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July 10, 2015

## VIA ELECTRONIC FILING

PUC Filing Center  
Public Utility Commission of Oregon  
PO Box 1088  
Salem, OR 97308-2148

**Re: Docket No. UM 1717 – In the Matter of NW Natural Application for Prudence  
Review of Costs of Post Carry Wells**

Dear PUC Filing Center:

Attached for filing in the above referenced case is an electronic copy of NW Natural's Reply Testimony of Robert Barg and Barbara Summers.

If you have any questions, please do not hesitate to contact this office.

Very truly yours,

A handwritten signature in black ink that reads "Wendy McIndoo". The signature is written in a cursive style.

Wendy McIndoo  
Office Manager

Attachment

NWN/300  
Witness: Barbara Summers

BEFORE THE PUBLIC UTILITY COMMISSION  
OF OREGON

**UM 1717**

In the Matter of

NORTHWEST NATURAL GAS  
COMPANY, dba NW Natural,

Application for Prudence Review of Costs  
of Post-Carry Wells.

**NORTHWEST NATURAL GAS COMPANY**

**REPLY TESTIMONY OF**

**BARBARA SUMMERS**

**July 10, 2015**

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**INTRODUCTION AND SUMMARY**

**Q. Please state your name.**

A. My name is Barbara Summers.

**Q. Have you previously filed testimony in this case?**

A. Yes, I filed direct testimony in this case on February 26, 2015.

**Q. What is the purpose of your reply testimony?**

A. I provide Northwest Natural Gas Company's (NW Natural) response to the testimony of Erik Colville of Staff of the Public Utility Commission of Oregon (Commission), Jamie McGovern of the Citizens' Utility Board of Oregon (CUB), and Edward Finklea on behalf of the Northwest Industrial Gas Users (NWIGU).

**Q. Is NW Natural offering any other reply testimony?**

A. Yes, we are offering the Reply Testimony of Robert Barg, a reserves engineer with Netherland Sewell and Associates, Inc. (NSAI).

**Q. Please summarize your testimony.**

A. As discussed in NW Natural's Direct Testimony,<sup>1</sup> in 2011 NW Natural entered into a transaction with Encana Oil and Gas (USA), Inc. (Encana) to fund and drill carry wells in Jonah Field in Wyoming—the Original Agreement. That agreement was later amended to terminate the parties' obligation to fund and drill carry wells and to increase NW Natural's ownership percentages in certain sections of Jonah Field—the Second Amended Agreement. Importantly, the Second Amended Agreement preserved NW Natural's right to consent, within thirty days, to any post-carry wells proposed by Encana. Encana subsequently sold its

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<sup>1</sup> Direct Testimony of Barbara Summers, filed as NWN/100, and Direct Testimony of Alex Miller, filed as NWN/200.

1 interests in the Jonah Field to Jonah Energy, LLC (Jonah Energy), a newly-  
2 formed subsidiary of TPG Capital (TPG).<sup>2</sup> Within a month of that sale, Jonah  
3 Energy began proposing the drilling of post-carry wells.<sup>3</sup>

4 The analysis developed by the Company to evaluate the post-carry well  
5 proposals was similar to that performed for the original carry wells. First, the  
6 Company relied on well forecasts produced by NSAI employing industry standard  
7 methodologies, and compared them to the cost of a ten-year hedge.<sup>4</sup> Reliance  
8 on such forecasts—which are produced on a section average basis—is standard  
9 and prudent industry practice. However, the Company also engaged in  
10 additional analysis for the post-carry wells. First, because NW Natural  
11 understood that Jonah Energy would present its proposals to NW Natural on a  
12 well-by-well basis, NW Natural also compared forecasts for each individual  
13 well—Individual Well forecasts—to the benchmark hedge. And, because NW  
14 Natural had historical data for the carry wells it had drilled, it also developed  
15 forecasts based on that data for each section in which it might receive proposals,  
16 and compared that data—Historical Performance—with the benchmark hedge.<sup>5</sup>  
17 The Company also evaluated risk by performing a tipping point analysis to  
18 determine the volume level at which an individual well would prove economic.  
19 This level proved to be 1.6 Billion cubic feet (Bcf), which allowed for an  
20 approximate 18 percent margin.<sup>6</sup> The Company also performed a non-consent  
21 analysis on each well to compare the potential net present value of “free gas,” if

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<sup>2</sup> The effective date of the sale was in December of 2013; however, the sale closed in the second quarter of 2014.

<sup>3</sup> NWN/100, Summers/3.

<sup>4</sup> NWN/100, Summers/15-24.

<sup>5</sup> *Id.*

<sup>6</sup> See Staff/100, Colville/23 and Staff/103, Colville/2.

