
**A Review of
Financial and
System Viability of
Connecticut's Small
Community Water
Systems Prepared
for the State of
Connecticut Public
Utilities Regulatory
Authority**

Submitted By the Townsley
Consulting Group, LLC
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EXECUTIVE SUMMARY

This report has been prepared for the State of Connecticut Public Utilities Regulatory Authority (PURA) in response to Section 47 of Public Act No. 13-298 *An Act Concerning Implementation of Connecticut's Comprehensive Energy Strategy and Various Revisions to the Energy Statutes* ("The Act"), which called for preparation of a study of the financial capacity and the system viability of small community water companies not included as part of a water supply plan pursuant to section 25-32d of the general statutes. Section 47 of The Act established major objectives of the study to include review of:

- (1) Potential factors affecting the costs necessary to maintain and operate such systems safely and effectively, and*
- (2) The potential benefits that could be derived from creating a financial assistance account to help such systems defray the costs of essential infrastructure improvements.*

To assist in its compliance with Section 47 of The Act, PURA retained the management consulting services of the Townsley Consulting Group, LLC of Old Saybrook, Connecticut.

Issues Facing Small Water Systems

Throughout the United States, small water systems typically present a challenge for regulators and policy makers. Due to their size, making major system improvements can be problematic and keeping up with increased health and safety regulations can be difficult due to their lack of economies of scale. Furthermore, many systems are associated with housing projects, condominiums or smaller residential single family home developments or housing clusters where the water system was never intended to be the main focus. The water system revenues for these systems may not always be sufficient to meet the systems' needs and their technical and managerial capacities may also be constrained. Townsley Consulting Group, LLC (TCG) worked with the staffs of

PURA and the State of Connecticut Department of Public Health (DPH) to develop relevant information regarding the viability of small community water systems in Connecticut.

The Study Investigative Process

The target group of small community water systems for the study was those systems serving populations of less than 1,000, which are not required to file water supply plans in response to State Statute Section 25-32d. A review of DPH's data revealed that there are approximately 348 such systems in Connecticut serving a total estimated population of about 56,400 (or comparable in total population to a town about the size of Manchester, Connecticut).

To efficiently gather operational and financial information for this analysis, TCG issued a mail survey to all 348 small community water systems (CWSs) in the target group. The survey solicited financial, technical, and qualitative information from the systems' owners and managers. The survey elicited a response rate of about 30%. In addition, TCG selected 65 CWSs on a random basis from the 348 member target group for an evaluation of DPH triennial infrastructure inspection reports. The distributions of the mail survey responses and the randomly selected inspection reports compared closely with distributions in the total population in terms of both the housing types and the frequency of the system sizes. Therefore, the results of the mail survey and the inspection report review are believed to be highly representative of the attributes of the total CWS population.

TCG also submitted discovery requests to the major investor-owned water utilities, the regional water authorities, and some municipal water systems regarding their acquisition activities over the past five years and their views on issues related to future acquisitions of CWSs. A state statute (Sections 16-262n & 16-262o) provides for the transfer of ownership of CWSs both on a voluntary and involuntary basis. The CWSs sometimes reach a point where it is not possible for them to carry on either financially or managerially. Often the most viable solution is for the CWS to be acquired by or

consolidated with a larger system. Acquisition activity for CWSs has been brisk over the past 5 years, with the larger investor-owned systems completing over 60 acquisitions. These ownership transactions can be quite time consuming and costly from a regulatory perspective and can sometimes take years to complete. The Legislature has approved *Public Act 13-78* which provides certain regulatory policies and incentive mechanisms to increase interest in water system consolidation activity.

TCG also reviewed the DPH's Draft Intended Use Plan (IUP) to determine the funding being allocated to assist the CWSs serving populations of 1,000 or less. The IUP describes the process by which the State's Safe Drinking Water Act Revolving Loan Fund Resources are allocated to water systems of all sizes including the CWS, and it identifies which projects proposed by the water systems will likely receive funding. This revolving loan fund is the major source of supplemental funding available to water systems of all sizes. The fund is subsidized in part by the Federal Government and the fund's allocation priorities are subject to Federal guidelines and policies which determine in part the level of subsidies the Federal government will allocate to each State.

Finally, TCG reviewed DPH violation data for the CWSs to ascertain the nature and frequency of their violations.

Significant Findings from this Review Include:

- The major cost factor identified by the CWSs is the cost of regulatory compliance, including the cost of water testing and infrastructure improvements needed to achieve regulatory compliance. 70% of the survey respondents identified regulatory compliance as a "significant" or "very significant" cost component. For some systems the cost of the water system testing requirements consumed a large portion of their total available annual financial resources. As regulatory requirements for drinking water safety are increased, particular at the Federal level, the financial viability of systems that are currently just getting by could become increasingly challenged.
- The cost of preventative maintenance is the second most significant cost element of the CWSs' operations. Well over 50% of the survey respondents identified preventative maintenance as a "significant" or "very significant" cost factor. Other cost factors identified by about 20% to 35% of respondents as "significant" or

“very significant” included: production costs, distribution system costs, water treatment, water storage, labor, administration and financing.

- The vast majority of the CWSs are currently providing adequate water service. However, based on the review of a random selected sample of DPH’s inspection reports most CWSs need more routine maintenance than they are receiving. About 6% are in poor condition, not providing adequate service, and need substantial infrastructure improvement work.
- None of the CWSs for which DPH inspection reports were reviewed appeared to be well positioned to comply with the US EPA Groundwater Rule and could be financially exposed to additional infrastructure improvement costs or escalating requirements for drinking water testing protocols.
- The CWSs have capital needs over the next five years that based on the survey results, could approach \$50 million. Interestingly, fewer than about 20 systems could account for about 60% of the estimated capital needs. And fewer than 40 systems could account for about 85% of the estimated capital needs. Approximately half of the CWSs though would require only about 15% of the total estimated capital needs and around 40% of the CWSs reported no need for capital infusions over the next 5 years.
- Of the draft IUP’s allocation of \$62.4 million for the 2014 fiscal year, only about \$1.2 million is assigned to the 348 CWSs for system improvement. Of the \$71.2 million in the draft IUP for the 2015 fiscal year no money is allocated to the 348 CWSs for system improvements. The current IUP process employed to allocate the financial resources available through the State Safe Drinking Water Act Revolving Loan will likely not be able to meet the financial needs of many of the CWSs over the next 5 years.
- 19% of the CWSs reported that they are “not” currently collecting (or obtaining) sufficient revenues to meet their daily operational needs. Nearly 30% of the CWSs who were unable to meet their daily financial requirements were condominium and apartment complexes and another 30% were other residential housing types typically cluster type single family housing.
- Of the 80% who are covering their daily operational expenses about 50% are able to also escrow some funds for future maintenance needs and emergencies. So, about 40% of the target population is financially operating on a day- to- day basis and are, therefore, financially vulnerable if unexpected infrastructure repairs and emergencies arise. However, in total approximately 60% of the CWSs are

potentially financially vulnerable to unexpected infrastructure repairs and or increased regulatory compliance costs.

- About 40% of the total CWS population appears to be solid enough financially to both meet their daily financial needs and escrow some funds to offset future liabilities.
- 25% of the survey respondents indicated that they would benefit from a State supplemental financial account and nearly 40% said they would not benefit and 35% were not sure. Factoring the survey results up to the total population would indicate that the capital needs of those responding definitively yes (25%) could be close to \$ 9 Million of which about \$ 5 Million would be for individual system financing requests in excess of \$1 Million each.
- The CWS acquisition initiatives by Aquarion Water Company (Aquarion) and the Connecticut Water Company (CWC) (over 60 in total) appear not to have had significant rate impacts for their existing customers over the past 5 years. However, going forward that may change if the acquired systems require proportionately more post acquisition rehabilitation work on average. The post-acquisition investment costs required to rehabilitate acquired systems have been significant. If the United Water acquisition is included the average for Aquarion is 21% of the original acquisition costs; excluding the United Water acquisition the post acquisition costs for Aquarion would be 79%. The CWC's post acquisition costs have averaged 165% of the original acquisition costs. It is clear that the CWSs acquired thus far have needed considerable infrastructure work.
- Over 56% of the survey respondents would not consider being acquired by a larger water system. This indicates that the consolidation or acquisition of the CWSs may have limits since many systems will prefer to remain independent as long as they can do so.

A listing of all of the pertinent study findings, with a detailed tabulation of the survey results, can be found in Appendix A.

