STATE OF NEW HAMPSHIRE

BEFORE THE

PUBLIC UTILITIES COMMISSION

Docket No. DW 17-128

Pennichuck East Utility, Inc.
Request for Change in Rates

DIRECT PREFILED TESTIMONY OF JOHN J. BOISVERT

IN SUPPORT OF PERMANENT RATES

September 26, 2017

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 PEU, 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 responsibilities as Chief Engineer of the Company?

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 providing details of the Company's major capital expenditures for improvements made to our PEU water systems from 2014 through 2016 and capital projects that will be placed into service in 2017. Many of these projects will be familiar to the Commission as they were described in financing petitions submitted by the Company. Commission Orders 25,541, 25,650, 25,746, 25,758, 25,773, 25,890 and 26,006 regarding financing are attached to this testimony for reference JJB-1.

Overview of Capital Expenditures

Q. Did the Company make capital expenditures during the period of January 1, 2013 through December 31, 2016 to its distribution, storage, treatment, and supply facilities?

A. Yes. The Company made capital expenditures totaling approximately $7.5 million from 2013 through 2016

Q. Are all of the capital expenditures completed during the period (and described further below) currently used and useful?

A. Yes.

Q. What were the major focal points of the Company's capital projects in the period of 2013 through 2016?

A. The Company's focus continues to be multifaceted and includes replacing and/or upgrading water treatment facilities to ensure compliance with all State and Federal Drinking Water Regulations, replacing aging infrastructure including treatment and pumping stations and water mains and services, and completing water supply and water quality improvement projects for its stand-alone community water systems. Each of the major project areas are described in more detail below.

Source of Supply, Water Treatment, Pumping, and Storage Expenditures

Q. What are the other major projects that the Company completed to ensure sufficient source of supply, treatment, pumping capacity, distribution and system storage?

A. There were several such projects. They will be addressed as detailed below by water system.

Locke Lake CWS Water Main Replacement 2013-2016 (Barnstead)

The Locke Lake distribution system replacement projects were all financed with NHDES State Revolving Fund Loans as described in Commission Orders attached to this testimony.

The projects include the following:

- Locke Lake Dam Site Road Area Phase 2 (2014)

- Locke Lake Winwood & Monroe Area Phase 1 (2014)
- Locke Lake Winwood & Monroe Area Phase 2 (2015)
- Locke Lake Varney Road Area (2016)

The total cost for completing the projects detailed above was approximately $2,859,000. When the Company acquired the Locke Lake water system in 2006 many deficiencies were known and several more were identified. Water quality and water storage issues were addressed early on while distribution repairs and improvements have been completed over time. There is approximately 53,600 LF of the original 104,000 LF of water main remaining in the Locke Lake Water System. Of the original water main, approximately 24,800 LF is 4-inch and 3-inch schedule 40 glued joint PVC electrical conduit and approximately 28,800 LF is 2-inch 160 PSI IPS HDPE with nylon stab fittings or 2-inch SDR21 PVC with glued joints. Neither type of pipe meets the AWWA standard for water mains. The schedule 40 glued joint PVC (all sizes) is consistently failing at the joints while the 2-inch HDPE consistently fails at the nylon stab fittings. Over the past seven years (2010 -2016) the Company repaired more than 81 leaks in the Locke Lake Water System; 34 have been water main breaks, with the remaining 47 leaks occurring on the main to stop portion of a service.

When the system was acquired in 2006, unaccounted for water in the Locke Lake Water system constantly exceeded 60 gpm, or about 125% unaccounted for water. Unaccounted for water currently averages about 15 gpm, or about 14%. Although the level of unaccounted water in the overall system has decreased significantly from the main replacement projects that the Company has undertaken over the past several years, the level of unaccounted for water continues to remain elevated but has become more

manageable. Nevertheless, as soon as one leak is found and repaired in the parts of the original mains still in use, another leak frequently develops in a different location. The Company believes that the only way to eliminate the constant leakage is to replace all the water mains and water services (main to stop). The current main replacement program along with a diligent effort at leak detection is responsible for the reduction in unaccounted for water.

Based on an average of the 2011 through 2015 construction costs, the Company replaced water main for about $72 per LF (including services). The Company believes that a program to closely monitor the remaining sections for the next 3 to 5 years will allow future main replacement projects to be more focused, if necessary. Over time, the Company targeted its total investment per customer in Locke Lake to approximately equal the amount it invested per non-Locke Lake customer in PEU.

