and gas valuation.

SELECTED SPEAKING ENGAGEMENTS

- 2014: Society of Petroleum Engineers
Hydrocarbon Evaluation and Economics Symposium
"Development of Discount Rates"
- 2014: Petroleum Accountants Society of Houston
Monthly Meeting
"Purchase Price Allocations: Book and Tax Differences"
- 2014: Financial Executives Institute of Houston
Annual Meeting
"Oil and Gas Price Outlook"
- 2013: American Society of Appraisers
Advanced Business Valuation Conference
"Oil and Gas Reserves: From Rock to Bank"
- 2013: American Society of Appraisers
Annual Oil and Gas School
"Oil and Gas Prices: History and Outlook"
- 2012: American Association of Drilling Contractors
International Tax Conference
"Oil and Gas Prices: Valuation Effect on Drillers?"
- 2012: American Society of Appraisers
Annual Oil and Gas School
"Fundamentals of Reservoir Analysis for Oil and Gas Valuation"
- 2012: Gardere Wynne and Sewell
Energy Luncheon Series
"Oil and Gas Outlook: How we got here and where we're headed"
- 2011: American Institute of Professional Geologists
Annual Conference
"Oil Prices, Currencies and Reserve Valuation"
- 2011: Petroleum Accountants Society of Houston
Annual Conference
"A Funny Thing Happened on the Way to the Bank"
- 2011: Tax Executives Institute
Annual Conference
"Oil, Gas, Money and Value"
- 2011: Haynes Boone
Energy Team
"Oil and Gas Valuation"
- 2010: Society of Petroleum Evaluation Engineers
Spring Meeting
"Currencies and Oil Prices – Where are we headed?"
- 2010: Society of Petroleum Engineers
International Oil and Gas Conference, Beijing, China
"Oil & Gas Prices and Outlook and Effect on Global Drillers"
- 2010: International Association of Drilling Contractors
Contracts and Risk Management Conference

- *"Economic Trends and the Effect on Oil and Gas Companies"*
2010: Society of Petroleum Engineers
Business Development Conference
"Currencies and the Value-effect on Oil and Gas Price"
- 2009: Mergermarket
Energy M&A Conference (keynote speaker);
"Perspectives on Oil and Gas Trends and Prices"
- 2009: International Association of Drilling Contractors
International Tax Conference
"Oil and Gas Issues in Volatile Times"
- 2008: International Association of Drilling Contractors
International Tax Conference,
"Valuation of Offshore Drilling Rigs"
- 2007: International Association of Drilling Contractors
International Tax Conference,
"Current Issues in Drilling Rig Valuations"
- 2003: American Society of Appraisers
International Business Valuation Conference,
"Oil and Gas Valuation Using Monte Carlo Simulations"

SELECTED ARTICLES

Canadian Institute of Chartered Business Valuators

Probabilities and Sensitivity Analysis in Oil and Gas Valuation

Society of Petroleum Engineers

Currencies and their Effect on the Oil Industry

His articles have also appeared in Oilpro.com, Colorado Energy News and Iraqi Economists Network. Jim was listed by the American City Business Journals as a "Who's Who in Energy" in 2014.

ALTUS GROUP US INC.

**FMV Assessment of Tyler County, WV Gas Wells
Held by Antero Resources Corporation**

As of July 1, 2016



Specialty Services Group

ALTUS GROUP US INC.

Fair Market Value Assessment - Antero Resources Corp.

Table of Contents

Valuation as of July 1, 2016



Reference #	Exhibit Description
Exhibit 1	FMV Conclusion
Exhibit 2	FMV Detail
Exhibit 3	FMV Comparison
Exhibit 4	Discount Rate Derivation

ALTUS GROUP US INC.**Exhibit 1****Fair Market Value Assessment - Antero Resources Corp.**

FMV Conclusion

Valuation as of July 1, 2016**Income Approach Summary**

<u>County</u>	<u>Well Count^[1]</u>	<u>Fair Market Value^[2]</u>
Tyler	18	32,943,378
Total	18	\$ 32,943,378

Notes to Exhibit

[1] As provided by management. See Exhibit 2.

[2] See Exhibit 2.

[illegible][illegible]

[illegible]

Asset Class	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Equity	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Fixed Income	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Real Estate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Commodities	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Private Equity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

The following table provides a summary of the market value assumptions used in the valuation model. The assumptions are based on the historical performance of the assets and the current market conditions. The assumptions are subject to change based on the market conditions and the performance of the assets.

1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120	2121	2122	2123	2124	2125	2126	2127	2128	2129	2130	2131	2132	2133	2134	2135	2136	2137	2138	2139	2140	2141	2142	2143	2144	2145	2146	2147	2148	2149	2150	2151	2152	2153	2154	2155	2156	2157	2158	2159	2160	2161	2162	2163	2164	2165	2166	2167	2168	2169	2170	2171	2172	2173	2174	2175	2176	2177	2178	2179	2180	2181	2182	2183	2184	2185	2186	2187	2188	2189	2190	2191	2192	2193	2194	2195	2196	2197	2198	2199	2200	2201	2202	2203	2204	2205	2206	2207	2208	2209	2210	2211	2212	2213	2214	2215	2216	2217	2218	2219	2220	2221	2222	2223	2224	2225	2226	2227	2228	2229	2230	2231	2232	2233	2234	2235	2236	2237	2238	2239	2240	2241	2242	2243	2244	2245	2246	2247	2248	2249	2250	2251	2252	2253	2254	2255	2256	2257	2258	2259	2260	2261	2262	2263	2264	2265	2266	2267	2268	2269	2270	2271	2272	2273	2274	2275	2276	2277	2278	2279	2280	2281	2282	2283	2284	2285	2286	2287	2288	2289	2290	2291	2292	2293	2294	2295	2296	2297	2298	2299	2300	2301	2302	2303	2304	2305	2306	2307	2308	2309	2310	2311	2312	2313	2314	2315	2316	2317	2318	2319	2320	2321	2322	2323	2324	2325	2326	2327	2328	2329	2330	2331	2332	2333	2334	2335	2336	2337	2338	2339	2340	2341	2342	2343	2344	2345	2346	2347	2348	2349	2350	2351	2352	2353	2354	2355	2356	2357	2358	2359	2360	2361	2362	2363	2364	2365	2366	2367	2368	2369	2370	2371	2372	2373	2374	2375	2376	2377	2378	2379	2380	2381	2382	2383	2384	2385	2386	2387	2388	2389	2390	2391	2392	2393	2394	2395	2396	2397	2398	2399	2400	2401	2402	2403	2404	2405	2406	2407	2408	2409	2410	2411	2412	2413	2414	2415	2416	2417	2418	2419	2420	2421	2422	2423	2424	2425	2426	2427	2428	2429	2430	2431	2432	2433	2434	2435	2436	2437	2438	2439	2440	2441	2442	2443	2444	2445	2446	2447	2448	2449	2450	2451	2452	2453	2454	2455	2456	2457	2458	2459	2460	2461	2462	2463	2464	2465	2466	2467	2468	2469	2470	2471	2472	2473	2474	2475	2476	2477	2478	2479	2480	2481	2482	2483	2484	2485	2486	2487	2488	2489	2490	2491	2492	2493	2494	2495	2496	2497	2498	2499	2500	2501	2502	2503	2504	2505	2506	2507	2508	2509	2510	2511	2512	2513	2514	2515	2516	2517	2518	2519	2520	2521	2522	2523	2524	2525	2526	2527	2528	2529	2530	2531	2532	2533	2534	2535	2536	2537	2538	2539	2540	2541	2542	2543	2544	2545	2546	2547	2548	2549	2550	2551	2552	2553	2554	2555	2556	2557	2558	2559	2560	2561	2562	2563	2564	2565	2566	2567	2568	2569	2570	2571	2572	2573	2574	2575	2576	2577	2578	2579	2580	2581	2582	2583	2584	2585	2586	2587	2588	2589	2590	2591	2592	2593	2594	2595	2596	2597	2598	2599	2600	2601	2602	2603	2604	2605	2606	2607	2608	2609	2610	2611	2612	2613	2614	2615	2616	2617	2618	2619	2620	2621	2622	2623	2624	2625	2626	2627	2628	2629	2630	2631	2632	2633	2634	2635	2636	2637	2638	2639	2640	2641	2642	2643	2644	2645	2646	2647	2648	2649	2650	2651	2652	2653	2654	2655	2656	2657	2658	2659	2660	2661	2662	2663	2664	2665	2666	2667	2668	2669	2670	2671	2672	2673	2674	2675	2676	2677	2678	2679	2680	2681	2682	2683	2684	2685	2686	2687	2688	2689	2690	2691	2692	2693	2694	2695	2696	2697	2698	2699	2700	2701	2702	2703	2704	2705	2706	2707	2708	2709	2710	2711	2712	2713	2714	2715	2716	2717	2718	2719	2720	2721	2722	2723	2724	2725	2726	2727	2728	2729	2730	2731	2732	2733	2734	2735	2736	2737	2738	2739	2740	2741	2742	2743	2744	2745	2746	2747	2748	2749	2750	2751	2752	2753	2754	2755	2756	2757	2758	2759	2760	2761	2762	2763	2764	2765	2766	2767	2768	2769	2770	2771	2772	2773	2774	2775	2776	2777	2778	2779	2780	2781	2782	2783	2784	2785	2786	2787	2788	2789	2790	2791	2792	2793	2794	2795	2796	2797	2798	2799	2800	2801	2802	2803	2804	2805	2806	2807	2808	2809	2810	2811	2812	2813	2814	2815	2816	2817	2818	2819	2820	2821	2822	2823	2824	2825	2826	2827	2828	2829	2830	2831	2832	2833	2834	2835	2836	2837	2838	2839	2840	2841	2842	2843	2844	2845	2846	2847	2848	2849	2850	2851	2852	2853	2854	2855	2856	2857	2858	2859	2860	2861	2862	2863	2864	2865	2866	2867	2868	2869	2870	2871	2872	2873	2874	2875	2876	2877	2878	2879	2880	2881	2882	2883	2884	2885	2886	2887	2888	2889	2890	2891	2892	2893	2894	2895	2896	2897	2898	2899	2900	2901	2902	2903	2904	2905	2906	2907	2908	2909	2910	2911	2912	2913	2914	2915	2916	2917	2918	2919	2920	2921	2922	2923	2924	2925	2926	2927	2928	2929	2930	2931	2932	2933	2934	2935	2936	2937	2938	2939	2940	2941	2942	2943	2944	2945	2946	2947	2948	2949	2950	2951	2952	2953	2954	2955	2956	2957	2958	2959	2960	2961	2962	2963	2964	2965	2966	2967	2968	2969	2970	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Age group 15-19	2,127,122,539	199	2,048	1,963	1,877	1,791	1,705	1,619	1,533	1,447	1,361	1,275	1,189	1,103	1,017	931	845	759	673	587	501	415	329	243	157	71	15	9	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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[illegible]

ACTUS GROUP US INC.

Full Market Value Assessment - Antero Resources Corp.

FMV Comparison - Antero Resources Corp.

Valuation as of July 1, 2018

Exhibit 4

(in \$ in Thousands)

HEIN

Full Market Value Summary

Well Name	NRA #	County	Well Type	Target Interval	Holt		West Virginia	
					FMV	% of Total	State Estimate	% of Total
Ingot Unit 2H	0120172200	Tyler	Horizontal	Marcellus	2,691,226	8.2%	3,816,525	8.5%
Ingot Unit 2H	0120172201	Tyler	Horizontal	Marcellus	2,366,811	7.2%	3,729,821	8.3%
Wall Unit 1H	0120172202	Tyler	Horizontal	Marcellus	2,144,129	6.5%	3,130,249	7.0%
Wall Unit 2H	0120172203	Tyler	Horizontal	Marcellus	2,025,521	6.1%	3,066,076	6.9%
Wedge Unit 2H	0220172215	Tyler	Horizontal	Marcellus	2,675,319	8.1%	3,056,102	6.9%
Sq Arnold Unit 1H	0520142039	Tyler	Horizontal	Marcellus	1,337,659	4.1%	0,002,040	0.0%
Sq Arnold Unit 2H	0520142038	Tyler	Horizontal	Marcellus	1,465,391	4.4%	Included in well status above	
Sweeney Unit 1H	0520152068	Tyler	Horizontal	Marcellus	1,694,479	5.1%	1,564,871	3.5%
Sweeney Unit 2H	0520152067	Tyler	Horizontal	Marcellus	1,617,156	4.9%	1,223,646	2.8%
Thoroldson Unit 1H	0520152078	Tyler	Horizontal	Marcellus	1,553,898	4.7%	1,755,026	3.9%
Thoroldson Unit 2H	0520152079	Tyler	Horizontal	Marcellus	1,479,467	4.5%	1,703,867	3.8%
Clower Unit 2H	0520172159	Tyler	Horizontal	Marcellus	1,257,109	3.8%	2,256,382	5.1%
Clower Unit 1H	0520172158	Tyler	Horizontal	Marcellus	1,473,594	4.5%	3,216,305	7.3%
Silas Unit 2H	0620172156	Tyler	Horizontal	Marcellus	1,447,042	4.4%	3,300,670	7.5%
Silas Unit 1H	0620172157	Tyler	Horizontal	Marcellus	1,398,134	4.2%	3,168,681	7.2%
Freeland Unit 2H	0620162127	Tyler	Horizontal	Marcellus	1,507,454	4.6%	4,198,215	9.5%
Grat Unit 1H	0720162064	Tyler	Horizontal	Marcellus	1,114,348	3.4%	4,129,118	9.3%
Wedge Unit 1H	0220162126	Tyler	Horizontal	Marcellus	3,702,009	11.5%	14,087,365	31.6%
					\$ 32,943,378	100.0%	\$ 71,230,027	100.0%

Notes to Exhibit

[1] Individual well data provided by Client.