In summary the review of the CWSs indicates that to date the case by case oversight approach being employed by PURA and DPH has been effective as most of the CWS are providing adequate drinking water at present and the consolidations of CWS

that have occurred in the past five years has resulted in minimal rate impacts for the existing customers of the larger acquiring companies. The impact of increasing regulatory requirements related to water quality do though pose risks to the continued viability of those CWS that are struggling to maintain sufficient income to meet ongoing day to day operational expenses. Continued efforts to enable the consolidations of CWSs with larger systems can be beneficial in improving the reliability, level of service quality and the safety of the drinking water supply (for even larger systems) though the cost of water service for acquired CWSs may increase. The capital infusion needs for many CWSs over the next five years may be quite modest, at or below \$1000 per unit of population.

Based on our review we believe that the following recommendations could enhance the strategic management and regulatory oversight of the CWSs to prevent the creation of new small systems which may be non viable in the intermediate term and to avoid an outcome where a significant number of the existing CWS could find themselves in a state of crisis over a short period of time:

1. To try and avoid creating future problematic CWSs situations, attention needs to be given to ensuring the financial adequacy of newly created CWSs. PURA should consider implementing an initial rate setting policy for new CWSs requiring some regulatory oversight to help ensure that the initial established rates are cost-based (i.e. cover expenses and provide a reserve fund for improvements and emergencies).
2. To enhance the sustainability of the smaller CWSs, a funding mechanism that is separate from the existing State Drinking Water Revolving Loan Fund could be useful. Not all of the CWSs are going to be attractive or willing acquisition opportunities for consolidation with larger water companies. A separate funding mechanism, with criteria geared to fund smaller scale infrastructure improvements which can be administrated in a manner suited for CWSs with limited technical and administrative capacities would be beneficial.
3. PURA and DPH should explore the streamlining of regulatory processes associated with uncontested water system acquisitions. The need for re-permitting of the acquired CWS's infrastructure, when there is no planned change in infrastructure use post-acquisition for the foreseeable future

needs to be reevaluated as there are procedures in state statutes to address the abandonment (or changes in use) of water sources and infrastructure.

4. A concerted effort is needed to identify those CWSs that could have high future capital requirements or that are unable (or are struggling) to obtain adequate financial resources to meet their daily operational and maintenance needs and to provide them heightened oversight before “a” service quality or deliverability problem(s) abruptly emerge that could limit their options.
5. A process should be developed and implemented that uses specified criteria (e.g. water quality problems, frequency of outages, etc.) to identify CWSs that are considered “fair” but, based on recent operating performance, have a high risk of system failure. This process would be proactive and involve both DPH and PURA working with the troubled CWSs to develop a corrective action plan that sets priorities to try and limit customer rate shock. This process would act as a safety net to avert a CWS crisis situation.
6. The current DPH triennial CWS inspection protocol mainly addresses issues pertaining to water quality, as required by Federal Law. It would be “highly” beneficial if data could also be collected on the condition of the water distribution infrastructure regarding system pressure, general condition, losses, etc. The triennial CWS inspection process also provides an excellent opportunity to monitor the future capital needs of the systems and collect some general financial information pertaining to the financial viability of the CWSs. Collecting this additional information could help to quickly determine whether heightened regulatory oversight by PURA and DPH is warranted, including perhaps the need for rate (or revenue) regulation.

I. INTRODUCTION

Townsley Consulting Group (TCG) has undertaken this study on behalf of the State of Connecticut Public Utilities Regulatory Authority in Docket No. 13-08-13 in compliance with Section 47 of Public Act No. 13-298 *An Act Concerning Implementation of Connecticut's Comprehensive Energy Strategy and Various Revisions to the Energy Statutes* ("The Act"). To conduct an "Investigation of the Financial and System Viability of Small Water Companies" for the purpose of studying the financial capacity and the system viability of small community water systems (CWSs) not included as part of a water supply plan pursuant to Section 25-32d of the General Statutes of Connecticut (Conn. Gen. Stat.). Section 25-32d requires water companies which serve over 1,000 people to produce long term water supply plans in which the water company must plan for adequate supply to meet projected demand for the next fifty years.

Given that CWSs serving populations less than 1,000 do not have to file long range plans and are not typically rate-regulated, finding useful data on their financial situation and the condition of their infrastructure is difficult. To address this subset of water systems and better understand their needs, the target group for this study is CWSs serving populations fewer than 1,000.

The major objectives of this study are:

- To identify potential factors affecting the costs necessary to maintain and operate CWSs safely and effectively.
- To identify potential benefits that could result from creating a financial assistance account to help CWSs defray the costs of essential infrastructure improvements.

The first step in this process was defining the target group for investigation. There are currently 551 CWSs on the Department of Public Health's CWS list. Of these, 455 serve a population of less than 1,000. Of the 455, 54 are owned by Aquarion Water Company, 42 are owned by the Connecticut Water Company, and 11 are owned by the Southwestern Connecticut Water Authority for a total of 107. Since the 107 CWSs are owned by entities that have the technical, financial, and managerial capacity to ensure their viability, they have been excluded from this study, leaving a target group of about 348 CWSs.

To obtain financial, operational and qualitative data on the CWS target group, TCG prepared a mail survey instrument. Due to uncertainty about the response rate that the survey would elicit, a mail out to the entire target group was undertaken to maximize the potential for a robust set of information to analyze. TGC received questionnaire responses during the period from late December 2013 through January 28, 2014. 100 systems responded to the survey, which represents a 29% response rate. In our experience, this is an excellent result for a survey of this type.

In addition to the survey, TCG undertook the following actions:

- Selected 65 CWSs on a random basis from the 348 member target group list for evaluation of Department of Public Health (DPH) inspection reports on file.
- Submitted discovery requests to the major investor-owned water utilities, the regional water authorities, and some municipal water systems regarding their acquisition activities over the past five years and their views on issues related to future acquisitions of CWSs.
- Reviewed the DPH's Draft Intended Use Plan to ascertain the funds being allocated to assist the CWSs serving populations of 1,000 or less.
- Reviewed DPH violation data for the CWSs.

With all of this information in hand, TCG was able to efficiently characterize the CWS systems and their needs in a fairly comprehensive manner.

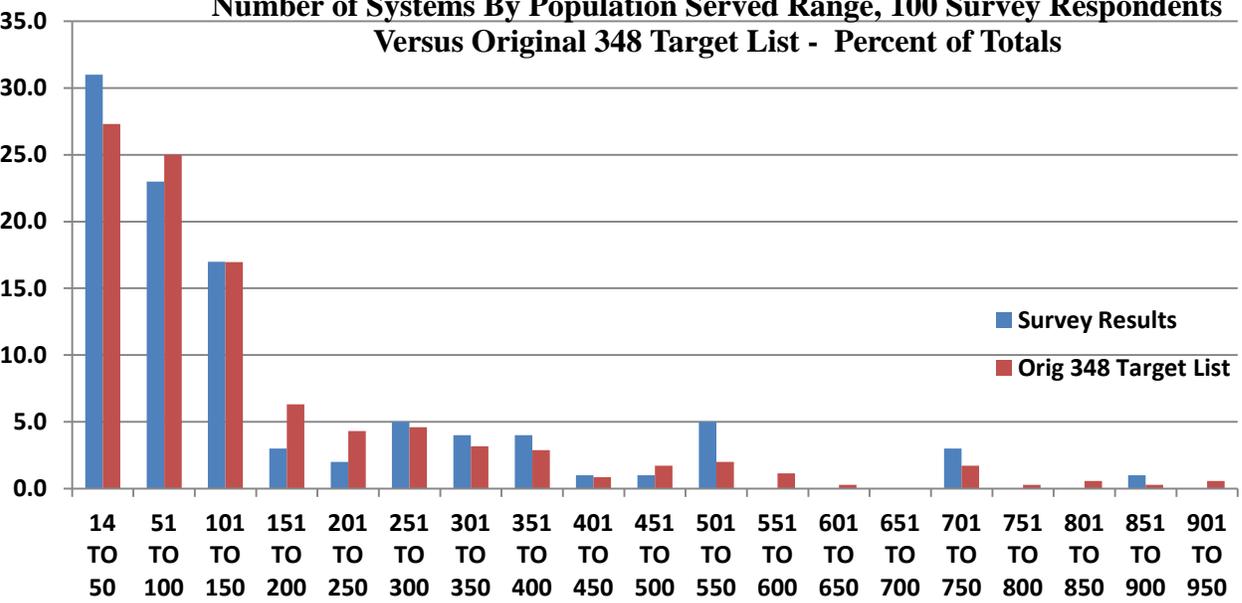
II. CHARACTERISTICS OF THE SMALL COMMUNITY WATER SYSTEMS

Distribution by Population Served

It was important that the results from the 100 CWSs that responded to the survey questionnaire provide a representative sample of the target group of 348 systems. Information that was available for the 348 target group systems included the distribution by population served and the distribution of the population per service connection. If the 100 systems that responded to the survey questionnaire differed along those characteristics, the extrapolation of the survey results to the target group of 348 systems could be of limited usefulness.

