

Before the North Dakota Public Service Commission  
State of North Dakota

In the Matter of the Application of Otter Tail Power Company  
For Advance Prudence on the Astoria Station Onsite  
Fuel Inventory System in North Dakota

Case No. PU-23-

Exhibit \_\_\_\_

**ASTORIA STATION PROJECT**

Direct Testimony

**KIRK A. PHINNEY**

**PUBLIC DOCUMENT – NOT PUBLIC  
(OR PRIVILEGED) DATA HAS BEEN EXCISED**

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Prefiled Direct Testimony of Kirk A. Phinney - redacted  
Otter Tail Power Company  
Cary Stephenson, Assoc. Gen. Counsel

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1 **I. INTRODUCTION AND QUALIFICATIONS**

2 Q. PLEASE STATE YOUR NAME AND OCCUPATION.

3 A. My name is Kirk A. Phinney. I am the Manager, Supply Engineering. Part of my  
4 duties include being the Project Manager of the Astoria Station Onsite Fuel  
5 Storage Project (Project) for Otter Tail Power Company (Otter Tail or Company).  
6

7 Q. PLEASE SUMMARIZE YOUR QUALIFICATIONS AND EXPERIENCE.

8 A. I have a Bachelor of Science Degree in Mechanical Engineering from South  
9 Dakota School of Mines and Technology. I have worked in the power generation  
10 business for 20 years and for Otter Tail for 18 years. I was the project manager of  
11 the Astoria Station project, where my responsibility was executing the project  
12 from construction to commercial operation. I have experience with coal-fired  
13 generation as a plant engineer at Coyote Station and Big Stone Power Plant and  
14 was the Principal Engineer, and later, the Commissioning Manager, for the Big  
15 Stone Air Quality Control System (AQCS) project. In my current role at Otter  
16 Tail, I provide support to various generation assets within Otter Tail's Energy  
17 Supply Department.  
18

19 **II. PURPOSE & OVERVIEW OF TESTIMONY**

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

21 A. The purpose of my testimony is to support the Company's application for an  
22 Advance Determination of Prudence (ADP) for the Project. In particular, I  
23 describe:

- 24
- The Project and associated facilities;
  - Otter Tail's approach to development, engineering, procurement  
26 and construction of the Project; and
  - The proposed schedule and estimated costs of the Project.
- 27  
28

1 **III. DESCRIPTION OF PROJECT**

2 Q. PLEASE DESCRIBE ASTORIA STATION.

3 A. Astoria Station is a 250 MW natural gas-fired, frame-style, simple cycle  
4 combustion turbine generation facility near Astoria, South Dakota that was  
5 placed into service in early 2021. Astoria Station has quick-start capability to  
6 serve a load-following function and provide for peak capacity. Astoria Station  
7 includes all associated facilities, including a short segment of natural gas pipeline  
8 necessary to interconnect to the Northern Border Pipeline, and a generation-tie  
9 line interconnecting Astoria Station to the Big Stone South-Brookings County  
10 345 kV electric transmission line.

11

12 Q. HOW IS ASTORIA STATION FUELED?

13 A. Astoria Station is fueled by natural gas from the Northern Border Pipeline.

14

15 Q. DID OTTER TAIL SEEK AN ADVANCED DETERMINATION OF PRUDENCE  
16 FROM THE COMMISSION FOR ASTORIA STATION?

17 A. Yes, Otter Tail received an ADP in Case No. PU-17-140.

18

19 Q. IS THERE ANY FUEL STORAGE CAPABILITY CURRENTLY AT ASTORIA  
20 STATION?

21 A. No. We currently lack the ability to store any kind of fuel on site.

22

23 Q. PLEASE DESCRIBE THE PROJECT.

24 A. In this Application we propose adding an onsite fuel inventory system at Astoria  
25 Station utilizing liquefied natural gas (LNG.) The Project will provide Astoria  
26 Station a LNG storage tank and the required pumps and vaporizers to convert the  
27 liquid to a gas. The vaporized gas will be delivered to the turbine via the same  
28 onsite route as pipeline natural gas.