[2] For further detail on the development of the FMV for each individual well, please refer to Exhibit 2.

Full Market Value Insurance - Annuity Payment Corp.
Insurance Rate Schedule
Yours truly,
[Signature]

Variable	DAF	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91
Population (millions)	1.63	71.4%	1.70	1.81	1.93	2.04	2.14	2.24
Urban	1.03	51.4%	52.4%	53.4%	54.4%	55.4%	56.4%	57.4%
Rural	0.60	48.6%	47.6%	46.6%	45.6%	44.6%	43.6%	42.6%
Urban (millions)	1.03	51.4%	1.11	1.20	1.30	1.40	1.50	1.60
Rural (millions)	0.60	48.6%	0.59	0.58	0.57	0.56	0.55	0.54
Urban density	0.03	13.4%	0.03	0.03	0.03	0.03	0.03	0.03
Rural density	0.03	13.4%	0.03	0.03	0.03	0.03	0.03	0.03

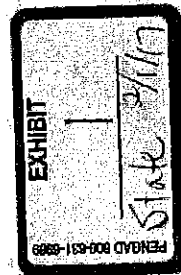
[illegible][illegible]

இதில் 1941-42 ஆம் ஆண்டில் 100 ரூபாய் மதிப்பில்

STATE OF WEST VIRGINIA
TAX AND REVENUE - PROPERTY TAX DIVISION
NATURAL RESOURCES GAS/OIL VALUE ABSTRACT FOR EXCEL
FOR TAXER: 2017

BR128PTD

PRODUCER	CY ACCOUNT	RIN EIL WELLS API	CRVPTD	ORVPTD	TOTAL OPERATOR
ANTERO RESOURCES CORPORATION	48 0100050002 C	1 00812	1767	0	1767 DOAK RE 1 (11320.1)
	48 0100050003 C	1 01104	5460	0	5460 CAIN HEIRS 5 (11314.1)
	48 0100050004 C	1 01303	9468	0	9468 CAIN HEIRS 6 (11315.1)
	48 0117171868 C	1 01868	6876	0	6876 CAIN HEIRS 8 (11318.1)
	48 0117171870 C	1 01870	10810	0	10810 CAIN HEIRS 9 (11317.1)
	48 0118181872 C	1 01872	3172	0	3172 CAIN HEIRS 10 (11319.1)
	48 0120162054 C	1 02064	3802885	326433	4129418 KRAFT UNIT 1H (10456.1)
	48 0120172200 C	1 02200	4615525	0	4615525 INGOT UNIT 1H (11336.1)
	48 0120172201 C	1 02201	3851516	0	3851516 INGOT UNIT 2H (11339.1)
	48 0120172202 C	1 02202	3130243	0	3130243 WALL UNIT 1H (11340.1)
	48 0120172203 C	1 02203	3096076	0	3096076 WALL UNIT 2H (11341.1)
	48 0120172272 C	1 02273	0	0	0 RUMER UNIT 4HD (11477.1)
	48 0168001371 C	1 01371	1353	0	1353 CAIN HEIRS 7 (11316.1)
	48 0170001587 C	1 01587	3792	0	3792 CAIN HEIRS 2 (11313.1)
	48 0220152126 C	1 02126	12715638	1966661	14682365 NEIGLE UNIT 1H (10336.1)
	48 0220172215 C	1 02215	3856102	0	3856102 NEIGLE UNIT 2H (10658.1)
	48 0400050005 C	1 00414	4705	0	4705 HESUP 1 (11337.1)
	48 0418181928 X	1 01928	25734	0	25734 SHERVES #203
	48 0418181929 X	1 01929	28585	0	28585 BOWEN 704
	48 0510000896 X	1 00996	1413	0	1413 WEESE 1 (NK 80)
	48 0520142038 C	2 02038	7663762	413179	8082941 ED ARNOLD UNIT 1H AND ED
	48 0520152067 C	1 02067	1694714	38932	1723646 SWENNEY UNIT 2H (10274.1)
	48 0520152068 C	1 02068	1935929	28942	1964871 SWENNEY UNIT 1H (10273.1)
	48 0520152078 C	1 02078	1725643	29983	1755626 THORNTONSON UNIT 1H (1028
	48 0520152079 C	1 02079	3680383	29564	1709847 THORNTONSON UNIT 2H (1028
	48 0520172156 C	1 02156	3380670	0	3380670 SILAS UNIT 2H (10514.1)
	48 0520172157 C	1 02157	3168669	0	3168669 SILAS UNIT 1H (10515.1)
	48 0520172158 C	1 02158	3246805	0	3246805 GLOVER UNIT 1H (10513.1)
	48 0520172159 C	1 02159	2758387	0	2758387 GLOVER UNIT 2H (10512.1)
	48 0620162127 C	1 02127	5707687	490528	6159215 FREELAND UNIT 2H (10587.1)



NR105: 1

ACCOUNT:0100050002
RESOURCE:GS OWNER:ANTERO RESOURCES CORPORATI LOCATION:DOAK AE 1 (11320.1)

STATUS: A	API#: 00912	DATE: 10/13/1911	DAYS: 365	BBLS:	0.000	MCPS:	851	RCPTS:	1347	GWT:	1179	OWI:	0
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SYSTEM RATES:	
CAP. RATE	16.000
DECLINE RATE	0.390
WELL LIFE	0.230
EXPENSE	0.080
	0.45
	5000
	5000

RATES USED:			
CAP RATE:	16.000	DECLINE RATE:	0.45
		WELL LIFE:	99
		EXPENSE:	5000
			5000

SETTLED YEARS: 105

	GAS WORKING INTEREST			GAS ROYALTY INTEREST			OIL WORKING INTEREST			OIL ROYALTY INTEREST		
	GROSS	NET	DISCOUNT	GROSS	DISCOUNT		GROSS	NET	DISCOUNT	GROSS	DISCOUNT	
	INCOME	INCOME	INCOME	INCOME	INCOME	FACTOR	INCOME	INCOME	INCOME	INCOME	INCOME	FACTOR
1	1,038	571	530	148	137	0.928						
2	958	488	390	136	103	0.800						
3	878	411	284	125	86	0.690						
4	808	341	203	115	68	0.595						
5	743	276	142	106	54	0.513						
6	684	217	96	97	43	0.442						
7	629	162	62	90	34	0.381						
8	579	112	37	82	27	0.329						
9	532	66	19	76	21	0.283						
10	490	23	5	70	17	0.244						
11	451	0	0	64	0	0.210						

TOTAL:

855

EXPENSE: 467

467

'TYLER' COUNTY, WV
YIELD CAP MODEL REPORT FOR - 2017

NR105: 2

JAN 27, 2017
09:56 AM

ACCOUNT#01000050003
STATUS: A API#01104
DATE: 10/30/1985 DAYS: 365 BELS: 0.000 MCPS: 2917 RCPTS: 4162 GWI: 3643 ONI: 0
SYSTEM RATES: 16.000 DECLINE RATE: 0.290 0.080 WELLLIFE: 99 EXPENSE: 0.45 5000 5000
CAP RATE: 16.000 DECLINE RATE: 0.290 0.45 5000 5000
RATES USED:
CAP RATE: 16.000 DECLINE RATE:
SETTLED YEARS: 31

	GAS WORKING INTEREST			GAS ROYALTY INTEREST			OIL WORKING INTEREST			OIL ROYALTY INTEREST		
	GROSS INCOME	NET INCOME	DISCOUNT	GROSS INCOME	DISCOUNT INCOME	FACTOR	GROSS INCOME	NET INCOME	DISCOUNT INCOME	GROSS INCOME	DISCOUNT INCOME	FACTOR
1	3,206	1,763	1,637	457	324	0.928	457	324	0.928	457	324	0.928
2	2,949	1,507	1,206	420	336	0.800	420	336	0.800	420	336	0.800
3	2,713	1,271	1,877	387	267	0.690	387	267	0.690	387	267	0.690
4	2,486	1,054	627	356	212	0.595	356	212	0.595	356	212	0.595
5	2,297	854	438	327	168	0.513	327	168	0.513	327	168	0.513
6	2,113	670	296	301	133	0.442	301	133	0.442	301	133	0.442
7	1,944	501	191	277	106	0.381	277	106	0.381	277	106	0.381
8	1,788	346	114	255	84	0.329	255	84	0.329	255	84	0.329
9	1,645	203	57	234	55	0.283	234	55	0.283	234	55	0.283
10	1,514	71	17	216	23	0.244	216	23	0.244	216	23	0.244
11	1,393	0	0	198	0	0.210	198	0	0.210	198	0	0.210
TOTAL:			5,460		1,848							
EXPENSE:	1443		1443	1443								

TYLER, COUNTY, WV
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NR105: 3

ACCOUNT: 0100050004

RESOURCE: GS OWNER: ANTERO RESOURCES CORPORATI LOCATION: CAIN HEIRS 6 (11315.1)

STATUS: A API#: 01303

DATE: 11/08/1989 DAYS: 365 BELS: 0.000 MCFS: 2808 RCPTS: 7220 GWT: 6317 OWT: 0

SYSTEM RATES:

CAP RATE: 16.000 DECLINE RATE: 0.390

EXPENSE: 5000

5000

RATES USED:

CAP RATE: 16.000 DECLINE RATE:

EXPENSE: 5000

5000

SETTLED YEARS: 27

	GAS WORKING INTEREST			GAS ROYALTY INTEREST			OIL WORKING INTEREST			OIL ROYALTY INTEREST		
	GROSS INCOME	NET INCOME	DISCOUNT	GROSS INCOME	NET INCOME	DISCOUNT	GROSS INCOME	NET INCOME	DISCOUNT	GROSS INCOME	NET INCOME	DISCOUNT
1	5,559	3,057	2,839	795	738	0.928						
2	5,114	2,613	2,091	731	585	0.800						
3	4,705	2,204	1,528	673	464	0.690						
4	4,329	1,827	1,087	619	368	0.595						
5	3,982	1,481	759	569	292	0.513						
6	3,664	1,162	514	524	232	0.442						
7	3,371	869	331	482	184	0.381						
8	3,101	600	197	443	146	0.329						
9	2,853	351	100	408	115	0.283						
10	2,625	123	30	375	92	0.244						
11	2,415	0	0	345	0	0.210						
TOTAL:			9,468			3,215						
EXPENSE:	2502		2502			2502						

'TYLER' COUNTY, WV
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ACCOUNT: 0117171868
STATUS: A API#: 01868
DATE: 06/01/2006 DAYS: 365
SYSTEM RATES: 16.000 DECLINE RATE: 0.390
CAP RATE: 16.000 DECLINE RATE: 0.390
RATES USED:
CAP RATE: 16.000 DECLINE RATE: 0.390
SETTLED YEARS: 10

RESOURCE: GS OWNER: ANTERO RESOURCES CORPORATI LOCATION: CAIN HEIRS 2 (11318.11)

2122 RCPTS: 5091 GWT: 4154 QWILL: 0

EXPENSE: 5000

EXPENSE: 5000

GAS ROYALTY INTEREST
GROSS INCOME
DISCOUNT INCOME FACTOR

OIL WORKING INTEREST
GROSS INCOME
NET DISCOUNT INCOME

OIL ROYALTY INTEREST
GROSS INCOME
DISCOUNT INCOME FACTOR

1	3,920	2,156	2,002	561	520	0.928
2	3,606	1,842	1,474	516	413	0.800
3	3,317	1,554	1,072	474	327	0.690
4	3,052	1,288	766	437	260	0.595
5	2,808	1,044	535	402	206	0.513
6	2,583	813	362	369	163	0.442
7	2,377	613	234	340	130	0.381
8	2,186	423	139	313	103	0.329
9	2,012	248	70	288	81	0.283
10	1,851	87	21	269	65	0.244
11	1,703	0	0	244	0	0.210

TOTAL: 6,576

EXPENSE: 1764

1764

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NR105: 5

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ACCOUNT: 0117171970
STATUS: A API#: 01870
SYSTEM RATES:
CAP RATE: 16.000 DECLINE RATE: 0.390
RATES USED:
CAP RATE: 16.000 DECLINE RATE:
SETTLED YEARS: 10

RESOURCE: GS OWNER: ANTERO RESOURCES CORPORATION LOCATION: CAIN HEIRS 8 (11317.1)