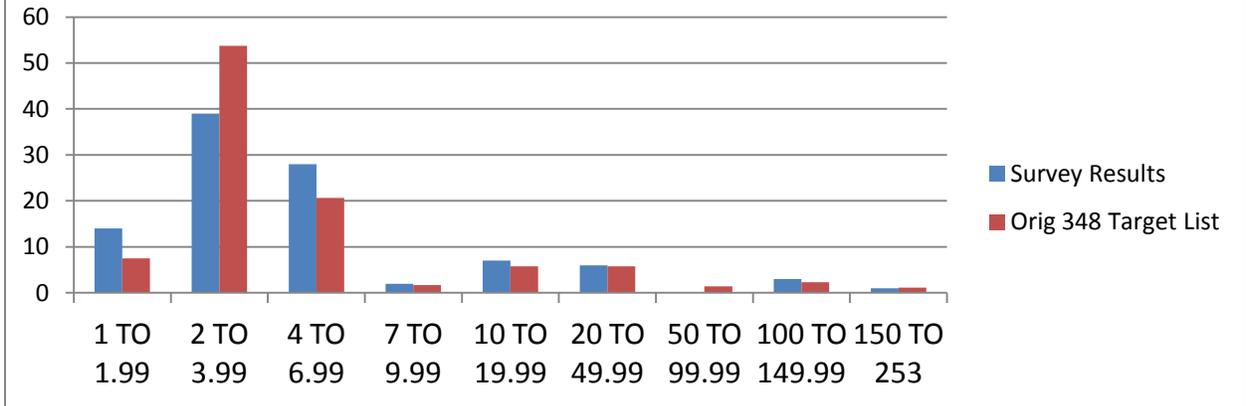
Exhibit II-1 shows the distribution by population served cohorts for the 100 systems providing survey responses compared with the 348 systems in the target group. Since there is a high degree of representation across the population served cohorts, the survey results can be relied upon as a representative sample of the target 348 systems. This observation is further confirmed by a comparison of the average population served per system, where the 100 systems providing survey responses serve 167.9 customers versus 162.1 customers for the 348 target group systems.

Exhibit II-1
Number of Systems By Population Served Range, 100 Survey Respondents
Versus Original 348 Target List - Percent of Totals



Further evidence of the adequacy of the 100 systems providing survey responses is shown in Exhibit II-2, where the population per service connection is shown for the 100 surveyed systems versus the 348 target group systems. As shown in the exhibit, the distribution of the surveyed systems is similar to that of the 348 member target group.

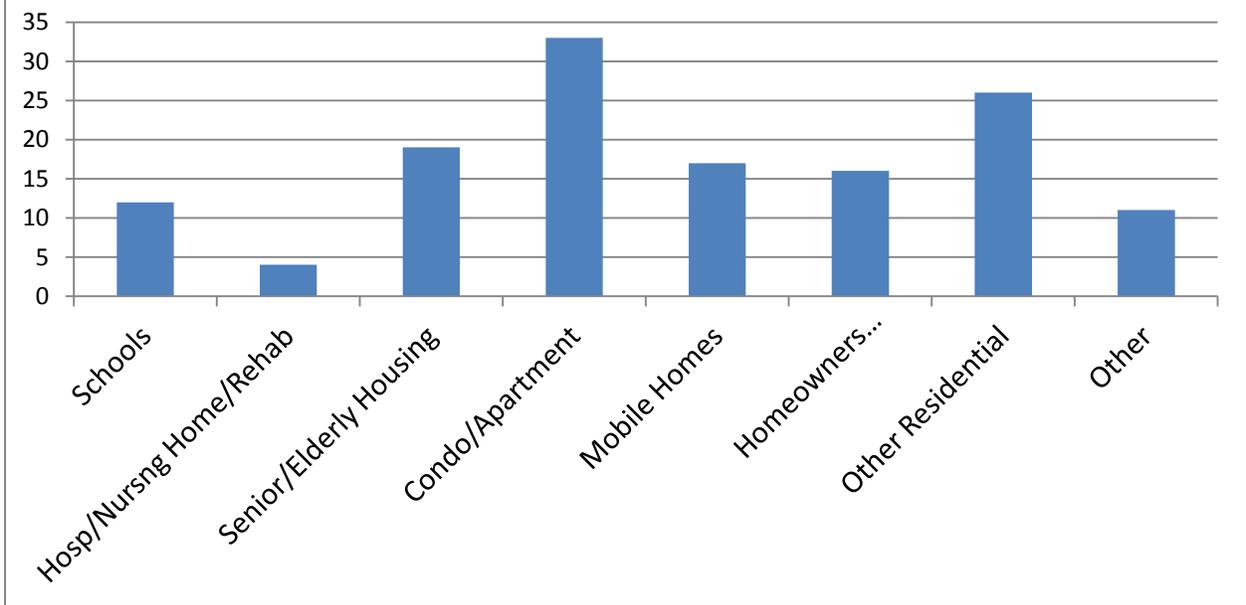
Exhibit II-2
Number of Systems by Population Per Service Connection Range
100 Survey Respondents vs Original 348 Target List
Percentage of Totals



Distribution by Housing Types

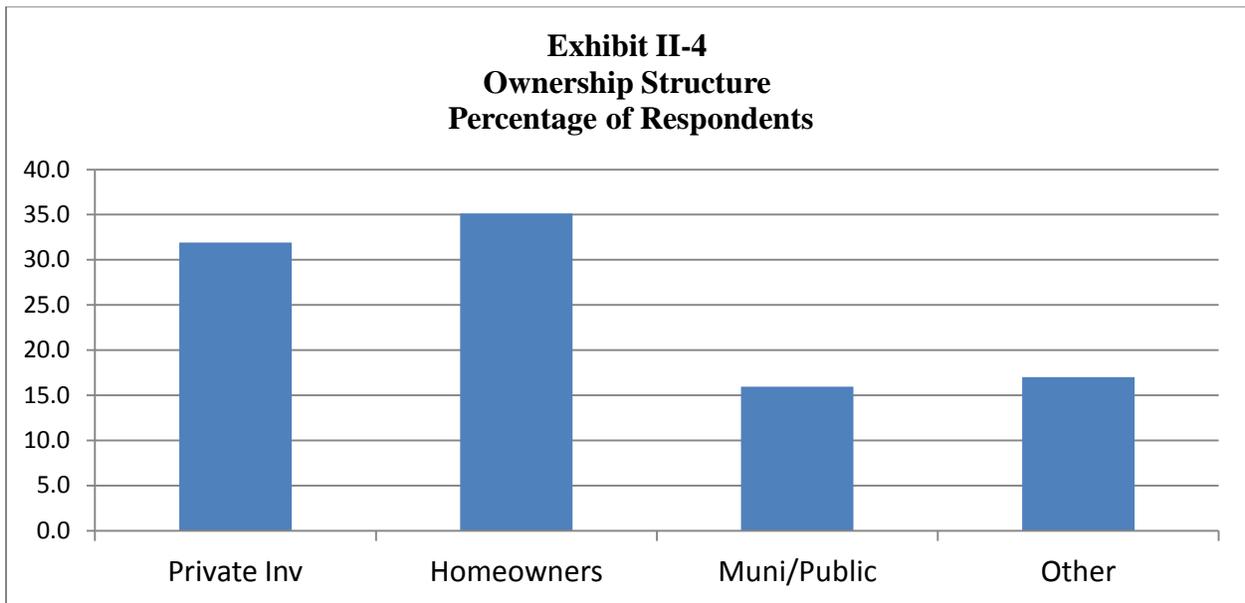
The number of housing (customer) types served by the 100 systems providing survey responses is shown in Exhibit II-3. Several of the responding systems serve more than one type of housing. As shown, the categories of Condo/Apartments along with Other Residential are the dominant types of housing served by the CWSs.

Exhibit II-3
Number of Customers of Various Types Served by Systems



Ownership of Small Community Water Systems

Approximately two-thirds of the responding systems indicated that ownership of their systems was by homeowners or private investors. The total ownership structure is shown in Exhibit II-4.