29

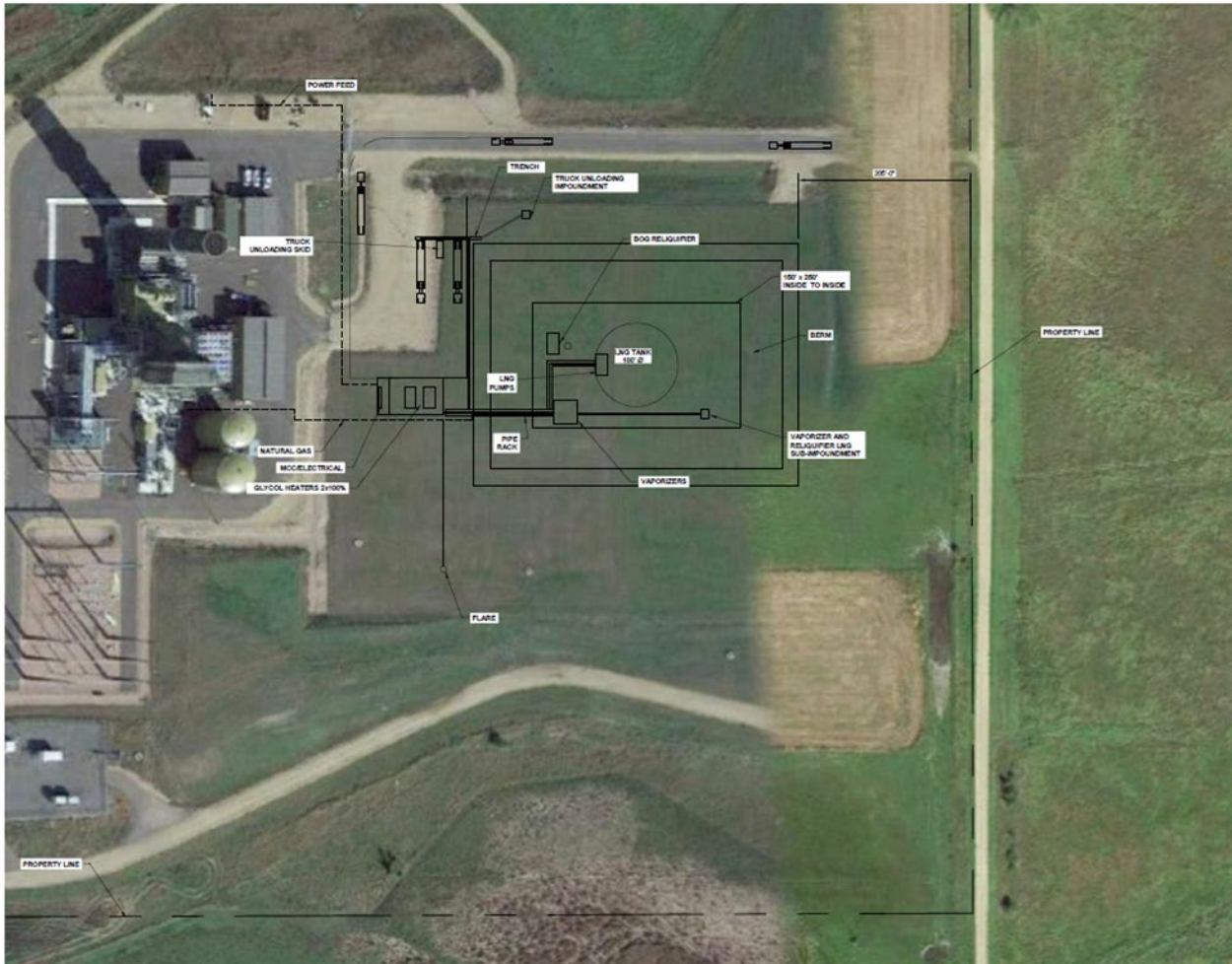
30 Q. WHERE WILL THE PROJECT BE LOCATED?

31 A. The new equipment and systems will be installed on the Astoria Station property  
32 Otter Tail currently owns. Figure 1, which is part of our Application, is the  
33 current proposed layout of the Project.

34

1

FIGURE 1: ASTORIA STATION SITE LAYOUT



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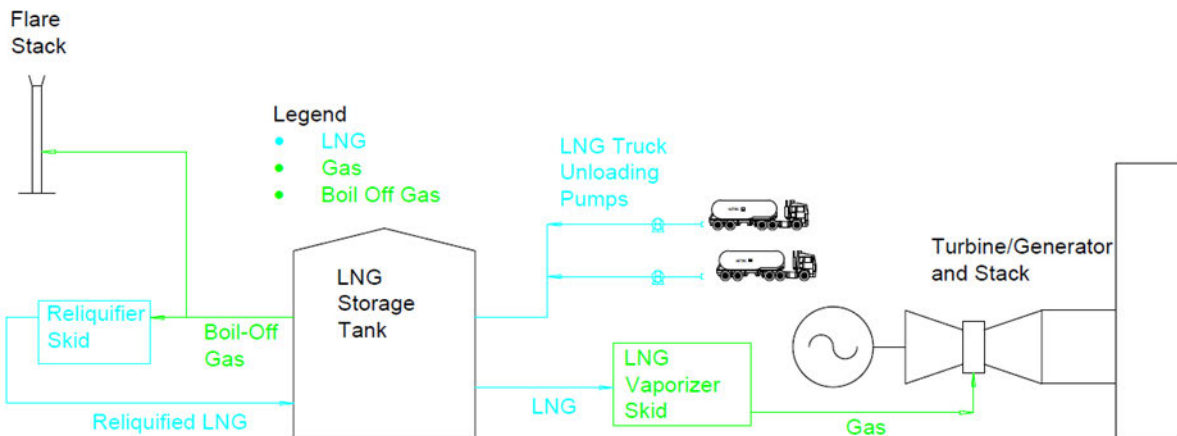
4 Q. WHAT ARE THE KEY COMPONENTS OF THE PROJECT?

