

STATE OF NEW HAMPSHIRE
BEFORE THE
PUBLIC UTILITIES COMMISSION

City of Nashua: Taking Of Pennichuck Water Works, Inc.

Docket No. DW 04-048

DIRECT TESTIMONY OF EILEEN PANNETIER

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1 **I. INTRODUCTION**

2 **Q: Please state your name and occupation.**

3 A: My name is Eileen Pannetier and I am the President/CEO of Comprehensive
4 Environmental, Inc., (“CEI”) a multi-disciplinary environmental engineering and
5 consulting firm with offices in Merrimack, New Hampshire and Milford, Massachusetts.
6 CEI counts as clients more than 65 private and government-owned water systems and
7 public works departments, as well as federal and state regulatory agencies.

8 **Q: What is your educational background and work experience?**

9 A: A resume of my qualifications and that of CEI is attached as Attachment EP-1.

10 **Q: What connection do you and CEI have with Pennichuck Water Works, Inc.?**

11 A: CEI has worked with Pennichuck Water Works, Inc. (“PWW”) since 1997 to assist it
12 with its efforts to improve water quality and watershed protection within the Pennichuck
13 Brook watershed.

14 **Q: What is the purpose of your testimony?**

15 A: My goal is to describe PWW’s exceptional success in implementing watershed protection
16 plans and its overall proactive attitude toward protecting the Pennichuck Brook
17 watershed. I will also describe my own observations with respect to Nashua’s efforts to
18 implement watershed protection, when it had opportunities to do so.

19 **II. PENNICHUCK BROOK WATERSHED BACKGROUND**

20 **Q: Describe the watershed which forms the basis for PWW’s water system serving the**
21 **City of Nashua.**

22 A: The Pennichuck Brook watershed is roughly 18,000 acres in total covering parts of
23 Nashua, Merrimack, Hollis, Amherst and Milford. It is a chain pond system that

1 meanders through these communities, with the lowest elevation ponds at the intakes
2 located at Harris Pond and Supply Pond. Much of the upper watershed is located in
3 Hollis, which has quite low density development. It contains large aquifers that feed the
4 river. The lower portion of the watershed is mostly in densely developed Nashua. The
5 most significant watershed features are heavily traveled Route 101A, which parallels a
6 significant portion of the brook, and the F.E. Everett Turnpike which crosses the brook
7 above Harris Pond. The primary intakes are located in Harris Pond with secondary, older
8 intakes in Supply Pond. A supplemental source of water is pumped into the ponds from
9 the Merrimack River in Merrimack, as needed. A map of the Pennichuck Brook
10 watershed is attached as Attachment EP-2.

11 **Q: Compare the Pennichuck Brook watershed to the sources of other water systems
12 with which you are familiar.**

13 A: The Pennichuck Brook watershed is a riverine system, which includes a river, shallow
14 ponds and wetland areas. It may be compared with Manchester's water system, which
15 uses Lake Massabesic (a shallow lake with surrounding wetlands), Portland, Maine
16 (Sebago Lake, a very large and deep lake), or Cambridge, Massachusetts (multiple
17 reservoirs and shallow ponds).

18 **Q: Does PWW's use of the Merrimack River water create system vulnerability?**

19 A: No. It gives PWW two sources to draw from and in fact increases the system's
20 reliability. During emergencies or natural disasters, such as storms or high winds, water
21 use is typically minimal because at those times customers are not watering lawns much, a
22 factor that is fast becoming one of the largest peak demands for most water systems.
23 Therefore if one water source could not be used for some reason, for example, a big

1 pollution spill, then the other source is likely to be available. Some points in the system
2 are more vulnerable than others, as is true of all water systems, and these have been the
3 focus of Pennichuck's efforts recently in implementing security measures.

4 **III. CEI'S STUDIES AND RECOMMENDATIONS FOR THE PENNICHUCK**
5 **BROOK WATERSHED**

6 **Q: What studies did CEI first conduct for PWW concerning the Pennichuck Brook**
7 **watershed?**

8 **A:** PWW hired CEI for the first time in 1997 to develop a watershed management plan.
9 PWW gave CEI great latitude in its work, with the instructions to come up with an
10 implementable, effective program to deal with water quality threats, both future and past.

