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STATE OF NEW HAMPSHIRE



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October 16, 2018

NHPUC 16OCT'18PM3:47

Debra A. Howland, Executive Director
New Hampshire Public Utilities Commission
21 South Fruit Street, Suite 10
Concord, New Hampshire 03301

RE: DW 18-132 Pennichuck East Utility, Inc.
Petition for Authority to Issue Debt
Staff Recommendation for Approval

Dear Ms. Howland:

On August 28, 2018, Pennichuck East Utility, Inc. (PEU or Company) submitted a petition pursuant to RSA 369:1, seeking authority to issue long-term debt. PEU intends to borrow up to \$4,240,000 from the Drinking Water State Revolving Loan Fund (SRF) administered by the New Hampshire Department of Environmental Services (DES). The proceeds of the loan will be used to complete three projects at the Company's Locke Lake Community Water System (Locke Lake) in the Town of Barnstead: 1) develop a surface water source in response to a Corrective Action Plan; 2) install alternative arsenic treatment at PEU's Airstrip Well; and 3) replacement of main in the Georgetown section of Locke Lake. The testimony of John J. Boisvert, PEU's Chief Engineer, and Larry D. Goodhue, PEU's Chief Executive Officer, accompanied the petition. After review of the filing, including the submission of discovery (see attached), Staff recommends the Commission approve PEU's proposed financing.

Under RSA 369:1, public utilities engaged in business in this state may issue evidence of indebtedness payable more than 12 months after the date thereof only if the Commission finds the proposed issuance to be "consistent with the public good." Analysis of the public good involves looking beyond the actual terms of the proposed financing to the use of the funds and the effect on rates to insure the public good is protected. See *Appeal of Easton*, 125 N.H. 205, 211 (1984). "[C]ertain financing related circumstances are routine, calling for more limited Commission review of the purposes and impacts of the financing, while other requests may be at the opposite end of the spectrum, calling for vastly greater exploration of the intended uses and impacts of the proposed financing." *Lakes Region Water Company, Inc.*, Order No. 25,753 (January 13, 2015) at 4-5, citing *Public Service Company of NH*, Order No. 25,050, 94 NH PUC 691, 699 (2009). Consistent with past SRF financing dockets, Staff reviewed PEU's filing as a routine financing.

Mr. Boisvert's testimony indicates the largest project of the three is the additional water source project which aims to develop a surface water source of supply from Locke Lake as a means of providing a seasonal water source. This project is the direct result of a Corrective Action Plan (CAP) filed with the DES in March 2017 to address Locke Lake's insufficient water capacity to meet domestic water demand on a consistent basis.¹ Mr. Boisvert's testimony includes numerous details on the project including a comprehensive report from HydroSource Associates, Inc. titled, Groundwater Development Prospects around the Locke Lake Water System.² This report discusses many geologic aspects of the Locke Lake area as well as other water source options that were considered. Mr. Boisvert's testimony indicates PEU continues to work very closely with DES in order to certify the use of the surface water source, including its treatment procedures and overall system design. The Company anticipates that the total cost for this project will be \$2,865,000³ and will be completed by late-2020.

The second project involves a 4,050 foot pipe connection between Locke Lake's Airstrip Well and the Peacham Road Treatment Facility which currently provides treatment for its Golf Course Wells. The purpose of this project is in order to replace the current arsenic treatment method used for the Airstrip Well of adsorptive media filtration with the much less expensive iron coprecipitation methodology currently used at the Peacham Road facility. The Company anticipates that the total cost for this project will be \$400,000 and will be completed by the fall of 2019. As a result of eliminating the expensive annual cost of media filtration currently required for the Airstrip Well of \$49,000, PEU estimates an approximate net savings in its annual revenue requirement of \$7,000 when compared to the estimated annual debt service and property taxes associated with this project of \$42,000.

The last project is for the replacement of existing main in the area of Georgetown Drive at Locke Lake that does not conform to American Water Works Association (AWWA) standards. PEU indicated the pipe is a schedule 40 glued joint PVC more appropriate for gravity flow wastewater applications.⁴ Approximately 7,800 feet of water main will be replaced. The estimated cost of this project is \$975,000 which is anticipated to be completed by the fall of 2019.

Mr. Goodhue's testimony describes the anticipated terms of the financing, which include a 30-year repayment term⁵ and a maximum interest rate of 2.704%. However, the actual interest rate of the financing will be determined at the time the loan is closed. Payments on the loan will begin six months after the project is substantially complete. Amounts advanced under the loan by DES during construction will bear interest at 1% per annum payable upon substantial completion of the project. The proposed loan will be unsecured, but PEU's parent, Pennichuck Corporation (Pennichuck) will be providing an unsecured corporate guarantee for the repayment of the loan. Through discovery, the Company also confirmed that the financing qualifies for principal forgiveness of 15%.⁶

¹ PEU submitted two CAP Updates as part of this filing. A CAP Update dated July 6, 2018 was included as Attachment JJB-3 to Mr. Boisvert's testimony. A CAP Update dated August 30, 2018 was included as Exhibit E to the Company's discovery responses. See Staff Data Request 1-8 which includes summary pages for the CAPs.

² See Filing Attachment JJB-4 to Mr. Boisvert's testimony.

³ See PEU's attached response to Staff Data Request 1-11.

⁴ See PEU's attached response to Staff Data Request 1-10.

⁵ Both Mr. Goodhue's and Mr. Boisvert's testimonies initially indicated a repayment term of 20 years. However, PEU's attached response to Staff Data Request 1-5 indicates that the correct loan term is 30 years.

⁶ See PEU's attached response to Staff Data Request 1-4.

In his testimony, Mr. Goodhue states that the anticipated issuance costs for the financing will total approximately \$10,000, covering loan documentation costs as well as the costs incurred to obtain Commission approval for the financing. Mr. Goodhue's testimony also includes pro-forma financial schedules showing the estimated impact of the loan on the balance sheet and income statements of PEU.

This financing has been approved by both PEU's and Pennichuck's respective Boards of Directors, as well as by the City of Nashua, the sole shareholder of Pennichuck. PEU has provided documentation in support of these approvals. (See attached.)

The Company estimated that the impact of the proposed projects and financing on its overall revenue requirement (excluding the NCCRS) will result in an increase of \$391,337, or 4.73%.

