

STATE OF NORTH DAKOTA
BEFORE THE
PUBLIC SERVICE COMMISSION

Otter Tail Power Company
Advance Prudence – Merricourt Wind
Application

Case No. PU-17-

Otter Tail Power Company
PC&N – Merricourt Wind
Application

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DIRECT TESTIMONY
OF
BRIAN DRAXTEN
ON BEHALF OF
OTTER TAIL POWER COMPANY

Resource Planning Testimony

April 10, 2017

- 54 PU-17-143 Filed 10/06/2017 Pages: 14
Exhibit OTP-12 - Direct Testimony of Brian Draxten
Otter Tail Power Company
- 50 PU-17-141 Filed 10/06/2017 Pages: 14
Exhibit OTP-12 - Direct Testimony of Brian Draxten
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- 45 PU-17-140 Filed 10/06/2017 Pages: 14
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1 **I. INTRODUCTION AND QUALIFICATIONS**

2
3 Q. PLEASE STATE YOUR NAME AND TITLE.

4 A. My name is Brian Draxten. I am Manager of Resource Planning for Otter Tail Power
5 Company (Otter Tail or the Company).

6
7 Q. PLEASE DESCRIBE YOUR QUALIFICATIONS AND EXPERIENCE.

8 A. I have a Bachelor of Arts degree in accounting with a minor in business finance from
9 Moorhead State University. I have worked for Otter Tail for 35 years in various
10 positions, including as a Rates Analyst, Manager of Market Research, and Manager of
11 Budget. I have served in my current position as Manager of Resource Planning since
12 January 2008.

13
14 Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

15 A. The purpose of my testimony is to provide support for Otter Tail's application for an
16 Advance Determination of Prudence (ADP) and Certificate of Public Convenience and
17 Necessity (CPCN) for the Company's proposed purchase, development and operation of
18 the Merricourt Wind Farm Project (the Merricourt Project or Project). My testimony
19 principally addresses the need for this resource addition.

20
21 **II. NEED FOR AND JUSTIFICATION OF THE RESOURCE ADDITION**

22
23 Q. PLEASE SUMMARIZE THE COMPANY'S PROPOSED RESOURCE ADDITION.

24 A. Otter Tail is proposing to purchase, develop, own, and operate the 150 MW Merricourt
25 Project, which will be located near Merricourt, North Dakota and will interconnect to
26 Montana-Dakota Utilities Company's Merricourt 230 kV substation located southwest of
27 Kulm, North Dakota. The Merricourt Project is one part of the Company's two-part plan
28 to meet our customers' capacity and energy needs by 2021.

1 Q. WHY IS THIS RESOURCE ADDITION NEEDED?

2 A. Otter Tail is forecasting capacity needs of approximately 273 MW by 2021 and energy
3 needs to mitigate reliance on the MISO energy markets. Together, the twin capacity and
4 energy needs argue for the installation of energy and capacity resources by 2021.

5
6 Q. HOW IS OTTER TAIL PROPOSING TO MEET ITS NEED FOR ENERGY AND
7 CAPACITY RESOURCES?

8 A. Otter Tail is proposing a two-part plan to meet its load serving obligations by 2021. The
9 Merricourt Project is the first part of the plan and will provide the low-cost energy
10 component. Part two of the plan is the construction of an approximately 250 MW frame-
11 style natural gas-fired simple cycle combustion turbine near the small town of Astoria,
12 South Dakota (Astoria Station). Astoria Station will provide low-cost capacity and
13 dispatchable energy, which facilitates reliability support through quick start capability to
14 follow load and an energy market hedge.

15
16 Together, the Merricourt Project and Astoria Station will, on a least-cost basis, reliably
17 address Otter Tail's capacity deficit and provide energy for Otter Tail's customers,
18 thereby reducing Otter Tail's projected 2021 reliance on the MISO energy markets from
19 approximately 26% to 31% to approximately 16% to 20%.

20
21 Q. WHAT IS DRIVING THIS NEED?

22 A. Several circumstances are driving Otter Tail's need for capacity and energy: (1) overall
23 load growth, including the potential of pipeline load developing in the Company's service
24 territory; (2) expiring capacity purchases; and (3) the anticipated 2021 retirement of the
25 1950s-era 140 MW Powder River Basin (PRB) coal-fired Hoot Lake Plant in Fergus
26 Falls, Minnesota.