11 **Q: What are the challenges to maintain water quality in the Pennichuck Brook**
12 **watershed?**

13 **A:** The primary challenge in this 18,000 acre watershed is that it is an urbanizing watershed
14 with major roadways and dense commercial development. This is occurring in other
15 watersheds throughout the northeastern U.S. The development process involves the
16 construction of roads, parking lots, homes, businesses etc. This construction, both during
17 the actual development and afterwards, can create significant amounts of water pollution
18 and may interrupt the hydrologic cycle significantly enough so as to affect stream and
19 river flows negatively, with much of the runoff rapidly leaving the watershed, unusable
20 for water supply, recreation or fisheries. This problem is so widespread that it has been
21 named by the U.S. Environmental Protection Agency as the No. 1 water quality threat
22 today throughout the U.S. There are better techniques that can be used to prevent these
23 problems, but they are not mandatory in most states, including New Hampshire, and are

1 too infrequently used. So while we environmental engineers know how to prevent much
2 of the threat, getting planning boards, zoning boards, developers and contractors to use
3 these superior techniques is challenging at best, since the problems themselves are not
4 often recognized outside of environmental circles.

5 **Q: Did CEI draw up a report with its plan from these initial studies?**

6 A: Yes it did. The report is attached as Attachment EP-3. It is dated August 1998.

7 **Q: What were the major recommendations of the 1998 plan?**

8 A: The major recommendations, listed in order of importance, included:

- 9 1. Improve storm water
- 10 2. Develop buffer zones
- 11 3. Evaluate sediment depths in the ponds
- 12 4. Work to address transportation impacts
- 13 5. Address agricultural impacts through education
- 14 6. Identify "hot spots" and using educational materials to address these
- 15 7. Provide technical education
- 16 8. Develop an educational program
- 17 9. Update regulatory authority or work out agreements with watershed communities
- 18 10. Develop a comprehensive water quality database

19 **Q: Did the 1998 plan recommend that Pennichuck dredge any of the Pennichuck**
20 **ponds? What is the purpose of dredging?**

21 A: The initial report recommended that the feasibility of dredging be evaluated, because
22 some of the ponds had internal loading of phosphorus from accumulated sediments.
23 While phosphorus is not a regulated chemical for purposes of drinking water quality, it

1 has the risk of creating eutrophication which can impact negatively the taste and smell of
2 water and which can hasten the process by which a pond bottom is filled up. Armed with
3 that recommendation, PWW asked CEI to evaluate dredging the ponds. From that
4 follow-up evaluation, we learned that the amount of sediment on the bottom of the ponds
5 was not as large as had been thought, and the technical constraints were greater than
6 anticipated. Given the environmental concerns and technical constraints, we did not
7 believe it would be worth the exorbitant expense. We recommended that if it were
8 considered, it should only be on a small scale and would need further study. At the same
9 time, PWW was concentrating on its treatment plant upgrades and chose to begin aeration
10 of the ponds instead, which is another established technique to address the internal
11 loading of phosphorus. This has been constructed and is operational.

12 **Q: Of the recommendations in CEI's 1998 initial report, how well did Pennichuck**
13 **implement CEI's recommendations?**

14 A: That plan was finalized in August 1998. Once the plan was developed, PWW then
15 instructed CEI to begin implementing it, which we did. During the implementation
16 phase, CEI conducted the most thorough review we have ever performed of any
17 watershed for a public or private water department of any size, including systems much
18 larger than PWW. CEI studied ten different sub-watersheds of Pennichuck Brook and
19 completed five separate analyses. From that, CEI developed an update of the plan for
20 PWW to implement in order to sustain and improve water quality in the Pennichuck
21 Brook watershed. CEI also worked with PWW to design and bid out a number of
22 construction projects to implement structural recommendations of the subwatershed
23 reports. This includes a project that is one of the most advanced watershed restoration

1 projects in the U.S., in which parking for a 2-acre commercial strip mall next to the
2 Brook was reconstructed to treat runoff effectively through biofilters and other innovative
3 techniques. It is on the cutting edge of watershed technology.