Based on such, the monthly bill of a typical non-North Country residential customer, using 7.29 hundred cubic feet (ccf) of water per month, will increase by \$3.57, or \$42.84 on an annual basis.⁷

Staff recommends approval of the proposed financing. Staff believes that the proposed projects are prudent and that the procurement of the SRF loan ensures that the Company will finance these projects at the lowest possible cost to customers. Staff believes PEU has demonstrated that the proposed use of the funds is appropriate and consistent with the Company's duty to provide "reasonably safe and adequate and in all other respects just and reasonable" service to its customers as stated in RSA 374:1.

Staff has consulted with the Office of Consumer Advocate (OCA) prior to filing this recommendation, and the OCA notified Staff of their concurrence to Staff's position.⁸ Thank you for your assistance in this matter. If you have any questions regarding this matter, please contact me.

Respectfully,



Anthony J. Leone
Utility Analyst

cc: Service List

⁷ Per Commission Order No. 26,179 (October 4, 2018) in DW 17-128, an average non-North Country customer using 7.29 ccf of water per month will have an average bill of \$75.47 per month. Therefore, $\$75.47 \times 4.73\% = \$3.57 \times 12 \text{ months} = \42.84 .

⁸ The OCA filed a notice of participation on September 25, 2018.

Pennichuck East Utility, Inc.
DW 18-132
Petition For Approval of SRF Financing - Staff Data Requests - Set 1

Date Request Received: 9/18/18
Request No. Staff 1-1

Date of Response: 10/02/18
Witness: Larry D. Goodhue

REQUEST: Re: Petition Page 3 at 7:

Please provide the Board of Aldermen of the City of Nashua written approval for the current SRF financing.

RESPONSE:

A copy of the written and signed approval is attached to this response as Exhibit A.



RESOLUTION

AUTHORIZING PENNICHUCK CORPORATION, PENNICHUCK WATER WORKS, INC., AND PENNICHUCK EAST UTILITY, INC., TO BORROW FUNDS FROM THE STATE OF NEW HAMPSHIRE DRINKING WATER REVOLVING LOAN FUND AND THE STATE OF NEW HAMPSHIRE DRINKING WATER AND GROUNDWATER TRUST FUND

CITY OF NASHUA

In the Year Two Thousand and Eighteen

WHEREAS, the City of Nashua is the sole shareholder of Pennichuck Corporation and each of its subsidiaries;

WHEREAS, Article IX (3) of the Articles of Incorporation of Pennichuck Corporation and Article V §2 of the by-laws of Pennichuck Corporation require the approval of the sole shareholder (the City of Nashua) for Pennichuck to create, incur, assume, or guarantee any indebtedness for borrowed money, which includes contracting a loan on behalf of the Corporation; and

WHEREAS, Pennichuck Water Works, Inc. ("PWW"), and Pennichuck East Utility, Inc. ("PEU"), are regulated New Hampshire public water utility corporations providing retail water service to New Hampshire customers, and are wholly owned subsidiaries of Pennichuck Corporation ("Pennichuck") which, in turn, is wholly owned by the City of Nashua.

NOW, THEREFORE, BE IT RESOLVED by the Board of Aldermen of the City of Nashua that the City approves the borrowing by Pennichuck East Utility, Inc. of up to \$4,240,000 from the State of New Hampshire Drinking Water Revolving Loan Fund to finance the cost of the Locke Lake New Groundwater Source Project;

FURTHER RESOLVED by the Board of Aldermen of the City of Nashua that the City approves the borrowing by Pennichuck Water Works, Inc. of up to \$3,375,000 from the State of New Hampshire Drinking Water and Groundwater Trust Fund to finance the cost of the Pennichuck Core Water main Replacement Project; and

FURTHER RESOLVED by the Board of Aldermen of the City of Nashua that the City approves the guaranty by Pennichuck Corporation of the payments by Pennichuck East Utility, Inc. and Pennichuck Water Works, Inc. for each of the two loans described above.

LEGISLATIVE YEAR 2018

RESOLUTION:

R-18-058

PURPOSE:

Authorizing Pennichuck Corporation, Pennichuck Water Works, Inc., and Pennichuck East Utility, Inc. to borrow funds from the State of New Hampshire Drinking Water Revolving Loan Fund and the State of New Hampshire Drinking Water and Groundwater Trust Fund

ENDORSERS:

Alderman-at-Large Lori Wilshire

**COMMITTEE
ASSIGNMENT:**

FISCAL NOTE:

None.

ANALYSIS

This resolution approves the proposals by Pennichuck Corporation and two of their regulated public water subsidiaries to obtain loans from the State of New Hampshire Drinking Water Revolving Loan Fund and the State of New Hampshire Drinking Water and Groundwater Trust Fund for the purposes described in the resolution.

Pennichuck has provided additional information on the proposal to the Board of Aldermen.

Article IX (3) of Pennichuck Corporation's Articles of Incorporation and Article V §2 of the Pennichuck Corporation's by-laws requires City approval for the borrowing.

Approved as to form:

Office of Corporation Counsel

By:



Date:



Pennichuck East Utility, Inc.
DW 18-132
Petition For Approval of SRF Financing - Staff Data Requests - Set 1

Date Request Received: 9/18/18
Request No. Staff 1-2

Date of Response: 10/02/18
Witness: Larry D. Goodhue

REQUEST: Re: Petition Page 3 at 7:

Please provide updated approvals from PEU's and Pennichuck Corporation's Boards of Directors with the updated interest rates from the September meeting.

RESPONSE:

The updated approvals from PEU's and Pennichuck Corporation's Board of Directors, as voted upon in their September 28, 2018 meetings, are attached as Exhibits B-1 and B-2 to this response.



PENNICHUCK CORPORATION

CORPORATE SECRETARY'S CERTIFICATE

I, Suzanne L. Ansara, do hereby certify that I am the duly elected Corporate Secretary of Pennichuck Corporation (the "Company"), a New Hampshire corporation, and that I am authorized to execute and deliver this Certificate on behalf of the Company. In that capacity, I do hereby further certify that:

1. The following resolutions were adopted by the Board of Directors of the Company on September 28, 2018; and such resolutions have not been altered, amended or repealed, and are in full force and effect, as of the date hereof:

Resolved: that the Board of Directors hereby approves the guaranty by Pennichuck Corporation (the "Company") of the payment by Pennichuck East Utility, Inc. ("PEU") of all of its obligations with respect to PEU's borrowing of up to \$4,240,000 in principal amount from the State of New Hampshire (the "State"), such amount to be paid over a 30-year term, level payment, with interest at a maximum rate of 2.704% and related costs, for the purpose of funding the Locke Lake New Groundwater Source Project, pursuant to a Loan Agreement between PEU and the State under the State's Drinking Water Revolving Loan Fund program.

