



**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

Case No. PU-17-

**DIRECT TESTIMONY
OF
RANDY SYNSTELIEN
ON BEHALF OF
OTTER TAIL COMPANY**

Economic Analysis Testimony

PUBLIC DOCUMENT – NOT PUBLIC DATA HAS BEEN EXCISED

April 10, 2017

- 55 PU-17-143 Filed 10/06/2017 Pages: 16
Exhibit OTP-13 - Direct Testimony of Randy Synsteliien - Public
Otter Tail Power Company
- 51 PU-17-141 Filed 10/06/2017 Pages: 16
Exhibit OTP-13 - Direct Testimony of Randy Synsteliien - Public
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- 46 PU-17-140 Filed 10/06/2017 Pages: 16
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Otter Tail Power Company

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I. INTRODUCTION AND QUALIFICATIONS

1
2
3 Q. PLEASE STATE YOUR NAME AND TITLE

4 A. My name is Randy Synstelien. I am the Principal Resource Planner 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 from Moorhead State University. I have
9 worked for Otter Tail Power Company since 1991. My current job responsibilities as the
10 Principal Resource Planner include ensuring that Otter Tail has sufficient capacity and
11 energy resources to reliably and affordably meet customer needs.
12

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

14 A. The purpose of my testimony is to support the Company's application for an Advance
15 Determination of Prudence (ADP) and Certificate of Public Convenience and Necessity
16 (CPCN) in connection with the 150 MW Merricourt Wind Farm Project (the Merricourt
17 Project or Project). In particular, I first address the levelized cost of the Project. Next, I
18 discuss the analyses performed by Otter Tail through its Integrated Resource Plan (IRP)
19 process. I then address the Company's wind project selection process. Last, I address the
20 impact of adding the Project to the Company's integrated system as a Company-owned
21 asset.
22

23 **II. PROJECT DESCRIPTION AND LEVELIZED COST**
24

25 Q. PLEASE DESCRIBE OTTER TAIL'S PROPOSED RESOURCE ADDITION.

26 A. The Merricourt Project is a 150 MW wind generating facility, which will be located near
27 Merricourt, North Dakota and will interconnect to Montana-Dakota Utilities Company's
28 Merricourt 230 kV substation located southwest of Kulm, North Dakota. The Merricourt
29 Project is one part of the Company's two-part plan to meet our customers' capacity and
30 energy needs by 2021. As discussed by Mr. McMahon, Otter Tail currently estimates the

Project to have capital costs of approximately [NOT PUBLIC DATA BEGINS...
...NOT PUBLIC DATA ENDS].

Q. WHAT IS THE LEVELIZED COST OF THE MERRICOURT PROJECT?

A. Based on Otter Tail's capital cost estimates for the Project, the levelized cost of the Merricourt Project is approximately [NOT PUBLIC DATA BEGINS...
...NOT PUBLIC DATA ENDS] assuming a 25-year useful life.

Q. HOW DID YOU CALCULATE THIS LEVELIZED COST?

A. I used the capital estimates provided by Mr. McMahon to calculate a revenue requirement for the Project based on Otter Tail's currently effective ratemaking requirements. More specifically, a spreadsheet cost of service model was used to determine the annual revenue requirements associated with the Project. The model takes into account the amount of generation expected from the Project, the capital cost of the Project, return on rate base, anticipated operation & maintenance expense, landowner payments, insurance, property tax, interest expenses, and the impact of the full value 100% Federal Production Tax (PTC). I then levelized the annual revenue requirements assuming a 25-year useful life.

III. INTEGRATED RESOURCE PLANNING

Q. PLEASE DESCRIBE OTTER TAIL'S RESOURCE PLANNING APPROACH?

A. The Company's integrated resource planning (IRP) process utilizes generic demand-side and supply-side resources (e.g., energy efficiency/conservation and generation from wind, solar, natural gas, or coal) which are identified as potential components of the Company's preferred resource plan. Once a resource is identified as a part of the preferred plan in the IRP process, Otter Tail then seeks to identify the most cost-effective individual components for the preferred plan.