The 2016 work in the Varney Road area represented acceleration in water main replacement from prior years (approximately four years work) at Locke Lake. The Town of Barnstead is reconstructing and will re-pave the entire length of Varney Road in 2017. Varney Road is one of the major roads in Locke Lake, as well as one of the few that are paved. The water main on Varney Road was one of the more problematic mains with respect to pipe failure and leakage. Varney Road also had several streets and water mains that connect into it. The Locke Lake Varney Road Project replaced water main in Varney Road and water main and services in those connecting/area streets in order to:

- Minimize the need for heavy construction vehicles to use Varney Road by completing all pipeline work prior to reconstruction of Varney Road. This minimized the potential for damage to a newly reconstructed street, which the

Company might be held responsible for, if construction on nearby streets were to occur after 2017.

- This work completed replacement in the last most pressing area of substandard piping in Locke Lake. Other areas in Locke Lake with original piping have not experienced a similar degree of failure and leakage. Until 2016, the Company had deferred replacing the main in Varney Road as it would cause the Company to assume significant pavement restoration costs. However, with the Town of Barnstead reconstructing Varney Road in 2017, the Company's road restoration costs for this project were approximately one-third of what they would be absent the Town's participation.
- By completing this sizeable project in 2016, the company:
  - Improved the ability to investigate, reduce and manage leakage.
  - Reduced overall cost for the project by partnering with the Town.
  - Relieved residents (customers) in Locke Lake of continuous summer/fall construction that has been occurring since 2006. The Company's plan is to step back from major water main construction activity for a period of four to five years, unless specific circumstances necessitate further water main replacement.

The Company will continue to monitor the remaining original pipe in Locke Lake and balance the impact of additional water main replacement in Locke Lake against the cost of continued leakage and the associated rate impact.

W&E CWS (Windham)

W&E Water Main Replacement 2014 & 2015

The W&E Water System is an independent Community Water System that provides water service to 222 customers. The W&E Water System is located in Windham, NH. The W&E system contains approximately 44,000 linear feet of 2, 3, 4, 6, and 8 inch diameter water main. Water mains installed after the Company acquired the system in 1998 are consistent with AWWA standards. This project replaced approximately 8,800 feet of the 24,800 feet of 2, and 3 inch diameter polyethylene ("PE") and PVC water main that does not meet current AWWA standards and replaced all main to stop sections of customer services. The system has had approximately 80 failures since 1998. The W&E system often experiences spikes in unaccounted for water loss of 20%. This amount of leakage and failure is critical for a system with limited supply. Project costs were approximately $1,063,000

W&E Water Main Relocation Interstate 93 Expansion

The relocation and expansion of Interstate 93 in the area of Route 111A (Range Road) by the NHDOT required the Company relocate an existing water main and the transmission main from W&E Well No,3 to avoid overpass bridge abutments and new road alignment. The work was included into the NHDOT project by force account. Project costs were approximately $132,000

Avery Estates CWS (Londonderry)

Hudson, Hickory Woods, and Avery Estates CWS Interconnection

The Avery Water System was operated as an independent Community Water System providing water service to 47 residential customers. The Avery Water System is located in Londonderry, NH. The existing Avery Station, treatment and atmospheric tanks were in need of replacement. The Company currently treats the water for

hardness, arsenic, iron & manganese control, corrosion control, disinfection, sediment filtration and radon. The Company evaluated three options to correct the current water quality problems, deteriorating building and rusting atmospheric tanks:

1. Rebuild the Avery Booster Station, storage and treatment systems.
2. Interconnect the Avery CWS to the Town of Hudson water system.
3. Interconnect the Avery CWS to the Londonderry Core Water System.

The Company completed a detailed analysis of whether onsite treatment or one of the interconnection options provided the lowest life cycle cost. A copy of life cycle analysis comparing the onsite rebuild versus the interconnection options was provided in the Company's financing petition. That analysis showed the Hudson Interconnection option had the lowest life cycle cost in conjunction with a private development, Hickory Woods. The project included construction of a pumping station in Hudson and extending a new 12" water main from the booster station to the Hickory Woods development project in Londonderry. The Avery Interconnection began at the end of the Hickory Woods water main. Project costs included a contribution to the Hudson water booster station and the upsizing of developer installed water main from 8 inch diameter to 12 inch diameter in order to accommodate the additional domestic demand and fire flow from the extension of the main to Avery Estates. Project costs were approximately $750,000

Spruce Pond CWS (Windham)

Spruce Pond – Windham Animal Hospital Well Replacement

The company acquired the Spruce Pond CWS system in 2008 from a private developer. The wells servicing the system were approved by the NHDES under the

Large Groundwater withdrawal rules. Testing of the Spruce Pond wells during the permitting phase indicated a hydraulic connection between the Spruce Pond wells and some neighboring private wells. One of the private wells servicing the Windham Animal Hospital exhibited the potential for negative impacts once the Spruce Pond wells reached capacity at full build out. The Spruce Pond wells were approved by the NHDES with a source replacement plan should a private well be negatively impacted. In 2013, the Windham Animal Hospital reported to the NHDES and Pennichuck that its well went dry. The Company evaluated the options to replace the private water source and determined the best option was to drill the Windham Animal Hospital a new well on their property. Connecting the Windham Animal Hospital to the Spruce Pond system would have required Town of Windham Planning Board approval leaving a new well on their property as the most feasible and timely option. The project included drilling of the well, constructing over 400 feet of pipeline to the hospital building, and installing electrical power and water treatment to meet drinking water standards (manganese filtration, arsenic removal, and hardness). Project costs were approximately $60,000.