4 **Q: Was everything in the original plan and its amendments implemented?**

5 A: Substantially yes. The status is shown on Figure 6-1 and Table 6-1 (Attachment EP-4) of
6 the 2004 Subwatershed Study of PBS, PBH, PBP, WBS and MB Subwatersheds, which
7 also contained a 10-year update to the program. These new projects are now beginning.
8 A few of the original projects have not been implemented because we could not get
9 permission from the private landowners. For example, CEI recommended some
10 modifications be made to a detention basin on the PC Connection property in Merrimack.
11 Despite a number of contacts with this company, their attorneys ultimately recommended
12 against allowing the project as they did not want any sampling to occur. As a backup
13 plan, we then recommended that PWW contact the individual towns when these private
14 sites come up for redevelopment to let them know that improvements need to be made.
15 In my experience, Pennichuck has always done a good job of monitoring projects up for
16 town review and of asking for improvements. Other projects, like the public education
17 efforts and efforts to influence future development controls, are ongoing.

18 **Q: What updates has CEI made to its 1998 report and how has PWW implemented any
19 further recommendations?**

20 A: That would be the updates of Section 6 referred to above.

21 **Q: Is CEI conducting any further studies on behalf of PWW?**

22 A: CEI is now working on a project that will create a modeled restoration plan for the
23 watershed. The restoration plan will be completed in 2006 and will be the first of its kind

1 in the U.S. (as I have been told by NH DES personnel) to quantitatively assess and
2 model watershed restoration techniques calibrated to real conditions. The subsequent
3 implementation could take place over the next ten years. We are also working on the
4 permitting and design of what will likely be the largest protection effort yet, restoration
5 of the Tinker Road detention basin that abuts Harris Pond. This detention basin has
6 rapidly filled in, due to several factors: the surrounding developments, construction
7 erosion and road sanding by Nashua and NH DOT. It needs restoration to provide an
8 effective control for about 150 acres of watershed that is tributary to Harris Pond.

9 **IV. COMPARATIVE QUALITY OF PWW'S WATERSHED PROTECTION**

10 **Q: Describe the quality of PWW's efforts to maintain the watershed. How does PWW**
11 **stack up against other systems, public and private, in your experience?**

12 **A:** In short, I think most state and federal officials involved in source water protection would
13 agree that Pennichuck's program is one of the best, if not the best, watershed program in
14 the region today. PWW is the best for-profit company in terms of watershed protection
15 that I have encountered, and it is better than any government-operated system of its size.
16 My experience includes that of performing work for or reviewing many municipal and
17 private water company watershed protection efforts across the Northeast, and performing
18 work for EPA Headquarters reviewing many programs from across the U.S. as part of a
19 Blue Ribbon Panel studying the New York City watershed protection program. In my
20 experience, there are well-run watershed management programs in both municipal and
21 private water companies, and there are poorly run watershed protection plans in
22 municipal and private companies. The distinction between good and bad providers is not
23 based upon government or private ownership.

1 **Q: What is it about PWW's watershed protection commitment that makes you rate it**
2 **so highly?**

3 A: Pennichuck's program is comparable to or better than many of the programs from
4 progressive water suppliers in New England, yet it is not mandated by any law or
5 regulation. My estimate is that there are probably only 2 or 3 in 10 water suppliers that
6 have a carefully planned watershed management plan at all, and few could compete with
7 Pennichuck's efforts to address these common problems that all water systems face. In
8 fact I have never seen any other water system that implemented their plan more
9 aggressively or effectively, and most have their plans sitting on the shelf collecting dust.

10 **Q: PWW has sold off some of its land to Southwood, and at least one City of Nashua**
11 **employee has stated that PWW should have purchased additional watershed land**
12 **over the years. Describe how those decisions have affected the quality of the**
13 **Pennichuck Brook watershed.**

14 A: I do not believe this decision would significantly affect water quality or quantity. The
15 amount of land involved, roughly 500 acres, was developed with the best runoff controls
16 known combined with careful erosion control. As to land acquisition, few water systems
17 acquire land just for watershed protection aside from a handful of large systems that have
18 treatment waivers. These systems, by nature, have hydrologic advantages because of
19 their large reservoir size and the residence time of the water. That advantage has allowed
20 them to meet the stringent treatment waiver criteria. Since these systems may save tens
21 of millions of dollars in avoided treatment costs, a few million dollars of land acquisition
22 seems minor. For those systems, like PWW, that do not have this inherent advantage of a

1 massive water body, the best option is a proactive watershed management program,
2 which is exactly what PWW has.