5 A. Key components for onsite LNG storage include (1) an LNG truck unloading  
6 facility, (2) a 5-million-gallon LNG storage tank, and (3) a forwarding pump and  
7 vaporizer to convert the LNG to conditions suitable for the existing combustion  
8 turbine. Other systems associated with the Project are secondary containments  
9 in the event of a LNG release, fire protection systems, LNG boil off gas reliquifier,  
10 and all required electrical systems.

11

1 Q. PLEASE DESCRIBE HOW LNG WOULD BE USED AT ASTORIA STATION?  
2 A. Figure 2: LNG Process Diagram, which is part of our Application, provides a  
3 simple illustration of the LNG process. Similar to all peak-shaving natural gas  
4 facilities, Astoria Station will utilize an LNG storage tank and the required pumps  
5 and vaporizers to convert the liquid to a gas. The vaporized gas will be delivered  
6 to the turbine via the same onsite route as pipeline natural gas. Since vaporized  
7 LNG is like pipeline natural gas, combustion turbine modifications will not be  
8 required, and combustion turbine operation will remain the same.

9  
10 **FIGURE 2: LNG PROCESS DIAGRAM**



11  
12 Q. IS THERE A DIFFERENCE BETWEEN THE PROJECT AND OTHER PEAK  
13 SHAVING NATURAL GAS FACILITIES?  
14 A. Yes. One difference between Astoria’s LNG project and large peak-shaving  
15 natural gas facilities is that Otter Tail does not intend to install equipment to  
16 liquify pipeline natural gas onsite. Otter Tail evaluated onsite liquefaction and  
17 could not justify the added cost. This is mainly due to the frequency at which  
18 Otter Tail assumes LNG will be used. LNG will be trucked to site and will be  
19 procured under a long-term agreement that will be competitively bid.

1 Q. WHY HAS THE COMPANY ELECTED TO USE LNG INSTEAD OF OTHER  
2 FUEL?

3 A. Otter Tail introduced an onsite fuel project for Astoria Station in our North  
4 Dakota Integrated Resource Plan filing in Case No. PU-21-380. At the time of  
5 that filing we focused on fuel oil as a secondary fuel type to be stored onsite at  
6 Astoria Station. Since then, we completed an evaluation of fuel type and  
7 determined LNG to be the preferred onsite fuel source.

8  
9 Q. HOW DO YOU EVALUATE FUEL SOURCES?

10 A. To determine the most cost-effective dual fuel source for Astoria Station,  
11 conceptual designs and cost estimates were developed for a fuel oil project and a  
12 LNG project. Otter Tail retained Sargent & Lundy to develop the fuel oil design  
13 and cost estimate and to complete the economic analysis between fuel oil and  
14 LNG. For LNG, Otter Tail retained HDR, Inc., to develop the design and cost  
15 estimate. HDR, Inc., has experience in estimating and supporting recent LNG  
16 projects. After the conceptual designs and cost estimates were completed a net  
17 present value comparison was used to determine which fuel source would have  
18 the lowest cost over a 30-year life.

19  
20 Q. PLEASE DESCRIBE SOME OF THE KEY DESIGN ASSUMPTIONS.

21 A. The conceptual design criteria included five days of onsite fuel storage based on  
22 Astoria Station's maximum winter capacity of 286 megawatts (MWs). Another  
23 base assumption was that the fuel stored at Astoria Station would be completely  
24 consumed once every four years.

25  
26 Q. WHAT WAS THE OUTCOME OF THE EVALUATION?

27 A. LNG was determined to have a lower cost than fuel oil over a 30-year life using a  
28 net present value comparison. Compared to fuel oil, LNG has lower initial capital  
29 cost, lower O&M costs, and lower fuel cost. In addition to lower overall costs,  
30 LNG does not have the emissions, capacity, or operational drawbacks or  
31 limitations that have been identified with fuel oil as a secondary fuel.