1 Q. HOW DOES OTTER TAIL UNDERTAKE ITS IRP PROCESS?

2 A. Otter Tail uses resource planning software called Strategist to aid in the resource
3 planning process. The goal of the resource planning process is to develop a single
4 preferred plan, on an integrated system basis, which reliably and economically meets the
5 capacity and energy needs of customers in the three states we serve, while complying
6 with all legal and regulatory obligations and adequately addressing risk. Otter Tail
7 provides service in three states on an integrated system basis, which affords significant
8 benefits to customers due to the economies of scale achieved from planning and
9 integrating generation assets on a larger scale. The resource planning process
10 incorporates the full complement of the Company's existing fleet of generation, bilateral
11 transactions, and demand-side management (DSM) programs, as well as evaluating new
12 resource alternatives to meet customer demand, expiring bilateral transactions, and the
13 anticipated retirement of existing generation resources. The preferred plan is considered
14 under numerous scenarios relating to forecasted fuel prices (i.e., coal and natural gas),
15 market energy prices, market capacity prices, load growth, and resource costs (including
16 both capital and O&M).

17

18 Q. IS THE PROJECT A RESULT OF OTTER TAIL'S IRP PROCESS?

19 A. Yes. In both our 2013 and 2016 IRP processes, we analyzed the impact of low-cost wind
20 and the potential to include it in our preferred plan.

21

22 Q. WHAT WERE THE RESULTS OF THE 2013 IRP PROCESS?

23 A. Our 2013 IRP process indicated it would be cost-effective to add wind to our system to
24 meet system energy needs if wind was priced at or below \$30/MWh.

25

26 Our 2013 IRP model started with the assumption that wind energy was priced at
27 \$45/MWh. At that price, Strategist suggested that it would be more cost effective to
28 source system energy from the Midcontinent Independent System Operator, Inc.'s
29 (MISO) energy market, based on our then-current market pricing assumptions (which we
30 purchased from a third-party vendor and which are considered industry standard data).
31 However, when the Strategist was provided the option of selecting wind energy priced at

1 \$30/MWh, it selected approximately 150 MW of wind energy by 2021 in lieu of MISO
2 energy market purchases.

3
4 In almost every scenario analyzed, the 2013 IRP Process also selected a simple cycle gas
5 generator to meet Otter Tail's needs by 2021. The selection of wind and simple cycle gas
6 generation formed the basis of Otter Tail's two-part plan for resource additions by 2021.

7
8 Q. WHAT WERE THE RESULTS OF THE 2016 IRP PROCESS?

9 A. Our 2016 IRP process confirmed the results of the 2013 IRP analyses. Strategist
10 continued to select a wind-plus-gas configuration, with up to 200 MW of wind and
11 approximately 250 MW of simple cycle gas generation by 2021.

12
13 Q. PLEASE DESCRIBE SOME OF THE SPECIFIC WIND ASSUMPTIONS USED IN
14 THE 2016 IRP AND THE MODELING RESULTS.

15 A. In the 2016 IRP, Otter Tail modeled generic 100 MW wind projects. The generic wind
16 projects were modeled as 20-year fixed price PPAs. The wind pricing reflected the
17 impact of the federal PTC, which is scheduled to be phased-out over the next several
18 years. The table below shows the impact of the PTC phase-out and the base wind energy
19 pricing modeled in the 2016 IRP.