DATE: 04/01/2006 DAYS: 365 BBUS: 0.000 MCPS: 3016 RCPTS: 8243 GML: 7212 GML: 0

EXPENSE: 5000

EXPENSE: 5000

	GAS WORKING INTEREST			GAS ROYALTY INTEREST			OIL WORKING INTEREST			OIL ROYALTY INTEREST		
	GROSS INCOME	NET INCOME	DISCOUNT INCOME	GROSS INCOME	DISCOUNT INCOME	INCOME FACTOR	GROSS INCOME	NET INCOME	DISCOUNT INCOME	GROSS INCOME	DISCOUNT INCOME	INCOME FACTOR
1	6,347	3,491	3,241	907	842	0.928						
2	5,839	2,983	2,388	835	668	0.800						
3	5,372	2,516	1,736	768	530	0.690						
4	4,942	2,086	1,241	706	420	0.595						
5	4,547	1,691	867	650	333	0.513						
6	4,183	1,327	587	598	264	0.442						
7	3,848	992	378	550	210	0.381						
8	3,540	684	225	506	166	0.329						
9	3,257	401	114	466	132	0.283						
10	2,997	141	34	428	105	0.244						
11	2,757	0	0	394	0	0.210						
TOTAL:			10,810			3,671						

EXPENSE: 2856

TYLER, COUNTY, WV
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ACCOUNT: 0120162064
RESOURCE: OG OWNER: ANTERO RESOURCES CORPORATE LOCATION: GRAFF UNIT 1R (10466-1)
STATUS: Z API#: 02064 DATE: 02/25/2014 DAYS: 365 BHIS: 3328.000 MCFG: 1154214 RCPTS: 2843032 GWI: 2223587 OWI: 152687
SYSTEM RATES:
CAP RATE: 16.000 DECLINE RATE: 0.520 0.230 0.180 WELL LIFE: 99 EXPENSE: 0.2 175000 175000
RATES USED:
CAP RATE: 16.000 DECLINE RATE: 0.520 0.230 0.180 WELL LIFE: 99 GS EXPENSE: 0.2 175000 175000
SETTLED YEARS: 2 OL EXPENSE: 0.2 5750 5750

	GAS WORKING INTEREST			GAS ROYALTY INTEREST			OIL WORKING INTEREST			OIL ROYALTY INTEREST		
	GROSS INCOME	NET INCOME	DISCOUNT INCOME	GROSS INCOME	DISCOUNT INCOME	FACTOR	GROSS INCOME	NET INCOME	DISCOUNT INCOME	GROSS INCOME	DISCOUNT INCOME	FACTOR
1	1,513,474	1,349,709	1,253,173	295,677	274,529	0.928	103,827	103,458	96,058	20,284	18,833	0.928
2	1,241,049	1,077,283	862,269	242,455	194,064	0.800	85,138	84,769	67,850	16,633	13,313	0.800
3	1,017,660	853,895	589,195	198,813	137,183	0.690	69,813	69,444	47,917	13,639	9,411	0.690
4	834,481	670,716	398,966	163,027	96,974	0.595	57,247	56,878	33,833	11,184	6,653	0.595
5	684,275	520,509	266,911	133,682	68,551	0.513	46,943	46,573	23,882	9,171	4,703	0.513
6	561,105	397,340	175,648	103,619	48,458	0.442	38,493	38,124	16,853	7,520	3,324	0.442
7	460,106	296,341	112,931	80,888	34,255	0.381	31,564	31,195	11,888	6,166	2,350	0.381
8	377,287	213,522	70,147	73,708	24,215	0.329	25,883	25,513	8,382	5,056	1,661	0.329
9	309,375	145,610	41,238	60,441	17,117	0.283	21,224	20,855	5,906	4,148	1,174	0.283
10	253,688	89,922	21,954	49,561	12,100	0.244	17,034	17,034	4,159	3,400	830	0.244
11	208,024	44,259	9,315	40,640	8,554	0.210	14,271	13,903	2,926	2,788	587	0.210
12	170,580	33,325	1,236	33,325	6,046	0.181	11,702	11,333	2,055	2,286	415	0.181
13	139,875	6,814	0	27,326	0	0.156	9,596	9,227	1,443	1,875	293	0.156
14							7,868	7,499	1,011	1,537	247	0.135
15							6,452	6,083	707	1,260	104	0.116
16							5,231	4,922	493	1,034	73	0.100
17							4,338	3,969	343	848	52	0.086
18							3,558	3,188	237	695	37	0.074
19							2,917	2,548	164	570	37	0.064
20							2,392	2,023	112	467	26	0.055
21							1,961	1,592	76	383	18	0.048
22							1,608	1,239	51	314	13	0.041
23							1,319	950	34	258	9	0.035
24							1,082	712	22	211	6	0.031
25							887	518	14	173	5	0.026
26							727	358	8	142	3	0.023
27							596	227	4	116	2	0.020
28							489	120	2	96	2	0.017
29							401	32	0	78	1	0.015
30							329	0	0	64	0	0.013
TOTAL:			3,802,985		922,046				326,433		64,251	

GS EXPENSE: 163765 163765
OL EXPENSE: 369 369

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ACCOUNT: 0120172300 RESOURCE: OG OWNER: ANTERO RESOURCES CORPORATI LOCATION: INGOT UNIT 1H (11338.1)
 STATUS: 4 API#: 02200 DATE: 11/09/2015 DAYS: 53 BHLS: 5913.000 MCPS: 611815 RCPTS: 11529743 GMI: 9075039 OMI: 618421
 SYSTEM RATES:
 CAP RATE: 16.000 DECLINE RATE: 0.520 0.230 0.180 WELL LIFE: 99 EXPENSE: 0.2 175000 175000
 RATES USED:
 CAP RATE: 16.000 DECLINE RATE: 0.520 0.230 0.180 WELL LIFE: 99 GS EXPENSE: 0.2 175000 175000
 SETTLED YEARS: 1 OL EXPENSE: 0.2 5750 5750
 OL EXPENSE: 367 367 367

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ACCOUNT: 0120172201

RESOURCE: OG OWNER: ANTERO RESOURCES CORPORATION LOCATION: INGT UNIT 2H (11339.1)

STATUS: Z API#: 02201 DATE: 11/13/2015 DAYS: 49 BHLS: 4851.000 MCPS: 523625 RCPTS: 10609141 GWI: 8366396 OWI: 553081

SYSTEM RATES: 16.000 DECLINE RATE: 0.520 0.230 0.180 WELLLINE: 99 EXPENSE: 0.2 175000 175000

RATES USED: 16.000 DECLINE RATE: 0.520 0.230 0.180 WELLLINE: 99 GS EXPENSE: 0.2 175000 175000

CAP RATE: 16.000 DECLINE RATE: 0.520 0.230 0.180 WELLLINE: 99 OL EXPENSE: 0.2 5750 5750

SETTLED YEARS: 1

GAS WORKING INTEREST				GAS ROYALTY INTEREST				OIL WORKING INTEREST				OIL ROYALTY INTEREST			
GROSS	DISCOUNT	NET		GROSS	DISCOUNT	INCOME	FACTOR	GROSS	DISCOUNT	NET		GROSS	DISCOUNT	INCOME	FACTOR
INCOME	INCOME	INCOME		INCOME	INCOME	INCOME		INCOME	INCOME	INCOME		INCOME	INCOME	INCOME	
1 3,053,735	2,582,914	2,889,586		578,484	537,109	0.928		201,875	201,518	187,105		38,244	35,508	0.928	
2 2,427,719	1,811,787	2,263,570		459,895	358,105	0.800		160,490	160,124	128,173		30,404	24,335	0.800	
3 1,990,730	1,260,357	1,826,581		377,114	260,212	0.690		131,612	131,245	90,561		24,931	17,203	0.690	
4 1,632,398	873,368	1,468,250		309,233	183,943	0.595		107,914	107,557	63,379		20,443	12,160	0.595	
5 1,338,567	602,229	1,174,418		253,571	130,029	0.513		88,489	88,123	45,193		16,764	8,596	0.513	
6 1,097,825	412,652	933,476		207,928	91,917	0.442		72,561	72,205	31,919		13,745	6,077	0.442	
7 735,804	280,443	735,804		170,501	64,876	0.381		59,500	59,144	22,539		11,272	3,236	0.381	
8 738,043	188,537	738,043		139,811	45,931	0.329		48,790	48,434	15,911		9,243	2,146	0.329	
9 605,195	124,908	605,195		114,645	32,459	0.244		40,008	39,651	11,230		7,579	1,517	0.244	
10 496,260	81,084	496,260		94,009	22,452	0.225		32,806	32,450	7,923		6,215	1,073	0.225	
11 406,333	51,099	406,333		77,087	16,225	0.210		26,901	26,545	5,587		5,096	0.181	0.156	
12 333,685	30,761	333,685		63,212	11,469	0.181		22,059	21,703	3,938		4,179	536	0.156	
13 273,622	17,123	273,622		51,834	8,107	0.156		18,088	17,732	2,774		3,427	379	0.156	
14 224,370	8,120	224,370		42,503	5,731	0.135		14,833	14,476	1,952		2,810	268	0.135	
15 183,983	2,306	183,983		34,853	4,051	0.116		12,163	11,808	1,372		2,304	189	0.116	
16 150,866	0	150,866		28,579	0	0.100		9,973	9,617	964		1,889	134	0.100	
17 150,866	0	150,866		28,579	0	0.100		8,178	7,822	676		1,549	95	0.100	
18 150,866	0	150,866		28,579	0	0.100		6,706	6,350	473		1,270	67	0.100	
19 150,866	0	150,866		28,579	0	0.100		5,499	5,142	330		1,042	47	0.100	
20 150,866	0	150,866		28,579	0	0.100		4,508	4,153	230		854	43	0.100	
21 150,866	0	150,866		28,579	0	0.100		3,698	3,341	159		700	33	0.100	
22 150,866	0	150,866		28,579	0	0.100		3,032	2,675	110		574	24	0.100	
23 150,866	0	150,866		28,579	0	0.100		2,486	2,130	76		471	17	0.100	
24 150,866	0	150,866		28,579	0	0.100		2,039	1,682	51		386	12	0.100	
25 150,866	0	150,866		28,579	0	0.100		1,672	1,315	35		317	8	0.100	
26 150,866	0	150,866		28,579	0	0.100		1,371	1,014	23		260	4	0.100	
27 150,866	0	150,866		28,579	0	0.100		1,124	868	15		213	3	0.100	
28 150,866	0	150,866		28,579	0	0.100		922	665	10		175	2	0.100	
29 150,866	0	150,866		28,579	0	0.100		756	565	6		143	1	0.100	
30 150,866	0	150,866		28,579	0	0.100		620	463	3		117	1	0.100	
31 150,866	0	150,866		28,579	0	0.100		508	399	2		96	1	0.100	
32 150,866	0	150,866		28,579	0	0.100		417	322	1		79	0	0.100	
33 150,866	0	150,866		28,579	0	0.100		342	263	0		65	0	0.100	
TOTAL:				8,427,687	1,783,224	623,316		118,533				118,533			

GS EXPENSE: 164149 164149
OL EXPENSE: 357 357

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ACCOUNT: 0120172202 RESOURCE: OG OWNER: ANTERO RESOURCES CORPORATION LOCATION: WALL UNIT 1H (11340.1)
STATUS: 2 API#: 02202 DATE: 11/18/2015 DAYS: 44 BELS: 3219.000 MCPS: 422551 RCPTS: 9404235 GMI: 7389217 OMI: 425791

SYSTEM RATES:
CAP RATE: 16.000 DECLINE RATE: 0.520 0.230 0.180 WELLLIFE: 99 EXPENSE: 175000 175000
RATES USED:
CAP RATE: 16.000 DECLINE RATE: 0.520 0.230 0.180 WELLLIFE: 99 GS EXPENSE: 175000 175000
SETTLED YEARS: 1 OL EXPENSE: 5750 5750