1 any, to the net present value of participating in the well. Based on all of this  
2 analysis, the Company consented to seven wells, declined to consent to two, and  
3 requested that Jonah Energy remove two additional post-carry wells from its  
4 drilling schedule.<sup>7</sup>

5 Staff, CUB, and NWIGU all propose that the Commission find that the  
6 Company's decision to invest in the seven post-carry wells was imprudent. Staff  
7 and NWIGU propose that the Commission disallow any investment beyond the  
8 cost of a ten-year hedge. CUB proposes that the Commission disallow all  
9 investment in the post-carry wells. The primary argument relied upon by these  
10 parties is that the Company unreasonably relied on the same analysis that it  
11 engaged in to evaluate whether to invest in the original carry wells; the parties  
12 argue that the Company should have conducted a more robust analysis of the  
13 risks involved in the post-carry wells, particularly in light of the fact that actual  
14 performance of the carry wells has fallen short of NSAI's forecasts made at the  
15 time of the original investment, and in light of the fact that the post-carry wells  
16 involved more risk than the carry wells. Staff in particular argues that the  
17 Company should have performed an IRP-like risk analysis, involving either  
18 deterministic, or stochastic (probabilistic) analysis.<sup>8</sup>

19 What these parties fail to acknowledge is that NSAI's forecasts are based  
20 on industry standard methodologies for evaluating proved reserves (such as the  
21 post-carry wells). NSAI's forecasts for proved reserves use deterministic  
22 methodologies, produced using industry standard modelling software, and these  
23 forecasts form the basis for prudent investment decisions throughout the  
24 industry. Moreover, NW Natural went beyond industry standard practice by

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<sup>7</sup> NWN/100, Summers/19-24.

<sup>8</sup> Staff/100, Colville/26-27.

1 performing additional tests applying Individual Well and Historical Performance  
2 measures—and by performing a tipping point analysis.

3 It is certainly unfortunate that, to date, the post-carry wells have not  
4 performed as well as expected. However, we do not agree that our analysis of  
5 the investment was imprudent. On the contrary, our analysis met and surpassed  
6 industry standards for investment in proved reserves.

7 **RESPONSE TO STAFF'S TESTIMONY**

8 **Q. Please summarize Staff's recommendation in this case.**

9 A. Staff recommends that the Commission find that the Company's decision to enter  
10 into the Second Amended Agreement—releasing Encana from the obligation to  
11 drill carry wells in exchange for increased ownership percentages in Sections 33  
12 and 34 of Jonah Field—was a prudent one.<sup>9</sup> However, Staff recommends that  
13 the Commission find that the Company's decisions to invest in the seven post-  
14 carry wells were not prudently made, and that the Commission therefore disallow  
15 the cost of gas from those wells in excess of the market cost.<sup>10</sup> Alternatively,  
16 Staff recommends that the Commission disallow gas costs that exceed a 10-year  
17 financial hedge price of \$.04725 for the seven post-carry wells.<sup>11</sup>

18 **Q. What is the basis for Staff's view that the Company's investment in the  
19 seven post-carry wells was not prudently made?**

20 A. Staff found three deficiencies in NW Natural's post-carry well investment  
21 analysis—one major and two minor. Staff claims that the major deficiency is that  
22 the Company failed to perform adequate risk assessment prior to investing in the

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<sup>9</sup> Staff/100, Colville/10.

<sup>10</sup> Staff/100, Colville/3, and Colville/40.

<sup>11</sup> *Id.*

1 post-carry wells.<sup>12</sup> In addition, Staff posits two minor deficiencies as follows:

2 Staff claims that the Company did not analyze its investment options on a  
3 comparable risk basis, and that the Company failed to seek an independent  
4 second opinion regarding the forecast gas volumes from the post-carry wells.<sup>13</sup>

5 **Q. Please explain Staff's argument that the Company did not perform**  
6 **adequate risk analysis to support its decisions to proceed with drilling the**  
7 **post-carry wells.**

8 **A.** Staff notes that the Company relied on NSAI forecasts for the post-carry wells, as  
9 well as historical data from the carry wells that had been drilled under the  
10 Original Agreement, and that the net present value (NPV) analysis prepared by  
11 the Company showed that each of those forecasts compared favorably with a 10-  
12 year hedge price.<sup>14</sup> In addition, Staff acknowledges the Company's tipping point  
13 analysis that shows the positive net present value associated with the 1.6 Bcf  
14 decision criteria as another calculation performed to show measureable risk  
15 tolerance.<sup>15</sup> Finally, Staff notes that the analysis performed by the Company for  
16 the NW Natural Executive Committee modelled various scenarios in which the  
17 drilling costs and/or volumes were varied and showed that the post-carry wells  
18 would prove economic, with a 20 percent gas shortfall.<sup>16</sup> Nevertheless, Staff  
19 concludes that the Company should have performed a risk analysis similar to that  
20 established in Commission orders guiding IRP resource decisions. Staff points  
21 out that to comply with these guidelines, Oregon utilities generally perform risk

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<sup>12</sup> Staff/100, Colville/22.

<sup>13</sup> *Id.*

<sup>14</sup> Staff/100, Colville 23.