20

Construction start	COD by end of	First full year of operation	PTC level	PPA base price (\$/MWh)
2016	2020	2021	100%	\$30.00
2017	2021	2022	80%	\$34.00
2018	2022	2023	60%	\$39.00
2019	2023	2024	40%	\$44.00
2020	2024	2025	0%	\$58.00

21
22 Projects that start construction by the end of 2016 and reach commercial operation by the
23 end of 2020 are eligible to receive the full 100% value of the PTC. The "full value PTC"
24 projects were modeled at \$30/MWh for the entire 20-year planning horizon. The 2016
25 IRP modelled 58 sensitivities. The amount of wind selected varied between 100 MW and
26 600 MW. The table below shows the number of sensitivities and the quantity of wind

1 chosen at the various PTC levels. As expected, more expensive wind energy is less likely
 2 to be selected as part of the least-cost plan.
 3

100 MW of 100% PTC wind	100 MW total wind	58 of 58 sensitivities
200 MW of 100% PTC wind	200 MW total wind	57 of 58 sensitivities
100 MW of 80% PTC wind	300 MW total wind	39 of 58 sensitivities
100 MW of 60% PTC wind	400 MW total wind	30 of 58 sensitivities
100 MW of 0% PTC wind	500 MW total wind	2 of 58 sensitivities
200 MW of 0% PTC wind	600 MW total wind	1 of 58 sensitivities

4
 5 Q. DO THESE IRP RESULTS REFLECT THE USE OF EXTERNALITY VALUES?

6 A. No. North Dakota law prohibits the consideration of externality values when analyzing
 7 the prudence of a proposed resource addition.
 8

9 One of the key policy differences between the states we serve is the use of externality
 10 values in the resource planning process. As a result of this difference, the Company
 11 performs a full of suite of sensitivities with externality values, as required in Minnesota,
 12 and a full suite of sensitivities without externality values, as required in North Dakota.
 13 The main difference in outcomes from these sensitivities was the quantity of generic
 14 wind resources selected. With externality values applied, 31 modeling runs selected
 15 between 400 MW and 600 MW of generic wind. Without externality values applied, 26
 16 modeling runs selected between 200 MW and 300 MW of generic wind. Our Company's
 17 preferred plan calls for only 200 MW of wind.
 18

19 Q. HOW DOES THE MERRICOURT PROJECT COMFORM WITH THE PREFERRED
 20 PLAN IF IT IS ONLY 150 MW?

21 A. Our IRP process generally analyzes generic resource additions. With respect to wind,
 22 Strategist was allowed to select generic wind resources only in 100 MW increments as
 23 part of our 2016 IRP. The results of the IRP indicated that adding up to 200 MW of wind
 24 by 2021 would be the most cost effective way to meet Otter Tail's energy needs. As I
 25 discuss further below, executing on the preferred plan requires Otter Tail to evaluate
 26 actual, rather than generic, wind resource additions available. Through our selection
 27 process, we identified the Merricourt Project as the least-cost wind addition available to

1 the Company. At 150 MW it is consistent with the Strategist results indicating wind is a
2 least-cost energy resource consistent with the generic results of our IRP modeling.

3
4 Based on the expected net capacity factor of the Merricourt Project, we anticipate that it
5 will generate approximately 666,000 MWh of energy a year. Under the assumptions
6 utilized in our IRP modelling, the 200 MW of wind selected in our 2016 IRP was
7 modelled as having an output of approximately 700,000 MWh of energy per year. By
8 harvesting North Dakota's excellent wind resources, the Merricourt Project at 150 MW
9 can produce nearly as much energy as the 200 MW of generic wind resource included in
10 our 2016 IRP model.

11
12 Q. IS THE AVAILABILITY OF THE PTC A DRIVER FOR THE RESOURCE
13 ADDITION?

14 A. Yes. The availability of the federal PTC drives down the overall cost of wind generation
15 to a level that makes it a least-cost and prudent energy source. Without the federal PTC,
16 our IRP results indicate that it would be more cost-effective for Otter Tail to source its
17 energy from the MISO energy markets in almost all scenarios analyzed. However, doing
18 so would also expose the Company's customers to material energy market price risk.

19
20 Q. PLEASE DESCRIBE HOW CONGRESSIONAL ACTION WILL RESULT IN PHASE-
21 OUT OF THE PTC OVER THE NEXT SEVERAL YEARS.

