

STATE OF NEW HAMPSHIRE
BEFORE THE
PUBLIC UTILITIES COMMISSION

Re: Petition of Pennichuck East Utility, Inc. for Approval of Financings
Under the State Revolving Loan Fund for
Water Supply Development and Water Main Replacement in the Locke Lake
Community Water System
DW 18-__

DIRECT PREFILED TESTIMONY OF JOHN J. BOISVERT

August 28, 2018

Professional and Educational Background

Q. What is your name and what is your position with Pennichuck East Utility, Inc.?

A. My name is John J. Boisvert. I am the Chief Engineer of Pennichuck Water Works, Inc. (“PWW”), which provides services to Pennichuck East Utility, Inc. (“PEU” or the “Company”) pursuant to a management allocation agreement. I have worked for PWW since February 1, 2006. I am a licensed professional engineer in New Hampshire and Maine.

Q. Please describe your educational background.

A. I have a Bachelor of Science degree and a Master of Science degree in Civil Engineering from the University of New Hampshire in Durham, New Hampshire. I also have a Master’s degree in Environmental Law and Policy from Vermont Law School in South Royalton, Vermont.

Q. Please describe your professional background.

A. Prior to joining PWW, I served as a Team Leader for Weston & Sampson Engineers of Portsmouth, New Hampshire in their Water Practices Group from 2000 to 2006. Prior to Weston & Sampson, I was employed by the Layne Christensen Company of Shawnee Mission, Kansas as Regional Manager for their Geosciences Division in Dracut, Massachusetts from 1994 to 2000. I completed graduate school in 1992 and was employed by Hoyle, Tanner, & Associates of Manchester, New Hampshire as a Project Engineer from 1992 to 1994. Prior to entering full time graduate programs at the University of New Hampshire and Vermont Law School, I was employed by Civil Consultants of South Berwick, Maine as a Project Engineer from 1986 to 1989 and by

Underwood Engineers of Portsmouth, New Hampshire as a project Engineer from 1985 to 1986.

Q. What are your current responsibilities as Chief Engineer?

A. As Chief Engineer, I am responsible for the planning, design, permitting, construction, and startup of major capital projects, including pipelines, reservoirs/dams, building structures, pumping facilities, treatment facilities, and groundwater supplies. I provide regular technical assistance to PWW's Water Supply Department, Operations Department, Customer Service Department, and Senior Management.

Q. What is the purpose of your testimony?

A. I will be describing three proposed Company projects at the Locke Lake Community Water System.

The Three Projects are:

- A. Surface Water Supply Development.
- B. Airstrip Well Interconnection and Alternative Treatment.
- C. Georgetown Drive Water Main Replacement.

The Company is seeking approval to finance all three projects with the proceeds of loans issued by the New Hampshire Department of Environmental Services ("NHDES") through the State Revolving Fund ("SRF"). Please see Exhibit JJB-1 for the NHDES letter offering SRF Loan funds for these projects. All three projects will be described later in this testimony.

Q. What are the terms of the SRF loans?

A. The NHDES is offering the following loan amounts and terms:

Term: 20 years

Interest Rate: up to 2.704%

Q. Could you please describe each project?

A. Each Project will be discussed in detail below.

Surface Water Supply Development

Using Locke Lake as a seasonal surface water source is the only reasonably available source alternative the Company has been able to find in order to meet the overall current and future demand for its Locke Lake community water system. The need to develop additional source capacity for this water system has been understood for some time. As a result, the Company has made significant investments since 2006 to manage demand and supply. These investments include:

- Decrease system leakage and improve reliability (numerous pipeline replacement projects throughout the system infrastructure),
- Manage supply and demand (by adding storage capacity),
- Deepened and reconditioned Well #13,
- Added Well #15, and
- Performed geologic and hydrologic evaluations to identify additional water sources in the Locke Lake system.