Hardwood CWS (Windham)

Improvements to the Hardwood CWS included the addition of an emergency standby generator, a complete reconstruction of the station structure including treatment process, controls and pumping system, finished water storage and a new water supply well. The Company installed the emergency generator first as planning and design was underway for a replacement station. The generator would power the existing facility in an emergency and was sized to be re-used at the new facility when

constructed. The station was aging and the existing steel water storage tanks had considerable deep corrosion such that repair and rehabilitation of them would not be feasible. In addition, space was added to the station to accommodate treatment equipment over time resulting in too little room to replace the treatment without taking the system off line, which would likely have triggered water quality violations. The new station was constructed at the same location. The work included a new building, new pumping equipment, iron & manganese filtration, water softening, disinfection corrosion control, and finished water storage. The final phase of the Hardwood improvements was the siting and permitting of a new well to replace lost capacity of the existing wells. During 2016 in particular, as well as previous years, the Company needed to truck bulk water to the station to make up demand (even with full outside use restrictions) that could not be met by the existing wells. The Company began the process of siting and permitting a new well in 2016. The well was place into service in August of 2017 after the construction of pipeline, electrical service and access in order to tie the new well into the treatment process. The well was place into service outside of the 2016 test year. The Company is requesting the new well be included in a step increase for work completed in 2017 as discuss below. Project costs are approximately $820,000, exclusive of the $132,000 that was invested in the new well that went on line in August of 2017.

Stone Sled CWS (Bow)

Stone Sled Station Improvements

The improvements included an upgrade of the treatment process to remove iron, manganese and arsenic in the two existing wells at Stone Sled Station by replacing

the existing water softener and arsenic filters. The existing treatment at Stone Sled used a water softener to remove iron and manganese followed by two arsenic filters . High concentrations of brine backwash water from the softener were killing grass and plantings around the station. The softener was not effectively removing the high levels of iron. A new method of treatment for the removal of iron and manganese was needed. This project added iron and manganese filters eliminating the need for the softener and brine regeneration. Project costs were approximately $70,000

Station Demolitions

The Company began the process of demolishing pumping/treatment stations, storage tanks and wells that were no longer in service in PEU. These existing facilities carried property tax burdens. Additionally the existing onsite wells that were no longer in use were required to be grout filled according to NHDES regulations. . Abandoned facilities that were demolished were located at the following locations:

- Avery Estates (Londonderry)
- Birch Hill (Conway)
- Locke Lake (Barnstead)
- Green Hills (Raymond)
- Maple Hills (Derry)
- Oakwood (Derry)

Project costs were approximately $220,000.

PEU contribution to Town of Hudson Facilities

Hudson Old Windham Station Improvements

The Company provides water to customers along Route 128 in Windham and Pelham in accordance with a water purchase agreement with Hudson. Purchased water for this area passes through Hudson's Old Windham Road Booster Station. Growth and expansion in Hudson as well as modest growth and expansion of the Company's customer base served by the station required upgrades to the station be completed. The Company contributed to the cost of the upgrades based on its percentage of the flow passing through the station in accordance with its purchased water contract with the Town. Project costs were approximately $21,000

2017 Step Projects

Hardwood CWS New Source

The three existing wells at Hardwood CWS have declining yields and are not capable of producing enough water to meet demands during the summer months even with outside use restrictions. Water had to be trucked in on a weekly basis to keep the storage tanks full and to supply customers with enough water for domestic use in 2016. To restore lost capacity, the Company completed a geophysical survey on the Hardwood property to identify potential well sites. The geophysics identified two potential locations and a well was drilled at the location closest to existing infrastructure and the treatment facility. Testing determined the new well would have sufficient flow capacity to make up the supply shortfall and it was subsequently approved by the NHDES. Electric power and pipeline were extended to the new well and the well was placed into service in August 2017. Project costs are expected to be $132,000.

Maple Hills - Brady Avenue Water Main Replacement Phase 1 (Derry)

The Brady Avenue replacement project coincides with a Town of Derry sewer and street reconstruction project. The project is funded by a NHDES SRF loan. The Company is taking advantage of the Town's work to replace an existing 1.5 inch diameter water main (originally thought to be 3 inch diameter) on Brady which serves at least 22 homes with an 8 inch water main. By coordinating the work with Derry, the Company saves significant street reconstruction costs. Because of the project start, the project needs to be completed in two phases due to the need to place road pavement before winter. Phase 1 of the project includes approximately 1,900 feet of the total 4,000 feet of main in the project. The phase 1 water main will be in service before the end of 2017. Phase 1 costs are expected to be $200,000.