22 A. Originally enacted in 1992, the PTC has been renewed and expanded numerous times,
23 most recently by the Consolidated Appropriations Act, 2016 (H.R. 2029, Sec. 301) in
24 December 2015.

25
26 Action by Congress in December 2015 will phase down the value of the PTC for wind
27 facilities commencing construction after December 31, 2016. The phase-down will occur
28 annually in the following increments:

- 29 • For wind facilities commencing construction in 2017, the PTC amount is reduced
30 by 20%;

1 A. Yes. This approach has been used in the Company's previous wind resource additions
2 and has proven to be a cost-effective and flexible process that allows the Company to act
3 on opportunities in the wind space when the PTC is available to benefit customers. This
4 flexibility has allowed the Company to secure projects that maintain Otter Tail's
5 historically low electric rates. In this instance, the approach will again allow our
6 customers to realize the benefit of the full value PTC.

7
8 Q. IS THE DECISION TO ADD ADDITIONAL WIND BASED UPON ECONOMICS?

9 A. Yes. For Otter Tail, the decision to add wind is purely driven by economics. The
10 decision to add wind from the Project is not driven by Otter Tail's compliance obligations
11 for Minnesota's renewable energy standard. Instead, we are prudently planning least-cost
12 generation resource additions for all of our customers in the three states we serve.

13
14 Q. ARE THERE OTHER DRIVERS OF THE DECISION TO ADD WIND TO THE
15 OTTER TAIL SYSTEM?

16 A. Yes. Our IRP analyses indicate that the Project will primarily displace MISO market
17 purchases, thereby providing a key hedge against energy market price volatility. In fact,
18 without the Project, Otter Tail estimates that between 26% and 31% of its energy needs
19 would be sourced from the MISO market, imposing significant market exposure on
20 customers. As I describe further below, the addition of the Merricourt Project will bring
21 our customer's exposure to energy market price volatility down to between 16% and
22 20%.

23
24 **V. ECONOMIC IMPACT OF THE RESOURCE ADDITION**

25
26 Q. HAS OTTER TAIL ANALYZED THE ECONOMIC IMPACT OF THE PROJECT?

27 A. Yes. To determine if the Project had a favorable economic impact on the Company's
28 customers, we analyzed a number of scenarios and compared them to our base case (i.e.,
29 without any resource additions).

30
31 Q. WHAT WERE THE RESULTS OF OTTER TAIL'S ANALYSIS?

1 A. In all scenarios analyzed, the addition of the Merricourt Project lowered overall system
2 costs. Depending on the scenario analyzed, cost savings were in the range of
3 approximately \$112 million to \$152 million on a present value of revenue requirement
4 (PVRR) basis.

5 Q. WHAT SCENARIOS WERE ANALYZED?

6 A. Otter Tail analyzed four scenarios.

7

8 The first scenario simply compared the addition of the Merricourt Project to the base
9 case, which does not include this resource. This isolates the direct impact of the
10 Merricourt Project.

11

12 The second scenario analyzed the impact of the Company's two-part plan by comparing
13 the addition of both the Merricourt Project and Astoria Station to the base case, which
14 does not include these resources. This scenario analyzes the economic impact of the
15 Company's wind-plus-gas approach to meeting energy and capacity generation needs.

16

17 The third scenario analyzed the impact of the Company's two-part plan compared to the
18 base case but utilizing a high capital sensitivity. As discussed by Mr. McMahon, there is
19 still considerable uncertainty regarding certain cost contingencies for the Merricourt
20 Project. Consequently, Otter Tail wanted to determine if the Merricourt Project would
21 remain cost-effective if those contingencies arose. To that end, Otter Tail analyzed a
high capital sensitivity of [NOT PUBLIC DATA BEGINS...

24

...NOT PUBLIC DATA ENDS].

25

26 The fourth scenario analyzed the impact of the Company's two-part plan compared to the
27 base case, but utilizing a 40-year life for the Merricourt Project. As Mr. McMahon
28 discusses, due to the evolution of wind generation technology, Otter Tail explored the
29 potential for extending the life of the Merricourt Project to 40 years and analyzed the
30 economic impact of doing so.

