

**STATE OF OHIO  
DEPARTMENT OF NATURAL RESOURCES  
DIVISION OF OIL AND GAS RESOURCES MANAGEMENT**

In re the Matter of the Application of :  
R.E. Gas Development, LLC for :  
Unit Operation : Application Date: November 10, 2014  
: Revised: August 28, 2015  
Vaughn Northeast Unit :

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**PREPARED TESTIMONY OF ALEX AZIZI  
ON BEHALF OF R.E. GAS DEVELOPMENT, LLC (“REX”)  
(RESERVOIR ENGINEER)**

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Attachment 3

**PREPARED TESTIMONY OF ALEX AZIZI**

1    **INTRODUCTION.**

2    **Q1.    Please introduce yourself to the Division.**

3    A1.    My name is Alex Azizi. I am the Director of Reservoir Engineering for Rex. My  
4           business address is 366 Walker Drive, State College, Pennsylvania 16801.

5    **Q2.    What are your job responsibilities as Director of Reservoir Engineering?**

6    A2.    My job responsibilities include understanding reservoirs in the Appalachian Basin,  
7           including, the Marcellus, Upper Devonian and Utica/Point Pleasant shales. I'm  
8           focused on the evaluation of the reserves and the economic evaluations of our  
9           projects.

10   **Q3.    What is your educational background?**

11   A3.    I earned a Bachelor of Science in Petroleum Engineering from the University of  
12           Texas at Austin in 2003.

13   **Q4.    How long have you worked for Rex?**

14   A4.    I have worked for Rex for the last four years. At Rex I have done some work in  
15           secondary and tertiary recovery in our Illinois Basin assets, however, I am focused  
16           primarily on Appalachian unconventional reservoirs.

17   **Q5.    Would you briefly describe your professional experience?**

18   A5.    I have worked in the oil and gas industry for approximately 10 years. During that  
19           time, I have worked for various oil and gas producers spending the first six years at  
20           Cano Petroleum in Fort Worth, Texas, where I was involved mostly in secondary  
21           water flood and tertiary recovery projects in Texas, Oklahoma and New Mexico.

22   **Q6.    And is that work similar to the work you now do for Rex?**

23   A6.    Yes. That work is similar in terms of evaluating resources in the area and  
24           understanding well behavior.

25   **Q7.    Are you a member of any professional associations?**

26   A7.    Yes. I am a member of the Society of Petroleum Engineers.

27   **Q8.    What is the purpose of your testimony today?**

28   A8.    I am testifying in support of the *Application of R.E. Gas Development, LLC for*  
29           *Unit Operation* filed with respect to the Vaughn Northeast Unit, consisting of  
30           seventy (70) separate tracts of land totaling approximately 612 acres in Carroll

1 County, Ohio. My testimony addresses the following: (i) that unit operations for  
2 the Vaughn Northeast Unit are reasonably necessary to increase substantially the  
3 recovery of oil and gas; and (ii) that the value of the estimated additional recovery  
4 due to unit operations exceeds its estimated additional costs.

5 **UNIT OPERATIONS ARE REASONABLY NECESSARY TO INCREASE**  
6 **SUBSTANTIALLY THE RECOVERY OF OIL AND GAS.**

7 **Q9. I'd like to begin by addressing whether unit operations in the Vaughn**  
8 **Northeast Unit are reasonably necessary to increase substantially the recovery**  
9 **of oil and gas from those properties. Would you describe briefly how Rex**  
10 **anticipates developing the Vaughn Northeast Unit?**

11 A9. The actual total number of wells will be dependent on production results.  
12 However, Rex anticipates drilling up to five wells ranging in approximate lateral  
13 length from 5,000' to 5,450' running from the southeast to the northwest. The  
14 Vaughn Northeast Unit will be drilled from two separate well pads the first located  
15 on lands outside the unit to the southwest of the unit while the second is on the  
16 southeast portion of the Vaughn Northeast Unit as shown in Exhibit AA-1.

17 **Q10. Do you have an opinion on whether unit operations in the Vaughn Northeast**  
18 **Unit are reasonably necessary to increase substantially the recovery of oil and**  
19 **gas from those properties, and if so, what is your opinion?**

20 A10. Yes. It is my opinion that unit operations are reasonably necessary to increase  
21 substantially the recovery of oil and gas from the unit. Given the location of the  
22 unleased tracts and the applicable regulatory setbacks, it is only possible to drill  
23 three laterals without an order authorizing unit operations. However, should an  
24 order authorizing unit operations be granted, it is possible to drill the five (5) wells  
25 depicted on Exhibit AA-1 which will be accompanied by a substantial increase in  
26 recovery of oil and gas.

27 **Q11. Have you made an estimate of the production you anticipate from the**  
28 **proposed unit operations?**

29 A11. Yes. The estimated ultimate recovery from the proposed Vaughn Northeast Unit  
30 development could be as much as between 30 and 35 billion cubic feet equivalent  
31 (Bcfe). This estimate is presented in greater detail on the attached Exhibit AA-2,

1 which includes an estimate of the recoverable reserves for each of the Vaughn  
2 Northeast Unit wells.

3 **Q12. Have you made an estimate of the production you anticipate without an order**  
4 **authorizing unit operations?**

5 A12. Yes. The estimated ultimate recovery from the Vaughn Northeast Unit without an  
6 order authorizing unit operations is between 18 and 21 Bcfe.