32

1 **IV. PROJECT MANAGEMENT & SCHEDULE**

2 Q. HOW WILL THE PROJECT BE MANAGED?

3 A. The Project will be developed and managed by Otter Tail, which has significant  
4 experience in managing large utility projects, including Astoria Station and the  
5 Big Stone Plant Air Quality Control System. Otter Tail has obtained a third-party  
6 engineer to perform the front-end engineering and design necessary to obtain all  
7 necessary permits and regulatory approvals. In conjunction with supporting  
8 permitting and regulatory approvals, the same engineer will also develop an  
9 Engineering, Procurement, and Construction (EPC) contractor bid package.  
10 Ultimately the EPC contractor will have responsibility for schedule and cost as it  
11 relates to the detailed design, procurement administration, erection, and  
12 commissioning of all project components.

13

14 Q. HOW WILL LNG BE PROCURED?

15 A. As part of the conceptual design development, we evaluated producing LNG  
16 onsite versus having LNG delivered to site via truck. We determined that truck  
17 deliveries are more economical. The source for Astoria Station's LNG is expected  
18 to be existing natural gas peak-shaving facilities that have onsite liquefaction.  
19 Otter Tail will issue a LNG supply agreement bid package to LNG distributors.  
20 Those distributors work with existing gas peak-shaving facilities to obtain LNG  
21 for customers and are also responsible for the delivery of LNG.

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23 Q. WHAT IS THE SCHEDULE PLANNED FOR THE PROJECT?

24 A. The following is the planned schedule to complete the project:

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**Table 1: Construction Schedule.**

<b>Activity</b>	<b>Schedule Estimate</b>
Receive Engineering, Procurement & Construction Proposals	July 2023
Receive LNG supply proposals	August 2023
Obtain permits and regulatory approvals	September 2023
Begin construction	March 2024
In-Service	December 2026

Q. PLEASE EXPLAIN HOW THE COMPANY INTENDS TO AVOID PROJECT DELAY RISK.

A. The Company is pursuing Project permitting and regulatory approvals and performing sufficient engineering to define project components. Performing these activities prior to the EPC procurement will mitigate project development delay risk. The current project construction schedule is based on information provided by LNG EPC contractors and engineering firms. Equipment lead times and construction schedules will be a part of Otter Tail’s evaluation when it competitively bids the EPC contract, and the EPC contract will ultimately include delay liquidated damages.

Q. WHAT SITE-RELATED PERMITS AND REGULATORY APPROVALS ARE REQUIRED?

A. As part of the original Astoria Station project, Otter Tail obtained an Energy Conversion Facility Permit (ECFP) from the South Dakota Public Utilities Commission and air emissions and water appropriations permits from the South Dakota Department of Agriculture and Natural Resources. The onsite fuel storage project operations fall within current permit conditions. However, Otter Tail will submit supplemental and amended information for the existing ECFP for review and approval and will obtain an air emissions construction permit. Any LNG-specific approvals are expected to be a part of the same South Dakota review and approval process.

1 **V. ESTIMATED PROJECT COST**

2 Q. WHAT IS THE ESTIMATED COST OF THE PROJECT?

3 A. The current cost estimate to complete the Project as described above is  
4 **[PROTECTED DATA BEGINS... ..PROTECTED DATA**  
5 **ENDS]**. A further breakdown of the project cost is:  
6

7 **TABLE 1: Project Cost Estimates**

8 **[PROTECTED DATA BEGINS...**


9 **...PROTECTED DATA ENDS]**

9

10

11 Q. ARE THESE COSTS FINAL?

12 A. No. These are initial cost estimates based on the best information now available  
13 and are provided in advance of the commencement of the bidding and  
14 procurement process for the Project. Given this stage of development the  
15 Company’s initial cost estimate includes a reasonable contingency.  
16

16

17 Q. WHAT WILL THE COMPANY DO IF COSTS CHANGE?

18 A. Consistent with N.D.C.C. § 49-05-16(3), Otter Tail will provide Project updates  
19 throughout the Project’s development as may be directed by the Commission.  
20

20

21 Q. PLEASE EXPLAIN HOW THE COMPANY’S APPROACH WILL ADDRESS  
22 CONSTRUCTION COST OVERRUN RISK.

23 A. Otter Tail is performing sufficient engineering to define project components that  
24 will be included in the competitively bid EPC contract. This will allow the EPC  
25 bidders to provide accurate and complete proposals for Otter Tail to evaluate.

1 Otter Tail will require the EPC bidders to provide firm pricing that will ultimately  
2 be the basis for a fixed price contract.

3

4 Q. IS IT REASONABLE FOR THE COMMISSION TO GRANT AN ADP BASED ON  
5 PRELIMINARY ESTIMATES?

6 A. Yes. In the Application and supporting testimony the Company provides a  
7 detailed and reasoned justification for moving forward with a LNG onsite fuel  
8 storage system. Otter Tail has also demonstrated sufficient due diligence and put  
9 forth a reasonable project cost estimate and project execution plan.

10 **VI. CONCLUSION**

11 Q. DOES THIS CONCLUDE YOUR TESTIMONY?

12 A. Yes, it does.

13