<sup>15</sup> *Id.*

<sup>16</sup> *Id.*

1 analysis using deterministic and/or stochastic approaches, and sensitivity  
2 analysis to refine and test analysis.<sup>17</sup>

3 **Q. Do you agree with Staff's critique?**

4 **A.** No, I do not. The Company based its investment decisions for both the carry and  
5 post-carry wells on NSAI volume forecasts, thus meeting industry standards for  
6 drilling decisions; moreover, the Company went beyond the analysis it had  
7 performed for the carry wells and exceeded industry standards.

8 **Q. On what do you base your statement that NW Natural's reliance on NSAI**  
9 **forecasts met industry standards?**

10 **A.** NSAI is an established oil and gas engineering firm recognized in the industry for  
11 its expertise in developing reserve forecasts. In fact, a neutral third party  
12 (KPMG) that worked jointly for the parties to UM 1520 noted that NSAI is well-  
13 respected in the field, and that its pricing assumptions were consistent with  
14 market estimates and its reserve studies include several conservative estimates,  
15 and few if any aggressive ones.<sup>18</sup>

16 Second, as explained in Mr. Barg's testimony, NSAI develops its  
17 forecasts using forecasting software that employs industry standard  
18 methodologies. Its estimates for the post-carry wells were developed using  
19 industry-standard deterministic methodologies.<sup>19</sup> These are precisely the type of  
20 forecasts relied upon by the industry to make drilling and investment decisions in  
21 proved reserves—such as those in which the Company invested—and these are

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<sup>17</sup> Staff/100, Colville/26-27.

<sup>18</sup> See, *In the Matter of NW Natural Gas Company, Application for Deferred Accounting Order Regarding Purchase of Gas Reserves*, Docket UM 1520, and *Application for Proposed Purchase of Natural Gas Reserves*, Docket UG 204, Joint Testimony in Support of Stipulation (April 19, 2011) at 13.

<sup>19</sup> NWN/400, Barg/5-6.



1           precisely the methodologies required by the Securities and Exchange  
2           Commission to ensure that investors receive accurate information regarding the  
3           value of oil and gas reserves.<sup>20</sup>

4   **Q.    Please explain your statement that the Company went beyond industry**  
5   **standards.**

6   **A.**    As explained by Mr. Barg, it would have been industry standard for us to rely on  
7           NSAI forecasts only.<sup>21</sup> Moreover, it would have been consistent with  
8           Commission precedent that declared the Company's investment in the Original  
9           Agreement—in which it relied on the NSAI forecasts—prudent.<sup>22</sup> However, we  
10          also reviewed Individual Well and Historical Performance data, and we  
11          performed a tipping point analysis to determine the volume level below which a  
12          particular well would prove economic. Thus, our analysis went beyond industry  
13          standards.

14   **Q.    Staff claims that the gas volume produced by the 72 carry wells had been**  
15   **more than 40 percent overestimated by NSAI and for that reason the**  
16   **Company should have anticipated that the post-carry well forecast could**  
17   **be similarly overestimated.<sup>23</sup> What is your response?**

18   **A.**    Staff's facts and reasoning are flawed. First, six out of seven of the post-carry  
19          wells were drilled in Section 34. The volumes from the carry wells drilled in  
20          Section 34 were overestimated, not by 40 percent, but by 13 percent. As noted  
21          by Staff, the Executive Committee analysis (even as altered by Staff to use  
22          Historical Performance data, which produces the highest cost of gas) still shows  
23          that those wells could have produced at between 22.2 percent below forecast to

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<sup>20</sup> NWN/400, Barg/7.

<sup>21</sup> NWN/400, Barg/6-7.

<sup>22</sup> See Docket UM 1520, Order No. 11-176 (May 25, 2011) (Order No. 11-176).

<sup>23</sup> Staff/100, Colville/28.

1 25.3 percent below forecast before they would have become uneconomic. Thus,  
2 the Company's historical experience suggested that, even if the December 2013  
3 forecasts over-estimated actual production to the same degree as the December  
4 2010 had proved, the wells drilled in Section 34 would nevertheless prove  
5 economic. Only one post-carry well agreed to by the Company was drilled in  
6 Section 33. As described in my original testimony, the Company relied on the  
7 NSAI Section average and Individual Well forecast when consenting to the first  
8 well proposed in Section 33.<sup>24</sup> Jonah Energy proposed two additional wells in  
9 Section 33 to which the Company did not consent based on its analysis of the  
10 volumes from its carry wells drilled in Section 33.<sup>25</sup> The volumes from the carry  
11 wells drilled in Section 33 underperformed in total by 28 percent.

12 Moreover, while thus far production has been below the December 2010  
13 forecasts, we had reason to believe that the December 2013 forecast of post-  
14 carry wells would not have been similarly overestimated because it incorporated  
15 and reflected the lowered production experienced from those wells. As explained  
16 in Mr. Barg's testimony, each December NSAI updates its reserves evaluations  
17 for Jonah Field and that year's evaluation reflects the historical experience from  
18 previous years.<sup>26</sup>

19 **Q. Please explain Staff's concern about the comparability of the Company's**  
20 **investment options.**

21 A. Staff points to the fact that the Company added the cost of a credit facility to the  
22 costs of a ten-year hedge, thereby eliminating any significant risk associated with  
23 this option, while customers bear the risk that the forecast cost of gas associated

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<sup>24</sup> NWN/100, Summers/20-21.