3 **Q: If PWW had maintained what it had and acquired more land over the years,**
4 **wouldn't this system be eligible for a treatment waiver, potentially with great**
5 **savings to the customer?**

6 A: No. In my experience, a watershed like Pennichuck Brook could never have met this
7 criteria no matter how much land was acquired. Pennichuck Brook is a riverine water
8 system, so drinking water by necessity will always contain color and turbidity (i.e.
9 suspended solids) requiring filtration. Even if the entire 18,000 acre Pennichuck Brook
10 watershed had been protected from development, and Route 101A is removed, the color
11 and turbidity issues would remain. Systems such as Manchester's Massabesic Lake
12 (which contains much protected land surrounding it) require filtration because of the
13 shallow nature of the lake and extensive wetlands, both of which create color and
14 turbidity issues. Only in rare systems with large water bodies, like Portland's Lake
15 Sebago, can filtration arguably be avoided. Given that the Pennichuck Brook watershed
16 requires filtration, the gains to be achieved through the prevention of development within
17 any location within the watershed are very much case-specific and often would result in
18 only marginal differences at best. A much more pragmatic approach is to control runoff
19 and erosion, which has been the major focus of PWW's watershed protection efforts.

20 **Q: In terms of compliance with state environmental controls for drinking water**
21 **quality, how does PWW stack up?**

1 A: I have regular contact on behalf of my clients with the New Hampshire Department of
2 Environmental Services. The DES regularly praises the watershed protection efforts of
3 Pennichuck.

4 **V. NASHUA'S EFFORTS TOWARD WATERSHED PROTECTION**

5 **Q: Have you had any experience with the City of Nashua's efforts to protect the**
6 **Pennichuck Brook Watershed?**

7 A: Yes, two situations come to mind from my personal experience. CEI was a subcontractor
8 to VHB as the general contractor in a Nashua Regional Planning Commission study three
9 years ago to look at the Route 101A corridor through Nashua and beyond, all of which is
10 located in the Pennichuck Brook watershed. My understanding was that the same team
11 had been selected by NRPC and DOT to then perform the preliminary design based upon
12 that study. CEI's portion was to provide specific watershed protection designs along
13 Route 101A in sensitive areas crossing or running near Pennichuck Brook. The City of
14 Nashua elected instead to take over the project from DOT and Nashua rebid it recently.
15 Nashua's request for proposal did not even mention water supply protection as one of the
16 tasks.

17 The second situation of which I am aware involves the Alternative Stormwater
18 Management Manual. This was a joint project of the Nashua Department of Public
19 Works, PWW, and the New Hampshire Department of Environmental Services. PWW
20 and Nashua each funded \$25,000 and the state funded \$40,000 for this study. The study
21 was to focus on reducing transportation impacts and would benefit both the water supply
22 watershed and Nashua's combined sewer overflows in other areas of the city. I attended
23 meetings over a year-long period with PWW, Nashua DPW and Nashua Department of

1 Community Development. Various sites around Nashua were identified and CEI
2 prepared alternative designs for these sites that would improve the site in terms of
3 reducing runoff to protect water quality in the Pennichuck watershed and to reduce
4 Combined Sewer Overflows. Nashua refused to consider any sites in the Pennichuck
5 watershed, instead insisting that all of them be in CSO areas only. CEI presented many
6 conceptual designs and made a number of recommendations over the year long period,
7 receiving input from the Nashua City departments on these recommendations and
8 designs. Nashua DPW did not seem interested in those recommendations, and to my
9 knowledge they have not been implemented. The focus of Nashua DPW in this study
10 was in avoiding spending additional funds for this effort.

11 **Q. Does this conclude your testimony?**

12 **A. Yes.**