27
28 Q. HAS THE COMPANY BEEN ANALYZING THE FUTURE OF HOOT LAKE
29 PLANT?

30 A. Yes. By way of background, Hoot Lake Plant consists of Unit 2, built in 1959 with a
31 nameplate rating of 53.3 MW, and Unit 3, built in 1964 with a nameplate rating of

1 75 MW. Unit 1 (which was retired in 2005) and some of the plant site's original
2 infrastructure were constructed in 1948 with a nameplate rating of 7.5 MW.

3
4 Given the age and condition of Hoot Lake Plant, the magnitude of investment necessary
5 to keep its units and associated infrastructure operational, and the possible cost of
6 potential future environmental compliance upgrades, the Company has been analyzing
7 the plant's ongoing role in the Company's generation portfolio. The Company's analysis
8 began in 2010 when material investments in Hoot Lake Plant were likely to be needed to
9 comply with the Mercury and Air Toxic Standards (MATS) regulations in 2015. To that
10 end, the Company conducted its Baseload Diversification Study in 2012 to determine the
11 most prudent course of action.

12
13 Q. WHAT DID THE COMPANY CONCLUDE IN THE 2012 BASELOAD
14 DIVERSIFICATION STUDY?

15 A. The 2012 Baseload Diversification Study evaluated three scenarios: (1) retiring Hoot
16 Lake Plant in 2015; (2) adding equipment to comply with the MATS regulations and then
17 retiring the plant in 2020; and (3) refurbishing the plant for long-term operation. The
18 Study concluded that making minimal investments for MATS compliance and then
19 retiring Hoot Lake Units 2 and 3 in 2021 was the least cost and most prudent course of
20 action.

21
22 Q. HOW DOES THE HOOT LAKE PLANT CURRENTLY OPERATE IN THE MISO
23 MARKET?

24 A. Unit 2 is available to the MISO market, but market prices have been so low that it has
25 been operated primarily in the winter as a source of building heat. Due to recent low
26 market prices, Unit 3 has seen only limited operation year-round, and is primarily
27 operated only for required environmental testing and as MISO infrequently dispatches the
28 unit.

1 Q. WHY IS THE COMPANY RETIRING HOOT LAKE PLANT?

2 A. There are several reasons. First, because of the age of Hoot Lake Plant's infrastructure
3 and its generation technology, it is comparatively expensive to keep operational. The
4 Company can no longer justify such additional investment in the existing facilities.
5 Second, future upgrades and investments could be necessary to comply with existing
6 environmental regulations and the cost of such upgrades could be significant. Third, the
7 plant's age and condition expose Otter Tail's customers to the risk of a major operational
8 disruption at a time when replacement capacity and energy cannot be procured
9 economically. This, in turn, could unnecessarily expose our customers to a volatile and
10 potentially non-economic market for capacity and energy.

11
12 For these reasons, Otter Tail has developed a plan to retire Hoot Lake Plant in 2021 and
13 replace it with an optimal complement of generation resources.

14
15 Q. WHAT CAPACITY PURCHASES DID THE COMPANY MAKE IN CONJUNCTION
16 WITH ITS PLAN TO RETIRE HOOT LAKE PLANT IN 2021?

17 A. In conjunction with the Company's plan to retire Hoot Lake Plant in 2021, Otter Tail
18 entered into several capacity purchase agreements to meet its obligations to serve
19 customers:

- 20 • A 50 MW capacity-only contract with Great River Energy in 2014, increasing to
21 100 MW from January 2015 through May 31, 2017;
- 22 • A 25 MW capacity-only contract with Great River Energy that begins on June 1,
23 2017 and runs through May 31, 2019, and increases to 50 MW capacity-only from
24 June 1, 2019 through May 31, 2021; and
- 25 • A 55 MW capacity-only contract with Great River Energy that begins on June 1,
26 2017 and runs through May 31, 2019.

27 The capacity purchased through these agreements was intended to "bridge" the
28 Company's capacity needs until Hoot Lake Plant is retired in 2021. Otter Tail arranged
29 for this package of capacity purchase to expire coincident with the retirement of Hoot
30 Lake Plant so that it could aggregate its capacity needs to support the addition of new
31 generation, rather than rely on the market.