7 **Q13. Are the estimates that you made based on good engineering practices and**  
8 **accepted methods in the industry?**

9 A13. Yes. They are based on initial results from analog wells in the area.

10 **Q14. Can you calculate the production from these wells ahead of time with**  
11 **mathematical certainty?**

12 A14. No. It is impossible at this early stage in the development of the area to calculate  
13 the well performance with mathematical certainty.

14 **Q15. Is horizontal drilling technology, including hydraulic fracturing the formation,**  
15 **required to economically develop unconventional resources?**

16 A15. Yes.

17 **Q16. Is horizontal drilling common in the oil and gas industry?**

18 A16. Yes. It has been common in the industry for the last few decades and it has become  
19 particularly common in the last five to ten years.

20 **Q17. In your professional opinion, would it be economic to develop the Vaughn**  
21 **Northeast Unit using vertical drilling?**

22 A17. No. In a vertical well, the area of the well exposed to the producing reservoir will  
23 be considerably less than in a horizontal well, thus reducing the production and  
24 ultimate recovery of the well. When you take into account that reduction of  
25 reserves together with the capital investment required for a vertical well, the  
26 development of the area using vertical technology becomes uneconomical.

1 **VALUE OF ESTIMATED ADDITIONAL RECOVERY EXCEEDS ITS**  
2 **ESTIMATED ADDITIONAL COSTS**

3 **Q18. Let's turn to the financial side of the project. Generally, in your professional**  
4 **experience, how would the economics of a development project such as the**  
5 **development of the Vaughn Northeast Unit be evaluated?**

6 A18. First you need to estimate the production profile expected of the horizontal wells.  
7 You do that by taking into account accepted practices in the industry and using  
8 analog wells in the vicinity. You also need to estimate the total capital expenditure  
9 required for the drilling, completion and production of the well. When you  
10 combine those two estimates with the expected cost of operating the well during its  
11 life, you can evaluate the economics.

12 **Q19. Did you do that here?**

13 A19. Yes.

14 **Q20. Would you walk us through your economic evaluation, beginning with your**  
15 **estimate of the anticipated revenue stream from the Vaughn Northeast Unit's**  
16 **development?**

17 A20. We estimate that, based on the lateral lengths of these wells, the cost of drilling in  
18 the Vaughn Northeast Unit will be between \$7,000,000 and \$8,000,000 for each  
19 well. Once you combine that cost with the cost of operating a typical well in the  
20 area, we believe that the Net Present Value for each of these wells is between  
21 \$200,000 and \$1,000,000. For additional details regarding the estimates for the  
22 wells within the Vaughn Northeast Unit, see attached Exhibit AA-2.

23 **Q21. What price scenario did you use for the anticipated revenue stream?**

24 A21. We assumed gas prices to be on average \$4.00/mcf and oil prices to be \$80/bbl for  
25 the life of the project. This is consistent with the values on the NYMEX futures  
26 markets during the first week of November 2014. For natural gas liquids, typically  
27 the market prices these liquids at a differential with respect to NYMEX pricing for  
28 oil. We have seen in the recent market trends for natural gas liquids values  
29 between 10% and 55% of the NYMEX oil value. We took this variation into  
30 account in making value estimates for the Vaughn Northeast Unit.

31 **Q22. What about anticipated capital and operating expenses?**

1 A22. You work in cooperation with the drilling and completion engineers, as well as  
2 with the geologist, all of whom determine the expected depth and pay of the area.  
3 Once you understand the depth of the formation and the total lateral length that you  
4 need to recover the reserves, you use the latest figures from recent wells regarding  
5 the cost of drilling per foot in order to calculate total capital cost. The operating  
6 expenses are calculated in a similar manner. Here, as shown on Exhibit AA-2,  
7 assuming full development of the Vaughn Northeast Unit, the estimated capital  
8 costs will range between \$35,000,000 and \$40,000,000 while, the life of well  
9 estimated operating expense for each well in the unit \$10,000,000. In making cost  
10 estimates, the capital cost of building the well pads is distributed equally among the  
11 wells. Without unitization, the capital cost of both well pads construction burdens  
12 two wells instead of five wells.

13 **Q23. Based on this information and your professional judgment, does the value of**  
14 **the estimated additional recovery from the operations proposed for the**  
15 **Vaughn Northeast Unit exceed its estimated additional costs, and if so, would**  
16 **you explain why?**

17 A23. Yes. As indicated on Exhibit AA-1, there are two additional wells that could be  
18 drilled in the unit if the proposed unit operations are allowed. The value of the  
19 additional recovery from those unit operations, when compared to their associated  
20 additional costs, is reflected in the estimated net present value for each additional  
21 well set forth on Exhibit AA-2. That estimated net present value is between  
22 \$200,000 and \$1,000,000 per well. The fact that this range of numbers is positive  
23 means that the estimated revenue generated from each well exceeds the estimated  
24 costs of drilling and operating that well. And the fact that the total amount when  
25 summed across all of these wells is positive indicates that the value of the estimated  
26 additional recovery from unit operations exceeds its estimated additional costs. If  
27 an order authorizing unit operations was not granted, economies of scale would be  
28 lost. For instance, the pad construction costs would burden two wells. This means  
29 a 3-5% reduction in the expected rate of return, not to mention the waste of the oil  
30 and gas resources left in the ground. This means that very likely that the Vaughn

1 Northeast Unit would not be developed, stranding all of the resources in the  
2 Vaughn Northeast Unit.

3 **Q24. And your opinions are based on your education and professional experience?**

4 A24. Yes.

5 **Q25. Does this conclude your testimony?**

6 A25. Yes.