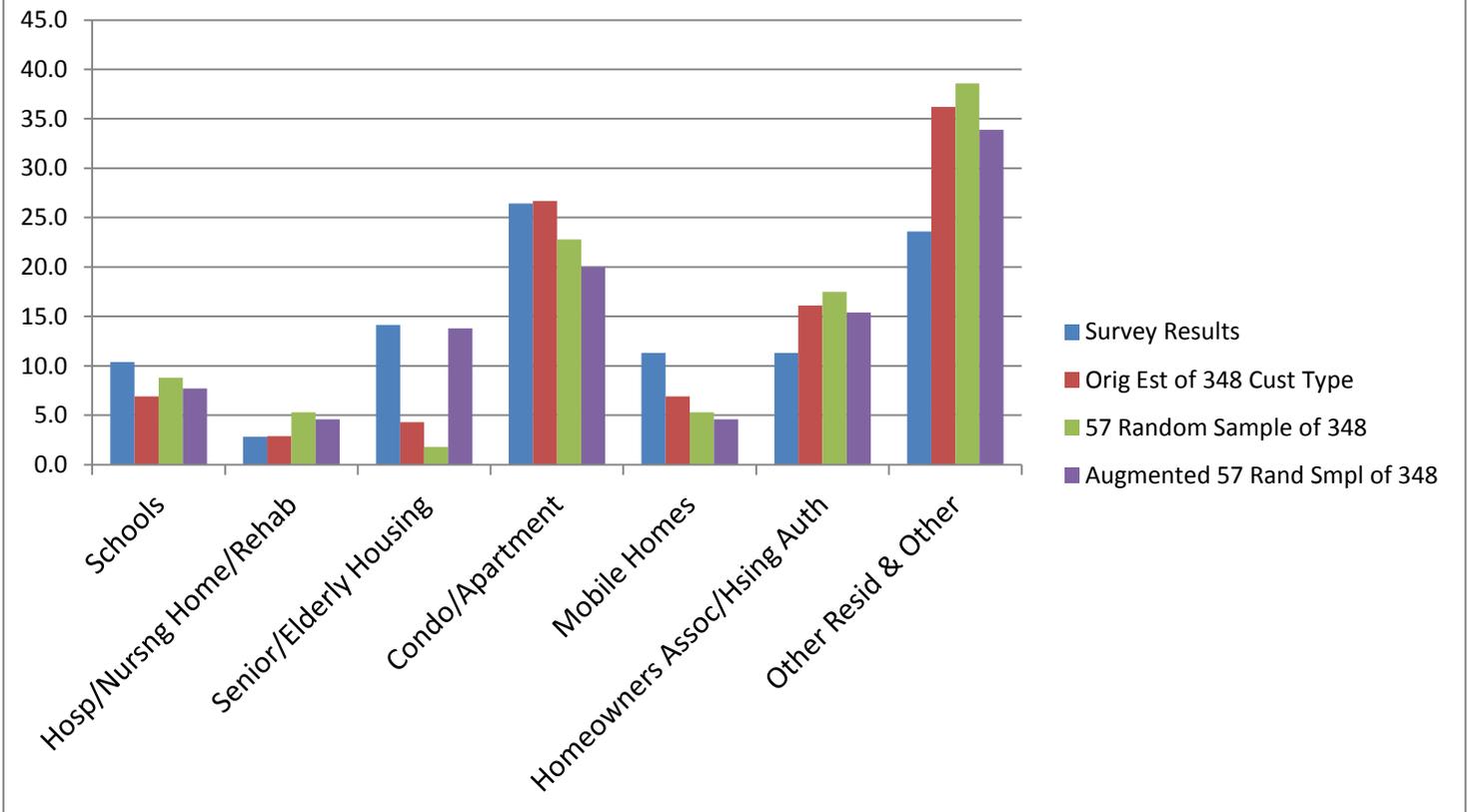


Comparisons of the Mail Survey and Inspection Reports of Random Sample With the Target Group Systems

Exhibit II-5 shows a comparison of the customer types served for the survey respondents versus the 348 target group systems. For the target group, this information was not readily available. Therefore, an estimate of the customer type served was ascribed to each system based upon the system's name (e.g. XYZ Mobile Homes System would be classified as serving "Mobile Homes" whereas XYZ Water Supply System would be classified as serving "Other"). Also shown in the Exhibit is the distribution of customer types served for a random sample of the 348 target group systems that was drawn for the purpose of reviewing the DPH Triennial Inspection Reports (see Section

V). To address possible concerns about the financial viability of CWSs serving senior housing facilities, TCG augmented the sample by randomly selecting an additional eight inspection reports specific to that group, bringing the total number of inspection reports to be reviewed to 65.

**Exhibit II-5
Comparison of Customer Types Served
Percentage of Totals**



Small Community Water System Coordination Process

In 1985 Connecticut passed Public Act 85-535 to provide for a coordinated approach to its long range water planning effort. To help accomplish this, Connecticut divided the state into seven management areas. Each management area was then to establish its own Water Utility Coordinating Committee (WUCC), comprised of representatives from public water systems and agencies. The management areas include: the Housatonic, the Upper Connecticut River, the South Central, the Southeast, the Northeast, the Northwest, and the Southwest. To date only four of the management areas have established WUCCs (the Housatonic, the Upper Connecticut River, the South Central, and the Southeast). Under this WUCC process, each management area's water utility representatives and local officials use a consensus approach to identify water-related issues and develop a long range plan to resolve them.

One of the issues identified by this coordinated planning approach was how to eliminate the creation of new non-viable CWSs (similar to those in the 348 member target group). To help address this issue, established WUCCs assigned Exclusive Service Areas¹ (ESA) to large public water companies in their respective management areas having the needed management, technical, and financial capacity to help ensure the viability of new CWSs. Under this process a new CWS built in the ESA of a large public water system would be owned and operated by that large public water system via a main extension. If a main extension was not practical, then the large water system would operate the new CWS as a satellite operation (via an agreement or ownership).

The Connecticut statute quoted below was created as a companion process to that described above and is administered jointly by PURA and DPH:

Section 16-262m Certificate of Public Convenience and Necessity (CPCN) for Small Water Companies.... (b) No water company may begin the construction of a water supply system for the purpose of supplying water to fifteen or more service connections or twenty-five or more persons for at least sixty days in any one year, and no person or entity, except a water company supplying more than two hundred fifty service

¹ Exclusive Service Area is an area where the right to provide public water service has been awarded to one system.

connections or one thousand persons, may begin expansion of such a water supply system, without having first obtained a certificate of public convenience and necessity....²

This CPCN process was intended to work in conjunction with the efforts of the WUCC planning process, creating an orderly expansion of water supply service in all geographic regions of Connecticut and preventing the continued creation of new undercapitalized CWSs.

The implementation of the WUCC process in several of the seven management areas has been slow. To try and address this, DPH organized the WUCC Chairs Advisory Group to assess the WUCC planning process and advise DPH on the potential for consolidating management areas. The group believes the WUCC process should be saved and has recommended a consolidation process of management areas that considers today's demographics, water company consolidations, and the adequacy of supply data from DPH's on-going evaluations. The group also believes that water system ESAs should not be approved without the respective water systems first demonstrating that they possess an adequate supply of water and a viable service plan.

DPH plans to update existing WUCC management areas via consolidation. However, a public hearing will be required to effect such a management area change and, if approved, Connecticut could benefit from a more manageable number of WUCCs and improved coordination of WUCC plans.

Since the Certificate of Public Convenience and Necessity (CPCN) process requires developers to work with water system ESA providers, where assigned, when creating new CWSs, the WUCC consolidation effort will hopefully result in the completion of the statewide assignment of ESAs and help to ensure the long-term reliability and viability of public water systems. **However, in the interim new CWSs will continue to be created and a process will need to be in place to help ensure their continued viability.** As part of the CPCN process, a review is done to help ensure that a new CWS has the needed management, technical, and financial capacity to operate effectively, but this review needs to be augmented to include a formal initial and long-term rate setting process. This will help to ensure that new CWSs not owned or operated

² General Statutes of Connecticut Volume 5, Title 16, Chapter 283, Section 262m.

by a large water system ESA provider will establish initial rates that are cost-based (cover expenses and a needed reserve fund for improvements and emergencies) and are maintained at an appropriate level prospectively.

CWS Monitoring Process

Once a CWS begins providing service to customers DPH is charged with monitoring the quality and adequacy of the drinking water being provided. It is responsible for implementing and enforcing provisions of the SDWA through state statutes and regulations. The Drinking Water Section (DWS) is part of DPH's Regulatory Services Branch and administers the statewide drinking water program associated with the SDWA. DWS is responsible for conducting sanitary inspections of the water plant facilities once every three years for all CWSs to help ensure compliance with the SDWA.

Per [Connecticut General Statute Section 16-20](#), PURA "can" review the rates for "a small private community water system" serving less than a population of 1,000.

However, this is quite rare.

Recommendation

1. To try and avoid creating future problematic CWSs situations attention needs to be given to ensuring the financial adequacy of newly created CWSs. PURA should consider implementing an initial rate setting policy for new CWSs requiring some regulatory oversight to help ensure that the initial established rates are cost-based (i.e. cover expenses and provide a reserve fund for improvements and emergencies).