1 Q. HOW DO THE COMPANY'S LOAD FORECASTS INFORM DECISIONS RELATED
2 TO HOOT LAKE PLANT?

3 A. Otter Tail forecasts continued load growth. The Company's MISO obligation (non-
4 coincident summer peak demand + transmission losses + reserve margins) for 2017 is
5 795 MW; this is expected to increase to 938 MW by 2031. A significant portion of this
6 load growth is anticipated to result from expansion of pipelines that transport oil from the
7 Bakken Shale in North Dakota and from Canada. While load growth forecasts are
8 inherently uncertain, the need to reliably serve customers with capacity and energy is an
9 additional driver of the need for the Merricourt Project.

10

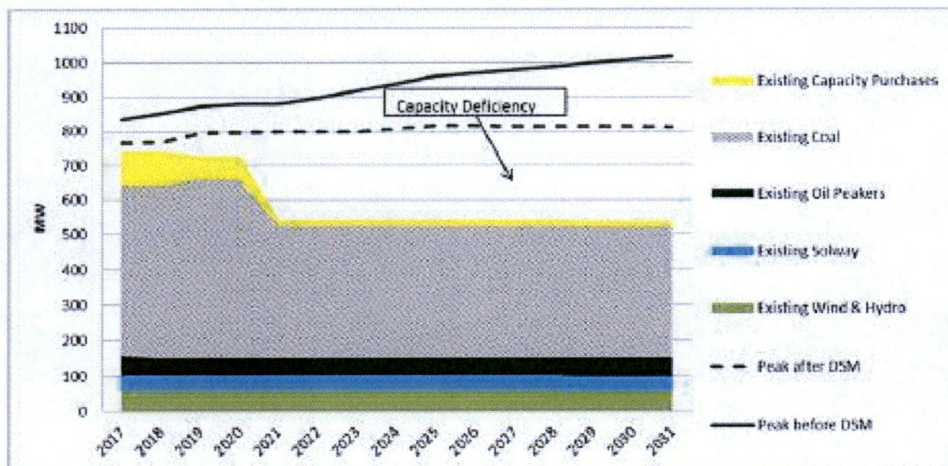
11 Q. ARE THERE AGREEMENTS AFFECTING THE COMPANY'S ANTICIPATED
12 ENERGY NEEDS?

13 A. Yes. In addition to Otter Tail's capacity needs, energy needs will also increase due to the
14 2021 expiration of a 50 MW on-peak energy-only contract. This agreement is separate
15 from the capacity purchase agreements I previously described.

16

17 Q. WHAT DOES THIS CONFLUENCE OF NEED DRIVERS MEAN FOR OTTER TAIL?

18 A. Together, these events require Otter Tail to take action. The Company's current analysis
19 indicates that without replacement capacity and energy, Otter Tail will have a capacity
20 deficit of approximately 273 MW in 2021 and will need to source between approximately
21 26% to 31% of its energy from the MISO market. This capacity deficit is illustrated
22 below:



23

1 In response to these need drivers, Otter Tail needs to install new generation resources.
2

3 **III. ANALYSIS OF OPTIONS TO MEET NEEDS**
4

5 Q. WHAT OPTIONS DID THE COMPANY CONSIDER TO ADDRESS THE NEEDS
6 YOU DESCRIBE ABOVE?

7 A. In its 2013 Resource Plan, Otter Tail analyzed a number of potential resources options,
8 including: (1) a 311 MW combined cycle generator; (2) three different sized simple cycle
9 generators; (3) conversion of Hoot Lake Plant to natural gas-fired generation; and (4)
10 wind and solar resources. As described more fully in the testimony of Company witness
11 Randy Synstelien, the Company used the Strategist resource planning tool to aid in the
12 examination of the various options.
13

14 Q. WHAT DID THE 2013 RESOURCE PLAN MODELLING CONCLUDE WOULD BE
15 THE MOST ECONOMIC CAPACITY RESOURCE?

16 A. The Strategist model concluded that meeting Otter Tail's 2021 capacity need with a
17 simple cycle generator was the most economic capacity resource.
18

19 Q. DID THE COMPANY CONSIDER COMBINED CYCLE GENERATION?

20 A. Yes. Typically, when a utility has a simultaneous capacity and energy need for a portion
21 of its load-serving obligation, it seeks resource additions that provide both capacity and
22 energy at reasonable pricing, generally combined cycle generation. Combined cycle
23 generation has the ability to follow load by ramping up and down throughout the day
24 while providing energy at lower marginal cost than a simple cycle generator and with
25 lower capital cost than a baseload generator. Therefore, the Company considered
26 combined cycle generation.
27