<sup>25</sup> NWN/100, Summers/24.

<sup>26</sup> NWN/400, Barg/3.

1 with the post-carry wells will vary.<sup>27</sup> Staff argues that, in order to produce an  
2 “apples to apples” comparison, the Company should have added to the cost of  
3 the post-carry wells the cost of an insurance policy to protect customers in the  
4 event that the wells don’t produce as forecast.<sup>28</sup>

5 **Q. What is your response?**

6 **A.** I disagree with Staff’s analysis for two reasons. First, at the time the Company  
7 consented to the post-carry wells, the investment opportunity presented both  
8 upside and downside risk. That is, NSAI forecasted that the reserves would  
9 come in **at or above** the volume forecast. Thus, while customers stood some  
10 risk that the reserves would produce less and/or cost more than estimated, they  
11 actually stood a greater chance that the reserves would come in above forecasts.  
12 Thus, the downside risk was more than compensated for by the upside risk.

13 More importantly, in making this comparison, NW Natural relied on the  
14 same methodology that the Commission found to be prudent when the Company  
15 entered into the Original Transaction.<sup>29</sup> If the Commission viewed the 10-year  
16 hedge plus credit facility as the appropriate comparator in the Original  
17 Transaction, there is no logical reason why the Company would select a different  
18 comparator for the post-carry wells.

19 **Q. Staff acknowledges that it is unlikely that the Company could have**  
20 **obtained an independent reserves audit or reserves estimate in thirty days,**  
21 **and that at best the Company might have obtained a review of the**  
22 **Company’s decision making process for making drilling decisions.**  
23 **However, Staff then suggests that not having time to obtain a second**

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<sup>27</sup> Staff/100, Colville/33.

<sup>28</sup> Staff/100, Colville/33-34.

<sup>29</sup> Order No. 11-176.

1 **opinion could have reasonably supported a decision not to consent to the**  
2 **post-carry wells.<sup>30</sup> Do you agree?**

3 **A.** No. As I have said, our analysis was more than reasonable.

4 **RESPONSE TO CUB**

5 **Q. What is CUB's position on the prudence of the post-carry wells?**

6 **A.** CUB believes that NW Natural has not demonstrated that the decision to consent  
7 to the post-carry wells was prudent and therefore recommends that the full cost  
8 of the post-carry wells be disallowed.<sup>31</sup>

9 **Q. What are CUB's reasons for this view?**

10 **A.** CUB gives three main reasons. First, CUB argues that reliance on the NSAI  
11 analysis was inadequate because, based on the results from the carry wells, the  
12 Company should have known that the NSAI evaluation might be overstated.<sup>32</sup>  
13 Second, CUB argues that the Company misapplied the NSAI data.<sup>33</sup> And third,  
14 CUB argues that the Company did not demonstrate that customers had a need  
15 for a new 10-year hedge.<sup>34</sup>

16 **Q. Is CUB's argument that the Company should have known the NSAI data**  
17 **was overstated similar to the argument made by Staff?**

18 **A.** Yes. CUB argues that, because the post-carry wells were riskier than the carry  
19 wells, and because NSAI's forecasts for the carry wells had proved to over-  
20 estimate volumes, the Company should have understood that NSAI's forecasts  
21 for the post-carry wells might be over-estimated and should therefore have  
22 performed a more rigorous analysis.<sup>35</sup> As I explained above, in making its

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<sup>30</sup> Staff/100, Colville/35.

<sup>31</sup> CUB/100, McGovern/14.

<sup>32</sup> CUB/100, McGovern/4-6.

<sup>33</sup> CUB/100, McGovern/6-9.

<sup>34</sup> CUB/100, McGovern/13.

<sup>35</sup> CUB/100, McGovern/4-6.

1 consent decisions regarding the post-carry wells, the Company relied on NSAI's  
2 December 2013 evaluation, which incorporated the updated production volumes  
3 from previous years. For that reason, it was reasonable for the Company to  
4 believe those updated forecasts would prove reliable. Moreover, for six of the  
5 seven post-carry wells, even if their volumes had fallen short of forecasts to the  
6 same degree as the carry wells, they still would have proved economic—a fact  
7 that NW Natural ascertained prior to consenting.

8 **Q. What about CUB's argument that the Company misapplied the NSAI data?**

9 A. CUB points to the fact that in NW Natural's analysis of the first four post-carry  
10 wells, the Company made an error in the way that it applied NSAI's type curve for  
11 its Historical Performance test, and asserts that this fact suggests that the  
12 Company's overall analysis was inadequate.<sup>36</sup> However, the fact is that the  
13 Company used NSAI's forecasts data—which is industry standard—and in  
14 addition ran several of its own tests using Individual Well and Historical  
15 Performance data. While the details of the additional methodologies evolved as  
16 the Company gained more information, the fact was that the Company went  
17 beyond the industry standard in its analyses.