31

1 Q. HOW WAS THE BASE CASE ESTABLISHED?

2 A. To assess impacts, Otter Tail established a baseline that assumes the retirement of Hoot
 3 Lake Plant in 2021, the expiration of bilateral capacity and energy purchases that the
 4 Company currently utilizes, and the addition of no new resources. The resulting plan has
 5 a considerable amount of energy and capacity purchased at forecasted market prices.
 6

7 Q. PLEASE SUMMARIZE THE RESULTS OF THE COMPANY’S ANALYSIS.

8 A. The table below identifies the PVRR impacts of the different scenarios analyzed.
 9

Scenario	Present Value Utility Costs (000)	Difference from Base
Base Case (Market energy and capacity purchases)	2,375,341.80	
Base plus Merricourt	2,262,374.00	-112,967.80
Base plus Astoria and Merricourt	2,238,187.50	-137,154.30
Base plus Astoria and Merricourt High Capital case	2,251,998.80	-123,343.00
Base plus Astoria and Merricourt 40 year life	2,223,324.00	-152,017.80

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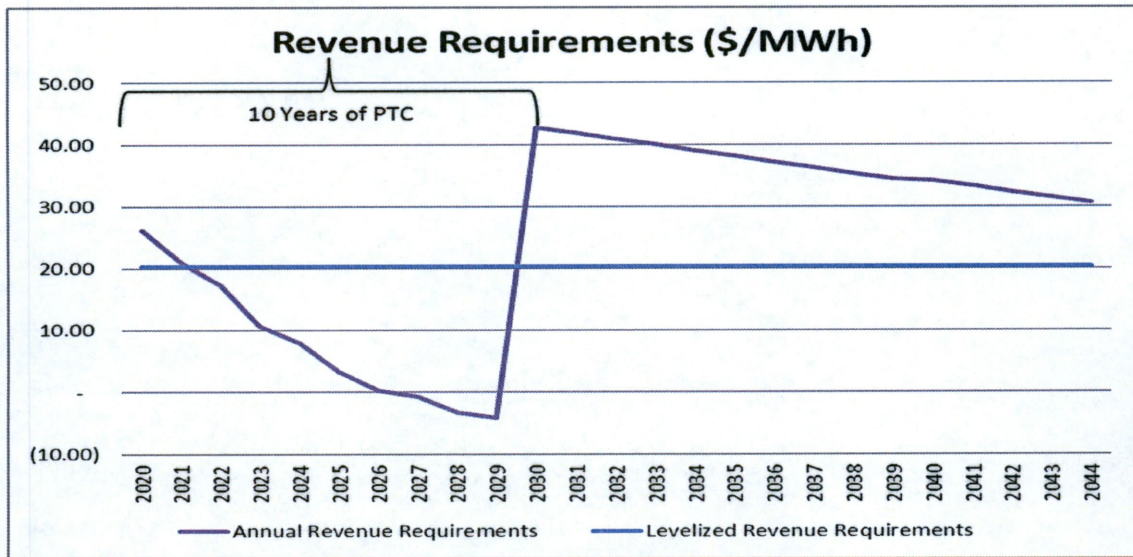
12 Q. DO THE IMPACTS OF THE PROJECT CHANGE OVER TIME?

13 A. Yes. The nature of Company ownership of the Merricourt Project means that the impact
 14 to customers will vary over time. There will be a slight increase in rates when the Project
 15 is placed in service and then savings will begin shortly thereafter as the PTC is used.
 16 When the PTC (which is available for ten years) has been fully used by 2029, rates will
 17 increase but cost savings compare favorably to the base case.
 18