28 The 311 MW combined cycle plant utilized in the Strategist model would have been the
29 smallest unit for Otter Tail to develop on its own consistent with its identified capacity
30 need. As I mentioned, Strategist indicated that this generation addition would not be
31 economic but, rather, that it would be more cost effective to install a capacity resource

1 through a simple cycle generator and source energy elsewhere, either in the MISO
2 markets or through the installation of wind facilities, if pricing was sufficiently attractive.
3 I note that a hybrid approach of wind-plus-gas can more optimally provide many of the
4 same characteristics as combined cycle generation, which I discuss further later in my
5 testimony.

6
7 Q. DID OTTER TAIL CONSIDER REFURBISHING OR OTHERWISE CONTINUING
8 TO OPERATE HOOT LAKE PLANT TO MEET ITS NEEDS?

9 A. Yes. Continued operation of Hoot Lake Plant was considered. However, based on the
10 results of the Baseload Diversification Study, Otter Tail did not pursue continued
11 operation.

12
13 Q. WHAT DID THE 2013 RESOURCE PLAN MODELLING CONCLUDE WITH
14 REGARD TO WIND GENERATION?

15 A. The 2013 modelling results indicated that market purchases should be made to meet the
16 Company's energy needs unless wind generation is priced at or below \$30/MWh, at
17 which point acquiring 150 MW of wind generation in 2021 was the most economic
18 choice to meet Otter Tail's energy needs.

19
20 Q. DID THE COMPANY CONTINUE TO ANALYZE REPLACEMENT SCENARIOS
21 FOR HOOT LAKE PLANT IN SUBSEQUENT RESOURCE PLANNING CYCLES?

22 A. Yes. The Company's 2016 Resource Plan again analyzed a number of scenarios,
23 including combined cycle generation, two sizes of natural gas simple cycle generation,
24 wind, and solar. The 2016 resource planning analysis also included generic simple cycle
25 generation with the characteristics of the Company's proposed Astoria Station and a
26 generic low-priced wind project. The 2016 resource planning analysis confirmed the
27 outcome of the 2013 resource planning cycle, especially in light of forecast load growth
28 from the 2013 to the 2016 planning cycles.

29
30 Q. DID THE 2016 RESOURCE PLAN CONSIDER ACQUIRING ENERGY FROM
31 MARKET SOURCES, RATHER THAN NEW GENERATION FACILITIES?

1 A. At the time of the 2016 resource planning cycle, our assumptions had been updated to
2 account for the extension of the federal Production Tax Credit (PTC) for wind projects
3 and its impact on wind energy pricing. The Company's 2016 resource plan assumed
4 wind energy pricing at approximately \$30/MWh. At this pricing, Strategist again
5 selected a wind and gas combination in all scenarios analyzed.
6

7 Q. WHAT DID THE 2016 RESOURCE PLAN CONCLUDE?

8 A. The 2016 Resource Plan concluded that the least-cost option was a wind-plus-gas
9 configuration: the 2018 addition of 100 MW of wind generation and another 100 MW of
10 wind generation in 2020, plus the 2021 addition of an approximately 248 MW simple
11 cycle natural gas turbine.
12

13 Q. HOW DOES THE WIND-PLUS-GAS CONFIGURATION COMPARE TO OTHER
14 APPROACHES FOR MEETING A SIMULTANEOUS ENERGY AND CAPACITY
15 NEED?

16 A. The combination of low-cost wind and a natural gas-fired simple cycle generator
17 provides many beneficial operating characteristics. The simple cycle component
18 provides relatively low-cost capacity and dispatchable energy. The wind component
19 provides low-cost energy. Wind and natural gas simple-cycle generation have natural
20 synergies. Wind is an intermittent, variable energy resource. Natural gas simple cycle
21 generation demonstrates great flexibility in addressing wind generation's intermittency
22 and variability, inasmuch as it is able to start and achieve full-output in a matter of
23 minutes and is capable of cycling multiple times per day. Consequently, a simple cycle
24 generator can provide load-following capability to support a reliable grid. Backing wind
25 with gas captures the low-cost energy made possible by the current market for wind
26 generation while helping to ensure sufficient reliability through grid support from
27 dispatchable simple cycle generation, which includes low-cost capacity. Simple cycle
28 generation paired with wind is particularly attractive to Otter Tail because the Company's
29 service territory has some of the best wind resources in the country, with low potential for
30 transmission congestion due to the proximity of the wind resource to Otter Tail's load. A

1 wind-plus-gas configuration can provide many of the same economic and operational
2 benefits of a combined cycle plant.