Further

Resolved: that the officers of the Company are severally authorized, empowered and directed to execute and deliver, in the name and on behalf of the Company, the Guaranty agreement with respect to the SRF loan described in the prior resolution (the "SRF Loan"), with such terms as may be deemed necessary or advisable in the several judgment of the officers executing the Guaranty agreement.

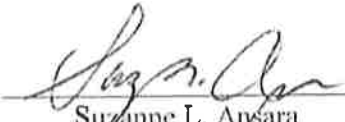
Further

Resolved: that the officers of the Company are hereby authorized, empowered and directed to take any and all actions to obtain all necessary approvals for the Guaranty from the New Hampshire Department of Environmental Services, the Governor and Executive Council, and the City of Nashua in its capacity as the sole shareholder of the Company, and any other authority determined by such officers relating to the Guaranty.

Further

Resolved: that Larry D. Goodhue, Donald L. Ware and Carol Ann Howe are severally authorized, empowered and directed to take such actions and to execute and deliver such documents as in the opinion of the officer or officers so acting or in the opinion of counsel, are necessary or desirable to effect the Guaranty and the SRF Loan and to carry out the purposes of the preceding resolutions, the taking of such actions and the execution and delivery of such documents to be sufficient and conclusive evidence that the same are within the authority conferred by these resolutions.

In Witness Whereof, I have hereunto set my hand as Corporate Secretary of Pennichuck Corporation this 1st day of October, 2018.


Suzanne L. Ansara
Corporate Secretary



PENNICHUCK®

PENNICHUCK EAST UTILITY, INC.

CORPORATE SECRETARY'S CERTIFICATE

I, Suzanne L. Ansara, do hereby certify that I am the duly elected Corporate Secretary of Pennichuck East Utility, Inc. (the "Company"), a New Hampshire corporation, and that I am authorized to execute and deliver this Certificate on behalf of the Company. In that capacity, I do hereby further certify that:

1. The following resolutions were adopted by the Board of Directors of the Company on September 28, 2018; and such resolutions have not been altered, amended or repealed, and are in full force and effect, as of the date hereof:

Resolved: that the Board of Directors hereby approves the borrowing by Pennichuck East Utility, Inc. (the "Company") of up to \$4,240,000 in principal amount from the State of New Hampshire (the "State"), such amount to be paid over a 30-year term, level payment, with interest at a maximum rate of 2.704% and related costs, for the purpose of funding the Locke Lake New Groundwater Source Project, pursuant to a Loan Agreement between the Company and the State under the State's Drinking Water Revolving Loan Fund program.

Further

Resolved: that the officers of the Company are severally authorized, empowered and directed to execute and deliver, in the name and on behalf of the Company, the Loan Agreement for the SRF loan described in the previous resolution (the "SRF Loan") with such terms, including the exhibits and schedules to such Loan Agreement, as may be deemed necessary or advisable in the several judgment of the officers executing the Loan Agreement.

Further

Resolved: that the officers of the Company are hereby authorized, empowered and directed to take any and all actions to obtain all necessary approvals for the SRF Loan from the New Hampshire Public Utilities Commission, the New Hampshire Department of Environmental Services, the Governor and Executive Council, and the City of Nashua in its capacity as the sole shareholder of Pennichuck Corporation (the Company's parent corporation), and any other authority determined by such officers relating to the SRF Loan.

Further

Resolved: that Larry D. Goodhue, Donald L. Ware and Carol Ann Howe are severally authorized, empowered and directed to take such actions and to execute and deliver such documents as in the opinion of the officer or officers so acting or in the opinion of counsel, are necessary or desirable to effect the SRF Loan and to carry out the purposes of the preceding resolutions, the taking of such actions and the execution and delivery of such documents to be sufficient and conclusive evidence that the same are within the authority conferred by these resolutions.

In Witness Whereof, I have hereunto set my hand as Corporate Secretary of Pennichuck East Utility, Inc. this 1st day of October, 2018.


Suzanne L. Ansara
Corporate Secretary

Pennichuck East Utility, Inc.
DW 18-132
Petition For Approval of SRF Financing - Staff Data Requests - Set 1

Date Request Received: 9/18/18
Request No. Staff 1-4

Date of Response: 10/02/18
Witness: Larry D. Goodhue

REQUEST: Re: Direct Prefiled Testimony of Larry D. Goodhue, Page 4, line 14:

- a. What, if any, portion of the currently proposed financing is or is anticipated, to be eligible for principal forgiveness and/or an extended repayment term?
- b. Which projects are possibly eligible for principal forgiveness and/or extended repayment terms?
- c. When will PEU know if any portion of the proposed financing for any project qualifies for principal forgiveness and/or an extended repayment term?

RESPONSE: (See attached confirmatory email from the NHDES Exhibit D)

- a. 15% Principal Forgiveness has been granted by the NHDES on this loan. As in all prior cases of Principal Forgiveness, this forgiveness is earned over time, with each monthly payment made on the loan.
- b. All the work covered by this loan qualifies.
- c. The Company has already been notified by the NHDES that his project qualifies for the 15% Principal Forgiveness. No additional terms were specified.

Pennichuck East Utility, Inc.
DW 18-132
Petition For Approval of SRF Financing - Staff Data Requests - Set 1

Date Request Received: 9/18/18
Request No. Staff 1-5

Date of Response: 10/02/18
Witness: Larry D. Goodhue

REQUEST: Re: Direct Prefiled Testimony of Larry D. Goodhue, Page 4, line 9-16; Attachment LDG 4 & 5; Direct Prefiled Testimony of John J. Boisvert, Page 3:
The documents included in Attachment LDG 4 indicate a repayment term of 30 years, while the respective testimonies of Messrs. Goodhue and Boisvert indicate a 20 year repayment term. Please explain.

RESPONSE:

The correct term is 30 years. This has been verified with the NHDES since testimony was originally filed on this petition.

Pennichuck East Utility, Inc.
DW 18-132
Petition For Approval of SRF Financing - Staff Data Requests - Set 1

Date Request Received: 9/18/18
Request No. Staff 1-8

Date of Response: 10/02/18
Witness: John J. Boisvert

REQUEST: Re: Direct Prefiled Testimony of John J. Boisvert, Page 8:

The Company indicated a meeting with NH DES would happen sometime in August 2018, in order to review the results of collecting raw water samples, measuring flow passing over the Locke Lake Dam, and perform bench scale treatability testing of the water.