Hillcrest Road Water Main Replacement Litchfield, NH

The Hillcrest Road project has received SRF Loan financing and was planned for construction in 2017. Because of the significant amount a water main construction taking place in Litchfield due to PFOA contamination, staffing the project to complete the design and bid documents had to be delayed. The result is the Company will complete the design in late 2017 for bidding and construction in the second and third quarter of 2018 and will not be requested as a 2017 Step Project.

Q. Is this expected to be the anticipated level of pipeline replacement/rehabilitation in the future for PEU?

A. Water main replacement in Locke Lake will be in a holding pattern through 2019 unless conditions with respect to the older piping rapidly deteriorate. Other replacement projects on the horizon may be:

- Replacement a large area of W&E (Windham) with original small diameter piping. The effort will be similar in size to the work completed in 2014 and 2015 and would be timed to coincide with a Town paving project.
- Replacement of the Gage Hill (Pelham) CWS piping network. Gage Hill has had numerous leak repairs since the Company acquired the system. This effort will be timed to coincide with a Town paving project as well as completed in a year where it will not compete for capital with priority projects.
- Replacement and addition of piping in Williamsburg (Pelham Core) CWS (Pelham) will be required to address the need to replace existing undersized and substandard piping with larger piping. The replacement along with the addition of water main to complete a pipeline loop will improve flow and pressure as well as allow for fire protection in an area where it is currently unavailable.

Q. Are there other major projects planned by PEU in 2018, 2019, and 2020? If so can you briefly describe them?

A. Yes. The Company is planning four major projects in this time period including:

1. PEU – PWW Interconnection

The Interconnection was originally planned for 2016 but now has been shifted to 2018 because of environmental permitting of the pipeline crossing of the Merrimack River between Merrimack, NH and Litchfield, NH. The project is being funded in part with an SRF loan as approved in NHPUC Order No. 26,006 and NHPUC Order No. 26,026. The project budget is approximately $3.0M

2. Atkinson Commerce Park CWS Station Improvements

The Commerce Park Station currently serves five commercial accounts and it is expected to add three more accounts by the end of 2017. The station provides both domestic and fire protection flows. An evaluation of the station completed by the Company in 2016 found the pumping capacity insufficient to meet the required fire flow due to aging piping internal to the station and undersized pumps and controls. The work anticipates replacement of the station adjacent to the existing station and the addition of emergency standby power. The project budget is approximately $0.3M

3. Londonderry Core Water Storage Tank

The Company is in the initial planning stage for a new 1.1 million gallon tank to serve the Londonderry Core water system. Increases in customer base over time and the addition of a large private development in the Exit 4 area of Interstate 93 will begin to exceed the peak pumping capacity of the Mountain Homes Booster Station that feeds the majority of the Londonderry Core system. The Company is in discussions with the private developer to fund approximately 50% of the capital cost of the tank while the remaining 50% will be funded by a surcharge on new customer growth and by existing customers through decreased purchased water costs. The Company will receive a lower volumetric rate from Manchester Water Works once the tank is in service. The project budget is approximately $2.6M.

4. Locke Lake CWS Source of Supply

The Company is currently operating under a Corrective Action Plan (CAP) to address water source capacity at the Locke Lake CWS. The CAP is a result of

"significant deficiencies" identified by the NHDES. The Company estimates it may take up to three years to locate, acquire, permit, and construct a new water source to meet the current water demands of the system. The Company anticipates design and permitting to take place in 2018 and 2019 while construction is anticipated in 2020. The project budget is still not well defined but could run between $1.5 to 3.0M dependent upon the final identified water supply solution.

Q. Did the Company make investments to add or replace customer services, hydrants, valves, and meters in 2014-2016?

A. Yes, the table below presents the number of new and renewed services, new and renewed hydrants, added or replaced system valves, and the number of meters replaced at an investment of approximately $1.0M.

Feature/Year	2014	2015	2016	Total
Services (new)	3	8	20	35
Services (renewed)	2	7	8	24
Hydrants (new)	0	1	0	1
Hydrants (renewed)	2	0	0	3
Valves	9	10	3	26
Meters – Replacement of leaded brass meters	651	492	476	2535

Q. What other types of capital expenditures has the Company undertaken to maintain and enhance service?

A. There have been other efforts classified as capital projects that fall into this general category. These projects are predominantly replacements of plant and equipment as well as technology upgrades that improve operational efficiency. Examples of these projects include: booster pump replacements, well pump replacements, treatment equipment upgrades and replacements, filter media change outs, improvements to buildings (such as new roofs), electrical system upgrades, SCADA & communications additions.

Q. Does this complete your testimony?

A. Yes.