Overview of the Intended Use Plan (IUP) and Fund Allocation Process

Connecticut's current IUP covers State Fiscal Years (SFY) 2014 and 2015 (the period July 1, 2013 to June 30, 2015) and can be found at the following hyperlink (http://www.ct.gov/dph/lib/dph/drinking_water/pdf/draftintendeduseplan_ffy2013_2014.pdf). Funds for the IUP are based on the annual expected federal grant money; a 20% state match of the expected federal grant money; and other sources of funds, such as unliquidated obligations and loan repayments from prior years. For SFY 2014 and 2015

the IUP has funding available for water system projects totaling \$62.4 million and \$71.2 million, respectively. This represents about 80 projects for SFY 2014 and approximately 20 projects for SFY 2015.

Every two years the DPH solicits planning, design, and construction projects from community water systems, both privately and publicly owned, and non-profit, non-community water systems for funding under the Drinking Water State Revolving Fund (DWSRF) program. In developing the point ranking system for selecting projects to receive funding, DPH has made quality and adequate quantity of drinking water the highest priority in an effort to provide maximum public health benefits. The Safe Drinking Water Act (SDWA) Amendments of 1996 also requires that, to the extent that there is a sufficient number of eligible project applications, not less than 15% of the available funding shall be dedicated to small systems serving populations less than or equal to 10,000.

DWSRF Access and Outcome for Small Community Water Systems (CWSs)

TCG found that of the \$62.4 million for SFY 2014 only 1.2%, or \$737,000, was allocated for emergency generators and another approximately 1%, or \$506,000, was designated for filtration, tank, valve, and main projects for the 348 member target group. In addition, TCG found that of the \$71.2 million for SFY 2015, no money was allocated to the 348 member target group for improvement projects.

As indicated by the survey results, only 15% of the respondents had applied for funding under the DWSRF program. Of those who applied almost 70% indicated that they received a loan. Although about 20% of the respondents indicated that they had no need for money from the DWSRF program, about 8% of the respondents indicated that they did not know such funding existed or thought that applying for such funding was too expensive. In addition, about 60% of the respondents indicated a need for a capital infusion in the amount of about \$14 million over the next five years. This represents about \$5.5 million for mains, \$.6 million for supply, and \$2.9 million for water treatment, \$4.2 million for pumping, and \$.8 million for storage. Extrapolating this, based on the

ratio of the 29% survey sample, results in a \$48 million overall capital infusion need for the 348 member target group. Based on this information, it is apparent that the 348 member target group has a need for low cost financing that would be available through participation in the DWSRF program.

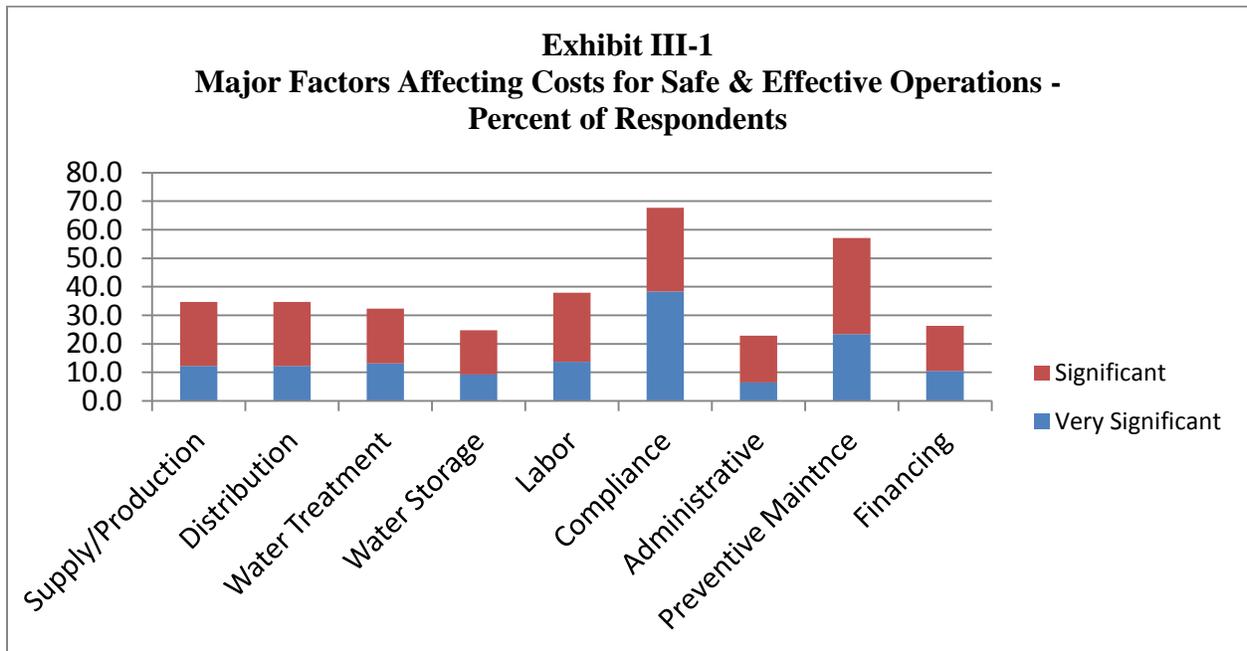
Recommendation

2. To enhance the sustainability of the smaller CWSs, a funding mechanism that is separate from the existing State Drinking Water Revolving Loan Fund could be useful. Not all of the CWSs are going to be attractive or willing acquisition opportunities for consolidation with larger water companies. A separate funding mechanism, with criteria geared to fund smaller scale infrastructure improvements which can be administrated in a manner suited for CWSs with limited technical and administrative capacities would be beneficial.

III. FINANCIAL CHARACTERISTICS AND NEEDS OF THE SMALL COMMUNITY WATER SYSTEMS

Major Cost Factors

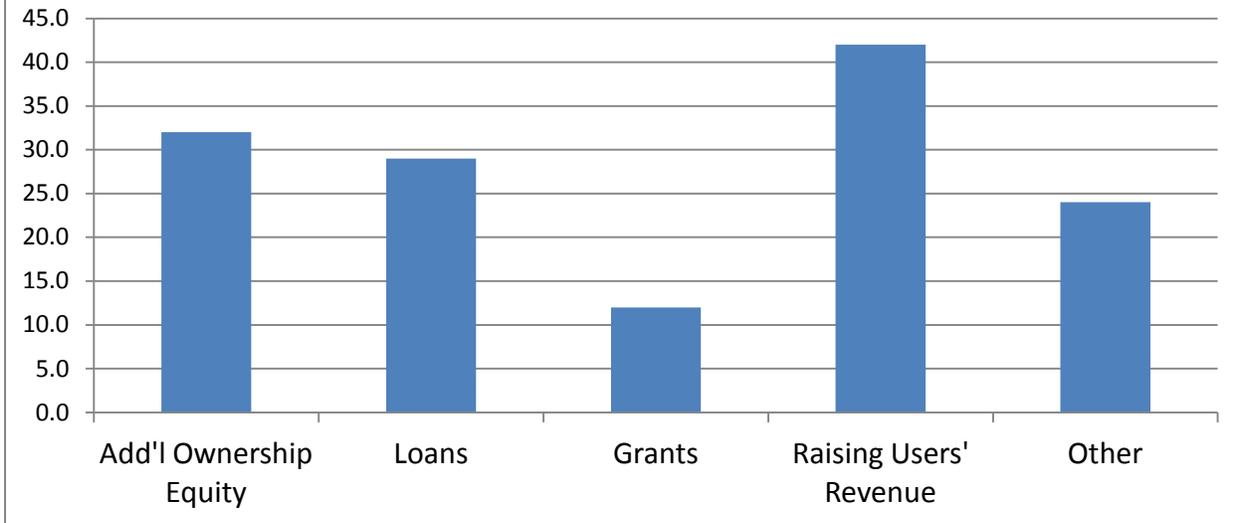
Major factors affecting the costs for safe and effective operations cited by the responding systems are shown in Exhibit III-1. The cost of compliance and preventive maintenance were identified as the most burdensome for the systems; nearly two-thirds of the systems cited these two factors as either “very significant or significant”. Systems serving Mobile Homes, Condo/Apartments, and Other Residential represented the majority of those systems citing the cost of compliance as the most significant cost factor.