In spite of these investments and evaluations, the completed work still left Locke Lake without sufficient capacity to meet domestic water demand on a consistent basis (water had to be trucked in from another system on several occasions.) The lack of sufficient supply resulted in the NHDES issuing a Significant Deficiency notice to the Company, in the Sanitary Survey dated January 9, 2017. Please see Exhibit JJB-2 for a copy of the Sanitary Survey. In response, the Company prepared and submitted a Corrective Action

Plan (“CAP”) to the NHDES on March 3, 2017. Please see Exhibit JJB-3 for a copy of the CAP, including updates. The CAP was approved by the NHDES and the Company accelerated efforts to investigate potential groundwater sources in 2017. In 2012, the Company, understanding the need to develop additional source capacity, in addition to replacing failing infrastructure, hired the groundwater consulting firm Hydro Source Associates (“HSA”) of Ashland, NH to investigate groundwater potential in the greater Locke Lake/Barnstead area. HSA issued a report on October 31, 2012 with their findings and recommendations. Please see Exhibit JJB-4. The report presented several locations in the greater Locke Lake area with “potential” for further groundwater investigation and possible well development. HSA prefaced each potential location as “A” high potential, “B” moderate potential, and “C” low potential. “A” locations were generally associated with sand and gravel deposits along the Suncook River, several miles south of Lock Lake. “B” locations were scattered throughout the study area and were generally associated with bedrock features/structures more favorable to well development. “C” locations were isolated possibilities, as the locations did not appear to be associated with more regional geologic features (fractures and faults). Company engineering staff evaluated the locations identified by HSA and selected the “B” locations in close proximity to the Locke Lake system, as properties to evaluate based on various criteria, including assess private land ownership, accessibility for HSA personnel to perform field geophysics, accessibility for well drilling equipment should geophysics confirm/identify target drilling locations, and the cost to construct the well, pipelines and other facilities to connect a well to the Locke Lake system. The Company, in consultation with HSA, selected three sites to perform geophysics. Two sites were west

of Route 28 and the third was within the Locke Lake system between North Barnstead Road and Bradford Lane. HSA completed geophysical surveys at all three locations. The results did not identify sufficient geologic structure (fractures/faults) at any of the three locations to warrant expenditures of site preparation and test well drilling. The probability of developing bedrock wells in the three locations with a capacity of 40 or more gallons per minute is very low. As the NHDES has stipulated that a large ground water withdrawal source is what is required (having a capacity of 40 or more gallons per minute), the Company concluded it was not cost effective to pursue these locations further.

The Company was now left to consider properties/locations a further distance away from the Locke Lake system, as well as beginning the process of considering surface waters as a source of supply (Locke Lake & Webster Stream). Based on the infrastructure that would be needed to extend transmission pipeline from the Locke Lake system to a new large ground water withdrawal well site, the Company considered high probability locations identified as “A” sites by HSA. The most feasible sites were: (a) one adjacent to the Suncook River off of Route 28, and (b) two along Big River off of Route 126 in Center Barnstead. All three sites are in “mapped” sand and gravel deposits and have been identified by the NHDES as potential “high yield” aquifers. The Company reached out to the respective land owners to assess their willingness to allow the Company to investigate well development on their property, and for the Company’s subsequent acquisition of the property or procurement of a permanent easement on their property. All land owners for these potential sites, when contacted by phone, stated they were not interested in the prospect of the Company developing a well on their property.

The Company then began its evaluation of surface water flowing from Locke Lake, as a potential water source. Outflow over the Locke Lake Dam in the fall, winter, and spring appeared to be sufficient to support the water demand of Locke Lake during those seasons, as observed by Company staff. Summer stream flow was quite low, and as such, would limit the Company's ability to use this overflow as a year-round incremental source of supply. To assess streamflow conditions over the Locke Lake Dam, the Company engaged Dr. Thomas Ballestero of Streamworks, LLC (Streamworks) to assess flow probabilities and statistics at the Locke Lake dam. The statistical analysis completed by Streamworks (Exhibit JJB-5) indicated that water demand at Locke Lake could be supported through much of the late fall, winter, spring, and possibly into the early summer. A 200 gallon per minute withdrawal could be supported much of the time, with reductions in withdrawals necessary at times to meet the de minimis withdrawal of 5% of the 7-day long "low flow" that would statistically occur once every 10-years, referred to as 7Q10. The Company has concluded that surface water pumped from Locke Lake, when there is sufficient flow over the dam, is a viable supply. The Company has determined that the withdrawal from Locke Lake, coupled with treatment at its current Peacham Road facility (with process upgrades and additions), could meet the Locke Lake demand requirements. Seasonally, the Company would switch to this new surface water withdrawal, which would allow the Company to curtail its current well use, thereby allowing groundwater levels in the bedrock aquifer to "recover." Once allowed to recover, the existing wells will see restored capacity (back to historic levels and flow rates) ensuring greater likelihood that summer demands will be met. This concept of conjunctive surface water and groundwater use allows surface water to be used when

plentiful and groundwater when surface water flows are low. Exhibit JJB-6 Figure 1 provides a location map for the proposed withdrawal and the Peacham Road Treatment Facility.

