



25 MANCHESTER STREET  
PO BOX 1947  
MERRIMACK, NH 03054-1947  
(603) 882-5191  
FAX (603) 913-2305  
WWW.PENNICHUCK.COM

STATE OF NEW HAMPSHIRE  
BEFORE THE  
NEW HAMPSHIRE PUBLIC UTILITIES COMMISSION

RE: PENNICHUCK EAST UTILITY, INC.

DW 05-072

PREFILED DIRECT TESTIMONY  
OF  
DONALD L. WARE

MAY 2005

1 **Professional and Educational Background**

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

4 A. My name is Donald L. Ware. I am the Senior Vice-President – Operations  
5 and the Chief Engineer at Pennichuck East Utility, Inc. (the “Company”). I  
6 have worked for the Company since Pennichuck Corporation  
7 (“Pennichuck”) acquired it from the Town of Hudson in April 1998. I am a  
8 licensed professional engineer in New Hampshire, Massachusetts and  
9 Maine.

10 Q. Please describe your educational background?

11 A. I have a Bachelor in Science degree in Civil Engineering from Bucknell  
12 University in Lewisburg, Pennsylvania and I completed all the required  
13 courses, with the exception of my thesis, for a Masters degree in Civil  
14 Engineering from the same institution. I have a Masters in Business  
15 Administration from the Whittemore Business School at the University of  
16 New Hampshire.

17 Q. Please describe your professional background.

18 A. Prior to joining Pennichuck Corporation, I served as the General Manager  
19 of the Augusta Water District in Augusta, Maine from 1986 to 1995. I  
20 served as the District’s engineer between 1982 and 1986. Prior to my  
21 engagement with the District, I served as a design engineer for the State  
22 of Maine Department of Transportation for six months and before that as a

1 design engineer for Buchart-Horn Consulting Engineers from 1979 to  
2 1982.

3 Q. What are your responsibilities as Senior Vice President/Chief Engineer of  
4 the Company?

5 A. As Senior Vice President/Chief Engineer, I am responsible for the overall  
6 operations of the Company, including water quality and supply,  
7 distribution, engineering and water system capital improvements. With  
8 regard to capital improvements overseen by the Company's Engineering  
9 Department, I am also responsible for project design, project management  
10 and construction management.

11 Q. What is the purpose of your testimony?

12 A. I will be providing details of the Company's operations and capital  
13 expenditures between April of 1998 and the end of 2004.

14 Q. Tell me about the status of the Company's water systems when acquired  
15 by Pennichuck in April of 1998?

16 A. There were 27 water systems spread among 10 communities serving  
17 3,640 customers. The systems ranged in size from 11 customers to just  
18 over 1000 customers in size. The sources of water supply ranged from a  
19 single small bedrock well for the smaller water systems to purchased  
20 water connections with Manchester Water Works, the Town of Derry  
21 Water Department and the Town of Hudson Water Department.

22 Q. What was the condition of the systems?

1 A. At the time that Pennichuck Corporation acquired the water systems there  
2 were many problems, including but not limited to, lack of supply, low  
3 pressure, poor water quality, poor quality water mains and equipment in  
4 poor condition.

5 Q. What has the Company done to correct the problems it encountered after  
6 it acquired these systems?

7 A. The Company took the remainder of 1998 to catalog and evaluate the  
8 problems that existed with each of the water systems that the Company  
9 had attained. Once the problems were identified, the Company began the  
10 process of planning for and implementing the required upgrades. The  
11 Company identified the following problems with the following systems in its  
12 initial system evaluations:

13 **Beaver Hollow Water System (Sandown)** – Poor water quality, high  
14 levels of iron and manganese.

15 **W&E Water System (Windham)** – Poor water quality, high levels  
16 manganese and hardness. Lack of supply.

17 **Green Hills Water System (Raymond)** – Poor water quality, high levels  
18 of manganese and MBTE. Poor infrastructure, unaccounted for water was  
19 in excess of 50%. Water mains were located outside of roadways across  
20 private property without proper easements.