- a. Please indicate if the planned August meeting between PEU and NH DES took place and;
- b. Please detail the results and concerns, if any, from the Company and the NH DES about proceeding with the Lock Lake Surface Water as a new source of water for the Locke Lake Community Water System and whether a new plan and timetable are being considered.
- c. If the NH DES does not ultimately grant approval of the use of surface water as an additional drinking water source, approximately how much will PEU have spent on the project at that point?
- d. How much, if any, has PEU spent on the project so far?
- e. If the NH DES does ultimately grant approval of the use of surface water as an additional drinking water source, when does PEU anticipate obtaining that approval?

RESPONSE:

- a. The meeting with the NHDES was delayed due to scheduling difficulties between NHDES staff and Company staff. The meeting is being planned for early October 2018.
- b. The latest update (dated August 30, 2018) of the Corrective Action Plan (CAP) (Exhibit E) was submitted to the NHDES on September 6, 2018. The Company is waiting for a response from the NHDES ahead of a planned meeting in October. The CAP presents raw water analyses and the results of bench scale treatability tests. The results indicate the water is treatable with flocculation and coagulation. We anticipate the NHDES to respond favorably to this information. The project schedule has been revised however the overall completion date of December 2020 has remained the same.
- c. The Company anticipates that the NHDES will grant approval to take the project to final design and construction after equipment pilot testing. Pilot testing will take place in the late winter of 2019. The Company anticipates expenditures of \$120,000 to \$140,000.
- d. As of September 21, 2018, the Company has spent \$21,355.25 primarily on laboratory analysis and internal labor.
- e. The Company anticipates the NHDES to approve moving to final design and permitting after successful small-scale pilot testing of the selected treatment equipment. We anticipate the timing of approval will be in the April 2019 time frame.

PENNICHUCK EAST UTILITY, INC.
LOCKE LAKE COMMUNITY WATER SYSTEM
EPA #0142010
UPDATED COMPREHENSIVE ACTION PLAN
To
Address Source of Supply Deficit
August 30, 2018

A Comprehensive Action Plan (CAP) was provided by Pennichuck East Utility, Inc. (PEU) on March 3, 2017 in response to a New Hampshire Department of Environmental Services ("NHDES") Sanitary Survey letter issued on January 9, 2017 for the Locke Lake Community Water System ("LLCWS" or the "System"). The NHDES letter required PEU, as owner of the LLCWS, to outline the steps that PEU will take to address a significant deficiency in source of supply for the LLCWS. That shortage in supply resulted in PEU having to haul over 1.5 million gallons water into the LLCWS over the last six months of 2016 to supplement the existing well supply. The CAP provided:

1. A short history of the LLCWS system, including actions taken by PEU through the end of 2016 toward correcting the many deficiencies that existed at the LLCWS when PEU acquired the System in May 2006.
2. A desktop analysis of the long term source of supply needs of the LLCWS, and
3. An outline of the steps that PEU will take to move forward with a plan to correct the short term supply shortage of the LLCWS and to map out a path to the development of a supply that will meet the future needs of a fully developed LLCWS.

The following items provide an update to the previously provided CAP.

I. LLCWS History Update

No significant capital improvements have been made to the LLCWS since the CAP was provided on March 3, 2017.

II. LLCWS Supply Analysis Update

PEU reviewed water supply and demand data from January 2013 to present and developed summary figures, attached. Below are major takeaways from the figures;

System Flows

- The combined well production decreased significantly in January 2015. The decrease in January 2015 was likely due to the replacement of a pump in well BRW 13 with a smaller pump at that time, which is supported by the data presented in the Well Production figure. The pump in BRW 13 was replaced with a larger pump and the well was reconditioned at the end of June 2018, which should recover some of the lost well production.



- The combined well production has continued to decrease over time. This is supported by data presented in the Well Production figure, specifically for wells BRW 13, 14 and 15. Wells BRW 14 and 15 will be evaluated for reconditioning and pump replacement following the work that was just performed on well BRW 13.
- The combined well production was significantly higher than the combined station finished flows from 2013 to 2015. This was likely due to the fact that there was only a 6-inch meter at the Peacham Road facility, which did not capture low flows. The meter was replaced with a compound meter (4-inch and ¾-inch) in May 2015. After this point, combined well production and station flows were much closer.
- The combined station finished flows exceeded the combined well production several times, most noticeably in the summer of 2016. These occurrences are indicative of times where water was trucked in due to the fact that the wells could not keep up with the system demand.
- The combined well production and combined station finished flows were significantly higher than the total metered consumption from 2013 to the end of 2014. This is indicative of unaccounted for water, which is supported by the data in the Unaccounted for Water figure. It is evident that unaccounted for water was reduced significantly in the end of 2014 and beginning of 2015 and has been relatively low since then. This can be attributed to the significant replacement of water mains and water services in that timeframe.

Well Production

- As previously noted, production in well BRW 13 dropped significantly in January 2015 when the existing pump was replaced with a smaller pump. The pump in BRW 13 was replaced with a larger pump and the well was reconditioned at the end of June 2018, which should recover some of the lost well production.
- Also, as previously noted, the production in wells BRW 13, 14 and 15 has slowly decreased over time, particularly since early 2015. Wells BRW 14 and 15 will be evaluated for reconditioning and pump replacement following the work that was just performed on well BRW 13.

Unaccounted for Water

- As previously noted, unaccounted for water was reduced significantly in the end of 2014 and beginning of 2015 and has been relatively low since then. This can be attributed to the significant replacement of water mains and water services in that timeframe.

Water Consumption

- Water consumption (gpd per customer) increased in late 2014 into early 2015 and has remained relatively constant since then at approximately 120 gpd per customer.
- The number of customers has increased from about 857 to 893 customers from January 2013 to May 2018.

These figures reinforce the need for additional supply to meet current (120,000 gpd) and more importantly future (240,000 gpd) demands. The future demand was reduced from 260,000 gpd (noted in

the original CAP) to 240,000 gpd based on Item 1 below. The 240,000 gpd future demand is based on the following;

1. A full build out of the LLCWS system to 1,020 customers (1,100 in the original CAP). The reduction is based on information from the Town of Barnstead that stated that the Town owns 57 non-conforming lots in Locke Lake that will only be sold to abutting property owners with the requirement of merging the lot with the abutter's existing lot and never subdividing the lots again (this lot merger form gets recorded at the Belknap County Registry of Deeds). Also, there are 23 other lots in Locke Lake that are classified as unbuildable.
2. The LLCWS consisting of 100% year-round customers.
3. The average daily use per customer of 146 gpd (the average usage for a PEU customer during the non-irrigation season in 2016).
4. An allowance of 15% for system leakage.
5. An irrigation demand of about 69,000 gpd based on 20% of the homes using outside irrigation (the approximate percentage of homes currently using outside irrigation).