18

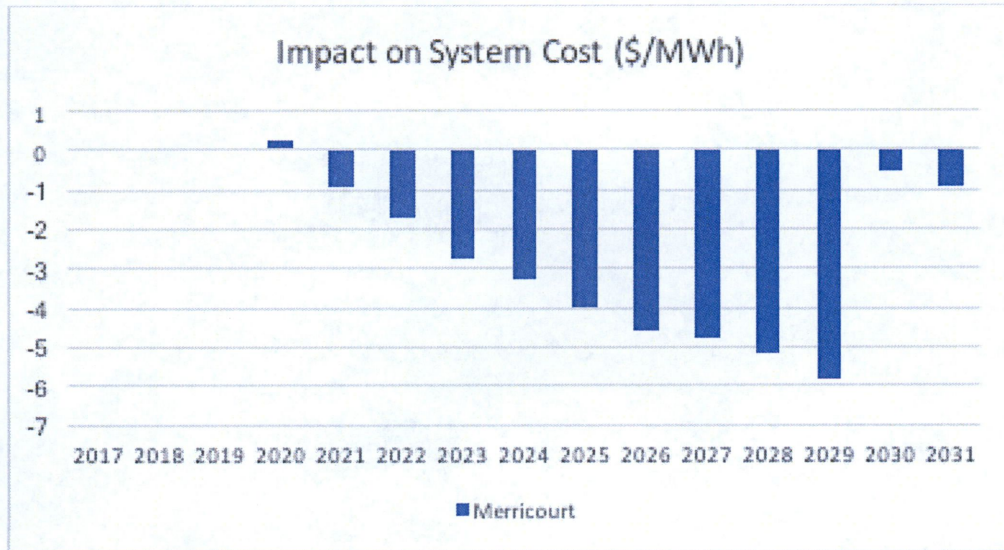
19 The chart below shows the revenue requirements curve for the Project.
 20

20



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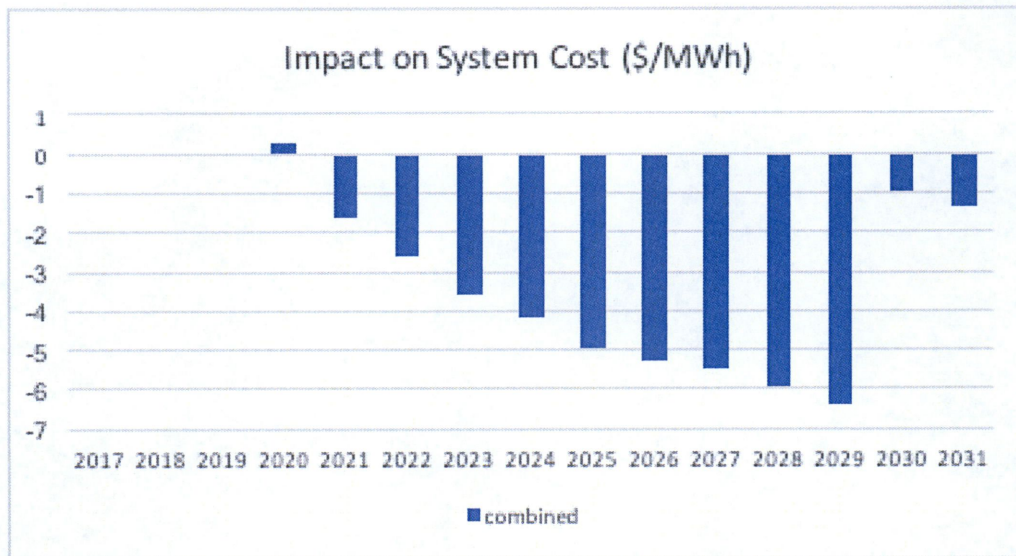
The chart below shows the cost impact of the Project on an annual basis compared to the base case. As shown, cost savings will begin in 2021 and continue through the life of the Merricourt Project.