Company staff met with NHDES officials to present the concept of conjunctive water use. The NHDES concurred that the concept of a surface water source is feasible predicated upon the completion of substantial testing, design, and permitting efforts necessary to ensure treated water quality, and compliance with State and Federal environmental laws and rules. The Company has already begun collecting raw water samples from Locke Lake, is measuring flow passing over the Locke Lake dam bi-weekly, and is currently performing bench scale treatability testing of Locke Lake water. The results will be reviewed with the NHDES in August 2018 along with the Company's recommendations for treatment process alternatives. With NHDES concurrence, pilot scale testing will occur in the fall of 2018 (warm water testing) along with the preliminary design of the proposed lake intake, such that environmental permitting can begin early in 2019. Pilot testing will continue in the spring of 2019 (cold water testing). Upon successful pilot testing, full scale design will begin, in order to have bid ready documents prepared by the end of 2019. If all of this proceeds as hoped for, the Company anticipates construction to begin on the groundwater intake, interconnection main, and treatment enhancements, in the early spring of 2020, with the process going online by December 2020.

Airstrip Well Alternative Treatment

The Company is evaluating two alternatives to provide less costly and more reliable arsenic treatment at the Airstrip Well. The Airstrip Well is a standalone well. It lies north of Locke Lake, while the Golf Course Wells and the Peacham Road Wells are south of Locke Lake. Exhibit JJB-6 Figure 2 provides a location map for the Airstrip Well project. The Peacham Road and Golf Course Wells are treated for iron, manganese, and arsenic at the Peacham Road Treatment Facility using iron coprecipitation. Whereas, Arsenic is reduced using an adsorptive media filtration process at the Airstrip Station. The adsorptive media is an effective means of arsenic treatment, however the cost of the media and the disposal of spent media is very expensive. The Airstrip Well has seen media replacements increase from twice per year, to now needing to be replaced once per month. This is attributed to slight changes in water quality, which results in the media being used up quicker, resulting in “breakthrough” sooner in the lead filter vessel. More rapid breakthrough of arsenic has resulted in compliance sample results of 12 parts per billion (ppb), which is in violation of the arsenic standard of 10 ppb. Please see Exhibit JJB-5 for the Notice of Violation.

The Company is preparing to install a direct pipe connection from the Airstrip Well to the Peacham Road Treatment Facility. The pipeline includes installing approximately 4,050 feet of four inch diameter PVC and HDPE water main from the Airstrip Well to South Shore Drive, along South Shore Drive to North Barnstead Road, then along North Barnstead Road to Georgetown Drive, down Georgetown Road to a private easement, where the main will be installed by directional drilling under Locke Lake, to Varney Road. Once on Varney Road, the pipeline will be connected to an existing four inch

main installed there. The existing pipeline on Varney Road will then be able to transport water from the Airstrip Well, the remaining distance to the Peacham Road Treatment Facility. The estimated cost of this connection is \$400,000.

Georgetown Drive Area Water Main Replacement

The existing 2 inch and 4 inch diameter water main in the Georgetown Drive area is plastic and does not conform to AWWA standards. A project location map is provided in Exhibit JJB-6 Figure 3. Company staff identified significant leakage in this area of the system. However, the leakage has been difficult to locate due to the pipe condition, depth of pipe burial, and the soil conditions. The substandard pipe may have numerous small leaks making them difficult to locate. The pipe is relatively deep (7-10 feet in some areas) and that depth, combined with a high groundwater table in poorly drained soils, makes complete main replacement the most effective means to reduce leakage and to ensure reliability of this area of the Locke Lake system. Main to stop sections of customer services will be replaced as part of this effort. New curb stops will make leak identification on private services more reliable.

Approximately 7,800 feet of water main will be replaced. At an estimated average cost of replacement of \$125 per foot, the estimated project cost is \$975,000.

Q. What is the annual additional cost to PEU's ratepayer's of completing the three projects described above?

A. The estimated cost to develop a new surface water supply for Locke Lake is estimated at \$2,850,000. The estimated annual cost to ratepayers is estimated at \$301,280 including the principal and interest payments times 1.1 plus State and local property taxes.