18 **Q. CUB argues that the Company did not correctly discount NSAI's forecasts**  
19 **for several inherent risks, such as party risk, reserve risk, commodity price**  
20 **risk, etc.<sup>37</sup> What is your response?**

21 A. NW Natural responds as follows to CUB's concerns about each of these risks as  
22 follows:

- 23 • **Party Risk:** CUB points out that NW Natural had limited experience with  
24 TPG and Jonah Energy. However, the Company had no reason to

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<sup>36</sup> CUB/100, McGovern/6-7.

<sup>37</sup> CUB/100, McGovern/8.

1 believe that Jonah Energy would be anything but a responsible partner—  
2 which in fact Jonah Energy has proved to be.

3 • **Reserve Risk:** CUB asks how much gas is really contained in “that area  
4 of the field . . . ?”<sup>38</sup> We have discussed NSAI’s reserve evaluation and  
5 NW Natural’s additional analysis above. The bottom line is that the  
6 Company’s assessment reserve risk surpassed industry standard.<sup>39</sup>

7 • **Commodity price risk:** CUB asks: “What if the wells are productive but  
8 so are many other wells in the country, driving down market prices,  
9 making the hedge ineffective?”<sup>40</sup> More simply, CUB is raising the  
10 possibility that gas prices could fall, rendering the price for the reserves  
11 “out of the money.” This concern really goes to whether the Company  
12 should hedge at all. As I explained in my Direct Testimony, the Company  
13 believes that the Commission has agreed that at least 10 percent of its  
14 gas portfolio should be secured through long-term hedges.<sup>41</sup>

15 • **Mechanical Risk:** CUB asks about the reliability of equipment and  
16 subsequent drilling costs.<sup>42</sup> The Company considered the potential for  
17 cost overruns in its Executive Committee analysis. However, the  
18 Company’s experience with both the carry and post-carry wells was that  
19 drilling and operational costs consistently came in under forecast.<sup>43</sup>

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<sup>38</sup> CUB/100, McGovern/8.

<sup>39</sup> NWN/100, Barg/7.

<sup>40</sup> CUB/100, McGovern/8.

<sup>41</sup> NWN/100, Summers/15.

<sup>42</sup> CUB/100, McGovern/8.

<sup>43</sup> CUB also points to “Deal Structure Risk.” CUB/100, McGovern/8. NW Natural is not clear in how this concern relates to the post-carry wells.

1 **Q. CUB also points out that it is logical that the earlier-drilled wells in an area**  
2 **would be better producers than subsequently-drilled wells, suggesting that**  
3 **NW Natural did not take well order into account.<sup>44</sup> Is CUB correct?**

4 **A.** No. First, as explained in my Direct Testimony, NSAI's Section Average data is  
5 based upon an aggregation of the forecasts for each individual well.<sup>45</sup>  
6 Assumptions about production based on well order is incorporated into the  
7 individual well forecast, and is therefore accounted for in both the Individual  
8 Forecast and Section Average analyses.

9 **Q. How do you respond to CUB's argument that the Company did not**  
10 **demonstrate that it had a need to lock into additional 10-year hedges?**

11 **A.** As I explained in my Direct Testimony, in UM 1520, the Commission expressly  
12 recognized that it was approving a hedge that would make up approximately 10  
13 percent of the Company's annual gas supply over the next 10 years.<sup>46</sup> More  
14 importantly, all of our analysis indicated that the post-carry wells would provide  
15 significant benefits to our customers, and we believed that the prudent decision  
16 was to consent.

17 **Q. CUB argues that NW Natural rushed through the process of analyzing the**  
18 **risks involved in the carry wells because "it believed that the risk of**  
19 **judgment of imprudence and subsequent loss of revenue was outweighed**  
20 **by the chance of approval and increased rate base."<sup>47</sup> What is your**  
21 **response?**

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<sup>44</sup> CUB/100, McGovern/10.

<sup>45</sup> NWN/100, Summers/18.

<sup>46</sup> NWN/100, Summers/15.

<sup>47</sup> CUB/100, McGovern/14.

1 A. CUB is wrong to impugn NW Natural's motives in this way. The Company's  
2 analysis suggested that the post-carry wells would perform very well compared to  
3 a 10-year hedge, and for that reason, we invested.

4 **Q. CUB claims that it viewed the post-carry well opportunity "primarily as a**  
5 **risk—a big risk, and clearly stated as such to the Company." Is CUB**  
6 **correct?**

7 A. There is no doubt that all parties appreciated the risks involved in the post-carry  
8 wells. CUB and the other parties' insistence, however, that the asset should be  
9 viewed as an opportunity for customers first and foremost indicates that all  
10 parties believed that there was a potentially meaningful opportunity as well.