III. LLCWS Comprehensive Action Plan Update

Phase I of the CAP was to locate and develop an initial additional supply of 39.9 gpm (quickest permitting time) while looking for a location that would be large enough and productive enough to support the siting and permitting of additional wells capable of producing a combined well yield of 100 gpm. PEU was unable to locate and develop an initial additional supply of 39.9 gpm, as we were unable to find a landowner that was willing to sell their land within target areas identified by HydroSource Associates, Inc. (HSA). PEU also had HSA perform a well-siting geophysical survey on a Locke Lake farm property in March 2018 that was believed to be a possible target area. The results of the survey, attached, indicated that major fracture networks are unlikely to exist in the local bedrock. Therefore, the likelihood was low of developing a sufficiently productive new well source that would justify the cost of developing that source.

Unable to accomplish Phase I, PEU has moved to Phase II, which includes the following;

1. Abandon New Groundwater Supply – PEU will no longer actively pursue a new groundwater source based on the results of Phase I. If PEU is notified of or presented with a possible new groundwater source, it will be fully evaluated.
2. Evaluate and Rehabilitate Existing Groundwater Supply - PEU installed groundwater level transducers in all existing wells and reviewed historic flow data to determine if the existing wells can provide additional supply. Transducers were installed in the wells in October 2017. Water level and flow data was collected and analyzed and it appears the wells may have some additional available capacity. The pump in well BRW 13 was replaced with a larger pump and the well was reconditioned at the end of June 2018 in an effort to increase production by approximately 10 gpm to return its production to what was seen from the well before 2015. Groundwater transducers were reinstalled in all wells in June 2018 and levels will continue to be monitored in well BRW 13 and surrounding wells to monitor impacts that the increased



withdrawal may have on groundwater levels. PEU will also evaluate having well BRW 14 reconditioned after the work is complete on well BRW 13, and if appropriate, may increase the pump size in that well also.

3. Develop New Surface Water Supply – PEU is evaluating utilizing Locke Lake as a new surface water supply for the LLCWS. The following steps have been taken thus far;
 - a. On March 15, 2018, a meeting was held with members from PEU and the NHDES Drinking Water and Groundwater Bureau to discuss the possibility of utilizing Locke Lake as a new surface water supply. NHDES was amenable to the idea and requested that PEU develop a strategic plan moving forward. The strategic plan is outlined in Section IV, below.
 - b. On June 14, 2018, a meeting was held at Locke Lake with members from the LLCA, PEU, and NHDES to discuss the water supply situation and the strategy moving forward. The possibility of utilizing Locke Lake as a new surface water supply was discussed. PEU will continue to communicate and work with the LLCA as the plan progresses.

IV. Locke Lake Surface Water Supply - Strategic Plan

A strategic plan for developing Locke Lake as a new surface water supply for the LLCWS is outlined below. The overall goal would be to utilize Locke Lake as a seasonal water supply, withdrawing 100 to 200 gpm of water from an intake near the dam, and treating, storing, and pumping into the distribution system from the Peacham Road station. The Locke Lake source would likely be utilized during the fall, winter, and spring seasons, allowing the existing wells to rest and recover during that period. An overall schedule is outlined in Table 1, below.

Table 1 Schedule for Locke Lake Surface Water Source Development

No.	Name	Description	Dates
1	Initial Investigation and Planning	Meetings with LLCA and NHDES. Strategic plan. Jar testing.	Jun-18 to Sep-18
2	Water Quality Sampling	Quarterly and biweekly sampling	Mar-18 to Mar-19
3	Process Evaluation and Preselection	Evaluation of available treatment technologies and selection for pilot tests	Aug-18 to Oct-18
4	Cold Water Piloting	Evaluate seasonal impacts on treatment technologies.	Feb or Mar-19
5	30% Preliminary Design	Basis of design and preliminary plans	Jan-19 to Apr-19
7	60% Intermediate Design	60% drawings and specifications	Apr-19 to Aug-19
5	Permitting	LLCA, Barnstead, and NHDES permits.	Aug-19 to Jan-19
8	100% Final Design	Final drawings and specifications	Aug-19 to Dec-19
9	Bidding and Award	Public bid and award period.	Jan-19 to Feb-19
10	Notice to Proceed		Mar-20
11	Construction		Mar-20 to Nov-20
12	Startup and Testing		Nov-20 to Dec-20
13	Project Complete	New system online.	Dec-20



**PENNICHUCK EAST UTILITY, INC.
LOCKE LAKE COMMUNITY WATER SYSTEM
EPA #0142010**

COMPREHENSIVE ACTION PLAN UPDATE

For

**Locke Lake Colony Association Board of Directors Meeting
July 6, 2018**

A Comprehensive Action Plan (CAP) was provided by Pennichuck East Utility, Inc. (PEU) on March 3, 2017 in response to a New Hampshire Department of Environmental Services ("NHDES") Sanitary Survey letter issued on January 9, 2017 in regards to the Locke Lake Community Water System ("LLCWS" or the "System"). The NHDES letter required PEU, as owner of the LLCWS, to outline the steps that PEU will take to address a significant deficiency in source of supply for the LLCWS. That shortage in supply resulted in PEU having to haul over 1.5 million gallons water into the LLCWS over the last six months of 2016 to supplement the existing well supply. The CAP provided:

1. A short history of the LLCWS system, including actions taken by PEU through the end of 2016 toward correcting the many deficiencies that existed at the LLCWS when PEU acquired the System in May 2006.
2. A desktop analysis of the long term source of supply needs of the LLCWS, and
3. An outline of the steps that PEU will take to move forward with a plan to correct the short term supply shortage of the LLCWS and to map out a path to the development of a supply that will meet the future needs of a fully developed LLCWS.

The following is meant to provide an update to the previously provided CAP.

I. LLCWS History Update

The following system improvements have been made to the LLCWS since March 3, 2017;

1. None

II. LLCWS Supply Analysis Update

PEU reviewed water supply and demand data from January 2013 to present and developed the summary figures, attached. Below are takeaways from the figures;

System Flows Figure

- The combined well production decreased significantly in January 2015. The decrease in January 2015 was likely due to the replacement of a pump in well BRW 13 with a smaller pump at that time, which is supported by the data presented in the Well Production figure. The pump in BRW

13 was replaced with a larger pump and the well was reconditioned at the end of June 2018, which should recover some of the lost well production.