	GAS WORKING INTEREST				GAS ROYALTY INTEREST				OIL WORKING INTEREST				OIL ROYALTY INTEREST			
	GROSS INCOME	NET INCOME	DISCOUNT INCOME	FACTOR	GROSS INCOME	NET INCOME	DISCOUNT INCOME	FACTOR	GROSS INCOME	NET INCOME	DISCOUNT INCOME	FACTOR	GROSS INCOME	NET INCOME	DISCOUNT INCOME	FACTOR
1	2,597,064	2,531,599	2,350,531	0.928	548,466	509,238	509,238	0.928	155,414	155,100	144,007	0.928	31,602	31,602	29,342	0.928
2	2,144,166	1,978,701	1,583,774	0.800	436,030	349,003	349,003	0.800	123,241	123,241	98,643	0.800	25,124	25,124	20,109	0.800
3	1,758,216	1,592,751	1,098,012	0.690	357,845	246,709	246,709	0.690	101,314	101,001	69,692	0.690	16,215	16,215	14,215	0.690
4	1,441,737	1,276,272	859,172	0.595	293,187	174,398	174,398	0.595	83,078	82,764	49,231	0.595	13,852	13,852	10,049	0.595
5	1,182,225	1,016,759	621,383	0.513	240,413	123,281	123,281	0.513	68,124	67,810	34,772	0.513	11,359	11,359	7,103	0.513
6	969,424	803,959	455,398	0.442	197,119	87,147	87,147	0.442	55,861	55,548	24,556	0.442	9,114	9,114	5,021	0.442
7	794,928	629,462	339,879	0.381	161,654	61,606	61,606	0.381	45,806	45,493	17,337	0.381	7,638	7,638	3,550	0.381
8	651,841	486,375	259,785	0.329	132,556	43,548	43,548	0.329	37,561	37,248	12,237	0.329	6,263	6,263	2,509	0.329
9	534,509	369,044	104,517	0.283	108,586	30,784	30,784	0.283	30,800	30,487	9,634	0.283	5,136	5,136	1,774	0.283
10	438,298	272,852	68,511	0.244	89,131	21,761	21,761	0.244	25,256	24,943	6,090	0.244	4,211	4,211	1,254	0.244
11	359,404	193,839	49,818	0.210	73,087	15,383	15,383	0.210	20,710	20,397	4,293	0.210	3,453	3,453	886	0.210
12	294,711	129,246	23,450	0.181	59,932	10,874	10,874	0.181	16,982	16,669	3,024	0.181	2,832	2,832	627	0.181
13	241,667	76,198	11,918	0.156	49,144	7,687	7,687	0.156	13,925	13,612	2,129	0.156	2,322	2,322	443	0.156
14	198,164	32,699	4,409	0.135	40,298	5,434	5,434	0.135	11,419	11,106	1,497	0.135	1,904	1,904	313	0.135
15	162,494	0	0	0.116	33,044	0	0	0.116	9,383	9,050	1,052	0.116	1,561	1,561	221	0.116
16									7,678	7,365	738		1,280	1,280	156	
17									5,296	5,083	517		1,050	1,050	111	
18									4,153	4,049	361		861	861	78	
19									3,233	3,120	252		706	706	55	
20									2,471	2,358	175		579	579	39	
21									2,847	2,533	121		475	475	28	
22									2,334	2,021	83		389	389	20	
23									1,914	1,601	57		319	319	14	
24									1,570	1,256	36		262	262	10	
25									1,287	974	26		215	215	7	
26									2,055	552	17		176	176	5	
27									865	396	11		144	144	3	
28									710	269	7		118	118	2	
29									582	164	4		97	97	1	
30									477	78	2		80	80	1	
31									391	8	0		65	65	0	
32									321	0	0		53	53	0	
33									263	0	0		0	0	0	

TOTAL: 7,320,659 1,686,850 479,603 97,948

GS EXPENSE: 165465 165465
OL EXPENSE: 313 313

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RESOURCE: OG OWNER: ANTERO RESOURCES CORPORATI LOCATION: WALT UNIT 2H (113441.1)
STATUS: Z API#: 02203 DATE: 11/23/2015 DAYS: 39 BBLs: 2182,000 MCFS: 370155 RCPTS: 8301386 GMI: 6592667 OWI: 305952
SYSTEM RATES:
CAP RATE: 16.000 DECLINE RATE: 0.520 0.230 0.180 WELLTYPE: 99 EXPENSE: 0.2 175000 175000 175000
RATES USED:
CAP RATE: 16.000 DECLINE RATE: 0.520 0.230 0.180 WELLTYPE: 99 GS EXPENSE: 0.2 175000 175000 175000
SETTLED YEARS: 1 OL EXPENSE: 0.2 5750 5750 5750

	GAS WORKING INTEREST			GAS ROYALTY INTEREST			OIL WORKING INTEREST			OIL ROYALTY INTEREST		
	GROSS INCOME	DISCOUNT INCOME	NET INCOME	GROSS INCOME	DISCOUNT INCOME	NET INCOME	GROSS INCOME	DISCOUNT INCOME	NET INCOME	GROSS INCOME	DISCOUNT INCOME	NET INCOME
1	2,406,323	2,078,936	2,239,082	489,343	454,344	411,636	111,636	103,415	111,381	22,703	21,079	0.928
2	1,913,027	1,397,346	1,745,786	389,028	311,382	88,751	88,751	70,833	88,496	18,049	14,447	0.800
3	1,568,682	1,067,007	1,401,441	319,003	220,115	72,775	72,775	50,040	72,521	14,800	10,212	0.690
4	1,286,319	865,658	1,119,078	261,582	155,999	59,676	59,676	35,346	59,421	12,136	7,219	0.595
5	1,054,782	665,121	887,541	214,498	109,992	48,934	48,934	24,362	48,679	9,952	5,103	0.513
6	864,321	455,121	697,680	175,888	77,753	40,126	40,126	17,625	39,871	8,160	3,607	0.442
7	709,235	308,415	541,994	144,228	54,963	32,903	32,903	12,442	32,648	6,691	2,550	0.381
8	581,573	206,546	414,332	118,267	38,853	26,981	26,981	8,780	26,726	5,487	1,893	0.329
9	476,890	136,117	309,649	96,979	27,455	22,124	22,124	6,194	21,869	4,359	1,274	0.283
10	391,050	87,695	223,808	79,523	19,415	18,142	18,142	4,367	17,887	3,639	901	0.244
11	320,661	54,642	153,420	65,209	13,724	14,676	14,676	3,077	14,621	3,025	637	0.210
12	262,942	32,290	95,701	53,471	9,702	12,199	12,199	2,167	11,944	2,481	450	0.181
13	215,612	17,364	48,701	43,846	5,858	10,003	10,003	1,525	9,748	2,034	318	0.156
14	176,802	7,566	35,371	35,954	4,848	8,202	8,202	1,072	7,947	1,568	225	0.135
15	144,978	1,289	9,561	29,482	0	6,726	6,726	752	6,471	1,363	159	0.116
16		0	0		0	5,515	5,515	527	5,260	1,122	112	0.100
17						4,523	4,523	389	4,268	920	79	0.086
18						3,708	3,708	250	3,454	754	56	0.074
19						3,041	3,041	179	2,866	618	40	0.064
20						2,434	2,434	124	2,309	507	28	0.055
21						1,845	1,845	85	1,790	416	20	0.048
22						1,577	1,577	58	1,422	341	14	0.041
23						1,375	1,375	40	1,170	280	10	0.035
24						1,127	1,127	27	872	229	7	0.031
25						924	924	18	670	188	5	0.026
26						758	758	11	503	154	4	0.023
27						622	622	7	367	126	2	0.020
28						510	510	4	255	104	2	0.017
29						418	418	2	163	85	1	0.015
30						343	343	1	88	70	1	0.013
31						281	281	0	26	57	1	0.011
32						230	230	0	0	47	0	0.009

TOTAL:

6,416,005

1,505,015

344,307

70,366

GS EXPENSE: 167241

167241

1,505,015

OL EXPENSE: 255

255

1,505,015

TYLER, COUNTY, WV
YIELD CAP MODEL REPORT FOR 2017

NR105: 13

JAN 27, 2017
09:56 AM

ACCOUNT: 0120172273 RESOURCE: GS OWNER: ANTERO RESOURCES CORPORATI LOCATION: RYMER UNIT #HD (11477.1)

STATUS: S API#: 02273 DATE: 12/07/2015 DAYS: 25 BELS: 0.000 MCES: 185830 RCPES: GWI: OWI:

SYSTEM RATES: CAP RATE: 16.000 DECLINE RATE: 0.520 0.230 0.180 WELLLIFE: 99 EXPENSE: WELLTYPE: 99

RATES USED: CAP RATE: 16.000 DECLINE RATE: WELLTYPE: 99

SETTLED YEARS:

GAS WORKING INTEREST			GAS ROYALTY INTEREST			OIL WORKING INTEREST			OIL ROYALTY INTEREST		
GROSS	NET	DISCOUNT	GROSS	DISCOUNT		GROSS	NET	DISCOUNT	GROSS	DISCOUNT	
INCOME	INCOME	INCOME	INCOME	INCOME	INCOME FACTOR	INCOME	INCOME	INCOME	INCOME	INCOME	INCOME FACTOR

TOTAL:

TYLER COUNTY, WV
YIELD CAP MODEL REPORT FOR 2017

NR105: 14

JAN 27, 2017
09:56 AM

ACCOUNT: 01600001371

STATUS: A API#: 01371

RESOURCE: GS. OWNER: ANTERO RESOURCES CORPORATI LOCATION: CAIN HEIRS 7 (11316.1)

DATE: 04/05/1990 DAYS: 365 DBLS: 0.000 MCPS: 235 RCPTS: 858 GWT: 751 OWI: 0

SYSTEM RATES: 16.000 DECLINE RATE: 0.180 0.160 0.060 WELL LIFE: 99 EXPENSE: 0.45 5000 5000

RATES USED: 16.000 DECLINE RATE: 0.45 5000 5000

SETTLED YEARS: 26

GAS WORKING INTEREST			GAS ROYALTY INTEREST			OIL WORKING INTEREST			OIL ROYALTY INTEREST		
GROSS	DISCOUNT	INCOME	GROSS	DISCOUNT	INCOME	GROSS	NET DISCOUNT	GROSS	DISCOUNT	INCOME	INCOME FACTOR
INCOME			INCOME			INCOME		INCOME			

1	683	376	349	97	90	0.928
2	642	335	268	92	73	0.800
3	604	296	204	86	59	0.690
4	568	260	155	81	48	0.595
5	534	226	116	76	39	0.513
6	502	194	86	71	32	0.442
7	471	164	62	67	26	0.381
8	443	136	45	63	21	0.329
9	417	109	31	59	17	0.283
10	392	84	21	56	14	0.244
11	368	61	13	52	11	0.210
12	346	38	7	49	9	0.181
13	325	18	3	46	7	0.156
14	306	0	0	44	0	0.135

TOTAL: 1,959 446

EXPENSE: 308 308

JAN 27, 2017
09:56 AM

TYLER, COUNTY, WV
YIELD GAS MODEL REPORT FOR - 2017

NR105: 15

ACCOUNT: 0170001587
RESOURCE: G4 OWNER: ANTERO RESOURCES CORPORATION LOCATION: GAIN HIRS 2 (11313.1)
STATUS: A API#: 01587 DATE: 01/04/1916 DAYS: 365 HBLR: 0.000 MCPS: 1050 RCPTS: 2892 GWI: 2530 OWI: 0
SYSTEM RATES:
CAP RATE: 16.000 DECLINE RATE: 0.390 0.230 0.080 WELLLIFE: 99 EXPENSE: 0.45 5000 5000
RATES USED:
CAP RATE: 16.000 DECLINE RATE: WELLLIFE: 99 EXPENSE: 0.45 5000 5000
SETTLED YEARS: 100

	GAS WORKING INTEREST			GAS ROYALTY INTEREST			OIL WORKING INTEREST			OIL ROYALTY INTEREST		
	GROSS INCOME	NET INCOME	DISCOUNT INCOME	GROSS INCOME	DISCOUNT INCOME	FACTOR	GROSS INCOME	NET INCOME	DISCOUNT INCOME	GROSS INCOME	DISCOUNT INCOME	FACTOR
1	2,226	1,225	1,137	319	296	0.928	319	296	0.928			
2	2,048	1,046	888	293	255	0.800	293	255	0.800			
3	1,884	883	609	270	185	0.690	270	185	0.690			
4	1,734	732	435	248	148	0.595	248	148	0.595			
5	1,595	593	304	228	117	0.513	228	117	0.513			
6	1,467	465	206	210	93	0.442	210	93	0.442			
7	1,350	348	133	193	74	0.381	193	74	0.381			
8	1,242	240	79	178	58	0.329	178	58	0.329			
9	1,143	141	40	163	46	0.283	163	46	0.283			
10	1,051	49	12	150	37	0.244	150	37	0.244			
11	967	0	0	138	0	0.210	138	0	0.210			

TOTAL:

3,792

1,289

EXPENSE:

1002

1002

1002

TYLER, COUNTY, WV
YIELD CAP MODEL REPORT FOR - 2017

NR105: 16

JAN 27, 2017
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ACCOUNT: 0220162126
STATUS: Z API#: 02126
DATE: 05/12/2014 DAYS: 365
RESOURCES: OG OWNER: ANTERO RESOURCES CORPORATION LOCATION: NEIGLE UNIT 1H (10936.1)
CAP RATE: 16.000 DECLINE RATE: 0.520
BRI: 39487.000 NCES: 3541017 RCPTS: 8931716 GWL: 6360328 OWI: 915255
SYSTEM RATES: 16.000 DECLINE RATE: 0.520
CAP RATE: 16.000 DECLINE RATE: 0.520
RATES USED: 16.000 DECLINE RATE: 0.520
CAP RATE: 16.000 DECLINE RATE: 0.520
SETTLED YEARS: 2