Sources of Capital

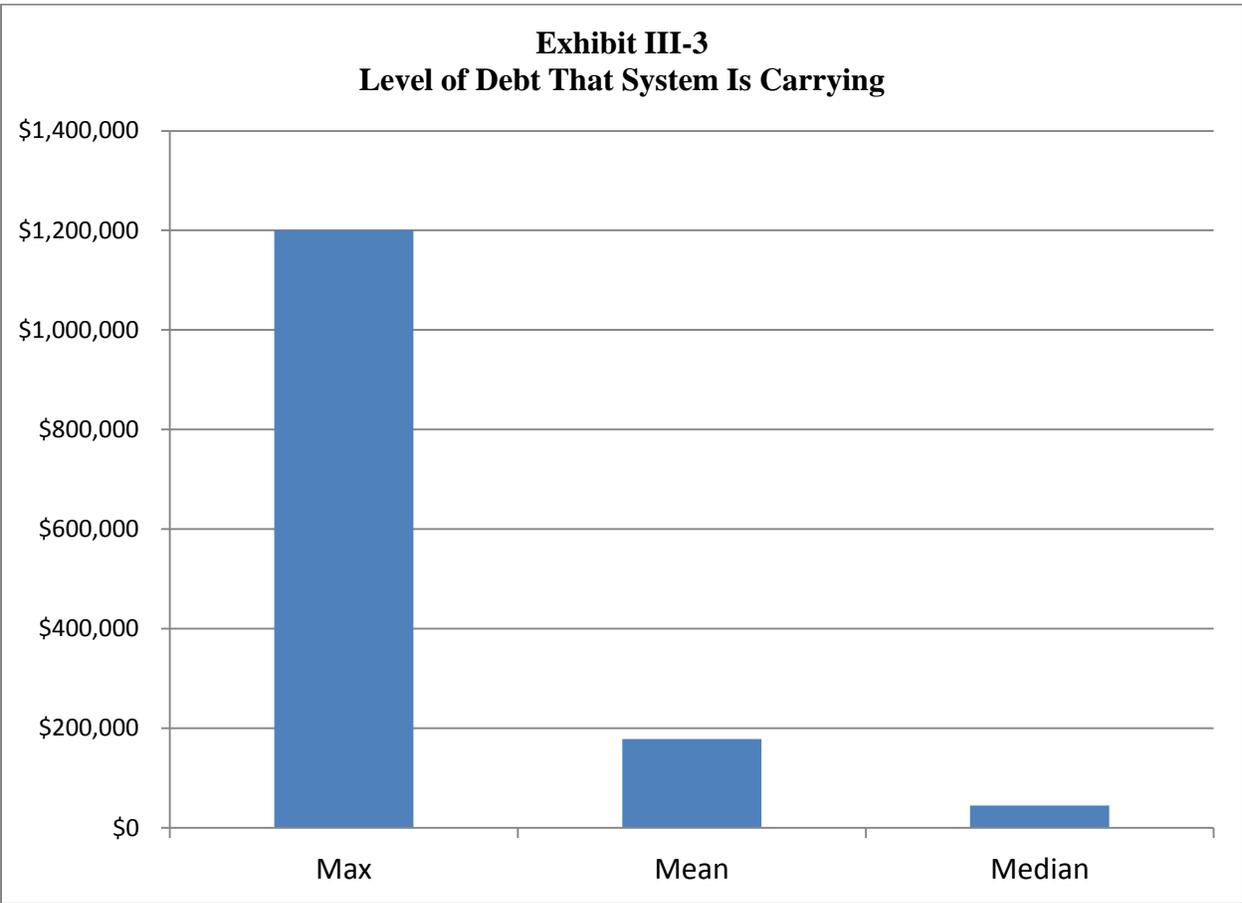
The current sources for obtaining capital for system improvements cited by the survey respondents are shown in Exhibit III-2. Raising revenues from users was cited as the means that is most likely to be used for obtaining capital. With respect to capital needs, 25% of responding systems indicated that their anticipated need for large capital expenditures would benefit from a State Supplemental Finance Account; over one-half of these systems serve the categories of Condo/Apartments or Other Residential customers.

Exhibit III-2
Current Sources of Obtaining Capital for System Improvements
Percent of Respondents



Level of Debt

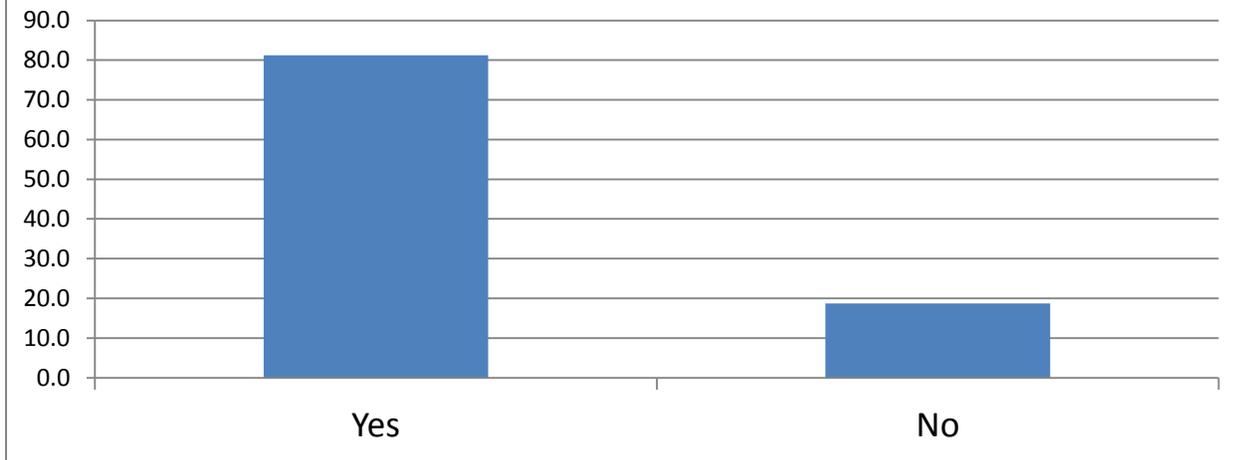
The debt level that the survey respondents indicated they were carrying is shown in Exhibit III-3. As shown in the Exhibit, the responses are highly skewed, with the maximum debt level equal to \$1.2 million, the average (mean) equal to \$178,000, and the middle of respondent values (median) equal to \$45,000. Only 13% of respondents indicated that they have ever applied for a State Revolving Safe Drinking Water Fund Loan. However, 70% of those systems that did apply received a loan.



Ability to Meet Daily Financial Need and Escrow for Future Repairs and Replacements

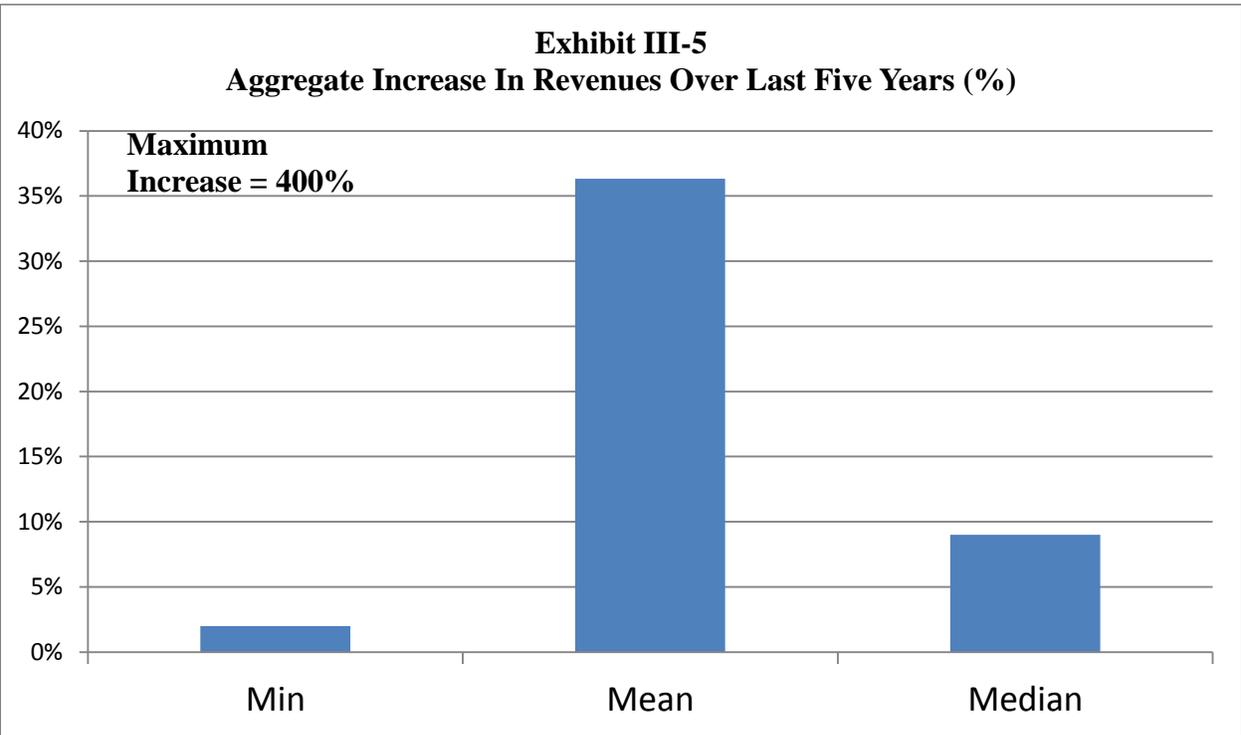
Only 19% of survey respondents indicated that they were not able to meet their daily financial needs (Exhibit III-4). Of these systems, over 50% are systems that serve the categories of Condo/Apartments and Other Residential customers. Interestingly, of the 81% of respondents indicating that they were able to meet daily financial needs, nearly one-half said that they are unable to consistently fund an escrow account for future needs.