- The combined well production has continued to decrease over time. This is supported by data presented in the Well Production figure, specifically for wells BRW 13, 14 and 15. Wells BRW 14 and 15 will be evaluated for reconditioning and pump replacement following the work that was just performed on well BRW 13.
- The combined well production was significantly higher than the combined station finished flows from 2013 to 2015. This was likely due to the fact that there was only a 6-inch meter at the Peacham Road facility, which did not capture low flows. The meter was replaced with a compound meter (4-inch and $\frac{3}{4}$ -inch) in May 2015. After this point, combined well production and station flows were much closer.
- The combined station finished flows exceeded the combined well production several times, most noticeably in the summer of 2016. These occurrences are indicative of times where water was trucked in due to the fact that the wells could not keep up with the system demand.
- The combined well production and combined station finished flows were significantly higher than the total metered consumption from 2013 to the end of 2014. This is indicative of unaccounted for water, which is supported by the data in the Unaccounted for Water figure. It is evident that unaccounted for water was reduced significantly in the end of 2014 and beginning of 2015 and has been relatively low since then. This can be attributed to the significant replacement of water mains and water services in that timeframe.

Well Production Figure

- As previously noted, production in well BRW 13 dropped significantly in January 2015 when the existing pump was replaced with a smaller pump. The pump in BRW 13 was replaced with a larger pump and the well was reconditioned at the end of June 2018, which should recover some of the lost well production.
- Also, as previously noted, the production in wells BRW 13, 14 and 15 has slowly decreased over time, particularly since early 2015 or so. Wells BRW 14 and 15 will be evaluated for reconditioning and pump replacement following the work that was just performed on well BRW 13.

Unaccounted for Water Figure

- As previously noted, unaccounted for water was reduced significantly in the end of 2014 and beginning of 2015 and has been relatively low since then. This can be attributed to the significant replacement of water mains and water services in that timeframe.

Water Consumption Figure

- Water consumption (gpd per customer) increased in late 2014 into early 2015 and has remained relatively constant since then at approximately 120 gpd per customer.

- The number of customers has increased from about 857 to 893 customers from January 2013 to May 2018.

These figures reinforce the need for additional supply to meet current (120,000 gpd), and more importantly future (260,000 gpd) demands. As discussed in the original CAP, a future demand of 260,000 gpd is based on the following;

1. A full build out of the LLCWS system to 1100 customers.
2. The LLCWS consisting of 100% year round customers.
3. The average daily use per customer of 146 gpd (the average usage for a PEU customer during the non-irrigation season in 2016).
4. An allowance of 15% for system leakage.
5. An irrigation load based of about 75,000 gpd based on 20% of the homes using outside irrigation (the approximate percentage of homes currently using outside irrigation).

III. LLCWS Comprehensive Action Plan Update

Phase I of the CAP was to locate and develop an initial additional supply of 39.9 gpm (quickest permitting time) while looking for a location that would be large enough and productive enough to support the siting and permitting of additional wells capable of producing a combined well yield of 100 gpm. PEU was unable to locate and develop an initial additional supply of 39.9 gpm, as we were unable to find a landowner that was located in the target areas from the HydroSource Associates, Inc. (HSA) report who was willing to sell their land. PEU also had HSA perform a well-siting geophysical survey on a Locke Lake farm property in March 2018 that was believed to be a possible target area. The results of the survey, attached, indicated that major fracture networks are unlikely to exist in the local bedrock. Therefore, the likelihood was low of developing a sufficiently productive new well source that would justify the cost of developing that source.

Unable to accomplish Phase I, PEU has moved to Phase II, which includes the following;

1. New Groundwater Supply – PEU will no longer actively pursue a new groundwater source based on the results of Phase I. If PEU is notified of or presented with a possible new groundwater source, we will evaluate it fully.
2. Existing Groundwater Supply - PEU installed groundwater level transducers in all existing wells and reviewed historic flow data to determine if the existing wells can provide additional supply. Transducers were installed in the wells in October 2017. Water level and flow data was collected and analyzed and it appears the wells may have some additional available capacity. The pump in well BRW 13 was replaced with a larger pump and the well was reconditioned at the end of June 2018 in an effort to increase production by approximately 10 gpm to return its production to what was seen from the well before 2015. Groundwater transducers were reinstalled in all wells in June 2018 and levels will continue to be monitored in well BRW 13 and surrounding wells to monitor impacts that the increased withdrawal may have on groundwater levels. PEU will also

evaluate having well BRW 14 reconditioned after the work is complete on well BRW 13, and if appropriate, may increase the pump size in that well also.

3. New Surface Water Supply – PEU is evaluating utilizing Locke Lake as a new surface water supply for the LLCWS. The following steps have been taken thus far;
 - a. On March 15, 2018, a meeting was held with members from PEU and the NHDES Drinking Water and Groundwater Bureau to discuss the possibility of utilizing Locke Lake as a new surface water supply. NHDES was amenable to the idea and requested that PEU develop a strategic plan moving forward. The strategic plan is outlined in Section IV, below.
 - b. On June 14, 2018, a meeting was held at Locke Lake with members from the LLCA, PEU, and NHDES to discuss the water supply situation and the strategy moving forward. The possibility of utilizing Locke Lake as a new surface water supply was discussed. PEU will continue to communicate and work with the LLCA as the plan progresses.

IV. Locke Lake Surface Water Supply - Strategic Plan

A strategic plan for developing Locke Lake as a new surface water supply for the LLCWS is outlined below. The overall goal would be to utilize Locke Lake as a seasonal water supply, withdrawing 100 to 200 gpm of water from an intake near the dam, to be treated, stored, and pumped into the distribution system from the Peacham Road station. The Locke Lake source would likely be utilized during the fall, winter, and spring seasons, allowing the existing wells to rest and recover during that period. An overall schedule is outlined in Table 1, below.

Table 1 Schedule for Development of Locke Lake Surface Water Source

No.	Name	Description	Dates
1	Initial Investigation and Planning	Meetings with LLCA and NHDES. Strategic plan. Jar testing.	Jun-18 to Jul-18
2	Water Quality Sampling	Quarterly and biweekly sampling	Mar-18 to Mar-19
3	Warm Water Piloting	Pilot testing various treatment technologies.	Aug-18
4	30% Preliminary Design	Basis of design and preliminary plans	Sep-18 to Dec-18
5	Permitting	LLCA, Barnstead, and NHDES permits.	Oct-18 to Feb-19
6	Cold Water Piloting	Evaluate seasonal impacts on treatment technologies.	Feb-19
7	60% Intermediate Design	60% drawings and specifications	Jan-19 to Jun-19
8	100% Final Design	Final drawings and specifications	Jun-19 to Sep-19
9	Bidding and Award	Public bid and award period.	Oct-19 to Dec-19
10	Notice to Proceed		Jan-20
11	Construction		Jan-20 to Nov-20
12	Startup and Testing		Nov-20 to Dec-20
13	Project Complete	New system online.	Dec-20

Below is a summary of items completed or currently underway.