21 **Litchfield Core – Darrah Zone** – The customers in this zone experienced  
22 colored water and low pressure on a regular basis (daily) during times of

- 1 high usage. Inefficient pump station design resulted in excessive  
2 electrical usage.
- 3 **Pine Have (Londonderry)** – Low water pressure.
- 4 **Oakwood (Derry/Windham)** – Poor water quality, high levels manganese  
5 and hardness. Lack of supply. Poor water pressure. Water mains were  
6 located outside of roadways across private property without proper  
7 easements.
- 8 **Hardwood (Windham)** - Poor water quality, high levels manganese and  
9 hardness. Lack of supply.
- 10 **Avery (Londonderry)** – –There was a single well feeding more than 29  
11 customers, in violation of DES requirements.
- 12 **Londonderry Core** – Large pressure swings, inefficient pump station,  
13 single source of supply.
- 14 **Williamsburg/Stonegate (Pelham)** – Lack of storage. Loss of service  
15 during power outage.
- 16 **Springwood Hills (Londonderry)** – Large pressure swings, inefficient  
17 pump station, incomplete construction not meeting Town of Londonderry  
18 site plan approval requirements.
- 19 **Rolling Hills (Plaistow)** – Poor water quality, high levels of iron and  
20 hardness. Lack of supply.
- 21 **Nesenkeag (Londonderry)** – Poor water quality, single well feeding more  
22 than 29 customers.
- 23 Q. Has the Company corrected the problems identified above?

1 A. The majority of the problems have been corrected or will be corrected by  
2 the end of 2005.

3 Q. How much did the Company spend, in total, for capital expenditures  
4 between the April of 1998 and the end of 2004 to correct the problems  
5 identified above as well as other minor issues?

6 A. The Company spent a total of \$7,539,740 on capital expenditures during  
7 this time frame (excluding retirements).

8 Q. Are all the capital projects completed between April of 1998 and the end of  
9 2004 used and useful?

10 A. Yes.

11 Q. Could you please be more specific about the nature and cost of  
12 completing the capital improvements delineated above?

13 A. Yes. I will break my response into the following major classifications of  
14 expenditures: failed or aging equipment replacements; distribution system  
15 replacements; water quality upgrades; water supply upgrades (availability  
16 or pressure); efficiency upgrades, and regulatory upgrades.

17 Q. Could you please talk about the Company's capital expenditures in the  
18 area of failed or aging equipment replacements?

19 A. During the past seven years, the Company has spent \$75,225 to replace  
20 17 failed well pumps. It has also spent \$71,197 to replace 18 failed  
21 booster pumps.

22 Q. What sort of distribution replacements have occurred?

1 A. The Company replaced over 11,000 feet of small diameter, poor quality  
2 PVC water mains that were located on private property and were a source  
3 of constant leaks in the Green Hills water system in Raymond, NH. The  
4 Company also replaced 153 water services in this water system that were  
5 poor quality plastic and often passed over a neighbor's property without an  
6 easement. The cost of this project was over \$1,700,000.

7 Q. Was this project paid for with Company capital?

8 A. No. Just under \$700,000 of the replacement project was paid for with a  
9 Community Development Block Grant. The remaining \$1,021,774.96 was  
10 paid for by the Company. This investment resulted in the elimination of  
11 approximately \$56,000 per year in unaccounted for purchased water, the  
12 availability of fire protection, and the use of wells which had levels of  
13 MTBE and manganese in excess of the SDWA standards. The Company  
14 was also able to increase pressure about 25%. Finally, the lack of water  
15 system valves and the frequent water main breaks that occurred prior to  
16 the water main replacement project resulted in system wide water outages  
17 on a regular basis.

18 Q. Were there any other major distribution main replacement projects?

19 A. Yes. The Company replaced the existing water mains in Derry and  
20 Windham along Gordon Street, Fordway extension, Joan Street and  
21 Hidden Valley in the Oakwood System. The cost of replacing the existing  
22 water mains and upgrading the associated services was \$486,625.