	GAS WORKING INTEREST			GAS ROYALTY INTEREST			OIL WORKING INTEREST			OIL ROYALTY INTEREST		
	GROSS INCOME	DISCOUNT INCOME	NET INCOME	GROSS INCOME	DISCOUNT INCOME	NET INCOME	GROSS INCOME	DISCOUNT INCOME	NET INCOME	GROSS INCOME	DISCOUNT INCOME	NET INCOME
1	4,325,023	3,873,641	4,172,038	984,509	914,086	622,373	622,373	577,188	141,671	131,538	0.928	0.928
2	3,586,519	2,715,222	3,393,534	807,290	546,164	510,346	510,346	407,908	116,170	92,984	0.800	0.800
3	2,908,145	1,901,085	2,755,160	651,978	456,771	418,484	418,484	288,259	95,259	75,730	0.690	0.690
4	2,384,679	1,327,492	2,231,694	542,822	322,890	343,157	343,157	203,692	78,113	46,464	0.595	0.595
5	1,955,437	924,297	1,802,452	445,114	228,249	281,389	281,389	143,922	64,052	32,845	0.513	0.513
6	1,603,458	841,136	1,450,473	364,983	161,349	230,739	230,739	101,681	52,523	23,218	0.442	0.442
7	1,314,836	442,765	1,161,851	298,295	114,057	188,482	188,482	71,828	43,069	16,413	0.381	0.381
8	1,078,165	303,942	925,180	245,422	80,626	154,423	154,423	50,732	35,316	11,602	0.329	0.329
9	884,098	207,057	731,110	201,246	56,525	103,599	103,599	35,559	23,747	8,202	0.244	0.244
10	724,958	139,645	571,273	165,021	40,489	84,821	84,821	25,293	19,472	5,798	0.210	0.210
11	594,466	92,918	441,481	135,318	28,480	69,423	69,423	17,852	13,033	4,098	0.156	0.156
12	487,462	60,687	334,477	110,960	20,133	57,520	57,520	12,596	10,736	1,448	0.135	0.135
13	399,719	38,568	246,734	90,988	14,232	47,168	47,168	8,884	7,219	1,021	0.116	0.116
14	327,769	23,568	174,784	74,610	7,112	37,453	37,453	3,106	2,920	0.100	0.086	0.086
15	258,771	13,459	115,786	51,180	5,027	31,715	31,715	2,184	1,980	0.074	0.064	0.064
16	220,392	6,755	67,407	50,168	3,554	26,006	26,006	1,534	1,475	0.055	0.048	0.048
17	180,722	2,396	27,736	41,437	0.074	21,325	21,325	1,076	1,000	0.035	0.031	0.031
18	148,192			33,733		17,486	17,486	754	754	64	0.026	0.023
19						14,339	14,339	526	526	45	0.020	0.017
20						11,758	11,758	367	367	32	0.015	0.013
21						9,641	9,641	255	255	16	0.011	0.009
22						7,806	7,806	176	176	11	0.008	0.007
23						6,483	6,483	121	121	6	0.006	0.005
24						5,316	5,316	83	83	4	0.004	0.003
25						4,359	4,359	56	56	3	0.003	0.002
26						3,574	3,574	37	37	2	0.002	0.001
27						2,921	2,921	24	24	1	0.001	0.000
28						2,403	2,403	16	16	0	0.000	0.000
29						1,971	1,971	10	10	0	0.000	0.000
30						1,616	1,616	6	6	0	0.000	0.000
31						1,325	1,325	3	3	0	0.000	0.000
32						1,087	1,087	1	1	0	0.000	0.000
33						731	731	0	0	0	0.000	0.000
34						599	599	0	0	0	0.000	0.000
35												
36												

TOTAL: 12,715,698 3,110,073 1,966,667 448,774

TYLER, COUNTY, WV
YIELD CAP MODEL REPORT FOR - 2017

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NR105: 17

ACCOUNT: 0220162126	RESOURCE: OG	OWNER: ANTERO RESOURCES CORPORATI	LOCATION: WEIGLE UNIT 1H (10936, 1)	
STATUS: Z API#: 02126	DATE: 05/12/2014	DAYS: 365	BBLs: 39487.000	MCPS: 3541017
				RCPTS: 8931715
				GWI: 6350328
				OWI: 915255
SYSTEM RATES:				
CAP RATE:	16.000	DECLINE RATE:	0.520	0.230
			0.180	WELL LIFE: 99
			EXPENSE:	175000
RATES USED:				
CAP RATE:	16.000	DECLINE RATE:	0.520	0.230
			0.180	WELL LIFE: 99
			GS EXPENSE:	175000
SETTLED YEARS: 2			OL EXPENSE:	5750
GS EXPENSE:	152985			5750
OL EXPENSE:	723			5750

TYLER, COUNTY, WV
YIELD CAP MODEL REPORT FOR 2017

NR105: 18

JAN 27, 2017
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ACCOUNT: 0220172215 RESOURCE: OQ OWNER: ANTERO RESOURCES CORPORATION LOCATION: WEGLE UNIT 2H (10688.1) 327939
STATUS: Z API#: 02215 DATE: 11/02/2015 DAYS: 60 BBLs: 4147.000 MCPS: 656156 RQPTS: 10690962 GWI: 8380689 OWL: 327939

SYSTEM RATES: CAP RATE: 16.000 DECLINE RATE: 0.520 0.230 EXPENSE: 0.2 175000 175000 175000

RATES USED: CAP RATE: 16.000 DECLINE RATE: 0.520 0.230 GS EXPENSE: 0.2 175000 175000 175000

SETTLED YEARS: 1 OL EXPENSE: 0.2 5750 5750 5750

	GAS WORKING INTEREST			GAS ROYALTY INTEREST			OIL WORKING INTEREST			OIL ROYALTY INTEREST		
	GROSS INCOME	DISCOUNT INCOME	NET INCOME	GROSS INCOME	DISCOUNT INCOME	NET INCOME	GROSS INCOME	DISCOUNT INCOME	NET INCOME	GROSS INCOME	DISCOUNT INCOME	NET INCOME
1	3,058,951	2,890,541	2,890,541	696,305	646,304	0.928	119,598	110,936	119,481	27,247	25,298	0.928
2	2,451,866	2,263,456	2,263,456	553,563	443,078	0.800	95,160	75,994	94,949	21,661	17,338	0.800
3	1,934,130	1,825,720	1,825,720	453,921	313,210	0.690	78,031	53,693	77,814	17,762	12,256	0.690
4	1,638,187	1,466,777	1,466,777	372,216	221,407	0.595	63,985	37,932	63,769	14,565	8,664	0.595
5	1,340,853	1,172,443	1,172,443	305,217	156,512	0.513	52,468	26,794	52,251	11,943	6,124	0.513
6	1,089,500	931,090	931,090	250,278	110,538	0.442	43,024	18,523	42,807	9,793	4,529	0.442
7	901,590	733,180	733,180	205,228	78,209	0.381	35,279	13,362	35,063	8,031	3,060	0.381
8	739,304	570,894	570,894	168,287	55,286	0.329	28,929	9,433	28,713	5,585	2,163	0.329
9	606,229	437,819	437,819	137,995	39,081	0.283	23,722	6,657	23,505	4,428	1,529	0.283
10	497,108	328,638	328,638	113,156	27,627	0.244	19,452	4,696	19,235	3,631	1,081	0.244
11	407,628	239,218	239,218	92,788	19,529	0.210	15,951	3,712	15,734	2,977	764	0.210
12	334,255	165,845	165,845	76,086	13,091	0.181	13,080	2,334	12,863	2,441	540	0.181
13	274,089	108,679	108,679	62,391	9,759	0.156	10,725	1,644	10,509	2,002	382	0.156
14	224,753	56,343	56,343	51,160	6,898	0.135	8,795	1,157	8,578	1,642	270	0.135
15	184,298	15,888	15,888	41,951	4,876	0.116	7,212	813	6,395	1,346	191	0.116
16	151,124	0	0	34,400	0	0.100	5,914	571	5,343	1,104	135	0.100
17	124,124	0	0	28,400	0	0.086	4,849	400	4,449	1,205	95	0.086
18	104,124	0	0	23,400	0	0.074	3,976	280	3,696	782	67	0.074
19	84,124	0	0	19,400	0	0.064	3,261	195	2,966	609	48	0.064
20	64,124	0	0	15,400	0	0.055	2,674	136	2,438	499	34	0.055
21	44,124	0	0	11,400	0	0.048	2,194	84	2,010	409	24	0.048
22	24,124	0	0	7,400	0	0.041	1,798	65	1,633	336	17	0.041
23	4,124	0	0	3,400	0	0.035	1,474	45	1,329	275	12	0.035
24	0	0	0	0	0	0.031	1,208	30	1,078	226	8	0.031
25	0	0	0	0	0	0.026	991	20	871	185	6	0.026
26	0	0	0	0	0	0.023	813	14	729	152	4	0.023
27	0	0	0	0	0	0.020	656	9	567	124	3	0.020
28	0	0	0	0	0	0.017	547	6	441	102	2	0.017
29	0	0	0	0	0	0.015	448	3	333	84	1	0.015
30	0	0	0	0	0	0.013	367	2	251	69	1	0.013
31	0	0	0	0	0	0.011	301	1	185	56	1	0.011
32	0	0	0	0	0	0.009	247	0	131	46	0	0.009
33	0	0	0	0	0	0.008	203	0	90	46	0	0.008

TOTAL: 9,418,178 2,146,419 84,449

GS EXPENSE: 168410 168410 168410

OL EXPENSE: 217 217 217

TYLER, COUNTY, NV
YIELD CAP MODEL REPORT FOR ~ 2017

NR105: 19

JAN 27, 2017
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ACCOUNT: 0400050005 RESOURCE: GS OWNER: ANTERO RESOURCES CORPORATION LOCATION: HELLIP 1 (11337.1)
STATUS: A API#: 00414 DATE: 09/01/1967 DAYS: 365 BBLs: 0.000 MCPS: 1425 RCPTS: 3827 GWT: 3139 GWT: 0
SYSTEM RATES:
CAP RATE: 16.000 DECLINE RATE: 0.390 0.230 0.080 WELL LIFE: 99 EXPENSE: 0.45 5000 5000 5000
RATES USED:
CAP RATE: 16.000 DECLINE RATE: WELL LIFE: 99 EXPENSE: 0.45 5000 5000 5000
SETTLED YEARS: 49

	GAS WORKING INTEREST			GAS ROYALTY INTEREST			OIL WORKING INTEREST			OIL ROYALTY INTEREST		
	GROSS INCOME	NET INCOME	DISCOUNT INCOME	GROSS INCOME	DISCOUNT INCOME	FACTOR	GROSS INCOME	NET INCOME	DISCOUNT INCOME	GROSS INCOME	DISCOUNT INCOME	FACTOR
1	2,762	1,519	1,411	605	562	0.928						
2	2,541	1,298	1,039	557	446	0.800						
3	2,338	1,095	1,756	512	354	0.690						
4	2,151	908	540	471	280	0.595						
5	1,979	736	377	434	222	0.513						
6	1,821	578	255	399	176	0.442						
7	1,675	432	165	367	140	0.381						
8	1,541	298	98	338	111	0.329						
9	1,418	175	49	311	88	0.283						
10	1,304	61	15	286	70	0.244						
11	1,200	0	0	263	0	0.210						
TOTAL:			4,795			2,449						

EXPENSE# 1243 1243 1243

TYLER, COUNTY, WV
YIELD CAP MODEL REPORT FOR - 2017

NR105: 20

JAN 27, 2017
09:56 AM

ACCOUNT: 0418181928

RESOURCE: CS OWNER: ANTERO RESOURCES CORPORATI LOCATION: SHREVES #703

STATUS: M API#: 01928

DATE: 10/01/2007 DAYS: 365

MCFS: 10383 RCPTS: 25444 GWI: 22263 OWI: 0

SYSTEM RATES: 16.000

DECLINE RATE: 0.520

WELL LIFE: 99

EXPENSE: 0.3

30000

RATES USED: 16.000

DECLINE RATE: 0.520

WELL LIFE: 99

EXPENSE: 0.3

30000

SETTLED YEARS: 9

	GAS WORKING INTEREST			GAS ROYALTY INTEREST			OIL WORKING INTEREST			OIL ROYALTY INTEREST		
	GROSS INCOME	DISCOUNT INCOME	NET INCOME	GROSS INCOME	DISCOUNT INCOME	NET INCOME	GROSS INCOME	DISCOUNT INCOME	NET INCOME	GROSS INCOME	DISCOUNT INCOME	NET INCOME
1	16,252	10,563	11,376	2,322	2,156	0,928	2,322	2,156	0,928	2,322	2,156	0,928
2	13,327	6,764	8,451	1,904	1,524	0,800	1,904	1,524	0,800	1,904	1,524	0,800
3	10,928	4,176	6,052	1,561	1,077	0,590	1,561	1,077	0,590	1,561	1,077	0,590
4	8,961	2,430	4,085	1,280	762	0,535	1,280	762	0,535	1,280	762	0,535
5	7,348	1,268	2,472	1,056	538	0,513	1,056	538	0,513	1,056	538	0,513
6	6,025	508	1,150	861	381	0,442	861	381	0,442	861	381	0,442
7	4,941	25	65	706	269	0,381	706	269	0,381	706	269	0,381
8	4,051	0	0	579	0	0,329	579	0	0,329	579	0	0,329
TOTAL:		25,734			6,707			6,707			6,707	
EXPENSE:	4876			4876			4876			4876		

TYLER, COUNTY, WV
YIELD CAP MODEL REPORT FOR 2017

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NR105: 21

ACCOUNT: 0418181929 RESOURCE: GS OWNER: ANTERO RESOURCES CORPORATION LOCATION: BOWEN 704
STATUS: M API#: 01929 DATE: 10/01/2007 DAYS: 365 BBLs: MCPS: 10123 RQPTS: 28363 GWT: 24817 QWT: 0
SYSTEM RATES: 16.000 DECLINE RATE: 0.520 0.230 0.180 WELL LIFE: 99 EXPENSE: 0.3 30000 30000 30000
CAP RATE: 16.000 DECLINE RATE: 0.520 0.230 0.180 WELL LIFE: 99 EXPENSE: 0.3 30000 30000 30000
RATES USED:
CAP RATE: 16.000 DECLINE RATE: 0.520 0.230 0.180 WELL LIFE: 99 EXPENSE: 0.3 30000 30000 30000
SETTLED YEARS: 9