1. **Hydrological Assessment – Streamworks, PLLC** performed a benchtop study to evaluate flows through Locke Lake and developed a report titled “Flow Duration Curves and Low Flows for Locke Lake”, dated August 23, 2017. The report is attached. The report determined that the drainage area or watershed for Locke Lake at the outlet is 6.17 square miles, and based on two different methods, concluded that the 7Q10 flows for Locke Lake range seasonally from a low of 0.19 cfs in the summer to a high of 3.69 cfs in the spring. A map of the watershed is in Figure 1, below.

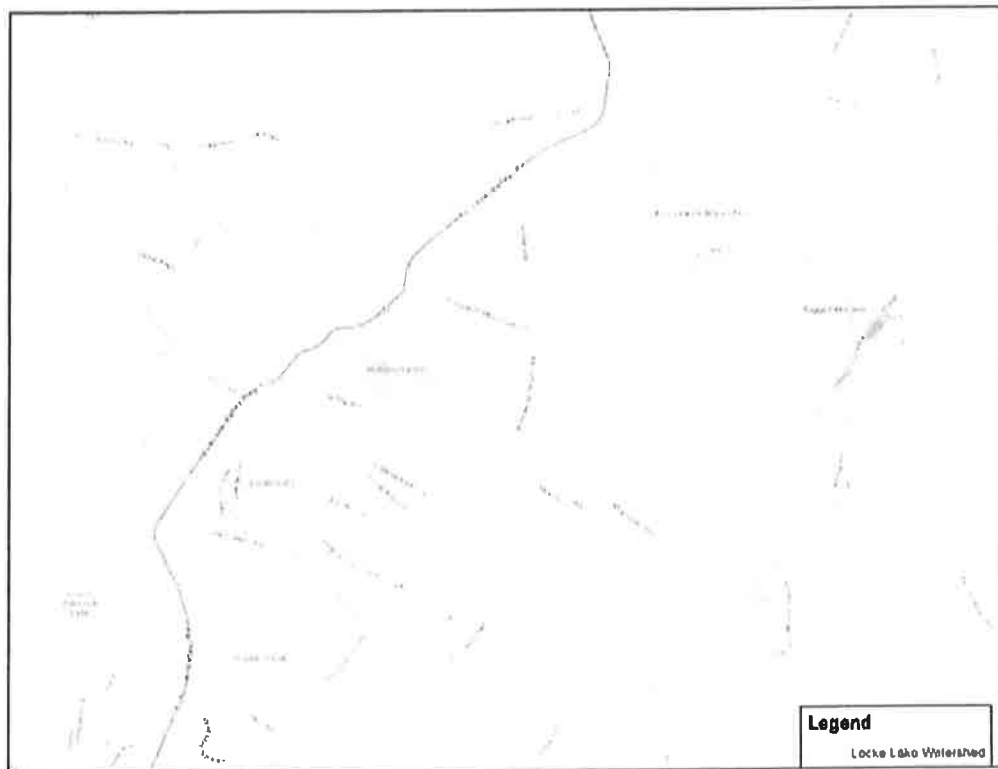


Figure 1 Locke Lake Watershed

The 7Q10 flows and the De Minimis withdrawals are shown Table 2. The permitting process with NHDES will dictate withdrawal limits and streamflow monitoring requirements, but PEU does not intend to impact the levels within Locke Lake. Water would only be withdrawn from the lake when sufficient flow is passing over the dam. PEU does not anticipate that a withdrawal from Locke Lake would impact the LLCA's current use of the lake as a recreational resource.

Table 2 Low Flows and De Minimis Withdrawals for Locke Lake

Description	Winter	Spring	Summer	Fall
Locke Lake 7Q10 Flows (gpm)	1,014	1,580	85	507
De Minimis Withdrawals (gpm)	50.7	79.0	4.3	25.4

2. Sampling plan – A sampling plan has been developed which involves quarterly sampling for a large suite of parameters as well as biweekly sampling for a smaller suite of parameters. The first quarterly sampling event was March 27, 2018 and biweekly sampling began on May 1, 2018. Results from the first quarterly sampling event are attached. Average, minimum, and maximum results from the biweekly sampling thus far are shown in the Table 3, below.

Table 3 Biweekly Sampling Results for Locke Lake

Parameter	Average	Minimum	Maximum
Turb, Field (NTU)	1.4	0.3	2.1
pH	6.55	5.99	7.09
Spec Cond (µS/cm)	109	88	161
Temp (°C)	17.77	5.40	23.90
DO (mg/L)	3.84	1.51	6.46
Alkalinity (mg/L as CaCO ₃)	7.32	5.91	8.30
Color, True (CPU)	44	27	95
Iron, Diss. (mg/L)	0.331	0.083	0.503
Iron, Total (mg/L)	0.507	0.171	0.700
Mn, Diss. (mg/L)	0.066	0.030	0.087
Mn, Total (mg/L)	0.073	0.031	0.091
UV Abs, 254nm	0.164	0.137	0.175
Total Phosphate (mg/L, as P)	0.03	0.03	0.03
Nitrate (mg/L, as N)	0.20	<0.2	0.21
Nitrite (mg/L, as N)	<0.2	<0.2	<0.2
DOC (mg/L)	3.99	3.73	4.2
TOC (mg/L)	4.5	4.3	4.67
Ammonia (mg/L, as N)	<0.2	<0.2	<0.2
TKN (mg/L)	1.09	1.01	1.16
E. Coll (MPN per 100mL)	59.7	3.1	>200
SUVA	3.92	3.67	4.17