3
4 Q. WHAT ARE SOME OTHER ADVANTAGES OF A WIND-PLUS-GAS
5 CONFIGURATION?

6 A. A wind-plus-gas configuration also has hedge and expansion value. If Otter Tail installed
7 a combined cycle plant, the Company and its customers would have significant exposure
8 to fluctuations in natural gas pricing. Because it will use less gas, a simple cycle plant
9 mitigates that potential exposure. Moreover, a natural gas simple cycle plant site can
10 include sufficient space and design parameters to accommodate the potential future
11 addition of combined cycle generation, if market conditions later warrant it. The wind
12 component can provide low-cost energy from a zero-cost fuel source providing both a
13 market and fuel hedge. And the Company's service area has excellent wind resources,
14 providing an economic generation resource with low potential for transmission
15 congestion due to the resource's proximity to the Company's load.

16
17 Q. IN LIGHT OF THESE NEED DRIVERS, WHAT HAS THE COMPANY
18 CONCLUDED?

19 A. The Company believes that the two-part plan—the Merricourt wind project and Astoria
20 Station—provides least-cost capacity and energy for the Otter Tail system in the most
21 prudent fashion.

22
23 **IV. THE MERRICOURT PROJECT IS PRUDENT**

24
25 Q. HAS THE COMPANY CONTINUED ANALYZING THE PRUDENCE OF THE
26 MERRICOURT PROJECT?

27 A. Yes. After Otter Tail selected the Merricourt Project as the least-cost wind resource
28 available, Otter Tail refined its modelling efforts with specific information related to the
29 Merricourt Project (rather than the generic modelling used previously) to confirm the
30 prudence of moving forward with the Project. This modeling process and its results are
31 described in more detail in the testimony of Company witness Randy Synstelien.

1 Q. WHY DOES THE COMPANY PROPOSE THE 150 MW MERRICOURT PROJECT
2 INSTEAD OF TWO 100 MW WIND PROJECTS AS RECOMMENDED IN THE 2016
3 RESOURCE PLAN?

4 A. The Strategist modelling in the 2016 Resource Plan used generic 100 MW units of wind;
5 it did not have an option for using smaller units and it did not consider specific wind
6 projects. As set forth in more detail in Mr. Synstelien's testimony, after the 2016
7 Resource Plan was completed, the Company continued revising its model to analyze
8 specific wind generation projects. This more targeted analysis concluded that addition of
9 the 150 MW Merricourt Project is the specific project option that comes closest to the
10 generic conclusion reached in the 2016 Resource Plan. Mr. Synstelien discusses how the
11 output of the Merricourt Project will be reasonably close to that of the 200 MW of wind
12 generation selected in the 2016 IRP.

13
14 Q. GIVEN THAT 2021 IS THE YEAR OF HOOT LAKE PLANT'S RETIREMENT, WHY
15 IS THE COMPANY PROPOSING TO DEVELOP THE MERRICOURT PROJECT
16 EARLIER THAN 2021?

17 A. First, although the Company's capacity deficiency becomes most acute by 2021, it will
18 grow years before then. That is one of the reasons the 2016 Resource Plan recommends
19 the addition of wind in 2018 and 2020, rather than waiting until 2021. In addition, by
20 embarking on the Merricourt Project now (resulting in a completion date in the third or
21 fourth quarter of 2019), Otter Tail can capture the highly-competitive pricing made
22 available by the 100% PTC for wind facilities before it expires. The impact of the PTC is
23 described in more detail in the testimony of Company witnesses Randy Synstelien and
24 Harvey McMahan.

25
26 **V. CONCLUSION**

27
28 Q. PLEASE SUMMARIZE YOUR TESTIMONY.

29 A. The Merricourt Project is a least-cost North Dakota generation resource. It is an essential
30 component of a two-part plan to meet our customers' growing needs, replace expiring
31 capacity purchase agreements, and prepare for the 2021 retirement of Hoot Lake Plant.

1 Q. DOES THIS CONCLUDE YOUR PRE-FILED DIRECT TESTIMONY?

2 A. Yes, it does.

3