11 **RESPONSE TO NWIGU**

12 **Q. What is NWIGU's recommendation in this docket?**

13 A. NWIGU also believes that the Company's investment in the post-carry wells was  
14 imprudent and requests that the Commission require the Company to absorb the  
15 costs of the gas produced compared to the cost of a long-term hedge. NWIGU  
16 recommends that the Commission conduct further proceedings to determine the  
17 proper price of a long-term hedge and the proper date to determine the 10-year  
18 hedge pricing.<sup>48</sup>

19 **Q. What is the basis of NWIGU's recommendation?**

20 A. Like Staff and CUB, NWIGU believes that the Company should have performed  
21 additional analysis given the increased risk associated with the post-carry wells.  
22 I disagree for the reasons explained above.

23 With respect to NWIGU's recommendation of an additional proceeding to  
24 determine the 10-year hedge pricing, NW Natural does not understand the

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<sup>48</sup> NWIGU/100, Finklea/6.



1           purpose of such a proceeding. It seems that clearly the hedge price at the time  
2           the Company made its decisions would be the appropriate benchmark, rather  
3           than developing another benchmark that does not coincide with the timing of the  
4           actual decisions.

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

6   **A.    Yes.**

NWN/400  
Witness: Robert Barg

BEFORE THE PUBLIC UTILITY COMMISSION  
OF OREGON

**UM 1717**

In the Matter of

NORTHWEST NATURAL GAS  
COMPANY, dba NW Natural,

Application for Prudence Review of Costs  
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**NORTHWEST NATURAL GAS COMPANY**

**REPLY TESTIMONY OF**

**ROBERT BARG**

**July 10, 2015**

1 **Q. Please state your name and position.**

2 A. My name is Robert Barg. I am currently employed as a Petroleum Reservoir  
3 Engineer with Netherland, Sewell & Associates, Inc. (NSAI), with the title of Senior  
4 Vice President. My job duties include estimating oil and gas reserves for properties  
5 located throughout the United States, Mexico, and Canada.

6 **Q. Please summarize your educational background and professional licensures.**

7 A. I received a Bachelor of Science (with highest honors) in Mechanical Engineering  
8 from Purdue University in 1983. I am a Licensed Professional Engineer in the  
9 State of Texas and a Member of the Society of Petroleum Engineers. I am also  
10 certified as an Independent Qualified Reserves Evaluator (IQRE) in Quebec,  
11 Canada.

12 **Q. Please describe your professional experience.**

13 A. Since joining NSAI in 1989, I have estimated oil and gas reserves for properties  
14 located throughout the United States, Mexico, and Canada, performing property  
15 evaluations and field studies, analyzing drilling proposals, conducting field  
16 optimization studies used by clients in arranging financing, evaluating potential  
17 acquisitions or sales, and U.S. Securities and Exchange Commission (SEC)  
18 reporting. Prior to NSAI, I worked for Exxon Company, USA from 1983 to 1989 as  
19 a reservoir engineer, subsurface engineer, and planning engineer.

20 **Q. What is the purpose of your testimony?**

21 A. The purpose of my testimony is to respond to testimony filed by Staff of the Public  
22 Utility Commission of Oregon (Staff), Citizen's Utility Board of Oregon (CUB), and  
23 the Northwest Industrial Gas Users (NWIGU). Specifically, I will respond to  
24 testimony by these parties suggesting that Northwest Natural Gas Company (NW  
25 Natural or Company) acted unreasonably by relying on reserves forecasts provided  
26 by NSAI.

1 **Q. Please provide some background information on NSAI.**

2 A. NSAI was established in 1961 and has offices in Dallas and Houston, Texas. Our  
3 present organization consists of 60 reservoir engineers, geoscientists, and  
4 petrophysicists; 80 engineering and geology analysts; 15 associate engineers,  
5 geoscientists, and petrophysicists as needed for special expertise; and additional  
6 support staff. Our professional staff are carefully recruited from the industry's most  
7 qualified candidates. The average experience level of our engineering, geoscience,  
8 and petrophysical staff exceeds 20 years, including 5 to 15 years with a major oil  
9 company. Most of our engineers, geoscientists, and petrophysicists obtained their  
10 initial training and experience with ARCO, British Gas, Chevron, ConocoPhillips, or  
11 ExxonMobil. Our engineering and geology analysts generally have 3 to 15 years of  
12 experience and have degrees in mathematics, computer science, geology, or  
13 business. They have diverse skills in data loading, database management,  
14 economic modeling, spreadsheet manipulation, computer mapping, well log  
15 processing, and report preparation.

16 **Q. Describe your experience relative to the Jonah Field.**

17 A. I first evaluated reserves in Jonah Field in 1996 with the drilling of the original  
18 multfrac vertical wells by Snyder Oil Company. Since that time, I have performed  
19 numerous year-end reserves evaluations, acquisitions analysis, and divestiture  
20 packages for the following companies in Jonah Field: Snyder Oil Company,  
21 McMurry Oil Company, Encana Corporation (Encana), British Petroleum, Noble  
22 Royalties, Enerplus Corporation, Jonah Energy LLC, NW Natural, Yates Petroleum,  
23 and other minor interest owners. I have performed year-end reserves evaluations  
24 in Jonah Field for Encana, and later for Jonah Energy, since December 31, 2002.

