



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

In re the Matter of the Application of PDC :
Energy, Inc., for Unit Operation : Application Date: December 16, 2014
 : Date of Supplement: February 2, 2015
Grove Unit :
 :

SUPPLEMENT TO APPLICATION

On December 16, 2014, PDC Energy, Inc., (“PDC”) filed a unitization application for the Grove Unit pursuant to Ohio Revised Code Section 1509.28 (“Application”), requesting the Chief of the Ohio Department of Natural Resources, Division of Oil and Gas Resources Management issue an order authorizing PDC to operate the Unitized Formation (as defined in the Application) and applicable land area in Washington County, Ohio known as the Grove Unit as a unit. PDC now submits this supplement to the Application, which amends and updates the Application to include an estimate of the cost to operate each well within the unit. We have attached hereto updated testimony of Antonio Vizurruga, identified in the Application as Attachment 2, to account for this revision.

Respectfully submitted,

W. Jonathan Airey (0017437)
Gregory D. Russell (0059718)
J. Taylor Airey (0081092)
Scott M. Guttman (0086639)
VORYS, SATER, SEYMOUR AND PEASE LLP
52 East Gay Street
P. O. Box 1008
Columbus, Ohio 43216-1008

Attorneys for Applicant,
PDC Energy, Inc.

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DEPARTMENT OF NATURAL RESOURCES
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In re the Matter of the Application of :
PDC Energy, Inc., for Unit Operation :
 : Application Date: December 16, 2014
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**PREPARED TESTIMONY OF ANTONIO VIZURRAGA
ON BEHALF OF PDC ENERGY, INC.**

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VORYS, SATER, SEYMOUR AND PEASE LLP
52 East Gay Street
P. O. Box 1008
Columbus, Ohio 43216-1008

Attorneys for Applicant,
PDC Energy, Inc.

Date: February 2, 2015

PREPARED DIRECT TESTIMONY OF ANTONIO VIZURRAGA

1 **INTRODUCTION.**

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

3 A1. My name is Antonio Vizurraga. I am a petroleum engineer with PDC Energy, Inc.
4 My business address is 1775 Sherman Street, Suite 3000, Denver, Colorado 80203.

5 **Q2. What is your educational background?**

6 A2. I hold a Bachelor and a Masters of Science in Mechanical Engineering from the
7 Georgia Institute of Technology.

8 **Q3. Would you briefly describe your professional experience?**

9 A3. I have approximately 25 years of experience as a reservoir and production engineer
10 in the oil and gas industry. After my Bachelor's degree, I worked for a year in a
11 project management role for an energy conservation consultant firm. Upon finish-
12 ing my graduate degree, I worked for Amoco E&P for seven years, eventually
13 moving to Colorado. I went through their rigorous training program for the first
14 two years where I trained in reservoir and production engineering. I also had vari-
15 ous job assignments in reservoir, production and completion engineering roles
16 throughout basins in the Unites States, including offshore Gulf of Mexico. After
17 leaving Amoco, I worked for the consulting group within Schlumberger specializ-
18 ing in reservoir studies. I worked on reservoir simulation projects and field devel-
19 opment studies for conventional, tight gas sands and unconventional reservoirs in
20 the USA, as well as conventional and unconventional projects in Mexico, Argenti-
21 na, Nigeria and China. These projects required that I use reservoir and production
22 engineering skills in nodal analysis, pressure transient analysis, fluid characteriza-
23 tion, material balance and reservoir volumetric analysis. I was employed by
24 Schlumberger for twelve years. Then, I worked for El Paso E&P for three years
25 where I was a reservoir engineer on their New Mexico and Utah assets. This was
26 mostly unconventional reservoirs: coalbed methane projects and tight oil sands. For
27 more than three years since leaving El Paso, I have worked for PDC Energy as a
28 Senior Lead Engineer for their Permian and Utica assets.

29 **Q4. What do you do as a Senior Lead Engineer for PDC?**

30 A4. As a Senior Lead Engineer at PDC, I am responsible for reservoir, production and

1 completion engineering in our Ohio operations. These responsibilities include
2 calculating reserves and forecasting production for our company. The team that I
3 supervise also works on the completion design for wells, which includes the
4 perforation and hydraulic fracture treatments.

5 **Q5. Are you a member of any professional associations?**

6 A5. I have been an active member of Society of Petroleum Engineers for over 10 years.

7 **Q6. What is the purpose of your testimony today?**

8 A6. I am testifying in support of the *Application of PDC Energy, Inc. for Unit*
9 *Operation* filed with respect to the Grove Unit, consisting of fourteen (14) separate
10 tracts of land totaling approximately 538 acres in Washington County, Ohio. My
11 testimony addresses the following: (i) that unit operations for the Grove Unit are
12 reasonably necessary to increase substantially the recovery of oil and gas; and (ii)
13 that the value of the estimated additional recovery due to unit operations exceeds its
14 estimated additional costs.