23 Q. Why was this project necessary?

1 A. The Company had worked with the Town of Derry and a local developer to  
2 replace the Oakwood water supply, which was poor in quality and  
3 quantity, with a connection to the Town of Derry and a purchase water  
4 agreement. In the process of installing the interconnection with Derry and  
5 the new water main up Gordon Road, it was determined that the existing  
6 water main serving the customers along Gordon Road, Joan Street and  
7 Hidden Valley Road was located outside of the public right of way and that  
8 numerous customers received their water service through other  
9 customers' property without an easement. The completed project resulted  
10 in each home having service across its own property and the  
11 abandonment of all the water mains that were located on private property.

12 Q. What are some of the major water quality initiatives that the Company has  
13 undertaken?

14 A. The first water quality project that the Company undertook was the  
15 installation of a green sand and softening system at the Beaver Hollow  
16 Water system in Sandown. This water system had dwindled from 44  
17 customers at its inception in the mid 1980's to 11 customers in April of  
18 1998 when the Company took over. The cost of the treatment system and  
19 the building addition required to house it was \$37,360.

20 Q. What other systems had water quality problems when the Company took  
21 over their operations in April 1998?



1 A. The Oakwood system, the W&E water system, the Hardwood system and  
2 the Green Hills systems all had poor water quality with inadequate  
3 treatment.

4 Q. Has the Company corrected the water quality problems referenced  
5 above?

6 A. Yes. The Oakwood and Green Hills water quality problems were solved  
7 by replacing the well supplies with interconnections with adjacent  
8 municipal water systems in Derry and Raymond. The Hardwood system  
9 water quality problems were corrected after upgrading the existing water  
10 treatment system and adding an additional roughing filter in front of a  
11 green sand filter and softening system.

12 Q. How did the Company correct the water quality problem at the W&E  
13 system?

14 A. The Company originally tried to arrange for a purchased water  
15 arrangement with the Town of Salem as the W&E system not only had  
16 water with bad quality (very high manganese and hardness) but also  
17 insufficient supply. After negotiating with the Town of Salem for over a  
18 year, the Town decided not to sell water to the W&E system, forcing the  
19 Company to look for additional water supply and to investigate the addition  
20 of a treatment system for the existing water. After an extensive search of  
21 the surrounding area for groundwater, the only viable site located was on  
22 the Company's existing 8.8 acre lot. A well was developed and a  
23 treatment system including green sand, softening and 80,000 gallons of

1 storage was constructed to service the W&E system. The cost of this  
2 project was \$487,937. The water at the W&E system is so hard that it  
3 requires over 4,000 pounds of salt to be added to the softening system per  
4 week to make it palatable. The brine backwash from the softening system  
5 is discharged to an adjacent wetland that drains into Canobie Lake. In the  
6 fall of 2004, the USEPA determined that the brine backwash was a major  
7 source (as much as 45%) of the chloride contamination of Canobie Lake.  
8 As a result, the USEPA has asked the NHDES to order the Company to  
9 stop treating the water at the W&E system. The Company is now  
10 searching for another source of water for the W&E system. The two  
11 alternatives currently being investigated involve abandoning the ground  
12 water supply and taking water from Canobie Lake either through a small  
13 surface water filtration plant owned and operated by the Company or via  
14 an interconnection with the Town of Salem. A decision on which  
15 alternative will be pursued should be made before the end of the year.

16 Q. Can you describe the water supply upgrades you referenced above?

17 A. Yes. The Company developed new sources of supply for the Londonderry  
18 Core system, the Oakwood system, the WESCO system, the Avery  
19 system, and the Hardwood system.