The Airstrip Well Alternative Treatment will not have an impact in rates. If the water from the Airstrip Well is treated at the Peacham Road Treatment Facility instead of at the Air Strip treatment facility the Company expects to save approximately \$49,080 in annual treatment expense (projected annual cost of approximately \$5,454 versus current annual cost of approximately \$54,536). The treatment process at Peacham Road (co-precipitation) removes arsenic for about one-tenth (1/10) of the cost of the disposable adsorptive media resin employed at the Airstrip Station. The savings of \$49,000 per year offsets the principal and interest payments times 1.1 plus the State and local property taxes on the estimated \$400,000.00 capital expenditure of about \$42,060 per year resulting in a net reduction in revenue requirement for the Airstrip Well Alternative Treatment project of about \$7,350 per year.

The Georgetown Area Water Main Replacement project is estimated at \$975,000.000.

The estimated annual cost to ratepayers is estimated at \$102,500.00 including the principal and interest payments times 1.1 plus State and local property taxes.

The total projected increase in revenue requirement associated with these three projects is estimated to be about \$391,337 or about a 4.7% increase in rates (based on the projected revenue requirement in DW17-128 of \$8,276,261 (exclusive of North Country capital recovery surcharge). See JJB-7 for the calculations regarding these savings..

Q. What are the factors driving the need for the Company to develop a new surface water supply?

A. Reasonably attainable groundwater supply alternatives have been exhausted. The surface water source is the only reasonable source of supply available to the Locke Lake system. Development of the source will eliminate the “significant deficiency” identified by the

NHDES, meet the goals of the Corrective Action Plan, and bring the Locke Lake system into compliance.

Q. What are the factors driving the need for the Company to seek an alternative treatment for the Airstrip Well supply?

A. The cost to treat for arsenic will be significantly reduced and result in cost savings to the customer. The alternate treatment method offers greater reliability and will ensure sustained compliance with the arsenic standard.

Q. What are the factors driving the need for the Company to replace water main in the Georgetown Drive area of the Locke Lake system?

A. The existing 2 inch and 4 inch diameter water main in the Georgetown Drive area is plastic and does not conform to AWWA standards. Company staff identified significant leakage in this area of the system. However, the leakage has been difficult to locate due to the pipe condition, depth of pipe burial, and the soil conditions. The substandard pipe may have numerous small leaks making them difficult to locate. The pipe is relatively deep (7-10 feet in some areas) and that depth combined with a high groundwater table in poorly drained soils makes complete main replacement the most effective means to reduce leakage and to ensure reliability of this area of the Locke Lake system. Main to stop sections of customer services will be replaced as part of this effort. New curb stops will make leak identification on private services more reliable.

Q. Please describe the estimated timeline required to complete the three projects.

A. The NHDES would like to finalize the loan document associated with the three projects before October 2018. The NHDES cannot finalize the loan documents without the NHPUC approving the proposed financing for this project, as well as obtaining approval

of the financing by the City of Nashua (as sole shareholder of Pennichuck Corporation, parent of PEU). The list below provides an estimated timeline for the three projects:

Regulatory Approvals and Permits with Estimated Dates

1. Company Board Resolution approving SRF loan– June 22, 2018.
2. File for Shareholder approval of financing – request for approval filed with City of Nashua – July 2018. Approval received – August 14, 2018.
3. File financing petition with Commission – August 28, 2018.
4. NHPUC approval of Financing – request for order approving financing, on or before end of September 2018.
5. Sign SRF Loan Documents for all Projects – October 2018.

Surface Water Supply Development

Development of a new surface water source will take two to three years to become used and useful. The current anticipated timeline was provided to the NHDES in the CAP update dated July 2018.

Airstrip Well Alternative Treatment

1. Complete Engineering Design – December 2018.
2. NHDES approval of proposed design – January 2019.
3. Bid the water main replacement project – February 2019.
4. Open bids for water main replacement project – March 2019.
5. Construction begins – April 2019.
6. Project substantial completion – August 2019.

Georgetown Drive Water Main Replacement

1. Complete Engineering Design – December 2018.
2. NHDES approval of proposed design – January 2019.
3. Bid the water main replacement project – February 2019.
4. Open bids for water main replacement project – March 2019.
5. Construction begins – April 2019.
6. Project substantial completion – September 2019.

Q. Does this complete your testimony?

A. Yes.