	GAS WORKING INTEREST			GAS ROYALTY INTEREST			OIL WORKING INTEREST			OIL ROYALTY INTEREST		
	GROSS	DISCOUNT	NET	GROSS	DISCOUNT	INCOME	GROSS	DISCOUNT	NET	GROSS	DISCOUNT	INCOME
	INCOME		INCOME	INCOME		INCOME	INCOME		INCOME	INCOME		INCOME
1	18,116	12,681	11,774	2,588	2,403	0,928						
2	14,855	9,421	7,540	2,122	1,689	0,800						
3	12,181	6,747	4,655	1,740	1,201	0,690						
4	9,989	4,554	2,709	1,427	849	0,595						
5	8,191	2,756	1,413	1,170	600	0,513						
6	6,716	1,282	567	959	424	0,442						
7	5,508	73	28	787	300	0,381						
8	4,516	0	0	645	0	0,329						
TOTAL:			28,686			7,475						
EXPENSE:	5435			5435								

'TYLER' COUNTY, WV
YIELD CAP MODEL REPORT FOR - 2017

NR105: 22

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ACCOUNT: 0510000896
STATUS: A API#: 00996
RESOURCE: GS OWNER: ANTERO RESOURCES CORPORATION LOCATION: WEASE 1 (WK 60)
DATE: 07/29/1982 DAYS: 365 BELS: NCFS: 554 RCPTS: 1078 GWI: 943 OWI: 0
SYSTEM RATES: 16.000 DECLINE RATE: 0.390 0.230 0.080 WELLLINE: 99 EXPENSE: 0.45 5000 5000
CAP RATE: 16.000 DECLINE RATE: 0.45 5000 5000
RATES USED:
CAP RATE: 16.000 DECLINE RATE:
SETTLED YEARS: 34

	GAS WORKING INTEREST			GAS ROYALTY INTEREST			OIL WORKING INTEREST			OIL ROYALTY INTEREST		
	GROSS INCOME	NET INCOME	DISCOUNT INCOME	GROSS INCOME	DISCOUNT INCOME	FACTOR	GROSS INCOME	NET INCOME	DISCOUNT INCOME	GROSS INCOME	DISCOUNT INCOME	FACTOR
1	830	456	424	119	110	0.928						
2	763	390	312	109	87	0.806						
3	702	329	227	101	69	0.690						
4	646	273	162	93	55	0.595						
5	594	221	113	85	44	0.513						
6	547	174	77	78	35	0.442						
7	503	130	49	72	27	0.381						
8	463	89	29	66	22	0.329						
9	426	52	15	61	17	0.285						
10	392	18	4	56	14	0.244						
11	360	0	0	52	0	0.210						
TOTAL:			1,413			481						
EXPENSE:	373			373								

'TYLER' COUNTY, WV
YIELD CAP MODEL REPORT FOR - 2017

NR105: 24

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ACCOUNT: 0520142038
STATUS: 2 API#: 02039 DATE: 10/16/2012 DAYS: 365 BELS: 239,000 NCFS: 58114 RCPTS: 3125728 GWI: 2427417 OWI: 96511
SYSTEM RATES: 16,000 DECLINE RATE: 0.520 0.230 0.180 WELLLIFE: 99 EXPENSE: 0.2 175000 175000 175000
CAP RATE: 16,000 DECLINE RATE: 0.520 0.230 0.180 WELLLIFE: 99 GS EXPENSE: 0.2 175000 175000 175000
RATES USED:
CAP RATE: 16,000 DECLINE RATE: 0.520 0.230 0.180 WELLLIFE: 99 GS EXPENSE: 0.2 175000 175000 175000
SETTLED YEARS: 4 OL EXPENSE: 0.2 5750 5750 5750

GAS WORKING INTEREST				GAS ROYALTY INTEREST				OIL WORKING INTEREST				OIL ROYALTY INTEREST			
GROSS INCOME	DISCOUNT INCOME	NET INCOME		GROSS INCOME	DISCOUNT INCOME	NET INCOME		GROSS INCOME	DISCOUNT INCOME	NET INCOME		GROSS INCOME	DISCOUNT INCOME	NET INCOME	
1,772,014	1,489,010	1,603,713	1	422,429	392,216	0.928		70,526	65,277	70,306		16,812	15,609	0.928	
1,453,052	1,028,328	1,284,750	2	346,292	277,256	0.800		57,831	46,113	57,511		13,786	11,034	0.800	
1,191,502	706,018	1,023,201	3	284,041	195,991	0.690		47,422	32,570	47,202		11,304	7,800	0.690	
977,032	481,063	808,730	4	232,914	138,546	0.595		38,886	23,000	38,666		9,270	5,514	0.595	
801,166	324,526	632,865	5	190,989	97,337	0.513		31,886	16,238	31,666		7,601	3,898	0.513	
656,956	216,015	488,655	6	156,611	69,232	0.442		26,147	11,461	25,927		6,233	2,755	0.442	
538,704	141,155	370,403	7	128,421	48,940	0.381		21,440	8,087	21,220		5,111	1,946	0.381	
441,737	89,830	273,436	8	105,305	34,585	0.329		17,581	5,703	17,361		4,191	1,577	0.329	
362,225	54,921	193,523	9	86,359	24,455	0.283		14,417	4,021	14,196		3,437	1,273	0.283	
297,024	31,427	128,723	10	70,807	17,230	0.244		11,822	2,832	11,601		2,818	888	0.244	
243,560	15,840	75,258	11	58,062	12,230	0.210		9,694	2,394	9,474		2,311	486	0.210	
199,719	5,900	31,418	12	47,611	8,539	0.181		7,949	1,985	7,729		1,895	343	0.181	
163,770	0	0	13	39,041	0	0.156		6,151	691	5,125		1,554	172	0.156	
			14					5,345	484	4,163		1,045	121	0.116	
			15					4,383	338	3,374		857	85	0.100	
			16					3,594	236	2,727		702	61	0.086	
			17					2,947	163	2,186		575	43	0.074	
			18					2,416	113	1,761		472	30	0.064	
			19					1,982	79	1,405		387	21	0.055	
			20					1,625	53	1,112		318	15	0.048	
			21					1,312	36	872		260	11	0.041	
			22					1,094	24	676		214	8	0.035	
			23					896	16	515		175	5	0.031	
			24					735	10	382		144	4	0.026	
			25					602	6	274		118	3	0.023	
			26					494	4	185		97	2	0.020	
			27					405	2	112		79	1	0.017	
			28					322	1	52		65	1	0.015	
			29					272	0	3		44	0	0.013	
			30					223	0	0			0	0.011	
			31					183	0	0			0	0.011	
TOTAL:	4,583,832			1,347,813				221,937				53,254			

GS EXPENSE: 168302 168302
OL EXPENSE: 220 220

'TYLER' COUNTY, WV
YIELD CAP MODEL REPORT FOR - 2017

NR105: 25

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ACCOUNT: 0520152067

RESOURCE: 09 OWNER: ANTERO RESOURCES CORPORATION LOCATION: SENEY UNIT 2H (10274.1)

STATUS: 2 API#: 02067

DATE: 08/01/2013 DAYS: 365 BHLS: 646,000 MCFS: 608576 RCPTS: 1376462 GWT: 1133598 OMT: 17081

SYSTEM RATES:

CAP RATE: 16.000 DECLINE RATE: 0.520 0.230 0.180 WELL LIFE: 99 EXPENSE: 0.2 175000 175000 175000

RATES USED:

CAP RATE: 16.000 DECLINE RATE: 0.520 0.230 0.180 WELL LIFE: 99 GS EXPENSE: 0.2 175000 175000 175000

SETTLED YEARS: 3

OL EXPENSE: 0.2 5750 5750 5750

GAS WORKING INTEREST				GAS ROYALTY INTEREST			
GROSS INCOME	NET INCOME	DISCOUNT INCOME		GROSS INCOME	DISCOUNT INCOME	INCOME FACTOR	
827,527	662,021	614,671		162,375	150,762	0.928	
678,572	513,066	410,664		133,148	106,573	0.800	
556,429	390,924	269,741		109,181	75,336	0.690	
456,272	290,766	172,958		89,529	53,255	0.595	
374,143	208,637	106,987		73,413	37,646	0.513	
306,797	141,292	62,459		60,199	26,612	0.442	
251,574	86,068	32,799		49,363	18,812	0.381	
206,290	40,785	13,399		40,478	13,298	0.329	
169,158	3,652	1,034		32,192	8,400	0.283	
138,710	0	0		27,217	0	0.244	

OIL WORKING INTEREST				OIL ROYALTY INTEREST			
GROSS INCOME	NET INCOME	DISCOUNT INCOME		GROSS INCOME	DISCOUNT INCOME	INCOME FACTOR	
12,469	12,384	11,498		2,446	2,271	0.928	
10,225	10,139	8,116		2,006	1,606	0.800	
8,384	8,299	5,726		1,645	1,135	0.690	
6,875	6,790	4,039		1,349	802	0.595	
5,638	5,552	2,847		1,106	587	0.513	
4,623	4,537	2,006		907	401	0.442	
3,791	3,705	1,412		744	283	0.381	
3,108	3,023	993		610	200	0.329	
2,549	2,464	698		500	142	0.283	
2,090	2,005	489		410	100	0.244	
1,714	1,629	343		338	71	0.210	
1,405	1,320	240		276	50	0.181	
1,152	1,067	167		236	35	0.156	
945	860	116		185	25	0.135	
775	690	80		152	18	0.116	
635	550	55		125	12	0.100	
521	436	38		102	9	0.086	
427	342	25		84	6	0.074	
350	265	17		69	4	0.064	
287	202	11		56	3	0.055	
236	150	7		46	2	0.048	
193	108	4		38	2	0.041	
158	73	3		31	1	0.035	
120	45	1		25	1	0.031	
107	21	0		21	0	0.026	
87	2	0		17	0	0.023	
72	0	0		14	0	0.020	

TOTAL:

1,684,714

491,692

38,932

7,748

GS EXPENSE: 165505

165505

OL EXPENSE: 85

85

TYLER, COUNTY, WV
YIELD CAP MODEL REPORT FOR - 2017

NR105: 26

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ACCOUNT: 0520152068 RESOURCE: 05 OWNER: ANTERO RESOURCES CORPORATI LOCATION: SHERREY UNIT 1R (10273.1)

STATUS: 2 API#: 02068 DATE: 07/01/2013 DAYS: 365 BBLs: 438,000 MCFS: 676511 RCPIS: 1527970 GWI: 1264654 OWI: 12680

SYSTEM RATES: 16.000 DECLINE RATE: 0.520 0.180 WELL LIFE: 99 EXPENSE: 0.2 175000 175000

RATES USED: 16.000 DECLINE RATE: 0.520 0.180 WELL LIFE: 99 GS EXPENSE: 0.2 175000 175000

SETTLED YEARS: 3 OIL EXPENSE: 0.2 5750 5750

	GAS WORKING INTEREST			GAS ROYALTY INTEREST			OIL WORKING INTEREST			OIL ROYALTY INTEREST		
	GROSS INCOME	DISCOUNT INCOME	NET INCOME	GROSS INCOME	DISCOUNT INCOME	FACTOR	GROSS INCOME	NET INCOME	DISCOUNT INCOME	GROSS INCOME	DISCOUNT INCOME	FACTOR
1	923,197	696,297	749,935	181,148	168,192	0.928	9,256	9,199	8,541	1,816	1,686	0.928
2	757,022	467,247	583,759	148,541	118,894	0.800	7,590	7,533	6,030	1,489	1,192	0.800
3	620,758	308,776	447,455	121,804	84,046	0.690	6,224	6,167	4,255	1,221	843	0.690
4	509,022	199,721	385,759	99,879	59,412	0.595	5,104	5,047	3,002	1,001	596	0.595
5	417,398	125,190	324,135	81,991	41,998	0.513	4,185	4,128	2,117	821	421	0.513
6	342,266	74,710	244,135	67,159	29,688	0.442	3,432	3,375	1,492	673	298	0.442
7	280,658	40,927	107,395	55,070	14,986	0.381	2,809	2,757	1,051	552	210	0.381
8	230,140	18,685	56,877	45,158	10,435	0.329	1,892	1,835	739	453	149	0.329
9	198,713	4,376	15,452	37,029	10,487	0.263	1,552	1,494	365	371	109	0.263
10	154,746	0	0	30,364	0	0.244	1,272	1,215	256	304	74	0.244
11							1,043	986	179	250	53	0.210
12							855	798	125	205	37	0.181
13							701	644	87	168	26	0.156
14							575	518	42	138	19	0.135
15							452	415	28	113	13	0.116
16							387	330	19	93	9	0.109
17							317	260	13	78	7	0.086
18							260	203	9	62	5	0.074
19							213	156	6	51	3	0.064
20							175	118	4	42	2	0.055
21							143	86	2	34	1	0.048
22							118	61	1	28	1	0.041
23							96	39	1	23	1	0.035
24							79	27	1	18	1	0.031
25							65	3	0	16	0	0.026
26							51	0	0	13	0	0.023
27								0	0	10	0	0.020