25 **Q. Please describe your role in evaluating the carry wells that were the subject**  
26 **of NW Natural's original Carry and Earning Agreement with Encana.**

1    **A.**     In January 2011, NW Natural retained the services of NSAI specifically to estimate  
2           the net proved reserves and future gas flowstreams related to the 102 carry wells in  
3           the Carry and Earning Agreement between NW Natural and Encana (Original  
4           Agreement). I prepared that work and presented the results to NW Natural. It is my  
5           understanding that those results were made available to the Commission in UM  
6           1520—the docket that was opened to review NW Natural’s transaction with Encana.

7    **Q.**     **Have you performed additional evaluations of the 102 carry wells since that**  
8           **time?**

9    **A.**     Yes, as mentioned above, each year I have conducted year-end reserves  
10          evaluations of Jonah Field for Encana, and now for Jonah Energy. Every year I have  
11          updated my estimates for producing wells, non-producing wells, and future drilling  
12          locations in those sections (approximately 40 sections) of Jonah Field in which  
13          Encana and now Jonah Energy owns an interest, including Sections 32, 33, and 34,  
14          that were the subject of the Original Agreement. Each year’s reserves update  
15          incorporates actual performance of the producing wells in the field. Accordingly,  
16          relevant to this case, my December 2013 evaluation included an analysis of all  
17          potential future drilling locations in Sections 32, 33, and 34 of Jonah Field. These  
18          future locations are now regarded as post-carry wells. This evaluation was made  
19          available to NW Natural and it is my understanding that this is the evaluation that  
20          served as the basis for NW Natural’s decision to fund the drilling of the post-carry  
21          wells at issue in this docket. In that evaluation we identified a total of 38 potential  
22          drilling locations that could be classified as “proved undeveloped” reserves in the  
23          sections covered by the Original Agreement that were economic under the SEC  
24          definitions and regulations as of December 31, 2013, which means the locations  
25          have positive future net revenue given the estimated forecast volumes, capital and  
26

1 operating costs, taxes, and processing fees associated with each location using SEC  
2 prices.

3 **Q. You referred to the post-carry wells as classified as “proved undeveloped**  
4 **reserves.” Please explain the relevant terms.**

5 A. Reserves are based on the definitions of the Society of Petroleum Engineers (SPE)  
6 Petroleum Resource Management System (PRMS) guidelines. The SEC definitions  
7 are designed to be consistent with these definitions. Reserves are those quantities  
8 of petroleum anticipated to be commercially recoverable by application of  
9 development projects to known accumulations from a given date forward under  
10 defined circumstances. Reserves must satisfy four criteria: They must be  
11 discovered, recoverable, commercial, and remaining, based on the development  
12 projects applied. Reserves may be developed or undeveloped. On a simple level,  
13 developed reserves have already been fully drilled while undeveloped reserves have  
14 not been fully drilled.

15 Reserves are further broken out as proved, probable, or possible, depending  
16 on how confident the estimator is that the wells will perform as forecasted. Proved  
17 reserves are those for which we have sufficient data to allow us a reasonable degree  
18 of certainty in our forecast—that is, if we have sufficient data from producing wells  
19 in the vicinity, the locations have already been permitted for development, and the  
20 locations are adjacent to already developed areas. Specifically, the area of a  
21 reservoir considered to be proved includes (1) the area delineated by drilling and  
22 defined by fluid contacts, if any, and (2) adjacent undrilled portions of the reservoir  
23 that can reasonably be judged as continuous with it and commercially produced on  
24 the basis of available geoscience and engineering data.

25

26

1 **Q. Both Staff and CUB claim that NW Natural should have not have relied on**  
2 **NSAI's well forecasts for the post-carry wells, given that it appears that the**  
3 **forecasts for the carry wells were overstated. Do you agree?**

4 A. No. NSAI uses industry standard methodologies to create its well forecasts, and it  
5 used the same industry standard methodologies to forecast the post-carry wells as  
6 it uses for all proved undeveloped reserves. Specifically, NSAI used deterministic  
7 methods that encompass both highly technical engineering and geoscience analysis  
8 as well as economic analysis, making use of the NSAI economics software  
9 programs. NSAI methods comply with the strict standards required by the SEC, and  
10 are relied upon by investors throughout the industry. NW Natural therefore acted  
11 reasonably in relying on NSAI forecasts.