20 Q. Why was a new source of supply required for the Londonderry system?

21 A. Previously, the Londonderry Core system got its water from the Town of  
22 Derry through the South Road Booster System. At the time of the  
23 acquisition, the Company inherited an agreement that required the

1 Company to connect the Londonderry Core system to Manchester Water  
2 Works by 2005. In 2000, the Company had an opportunity to work with  
3 Home Depot and Mountain Homes estates in a partnership that allowed  
4 the completion of the required interconnect in advance of the contract  
5 requirement, with \$603,000 being contributed by these partners to the  
6 Manchester Water Works' connection, resulting in a cost of \$1,510,567.  
7 This connection not only met the Company's contractual requirements but  
8 it more than doubled the fire protection to the Londonderry Core, provided  
9 two sources of supply to the Londonderry Core, and provided for water  
10 supply to the Londonderry Core during a power outage. The connection  
11 also allows the Company to buy water from Manchester Water Works at a  
12 rate that is much lower than the Company's purchased water rate from the  
13 Town of Derry.

14 Q. Can you tell me more about the Oakwood connection?

15 A. The Oakwood water system suffered from chronic water shortages and  
16 poor water quality when the Company acquired it. The Company  
17 negotiated a connection with the Town of Derry and partnered with a local  
18 developer to connect the Town of Derry water system to the Oakwood  
19 water system. The cost of the interconnection was \$190,684.

20 Q. What about the other water supply project you mentioned?

21 A. The WESCO water supply project involved replacing a single, low capacity  
22 well with an interconnection with the Hooksett Village Water Precinct at a  
23 cost of \$25,412. The Avery water supply project involved the

1 development of a second well to supplement the existing single well and  
2 also to meet regulatory requirements for two wells. The cost of developing  
3 the second well at Avery was \$45,732. Finally, the Hardwood project  
4 involved the development of a third well and a treatment upgrade to insure  
5 good water quality and adequate water supply at a cost of \$121,862.

6 Q. Were there any other major supply upgrades that you have not  
7 mentioned?

8 A. Yes. About half the Litchfield water system was supplied with water  
9 through the Darrah Booster Station. When the Company acquired this  
10 water booster station, it was incapable of pumping to meet the summer  
11 demands. As a result,, the system had low pressure and the station was  
12 run at an excessively high pressure resulting in high energy costs. The  
13 area served by the Darrah Station also contained a large amount of  
14 undeveloped land. In response to the existing pressure problem, the  
15 Company constructed a new water storage tank and a small zone booster  
16 station. The cost of this project was \$1,158,581. The Company has  
17 instituted a supply development charge of \$650 (in accordance with its  
18 tariff) to new customers to help pay for the sizing of the tank for both  
19 existing and future customers. To date, the Company has collected just  
20 over \$42,000 towards this project.

21 Q. Why did the Company construct the small zone booster station?

22 A. The hill where the Litchfield tank is located (off Colonial Drive) is high  
23 enough to serve all of Litchfield with the exception of the customers along

1 Colonial and Deerwood Drives. The reason that the former owner of the  
2 Darrah system had run the station at high pressures was to provide a  
3 minimum amount of pressure to the homes on these streets. Rather than  
4 build a tall tank and over pressurize the rest of Litchfield to serve these  
5 customers, the Company built a small zone booster.

6 Q. What initiatives, capital or otherwise, has the Company undertaken to  
7 improve service efficiency to its systems?

8 A. In order to better serve its customers, the Company has invested in radio  
9 reading, developed gate maps, developed operational routes to minimize  
10 excess travel and installed SCADA at many of its water systems. The  
11 largest investment made was in the area of radio meter reading. This has  
12 allowed the Company to bill its customers on a monthly basis to make it  
13 easier for the customers to budget and conserve water. At the outset of  
14 the Company's operations, the monthly reads included four estimates per  
15 year. The use of estimated readings proved to be very difficult and  
16 contentious with the Company's customers. The decision was made in  
17 2002 to migrate to 12 actual monthly readings by either adding additional  
18 reading staff or going to radio meter reading. Based on a Company pilot  
19 of radio reading in 2001 and 2002, the Company believed it could attain a  
20 90% reduction in meter reading costs (the cost of monthly manual reads  
21 was estimated to be about \$72,340) by installing radio meter readers  
22 which in turn made radio meter reading more cost effective for the  
23 Company's customers than completing manual monthly meter reads.