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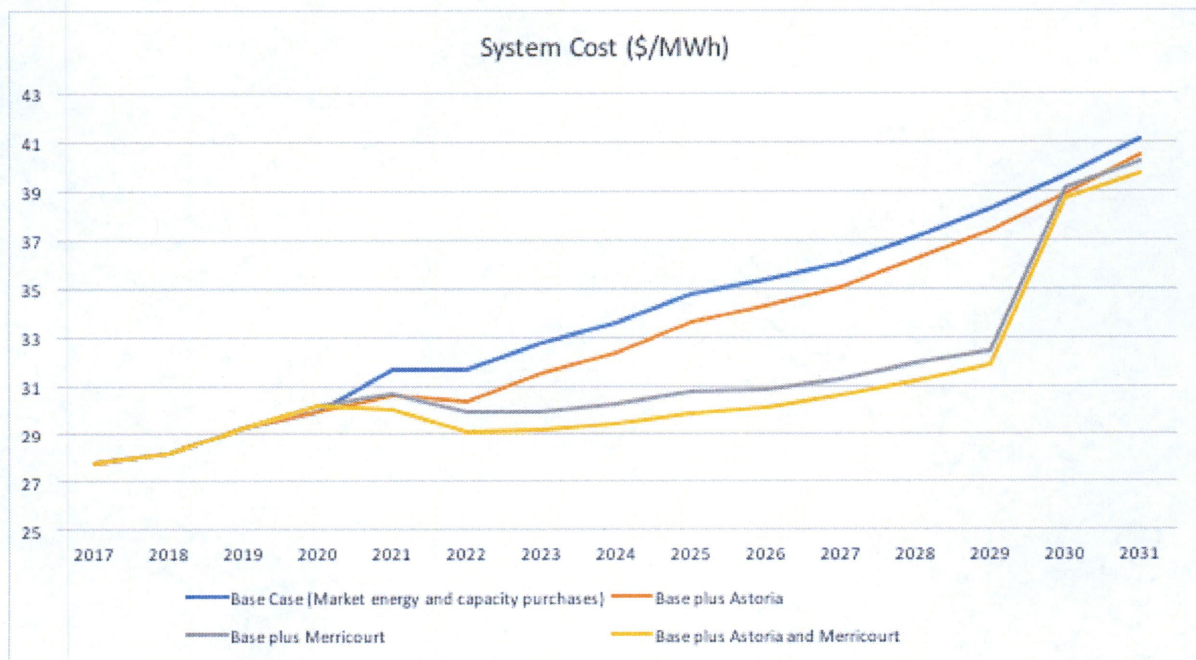
Q. HAS OTTER TAIL ANALYZED THE ANNUAL COST IMPACT FOR ITS TWO-PART PLAN?

A. Yes. The chart below shows the annual cost impact for the combined addition of the Merricourt Project and Astoria Station when compared to the base case.



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The chart below illustrates the annual cost impact of each scenario when compared to the base case.



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Q. WHAT DO YOU CONCLUDE FROM THESE ANALYSES?

A. The Merricourt Project alone – and as part of the Company’s two-part plan – is cost-effective in all scenarios analyzed.

1

2

VI. CONCLUSION

3

4 Q. DOES THIS CONCLUDE YOUR TESTIMONY?

5 A. Yes, it does.

6

7

STATE OF NORTH DAKOTA
PUBLIC SERVICE COMMISSION

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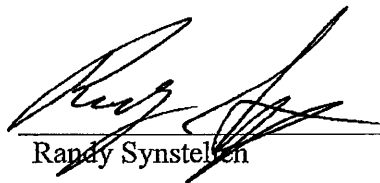
Case No. PU-17-___

VERIFICATION

STATE OF MINNESOTA)
) ss.
COUNTY OF OTTER TAIL)


Randy Synstelien, being first duly sworn on oath, deposes and says that he is the Principal Resource Planner for Applicant Otter Tail Power Company; that the testimony and schedules submitted in the above-captioned matter under his name were prepared under his direction; and that he knows and verifies the contents thereof, and that the same is true and correct to the best of his knowledge and belief.

Dated this 10 day of April, 2017



Randy Synstelien

Subscribed and sworn to before
me on this 10 day of April, 2017.



Notary Public
My Commission expires 1-31-22