12 **Q. Please explain the methodology you used to evaluate the reserves.**

13 A. The precise method we use to evaluate "proved" reserves (the category applicable  
14 to the post-carry wells at issue) differs depending on whether the location under  
15 evaluation has not yet been drilled or the well has already been drilled and is  
16 producing. For all producing wells and future locations, our evaluation starts with  
17 the original gas-in-place (OGIP). The OGIP is an estimate of the original amount of  
18 gas under the ground in Jonah Field. This estimate, which in this case is provided  
19 by Encana and then verified by NSAI, is derived from core geological samples as  
20 well as the logs of wells in the immediate area, resulting in estimates of OGIP at the  
21 field level, by 640-acre section, and by 40-acre block. The forecasts for existing  
22 producing wells are based on industry standard performance analysis that includes  
23 decline curve analysis of the historical daily and monthly production and flowing  
24 pressure data. We then compare the well performance estimated ultimate  
25 recoveries (EURs) versus the OGIP to check the reasonableness of the recovery  
26 factor of each 40-acre production block. The decline curve forecasts the estimated

1 future monthly gas volumes for each well and our economics program estimates the  
2 future cash flows given the price forecast, operating costs, capital costs, taxes, fees,  
3 royalties, etc.

4 In evaluating reserves for future drilling locations (undrilled wells) such as the  
5 post-carry wells, we also start with the OGIP. Then, we consider the historical  
6 performance of any other wells in the 40-acre block of the location, using this  
7 information to derive the cumulative recovery factor for each 40-acre block based on  
8 existing producing wells and then an estimate of the future recovery factor for each  
9 subsequent drilling location. We update this recovery factor each year as new wells  
10 are drilled and updated production data are received. Finally, based on historical  
11 production profiles of historical wells, we develop a type curve shape for future  
12 drilling locations. We can then estimate the future production profile and cash flow  
13 of each future location on a monthly basis.

14 **Q. Are you aware of the analysis that NW Natural employed to make drilling**  
15 **decisions regarding the post-carry wells?**

16 A. Yes. I am aware that NW Natural relied on the NSAI individual well and section  
17 average well forecasts contained in the report as of December 31, 2013. I am further  
18 aware that NW Natural also looked at the average historical production of the carry  
19 wells NW Natural had drilled in each section.

20 **Q. Was the information that NW Natural relied on based on updated forecasts?**

21 A. The last analysis we performed for NW Natural prior to drilling the post-carry wells  
22 was our evaluation as of December 31, 2013, that incorporated the well performance  
23 histories through November 2013. Please keep in mind that, while the carry wells  
24 had not performed as originally forecasted in the December 2010 evaluation, the  
25 lower performance was incorporated into the December 2013 forecasts.

26



1 **Q. Do you agree that the analysis performed by NW Natural was consistent with**  
2 **industry standards?**

3 **A.** Yes. NW Natural started with the well forecasts that NSAI provided that are based  
4 on industry standard definitions and evaluation methodologies. It is typical for  
5 companies to make investment and drilling decisions based on the estimates of  
6 proved undeveloped reserves prepared by NSAI, such as the estimates made for  
7 the post-carry wells. In addition, even though NW Natural was working with  
8 forecasts assigned a high degree of confidence, we understand that NW Natural  
9 adjusted those volumes lower and drilled only those wells that would be economic  
10 based on NW Natural economic criteria at reserves levels approximately 20 percent  
11 lower than the NSAI forecasts. Thus, NW Natural's analysis not only used reserves  
12 estimates prepared based on industry standard definitions, NW Natural also ran a  
13 sensitivity case that was more conservative than the proved undeveloped reserves  
14 that NSAI estimated.

15 **Q. You have stated several times that the analysis that NSAI performed, and upon**  
16 **which NW Natural relied, is industry standard. Can you explain what types of**  
17 **entities rely on your forecasts for predicting volumes?**

18 **A.** Yes. First, the PRMS and SEC have imposed strict requirements for the  
19 classification of proved reserves and accepted methods for forecasting them, in  
20 order to ensure that investors are provided with accurate information. Companies  
21 rely on our reserves reports for SEC filings, corporate financing, and acquisition and  
22 divestiture projects; the SEC uses our reserves estimates when reviewing company  
23 filings; investors rely on our forecasts in making investment decisions; and owners  
24 and operators of reserves rely on our forecasts for making economic drilling  
25 decisions.

26

1 **.Q. But do you agree that thus far the volumes in Sections 32, 33 and 34, from**  
2 **both the initial carry wells and the post-carry wells, have been below NSAI**  
3 **forecasts?**

4 **A.** While we do not know for certain whether the ultimate volumes recovered over the  
5 lives of these wells will be below forecasts, it does appear that this may be the case.<sup>1</sup>  
6 However, that fact does not suggest that different modeling techniques would have  
7 produced lower volume forecasts or suggested a higher degree of risk or uncertainty  
8 than the modeling performed by NSAI. The fact is that despite our best efforts, there  
9 is always a risk that reserves estimates may prove lower or higher than the amounts  
10 actually produced.

11 **Q. Does this conclude your testimony?**

12 **A.** Yes.

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26 <sup>1</sup> By comparison the wells drilled by NW Natural and Encana in the Downdip area exceeded  
reserve estimates made prior to drilling.