Exhibit III-4
Are Revenues Adequate to Meet Current Daily financial Needs?
Percent of Respondents



Ability to Increase Revenue

Revenue increases over the past five years by the responding systems are shown in Exhibit III-5. The values are severely skewed, with one system indicating a 400% increase and another only a 2% increase. The average (mean) increase is 36% while the middle of the responses (median) is 9%.



Capital Infusion Needs

The survey responses for average system capital infusion costs needed to ensure future safe and effective operations are shown in Exhibit III-6. Excluded from these values are those of the Durham Center Division system, which is considered unique among the 348 CWSs and is treated separately in this report. Shown in the exhibit are averages (means) and middles of all values (medians) since the survey responses (total of 62 systems responding with some positive value) are significantly skewed. Capital needs for mains was greatest among the systems’ components, with a median value of \$55,000 and an average of \$214,000. The total of all systems’ components capital infusion costs average is \$225,000, with a median value of \$25,000 (Note: Only 26 systems indicated >\$0 need for mains while 62 systems indicated >\$0 for at least one system component).

Table III-7 is a summary of the total capital infusion costs for the survey respondents by cost range. Approximately 62% of the nearly \$14 million is represented by only 5 of the 62 systems. Table III-8 shows the same information extrapolated to the 348 member target group based on the ratio of the 29% (i.e., 100/348) survey sample. Table III-9 presents statistics for extrapolation to the 348 target list of systems.

Exhibit III-6
Capital Infusion Costs Needed to Ensure Future Safe & Effective Operations - System Averages (Excluding Durham Center Division)

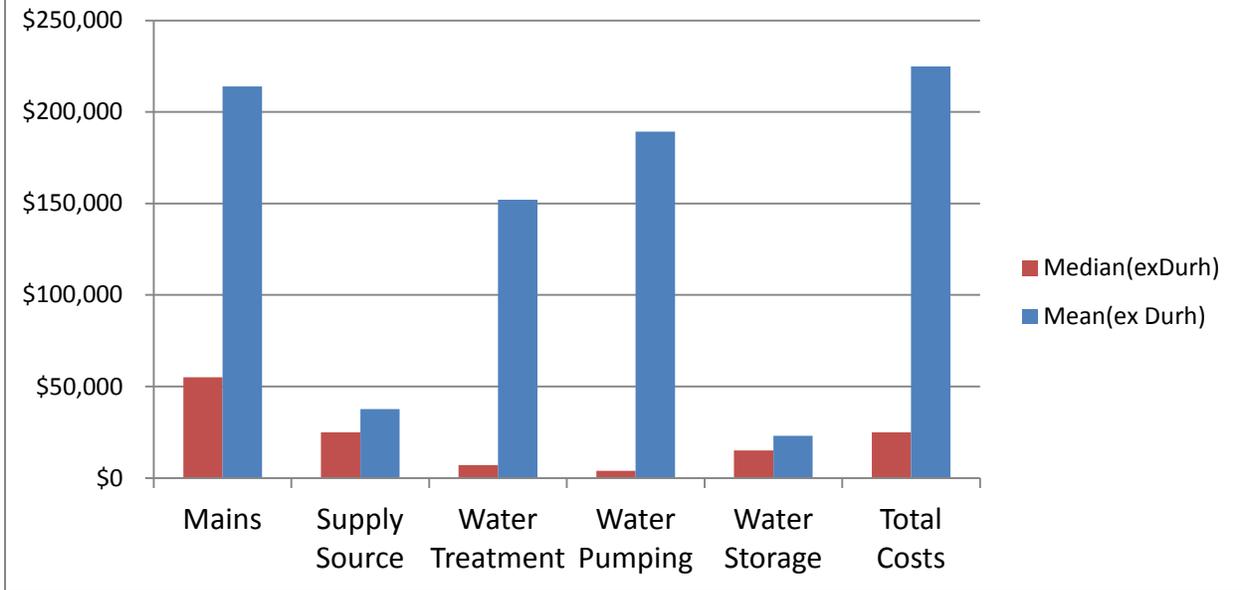


TABLE III-7

Total Capital Infusion Cost Survey Results

Cost Range	Total Dollars	Population Served	Dollars Per Pop Served	No of Systems	Dollars Per System
\$1 to 4 Million	\$8,660,000	1868	\$4,636	5	\$1,732,000
\$200k to \$1 Million	\$3,225,000	2110	\$1,528	5	\$645,000
Less Than \$200k	\$2,055,822	7939	\$259	52	\$39,535
Subtotal	\$13,940,822	11917	\$1,170	62	\$224,852
Durham Center Division	\$16,000,000	140	\$114,286	1	\$16,000,000
Total	\$29,940,822	12057	\$2,483	63	\$475,251

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TABLE III-8

**Total Capital Infusion Cost
Survey Results Extrapolated* to
Original 348 Target List**

Cost Range	Total Dollars	Population Served	Dollars Per Pop Served	No of Systems	Dollars Per System
\$1 to 4 Million	\$29,862,069	6,441	\$4,636	17	\$1,732,000
\$200k to \$1 Million	\$11,120,690	7,276	\$1,528	17	\$645,000
Less Than \$200k	\$7,089,041	27,376	\$259	179	\$39,535
Subtotal Durham Center Division	\$48,071,800	41,093	\$1,170	214	\$224,852
	\$16,000,000	140	\$114,286	1	\$16,000,000
Total	\$64,071,800	41,233	\$1,554	215	\$298,295

* Extrapolation based on ratio of 29% Survey Sample.

TABLE III-9

Extrapolation of Survey Results:

Population Served

15,164 of the 56397 Population Served by Systems in the Original 348 Target List would not require any Capital Infusion Costs.

Number of Systems

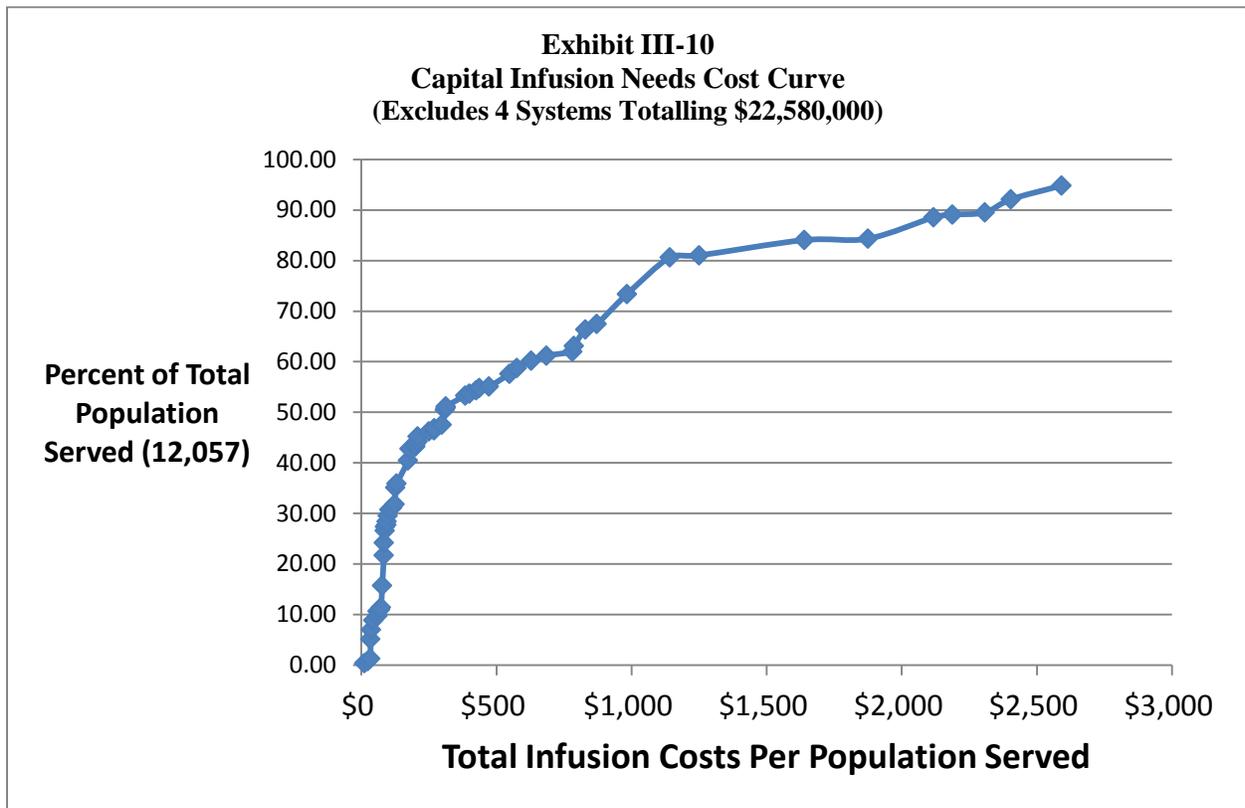
133 of the 348 Systems in the 348 Target List would not require any Capital Infusion Costs.