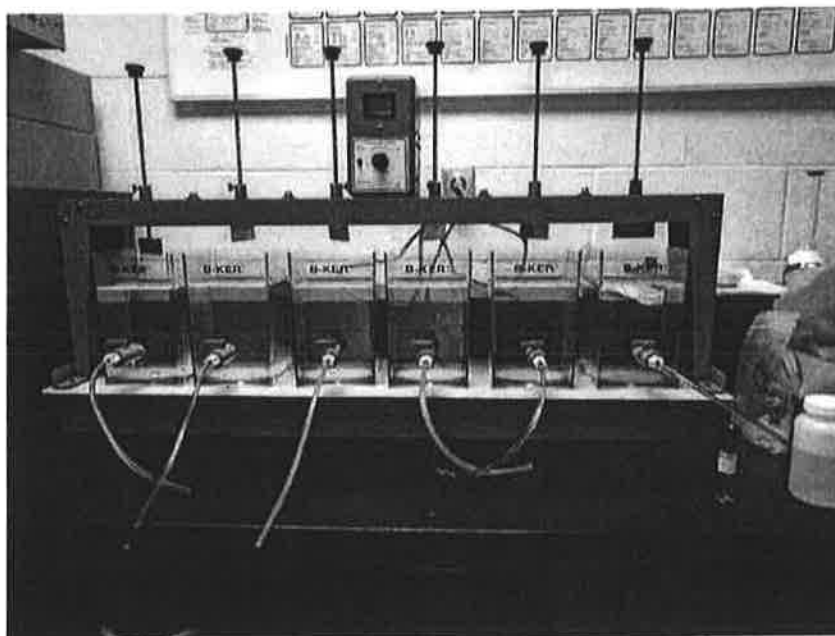
Notable results from sampling performed to date are identified and explained below.

- Slightly elevated iron and manganese above secondary standards. Iron and manganese will be addressed by the selected treatment process.
- Low levels of nutrients (phosphorous and nitrogen). We will continue to monitor for nutrients to see if they change throughout the summer with lawn care and farming practices.
- High color, which will be addressed via the selected treatment process.
- Low alkalinity. We will need to increase alkalinity in the treatment process for water stabilization in the distribution system.
- E.coli results thus far indicate a need to test for Cryptosporidium moving forward to determine treatment per the LT2ESWTR. Cryptosporidium testing will begin on July 24, 2018.

- All organics (VOCs, SVOCs, PFCs, etc) were below the detection limit, except for Perfluorobutanoic Acid (PFBA), which was detected at 3.32 ng/L. There currently is no standard for PFBA, but the detected concentration is well below the NHDES ambient groundwater quality standard and EPA health advisory limit of 70 ng/L for PFOS and PFOA combined.
- Perchlorate was detected at 0.139 µg/L, which is well below the current standards for perchlorate (Massachusetts limit is 2.0 µg/L and California is 6.0 µg/L).
- SUVA values above 2 indicate that organics will need to be removed to prevent disinfection byproduct formation in the system. Organics will be addressed by the selected treatment process.

One item that was brought up during the meeting with LLCA on June 14, 2018 was the fact that the community treats the lake for milfoil. PEU has been following up with the LLCA to understand the treatment methods such that the appropriate analyses can be performed to determine any impacts that the milfoil may have on water quality at the proposed intake location.

3. Jar Testing – PEU has collected samples and performed bench top jar testing (see figure below) to determine the effectiveness of removing turbidity and organics via coagulation and flocculation. Based on the jar testing performed thus far, coagulation and flocculation appears to be an effective treatment option using ferric chloride at a pH of between 6.5 and 8 and a dose of 35 to 45 mg/L.



PEU will continue with Phase II of the CAP and will provide an update on the status of the existing wells and the new surface water source as they progress.

Attachments

1. LLCWS Summary Figures (2013-2018)
2. HSA well-siting geophysical survey results
3. Flow Duration Curve and Low Flows for Locke Lake Report
4. Water quality sample results
5. Jar testing report

Pennichuck East Utility, Inc.
DW 18-132
Petition For Approval of SRF Financing - Staff Data Requests - Set 1

Date Request Received: 9/18/18
Request No. Staff 1-9

Date of Response: 10/02/18
Witness: John J. Boisvert

REQUEST: Re: Direct Prefiled Testimony of John J. Boisvert, Page 9

In accordance with NH RSA 371:17, when does PEU plan to file for a permit covering the directional drilling portion of the proposed raw water main connecting the Airstrip Well to the Peacham Road Treatment Facility.

RESPONSE:

Other than an overall approval by the NHDES Drinking Water and Groundwater Bureau, the project may require wetlands and shoreland permits from other NHDES bureaus. The Company is in the process of engaging a land surveyor and wetland/permitting scientists to assess the need for specific permitting. The Company will better understand the permitting needs by December 2018 and will apply for the necessary environmental permits early in 2019.

**Pennichuck East Utility, Inc.
DW 18-132
Petition For Approval of SRF Financing - Staff Data Requests - Set 1**

Date Request Received: 9/18/18
Request No. Staff 1-10

Date of Response: 10/02/18
Witness: John J. Boisvert

REQUEST: Re: Direct Prefiled Testimony of John J. Boisvert, Page 10: Please briefly explain in what specific way(s) the existing Georgetown plastic water main does not conform to American Water Works Association (AWWA) standards?

RESPONSE:

The Georgetown water main is schedule 40 glued joint PVC more appropriate for gravity flow wastewater applications. The AWWA does not include in its standards for water supply mains, pipes that are made of this material and/or installed in this manner.

Pennichuck East Utility, Inc.
DW 18-132
Petition For Approval of SRF Financing - Staff Data Requests - Set 1

Date Request Received: 9/18/18
Request No. Staff 1-11

Date of Response: 10/02/18
Witness: John J. Boisvert

REQUEST: Re: Direct Prefiled Testimony of John J. Boisvert, Page 10:

The documents included in the Testimony indicate the cost of the surface water supply as \$2,850,000 while the respective Attachment JJB-7 and the Testimony and Attachments of Mr. Goodhue indicate a \$2,865,000. Please explain.

RESPONSE:

The Correct value is \$2,865,000. The \$2,850,000 in the testimony was a typographic error when transferred from JJB-7.

SERVICE LIST - EMAIL ADDRESSES - DOCKET RELATED

Pursuant to N.H. Admin Rule Puc 203.11 (a) (1): Serve an electronic copy on each person identified on the service list.

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Docket #: 18-132-1 Printed: October 16, 2018

FILING INSTRUCTIONS:

- a) Pursuant to N.H. Admin Rule Puc 203.02 (a), with the exception of Discovery, file 7 copies, as well as an electronic copy, of all documents including cover letter with:

DEBRA A HOWLAND
EXECUTIVE DIRECTOR
NHPUC
21 S. FRUIT ST, SUITE 10
CONCORD NH 03301-2429

- b) Serve an electronic copy with each person identified on the Commission's service list and with the Office of Consumer Advocate.
- c) Serve a written copy on each person on the service list not able to receive electronic mail.