TOTAL: 1,935,929 548,538 28,942 5,753

GS EXPENSE: 173263 173263

OL EXPENSE: 57 57

TYLER, COUNTY, WV
YIELD CAP MODEL REPORT FOR - 2017

NR105: 27

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ACCOUNT: 0520152078
RESOURCE: OG
DATE: 08/01/2013
DAYS: 365
BBLs: 447,000
MCFS: 615516
RCPTS: 1397241
GWT: 1161138
OWI: 13151

SYSTEM RATES:
CAP RATE: 16.000
DECLINE RATE: 0.520
EXPENSE: 0.2
175000
175000
175000

RATES USED:
CAP RATE: 16.000
DECLINE RATE: 0.520
EXPENSE: 0.2
5750
5750
5750

SETTLED YEARS: 3

	GAS WORKING INTEREST			GAS ROYALTY INTEREST			OIL WORKING INTEREST			OIL ROYALTY INTEREST		
	GROSS INCOME	NET INCOME	DISCOUNT INCOME	GROSS INCOME	DISCOUNT INCOME	FACTOR	GROSS INCOME	NET INCOME	DISCOUNT INCOME	GROSS INCOME	DISCOUNT INCOME	FACTOR
1	847,631	678,105	629,605	160,933	149,432	0.928	9,500	9,536	8,854	1,822	1,692	0.928
2	695,057	525,531	420,641	131,865	105,626	0.800	7,872	7,808	6,249	1,494	1,196	0.800
3	569,947	400,421	278,294	108,211	74,667	0.690	6,455	6,391	4,410	1,225	845	0.690
4	467,356	297,830	177,160	88,733	52,782	0.595	5,293	5,229	3,110	1,005	598	0.595
5	383,232	213,706	109,586	72,761	37,311	0.513	4,340	4,276	2,193	824	422	0.513
6	314,250	144,724	63,977	59,664	26,782	0.442	3,559	3,495	1,545	676	299	0.442
7	257,685	88,159	33,596	48,925	18,645	0.381	2,919	2,854	1,088	554	211	0.381
8	211,302	41,776	13,724	40,118	13,180	0.329	2,393	2,329	768	454	149	0.329
9	173,268	3,742	1,060	32,897	9,317	0.283	1,962	1,898	558	372	105	0.283
10	142,079	0	0	26,875	0	0.244	1,609	1,545	377	305	75	0.244
11							1,320	1,255	264	250	53	0.210
12							1,082	1,018	185	168	37	0.181
13							887	823	129	138	26	0.156
14							728	663	89	113	19	0.135
15							597	532	62	93	13	0.116
16							489	428	43	76	8	0.100
17							401	337	29	62	7	0.086
18							329	265	20	51	5	0.074
19							270	205	13	42	2	0.054
20							221	157	6	34	2	0.055
21							181	117	3	28	1	0.048
22							149	84	1	23	1	0.041
23							122	58	2	19	1	0.035
24							100	36	1	16	0	0.031
25							82	18	0	13	0	0.026
26							67	3	0	10	0	0.023
27							55	0	0	10	0	0.020
TOTAL:			1,725,643		487,324				29,983		5,771	

GS EXPENSE: 169526
OI EXPENSE: 64

TYLER, COUNTY, WV
YIELD CAP MODEL REPORT FOR - 2017

NR105: 28

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ACCOUNT: 0520152079

RESOURCE: OG OWNER: ANTERO RESOURCES CORPORATI LOCATION: THORNTON UNIT 2H (102851)

STATUS: 2 API# 02079

DATE: 08/01/2013 DAYS: 365 BELLS: 443.000 MCPS: 609147 RCPTS: 1360713 GWI: 1130617 OWI: 12972

SYSTEM RATES: 16.000 DECLINE RATE: 0.520 0.230 0.100 WELL LIFE: 99 EXPENSE: 0.2 175000 175000 175000

RATES USED: 16.000 DECLINE RATE: 0.520 0.230 0.100 WELL LIFE: 99 GS EXPENSE: 0.2 175000 175000 175000

CAP RATE: 16.000 DECLINE RATE: 0.520 0.230 0.100 WELL LIFE: 99 OL EXPENSE: 0.2 5750 5750 5750

SETTLED YEARS: 3

	GAS WORKING INTEREST			GAS ROYALTY INTEREST			OIL WORKING INTEREST			OIL ROYALTY INTEREST		
	GROSS INCOME	NET INCOME	DISCOUNT INCOME	GROSS INCOME	NET INCOME	DISCOUNT INCOME	GROSS INCOME	NET INCOME	DISCOUNT INCOME	GROSS INCOME	NET INCOME	DISCOUNT INCOME
1	825,350	660,280	613,055	156,703	145,495	0.928	9,470	9,404	8,732	1,798	1,669	0.928
2	676,787	511,717	409,584	128,496	102,850	0.800	7,765	7,700	6,163	1,474	1,180	0.800
3	554,966	389,896	269,031	105,367	72,704	0.590	6,367	6,302	4,949	1,209	834	0.590
4	455,072	290,002	172,503	86,401	51,294	0.595	5,221	5,156	3,967	991	590	0.595
5	373,159	208,089	106,706	70,849	36,330	0.513	4,281	4,216	2,162	813	417	0.513
6	305,990	140,920	62,295	58,096	25,682	0.442	3,511	3,446	1,523	667	295	0.442
7	250,912	85,842	32,713	47,539	18,154	0.381	2,879	2,814	1,072	547	208	0.381
8	205,748	40,678	13,364	39,064	12,833	0.329	2,361	2,295	754	448	147	0.329
9	168,713	3,643	1,032	32,032	9,072	0.283	1,936	1,870	530	358	104	0.283
10	138,345	0	0	26,256	0	0.244	1,587	1,522	372	301	74	0.244
11							1,302	1,236	260	247	52	0.210
12							1,067	1,002	182	203	37	0.181
13							875	810	127	166	26	0.156
14							718	652	88	136	18	0.135
15							588	523	61	112	11	0.116
16							483	417	42	92	6	0.086
17							396	330	29	75	5	0.074
18							324	259	19	62	3	0.064
19							266	201	13	51	2	0.055
20							218	153	8	41	1	0.048
21							179	114	5	34	1	0.041
22							147	81	3	28	1	0.035
23							120	55	2	23	1	0.031
24							99	33	1	19	0	0.026
25							81	16	0	15	0	0.023
26							66	1	0	13	0	0.020
27							54	0	0	10	0	0.020

TOTAL: 1,680,283 474,514 29,564 5,695

GS EXPENSE: 165070 165070 165070

OL EXPENSE: 65 65 65

TYLER, COUNTY, NY
YIELD GAP MODEL REPORT FOR 2017

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NR105 29

ACCOUNT: 0520172156
RESOURCE: OG
DATE: 03/01/2015
DAYS: 306
WELLS: 789,000
MOPB: 1909368
RCPTS: 4881373
GWT: 4157034
OWT: 28158
SYSTEM RATES:
CAP RATE: 16,000
DECLINE RATE: 0.520
RATES USED:
CAP RATE: 16,000
DECLINE RATE: 0.520
SETTLED YEARS: 1

GAS WORKING INTEREST				GAS ROYALTY INTEREST				OIL WORKING INTEREST				OIL ROYALTY INTEREST			
GROSS INCOME	DISCOUNT INCOME	NET INCOME	DISCOUNT INCOME	GROSS INCOME	DISCOUNT INCOME	NET INCOME	DISCOUNT INCOME	GROSS INCOME	DISCOUNT INCOME	NET INCOME	DISCOUNT INCOME	GROSS INCOME	DISCOUNT INCOME	NET INCOME	DISCOUNT INCOME
1,517,317	1,247,404	1,343,496	1,247,404	252,397	234,345	0.928	234,345	10,278	10,239	8,132	9,507	1,709	1,587	0.928	0.928
1,206,267	826,380	1,032,445	826,380	200,655	160,607	0.800	160,607	8,171	8,132	6,509	6,509	1,359	1,088	0.800	0.800
889,139	562,576	815,117	562,576	164,534	113,532	0.690	113,532	6,700	6,661	5,455	4,596	1,114	769	0.690	0.690
811,094	379,072	637,272	379,072	134,921	80,256	0.595	80,256	5,494	5,455	4,466	3,245	914	544	0.595	0.595
665,097	251,920	491,275	251,920	110,635	56,732	0.513	56,732	4,505	4,466	3,655	2,290	749	384	0.513	0.513
545,380	164,251	371,157	164,251	90,721	40,104	0.442	40,104	3,694	3,655	2,991	1,616	614	272	0.442	0.442
447,211	104,185	273,389	104,185	74,391	28,349	0.381	28,349	3,039	2,991	2,445	1,140	504	192	0.381	0.381
366,713	63,369	192,891	63,369	61,001	20,040	0.329	20,040	2,484	2,445	1,938	803	413	136	0.329	0.329
300,705	35,354	126,892	35,354	50,020	14,166	0.283	14,166	2,037	1,938	1,632	566	339	96	0.283	0.283
246,578	17,763	72,755	17,763	41,017	10,014	0.244	10,014	1,670	1,632	1,331	398	228	68	0.244	0.244
202,194	5,971	28,371	5,971	33,634	7,079	0.210	7,079	1,370	1,331	1,084	197	187	34	0.210	0.210
165,799	0	0	0	27,580	0	0.181	0	1,123	1,084	882	138	153	24	0.181	0.181
								755	716	581	97	126	17	0.156	0.156
								619	581	469	67	103	12	0.135	0.135
								508	469	378	47	84	8	0.100	0.100
								416	378	303	33	69	6	0.086	0.086
								341	303	241	23	57	4	0.074	0.074
								280	241	191	15	47	3	0.064	0.064
								230	191	150	11	38	2	0.055	0.055
								188	150	116	7	31	1	0.048	0.048
								154	116	88	5	26	1	0.041	0.041
								127	88	65	3	21	1	0.035	0.035
								104	65	46	2	17	1	0.031	0.031
								85	46	31	1	14	0	0.026	0.026
								70	31	19	1	12	0	0.023	0.023
								57	19	8	0	10	0	0.020	0.020
								47	8	0	0	8	0	0.017	0.017
								38	0	0	0	6	0	0.015	0.015

TOTAL: 3,658,825 765,224 31,597 5,298

GS EXPENSE: 173823 173823 173823

OL EXPENSE: 39 39 39

TYLER, COUNTY, WV
YIELD GAP MODEL REPORT FOR - 2017

NR105: 30

JAN 27, 2017
09:56 AM

ACCOUNT:0520172157

RESOURCE:OG OWNER:ANTERO RESOURCES CORPORATI LOCATION:SILOS UNIT 1H (10515.1)

STATUS:Z API#:02157

DATE:03/09/2015 DAYS:298 BBLs: 750.000 MCFS: 1791936 RCPTS: 4857793 GWI: 3966030 ONI: 27467

SYSTEM RATES:

CAP RATE: 16.000 DECLINE RATE: 0.520 0.230 0.180 WELLLIFE:99 EXPENSE: 0.2 175000 175000 175000:

RATES USED:

CAP RATE: 16.000 DECLINE RATE: 0.520 0.230 0.180 WELLLIFE:99 GS EXPENSE: 0.2 175000 175000 175000:

SETTLED YEARS: 1

OL EXPENSE:

5750

GAS WORKING INTEREST				GAS ROYALTY INTEREST				OIL WORKING INTEREST				OIL ROYALTY INTEREST			
GROSS INCOME	DISCOUNT INCOME	NET INCOME		GROSS INCOME	DISCOUNT INCOME	NET INCOME		GROSS INCOME	DISCOUNT INCOME	NET INCOME		GROSS INCOME	DISCOUNT INCOME	NET INCOME	

1	1,447,601	1,273,805	1,182,698	240,800	223,577	0.928	10,025	9,986	9,272	1,558	1,549	0.928	1,558	1,549	0.928
2	1,150,843	977,045	782,838	191,436	153,227	0.800	7,970	7,931	6,348	1,325	1,061	0.800	1,325	1,061	0.800
3	943,691	769,895	531,234	156,978	108,316	0.690	6,516	6,496	4,482	1,087	750	0.690	1,087	750	0.690
4	773,827	600,030	356,920	128,722	76,568	0.595	5,359	5,320	3,164	892	530	0.595	892	530	0.595
5	634,528	460,742	236,263	105,552	54,126	0.513	4,395	4,355	2,333	731	375	0.513	731	375	0.513
6	520,321	346,525	153,185	86,554	38,261	0.442	3,604	3,564	1,575	600	265	0.442	600	265	0.442
7	426,663	252,867	96,364	70,973	27,047	0.381	2,955	2,915	1,141	492	187	0.381	492	187	0.381
8	349,664	176,068	57,842	58,198	19,119	0.329	2,423	2,383	783	403	132	0.329	403	132	0.329
9	286,888	113,092	32,029	47,722	13,515	0.283	1,987	1,947	551	331	94	0.283	331	94	0.283
10	235,248	61,452	15,003	39,132	9,554	0.244	1,629	1,590	388	222	47	0.244	222	47	0.244
11	192,904	19,107	4,022	32,088	6,754	0.210	1,336	1,296	273	182	23	0.210	182	23	0.210
12	158,181	0	0	25,313	0	0.181	1,095	1,056	134	149	23	0.181	149	23	0.181
13							898	859	94	123	17	0.181	123	17	0.181
14							737	697	66	100	12	0.181	100	12	0.181
15							604	564	46	82	8	0.181	82	8	0.181
16							495	456	32	68	6	0.181	68	6	0.181
17							406	367	22	55	4	0.181	55	4	0.181
18							333	293	15	45	3	0.181	45	3	0.181
19							273	234	10	37	2	0.181	37	2	0.181
20							224	184	7	31	1	0.181	31	1	0.181
21							184	144	5	25	1	0.181	25	1	0.181
22							151	111	3	21	1	0.181	21	1	0.181
23							123	84	2	17	0	0.181	17	0	0.181
24							101	62	1	14	0	0.181	14	0	0.181
25							83	43	1	11	0	0.181	11	0	0.181
26							58	29	0	9	0	0.181	9	0	0.181
27							46	16	0	8	0	0.181	8	0	0.181
28							38	0	0	6	0	0.181	6	0	0.181
29															