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

17 **Q7. I'd like to begin by addressing whether unit operations in the Grove Unit are**
18 **reasonably necessary to increase substantially the recovery of oil and gas from**
19 **those properties. Would you describe briefly how PDC anticipates developing**
20 **the Grove Unit?**

21 A7. In the Unitized plan for the Grove leases, PDC Energy would develop the acreage
22 with four horizontal wells each of approximately 6,300 feet each. The exact final
23 lateral length of each well will depend upon final permit requirements. The well
24 pad will be located in the southern part of the unit and go north according to the
25 directional program as indicated on attached Exhibit AV-1.

26 **Q8. Do you have an opinion on whether unit operations in the Grove Unit are**
27 **reasonably necessary to increase substantially the recovery of oil and gas from**
28 **those properties, and if so, what is your opinion?**

29 A8. Yes. It is my opinion that unit operations are reasonably necessary to substantially
30 increase the recovery of oil and gas from the unit properties. It is highly likely that
31 the leases not included in the Non-Unitized plan would never be developed.

1 Therefore those reserves would be stranded.

2 **Q9. What volumes would be lost if those properties are stranded?**

3 A9. PDC has four wells to the east of the Grove Unit, located in Washington County,
4 these wells were used to estimate the production characteristics of and volumes to
5 be produced from of the wells within the Grove Unit. The volumes of oil and gas
6 obtained from analyzing the internal model are the basis for the estimated ultimate
7 recovery for the Grove Unit. The estimated ultimate recovery from the Grove Unit
8 with an order authorizing unit operations is 32.99 BSCFE, which drops to 30.01
9 BSCFE without an order authorizing unit operations. Thus, we estimate a loss of
10 approximately 2.98 BSCFE absent unit operations. These estimates are broken
11 down on a per well basis on attached Exhibit AV-2.

12 **Q10. Are the estimates that you made based on good engineering practices and**
13 **accepted methods in the industry?**

14 A10. Yes.

15 **Q11. Can you calculate the production from these wells ahead of time with**
16 **mathematical certainty?**

17 A11. Utica development is relatively new. As such there is uncertainty on the exact
18 production for any given well; however, the range of production possible from
19 these wells can be determined with reasonable confidence.

20 **Q12. Is horizontal drilling technology, including hydraulic fracturing the formation,**
21 **required to economically develop unconventional resources?**

22 A12. Yes. Due to the low permeability of the Utica/Point Pleasant formation,
23 economically recoverable reserves would not be possible without it.

24 **Q13. Is it fair to say that horizontal wells are commonly used to develop shale**
25 **formations like the Unitized Formation today?**

26 A13. Yes.

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

3 **Q14. 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 Grove Unit be evaluated?**

6 A14. First, the hydrocarbon volumes produced over time are developed. The commodity
7 pricing for oil, condensate, natural gas and natural gas liquids, based on NYMEX
8 sources, are used to generate the revenue stream. The royalties, any burdens such as
9 federal and state taxes, capital costs and operating taxes are then subtracted from
10 the revenue stream to evaluate the income and cash flow from each well. These
11 dollars are then discounted at various rates to calculate various economic factors
12 such as present values and rate of return.

13 **Q15. Did you do that here?**

14 A15. Yes.

15 **Q16. Would you walk us through your economic evaluation?**

16 A16. First, the hydrocarbon volumes produced over time are estimated, using a
17 production profile developed for each Grove Unit well. The initial production rate
18 of oil and natural gas was declined to obtain monthly and annual hydrocarbon
19 volumes. Then, the commodity pricing for oil, condensate, natural gas and natural
20 gas liquids, based on NYMEX sources, are used to generate the annual revenue
21 stream. The royalties, any burdens such as federal and state taxes, capital costs and
22 operating taxes are then subtracted from the revenue stream to evaluate the income
23 and cash flow from each well. The capital cost for each of the four Grove Unit
24 wells with an order authorizing unit operations at 6,300 feet in lateral length was
25 estimated at \$9,700,000. The Grove Unit wells without an order authorizing unit
26 operations would have an estimated capital cost of \$8,000,000 for the 1H well,
27 \$9,700,000 for Grove 2H, 3H, and 4H wells respectively. The cost to operate each
28 well is accounted for in these numbers with the average cost per well per month in
29 the Grove Unit being \$4,500, which covers possible artificial lift costs. These
30 dollars are then discounted at various rates to calculate various economic factors
31 such as present values and rate of return.

1 **Q17. Based on this information and your professional judgment, does the value of**
2 **the estimated additional recovery from the unit operations proposed for the**
3 **Grove Unit exceed its estimated additional costs?**

4 A17. Yes. With an order authorizing unit operations, the Grove Unit would recover
5 32.99 BSCFE and the total capital investment would be \$38,800,000. The
6 economic analysis shows a net present value discounted at 10% (PV10) to be
7 \$24,811,000. Whereas, for development without an order authorizing unit
8 operations, the recovery of hydrocarbons would be 30.01 BSCFE and the total
9 capital investment would be \$37,100,000. The Non-Unitized economic analysis
10 shows a net present value discounted at 10% (PV10) to be \$21,220,000. This shows
11 that developing the stranded leases through a unit order increases the production
12 from the Grove Unit by 2.98 BSCFE having a net PV10 value of \$3,590,000.

13 **Q18. And your opinions are based on your education and professional experience?**

14 A18. Yes.

15 **Q19. Does this conclude your testimony?**

16 A19. Yes.

17