1 After a careful evaluation of the available radio meter readers, the  
2 Company opted to partner with Datamatic to install a trade name radio  
3 meter reader known as the Firefly #109. The Company completed the  
4 installation of the Firefly #109 radio at all existing meter locations in 2003  
5 at a cost of \$626,567. The cost component associated with the actual  
6 radio installation was about \$501,600, the remainder of the \$626,567 was  
7 associated with meter upgrades and replacements that were carried out at  
8 the time of the meter installation. Unfortunately, the Firefly #109 radio  
9 has proved unreliable with poor reading range and numerous equipment  
10 failures. As a result, the Company has only experienced about a 50%  
11 decrease in reading costs due to problems with the Firefly #109 radios.  
12 As a result of the poor performance of the Firefly #109, Pennichuck has  
13 engaged legal counsel to reach a resolution with Datamatic regarding  
14 Firefly #109 problems. The Company has requested that the Firefly #109  
15 radios be completely replaced at no cost to the Company or  
16 reimbursement for all expenses incurred to date in the radio meter reader  
17 program. In response to the Company's demands, Datamatic developed  
18 a new version of the Firefly known as the Firefly #111 radio. The  
19 Company is running a six month trial on 250 of the new radios. The first  
20 four months of the trial are fairly encouraging with radio reading rates  
21 increasing from about 50 per hour to 180 per hour which would result in  
22 meter reading costs of about \$10,070 per year or an 86% reduction in  
23 costs for radio reads. (The current cost for radio reading with the Firefly

1 #109 is about \$36,270 per year.) The Company's arrangement with  
2 Datamatic is that if the new Firefly #111 radio reader proves successful,  
3 Datamatic will replace, at no cost to the Company, all the Firefly #109  
4 radios with Firefly #111 radios. If the Firefly #111 does not meet the  
5 Company's requirements, the Company will seek reimbursement for all its  
6 expenses from Datamatic.

7 Q. Where and why were SCADA systems installed?

8 A. SCADA systems were installed at the booster stations in the Londonderry  
9 Core, the Litchfield Core, the Williamsburg/Stonegate system in Pelham,  
10 the Ministerial Heights and Springwood Hills system in Londonderry, and  
11 the W&E and Hardwood systems in Windham. The SCADA systems allow  
12 the Company to detect and correct system operational problems before  
13 they become major problems.

14 Q. Could you please describe some of the investments made for regulatory  
15 purposes?

16 A. Yes. The Company invested \$71,070 to meet local and State regulatory  
17 requirements. The required improvements included the completion of the  
18 Springwood pumping station for the Town of Londonderry in accordance  
19 with the approved site plan. Consumers Water had constructed the pump  
20 station initially but never completed the required road construction or  
21 landscaping of the station as stipulated in the site plan approval for the  
22 pumping station. The Company also invested in samplings stations and  
23 Chlorine monitors required by the NHDES.

1 Q. What major Capital Improvements do you foresee for the Company, and  
2 what are the estimated costs for these projects, over the next several  
3 years?

4 A. The major projects that will be undertaken and the year that each of the  
5 projects is expected to occur are as follows:

6 Pelham Storage Tank (2005) – \$1,056,000

7 Arsenic Treatment @ the Avery and Farmstead systems - \$254,000

8 New Well for Nesenkeag (2005) - \$45,000

9 Gage Hill Atmospheric Tank replacement (2005) - \$61,000

10 W&E Water Supply Replacement (2006) - \$650,000

11 Q. Are there any other capital improvements you would like to discuss at this  
12 time?

13 A. No.

14 Q. Does this complete your testimony?

15 A. Yes.

16

17