TOTAL:

3,442,598

30,810

5,170

GS EXPENSE: 173796 173796

OL EXPENSE: 40 40

JAN 27, 2017
09:56 AM

TYLER* COUNTY, WV
YIELD CAP MODEL REPORT FOR 2017

NR105: 31

ACCOUNT: 0520172158

RESOURCE: OG OWNER: ANTERO RESOURCES CORPORATI LOCATION: GLOVER UNIT 1H (10513.1)

STATUS: Z API#: 02158

DATE: 02/17/2015 DAYS: 318 BBLUS: 1416.000 MCPS: 2028636 RCPTS: 5109420 OWI: 3978980 OWI: 46189

SYSTEM RATES:

CAP RATE: 16.000 DECLINE RATE: 0.520 0.230 0.180 WELLLIFE: 99 EXPENSE: 0.2 175000 175000 175000

RATES USED:

CAP RATE: 16.000 DECLINE RATE: 0.520 0.230 0.180 WELLLIFE: 99 GS EXPENSE: 0.2 175000 175000 175000

SETTLED YEARS: 1

OL EXPENSE: 0.2 5750 5750 5750

	GAS WORKING INTEREST			GAS ROYALTY INTEREST			OIL WORKING INTEREST			OIL ROYALTY INTEREST		
	GROSS INCOME	NET INCOME	DISCOUNT INCOME	GROSS INCOME	DISCOUNT INCOME	FACTOR	GROSS INCOME	NET INCOME	DISCOUNT INCOME	GROSS INCOME	DISCOUNT INCOME	FACTOR
1	1,452,328	1,279,336	1,187,834	391,210	363,229	0.928	16,859	16,793	15,592	4,541	4,217	0.928
2	1,154,601	981,609	785,690	311,012	248,997	0.800	13,403	13,339	10,675	3,610	2,890	0.800
3	946,772	773,781	533,916	255,030	175,973	0.690	10,991	10,925	7,538	2,960	2,043	0.690
4	776,353	603,362	358,901	209,124	124,395	0.595	9,012	8,946	5,322	2,428	1,444	0.595
5	636,610	463,618	237,738	171,482	87,834	0.513	7,590	7,524	3,756	1,991	1,021	0.513
6	532,820	349,028	154,291	140,615	62,160	0.442	6,069	5,994	2,650	1,632	0.722	0.442
7	428,056	255,055	97,202	115,304	43,841	0.381	4,969	4,903	1,869	1,339	510	0.381
8	351,006	178,014	58,482	94,550	31,052	0.329	4,075	4,009	1,317	1,098	361	0.329
9	287,825	114,833	32,522	77,531	21,957	0.283	3,341	3,275	928	900	255	0.283
10	236,917	63,025	15,387	63,575	15,522	0.244	2,740	2,674	653	738	180	0.244
11	193,534	20,542	4,323	52,132	10,972	0.210	2,247	2,181	459	605	127	0.210
12	158,698	0	0	43,748	0	0.181	1,842	1,776	322	496	90	0.181
13							1,511	1,445	158	324	64	0.156
14							1,239	1,173	110	274	45	0.135
15							1,016	950	77	224	32	0.116
16							833	767	53	184	22	0.100
17							560	517	37	151	16	0.086
18							459	393	25	124	11	0.074
19							377	311	17	101	8	0.064
20							309	243	12	83	6	0.055
21							253	187	8	58	3	0.048
22							208	142	5	56	2	0.041
23							170	104	3	46	1	0.035
24							140	74	2	31	1	0.031
25							114	46	1	25	1	0.026
26							94	11	0	21	0	0.023
27							77	8	0	17	0	0.020
28							63	0	0	17	0	0.017
29												0.015

TOTAL:

3,456,286

1,186,083

51,815

14,075

GS EXPENSE: 172992 172992

OL EXPENSE: 56 56

TYLER, COUNTY, WV
YIELD CAP MODEL REPORT FOR - 2017

NR105: 32

JAN 27, 2017
09:56 AM

ACCOUNT:0520172159

RESOURCE:OG OWNER:ANTERO RESOURCES CORPORATI LOCATION:GLOVER UNIT 2H (10512.1)

STATUS:2 API#:02159

DATE:02/10/2015 DAYS:325 BBLs: 1730.000 MCFS: 1654857 RCPTS: 4436426 GWI: 3443414 OWI: 51574

SYSTEM RATES:

CAP RATE: 16.000 DECLINE RATE: 0.520 0.230 0.180 WELLDEPTH:99 EXPENSE: 0.2 175000 175000

RATES USED:

CAP RATE: 16.000 DECLINE RATE: 0.520 0.230 0.180 WELLDEPTH:99 GS EXPENSE: 0.2 175000 175000

SETTLED YEARS: 1

OL EXPENSE:

	GAS WORKING INTEREST			GAS ROYALTY INTEREST			OIL WORKING INTEREST			OIL ROYALTY INTEREST		
	GROSS INCOME	NET INCOME	DISCOUNT INCOME	GROSS INCOME	DISCOUNT INCOME	INCOME FACTOR	GROSS INCOME	NET INCOME	DISCOUNT INCOME	GROSS INCOME	DISCOUNT INCOME	INCOME FACTOR
1	1,255,846	1,084,429	1,006,867	338,554	314,340	0.928	16,825	16,740	17,399	5,071	4,708	0.928
2	999,193	826,775	661,760	269,150	215,431	0.800	14,965	14,881	11,511	4,011	3,227	0.800
3	819,338	646,920	446,381	220,703	152,287	0.690	12,272	12,187	8,409	3,306	2,281	0.690
4	671,857	499,440	297,085	180,977	107,651	0.595	10,063	9,978	5,935	2,711	1,612	0.595
5	550,923	378,505	194,093	148,401	76,098	0.513	8,251	8,167	4,188	2,223	1,140	0.513
6	451,757	279,339	123,485	121,688	53,794	0.442	6,766	6,681	2,954	1,823	806	0.442
7	370,441	198,023	75,464	99,785	38,027	0.381	5,548	5,463	2,082	1,495	570	0.381
8	303,751	131,344	43,149	81,824	19,602	0.229	4,559	4,465	1,467	1,226	409	0.229
9	249,084	76,667	21,713	67,095	13,432	0.244	3,731	3,646	1,033	1,005	285	0.244
10	204,249	31,831	7,772	55,018	0	0.210	3,059	2,974	726	824	201	0.210
11	167,484			45,115			2,509	2,424	510	676	142	0.210
12							2,057	1,972	358	554	101	0.181
13							1,697	1,602	251	454	71	0.156
14							1,383	1,299	175	373	50	0.135
15							1,134	1,049	122	306	36	0.116
16							920	845	85	251	25	0.100
17							783	708	59	205	18	0.086
18							625	540	40	168	13	0.064
19							513	428	27	138	9	0.044
20							420	335	19	113	6	0.055
21							345	260	12	93	4	0.048
22							283	198	8	76	3	0.041
23							232	147	5	62	2	0.035
24							190	105	3	51	1	0.026
25							156	71	2	42	1	0.023
26							128	43	1	34	1	0.020
27							105	20	0	28	0	0.017
28							86	1	0	19	0	0.015
29							70	0	0			

TOTAL: 2,877,788 1,016,943 57,780 15,716

GS EXPENSE: 172418 172418 172418

OL EXPENSE: 85 85 85

"TYLER" COUNTY, WV
YIELD CAP MODEL REPORT FOR 2017

JAN 27, 2017
09:56 AM

NR105: 33

ACCOUNT: 0620162127 RESOURCE: OG OWNER: ANTERO RESOURCES CORPORATION LOCATION: FREELAND UNIT 2H (10587.1)
 STATUS: Z API# 02127 DATE: 11/04/2014 DAYS: 365 BRLS: 7826.000 MCPS: 1360471 RCPTS: 3994388 GWI: 3119554 OWI: 228943
 SYSTEM RATES:
 CAP RATE: 16.000 DECLINE RATE: 0.520 0.230 0.180 WELL LIFE: 99 EXPENSE: 0.2 175000 175000 175000
 RATES USED:
 CAP RATE: 16.000 DECLINE RATE: 0.520 0.230 0.180 WELL LIFE: 99 GS EXPENSE: 0.2 175000 175000 175000
 SETTLED YEARS: 2 OL EXPENSE: 0.2 5750 5750 5750

	GAS WORKING INTEREST			GAS ROYALTY INTEREST			OIL WORKING INTEREST			OIL ROYALTY INTEREST		
	GROSS INCOME	NET INCOME	DISCOUNT INCOME	GROSS INCOME	DISCOUNT INCOME	INCOME FACTOR	GROSS INCOME	NET INCOME	DISCOUNT INCOME	GROSS INCOME	DISCOUNT INCOME	INCOME FACTOR
1	2,121,297	1,958,262	1,818,261	409,177	379,912	0.928	155,681	155,288	144,181	30,028	27,881	0.928
2	1,739,463	1,576,428	1,261,791	335,925	268,558	0.800	127,659	127,265	101,865	24,624	19,709	0.800
3	1,426,360	1,263,325	871,706	275,131	189,843	0.690	104,680	104,287	71,959	13,191	13,932	0.690
4	1,169,515	1,006,580	598,750	225,607	134,199	0.595	85,838	85,445	50,825	16,557	9,849	0.595
5	959,084	796,049	408,205	184,998	94,865	0.513	70,187	69,994	35,892	13,577	6,962	0.513
6	786,449	623,414	275,587	151,698	67,060	0.442	57,171	57,324	25,341	11,133	4,921	0.442
7	644,888	481,853	183,628	124,393	47,404	0.381	47,328	46,935	17,886	9,129	3,479	0.381
8	528,808	365,774	120,165	102,002	33,510	0.329	38,809	38,416	12,620	7,486	2,452	0.329
9	433,623	270,588	76,633	83,642	23,688	0.283	31,823	31,430	8,901	6,138	1,738	0.283
10	355,371	192,536	47,007	68,586	16,745	0.244	25,095	25,702	6,275	5,023	1,229	0.244
11	291,568	128,533	27,052	56,241	11,837	0.210	21,398	21,005	4,421	4,327	869	0.210
12	239,086	76,051	13,739	46,117	8,368	0.181	17,546	17,153	3,112	3,384	614	0.181
13	196,050	33,015	5,164	37,816	5,915	0.156	14,388	13,995	2,189	2,775	414	0.156
14	160,781	0	0	31,009	0	0.135	11,798	11,405	1,538	2,775	307	0.135
15							9,675	9,281	1,079	1,866	217	0.116
16							7,933	7,540	756	1,530	153	0.100
17							6,505	6,112	528	1,255	108	0.086
18							5,334	4,941	368	1,029	77	0.074
19							4,374	4,381	256	844	54	0.064
20							3,587	3,194	177	692	38	0.055
21							2,941	2,548	122	567	27	0.048
22							2,412	2,019	83	465	19	0.041
23							1,978	1,584	56	381	14	0.035
24							1,622	1,229	38	313	10	0.031
25							1,330	937	25	256	7	0.026
26							1,030	697	16	210	5	0.023
27							894	501	10	172	3	0.020
28							735	340	6	141	2	0.017
29							601	208	3	116	2	0.015
30							493	100	1	95	1	0.013
31							404	11	0	78	1	0.011
32							331	0	0	64	0	0.009

TOTAL: 5,707,687 1,281,903 490,528 95,122

GS EXPENSE: 163035 163035 163035

OL EXPENSE: 393 393 393

FILED

MAR 17 2017

**Candy L. Warner
Tyler Co. Circuit Clerk**

EXHIBIT B



**TYLER COUNTY COMMISSION
P.O. BOX 66
MIDDLEBOURNE, WV 26149**

February 7, 2017

Hearing Date: February 1, 2017 Time: 7:00 PM

Property Owner's Name: Antero Resources Corporation
1615 Wynkoop St.
Denver, CO 80202--1106

As requested, we, the Tyler County Commission sitting as the Board of Review and Equalization, have reviewed the tentative 2017 appraised values of Antero Resource Corporation's property in Tyler County, West Virginia. We have taken into consideration all factors, information, and comparisons presented to us at the February 1st hearing, by Antero as taxpayer and by the West Virginia State Tax Department. The commission does hereby find that the request for the appraised values to be altered is hereby DENIED.

A handwritten signature in cursive script, appearing to read "Eric H. Vincent", is written over a horizontal line.

Eric H. Vincent, Commissioner