Statistical Error & Confidence Level

Sample Error of +/-7% at 90% Confidence Level

Due to the skewness in the capital infusion needs cost responses, a majority of the population that is served by the CWSs can be satisfied at a lower average cost than for

the group as a whole. Exhibit III-10 shows (for 59 of the 63 systems responding to the capital needs infusion question) the percent of total population served as a function of the total infusion costs per population served.³ For example, approximately 75% of the population served would require a total infusion cost of about \$1,000 per population served or less; 55% of the population served would require an infusion cost of about \$500 per population served or less. This cost curve is equally applicable to the 348 member target group since it is portrayed in terms of percentage of total population served.



IV. CONSOLIDATION AND ACQUISITIONS

Acquisitions of small, troubled water systems by larger companies can help customers by providing better service and management, and economies of scale. Public

³ Inclusion of the remaining four systems would represent only 5% of the total population served but would render the cost curve illegible.

Act 13-78 recognized this principle by providing incentives for acquisitions, requiring PURA to provide enhanced rates of return to water utilities which could demonstrate that they have acquired non-viable water systems. That same Act also required PURA to allow water utilities to seek rate recovery of the difference between the sale price and the net book value of the water system purchased (acquisition premiums).

TCG sought to understand the small water system acquisition experience of Connecticut's Class A privately-held water utilities and municipal water systems. TCG obtained information on the number of water systems and customers acquired, and the cost to acquire these systems including any acquisition premiums, transaction costs, and post-acquisition investments that needed to be made. TCG also explored the ratemaking treatment afforded to these acquisitions, including whether existing customers of the acquiring company were affected.

TCG sought to understand the reasons why small companies wished to sell and why the acquiring companies looked to purchase smaller systems. TCG was also interested in learning about those situations where, despite discussions held by companies to change ownership of a company, such transactions were never consummated. Finally, impediments to acquisitions and the effects of recent legislation to encourage purchases of troubled water companies needed to be identified. TCG sent interrogatories on all of these topics to the Class A water utilities, municipal water utilities and the water authorities.

Responses to the interrogatories were received from Aquarion, the Connecticut Water Company (CWC), Valley Water Systems, Avon Water, Torrington Water Company, Jewett City Water Company, and the Hazardville Water Company. No municipal water utilities or water authorities provided information on their acquisitions in response to the interrogatories issued by PURA during the study. Only two water

utilities, Aquarion and CWC, have acquired water companies in the last five years, although Torrington Water has a purchase application pending with PURA⁴.

Over the last five years, Aquarion has acquired 10,253 customers (5.3% of its customer base); CWC has added 755 customers (0.85% of its customer base). TCG has calculated that overall, Aquarion spent \$4,954 per customer to acquire these water systems (purchase price, transaction costs, and post-acquisition investments). Removing the significant purchase cost for United Water from the calculations results in a cost per customer of \$2,223. CWC acquisition cost per customer equated to \$2,594. Mathematically extrapolating the acquisition cost per customer experienced (to date) to the remaining population of small water systems examined in this study yields total acquisition costs ranging from \$34 million (if the non-UW acquisition costs are used) to \$74 million (if all acquisitions are considered).

Both Aquarion and CWC expended funds post-acquisition on each of the water systems purchased. For Aquarion, the post-acquisition investments resulted in an additional 16% and 79% of the purchase price for its purchase of United Water and the non-United Water systems, respectively. CWC's post-acquisition investments resulted in an additional 165% of the purchase price. The range of post-acquisition investment percentages varies from 6% (Dunham) to 465% (Birchwood) for the Aquarion acquisitions varied from 22% (Country Manor) to 4,500% (Legend Hill) for the CWC acquisitions. These percentages indicate that the operating condition of the CWC and Aquarion (non-UW) acquired water companies varied significantly and in some cases was likely quite poor.

TCG explored the effect of the water system acquisitions on the rates paid by existing water utility customers. Aquarion received an enhanced rate of return in its last rate proceeding, and has recovered most of the acquisition premiums it incurred. CWC has not received an enhanced rate of return but has received rate recovery of the acquisition premium it paid. Information obtained from the two water companies

⁴ Note, Phase II of the acquisition of the local municipal water system involves assets encumbered by federal loans.

indicates that for Aquarion, during the last 5 years no exiting customers experienced higher rates as the result of its acquisition activity. Additional analysis by Aquarion is needed to ascertain the impact of PURA's most recent rate case decision on existing customers due to its acquisition initiatives. CWC reports that existing customers paid approximately \$42,000 (a 0.06% increase) more due to the water company acquisitions.

The results of this analysis indicate that overall the impact of the acquisitions made over the last five years on existing customers has been minimal. However, future acquisitions may put more pressure on existing customer rates because the better managed companies (that wanted to sell) may have been purchased. The potentially increasing cost effect of acquisitions on existing water utility customers could have an effect on the interest of larger companies in pursuing purchase of small, troubled systems needing extensive remediation. This could occur despite the existence of incentives already in place. The results of TCG's mail survey also indicated significant resistance on the part of the CWSs to be acquired or absorbed by larger water systems.

Both Aquarion and CWC report that while many discussions have resulted in completed acquisitions, some have not been successful. Valley Water, Avon, Torrington, and Jewett City reported that they have neither sought to purchase a small water system or been asked to sell. Hazardville Water noted that in the past 12 years it was approached by a small system operator but that the transaction was not completed. Aquarion estimates that approximately eight potential transactions did not succeed whereas CWC reports that seven potential transactions did not get consummated. Reasons for the inability to complete transactions include: poor water quality and company condition; unrealistic sale price; financial conditions; geographical location; and the cost to upgrade the water system would not be covered by the water revenues from the company.

Neither Aquarion nor CWC reported that it was limited in terms of future acquisitions of small water companies. Aquarion, however, noted that its views on future acquisitions are based on the continuation of regulatory policies that permit the recovery of acquisition premiums and provide enhanced rates of return. CWC expressed concerns over the complexity of the acquisition approval process and the amount of capital that

would be needed to remediate certain water systems. CWC also expressed a concern that regulators need to be wary of new programs that bail out troubled systems that do not have the managerial or technical skills to operate in the long term. Comments were also made that certain regulations that are not applicable to small water systems become applicable when a larger entity acquires the smaller entity. In this case, the acquiring company could be “out of compliance” on day one of ownership. It was also noted that the approval process could be streamlined by the use of joint applications with PURA and the DPH and giving both entities the power to waive hearings, particularly if no other party filed an objection to the acquisition.

TCG’s small water system survey addressed the topic of acquisitions. The survey results indicate that only approximately 45% of the small water companies would consider being acquired by a larger company. The rest would not. The vast majority, almost 90%, of the respondents have never attempted to sell their assets or merge with another company.

Recommendation

3. To maximize the potential for CWS acquisitions and consolidations. PURA and DPH should explore the streamlining of regulatory processes associated with uncontested water system acquisitions. The need for re-permitting of the acquired CWS’s infrastructure, when there is no planned change in infrastructure use post-acquisition for the foreseeable future needs to be reevaluated as there are procedures in state statutes to address the abandonment (or changes in use) of water sources and infrastructure.

V. The Potential Benefits of a Supplemental Financial Account

The results of the investigation indicate that a number of the CWSs could benefit from a supplemental financial support program. With the majority of the CWSs being unable to escrow any funds for future maintenance or emergencies and the amount of supplemental financing available to them from the State’s Safe Drinking Water Act Revolving Loan Fund being quite limited. There clearly is a need for some additional financial support particularly for the systems serving small populations.

These systems are also likely to have spontaneous needs that are not well suited for the longer programming funding time frames associated with the IUP process. Additionally, their technical and administrative capacities are usually constrained, which is a further barrier in competing for funding within program frameworks that have relative high transaction and ongoing engagement costs. It is not unusual for the administration of a CWS serving a small number of homes to be handled on a volunteer basis. Therefore any supplemental funding application and ongoing administration processes needs to be straightforward and uncomplicated for CWSs serving small populations.

The results of the TCG investigation further indicate that the supplemental financing needs for the majority of the CWSs could be quite modest, perhaps \$20,000 or much less per system.

Those CWSs with large capital needs should probably be directed into the IUP funding allocation process or brought under PURA's rate regulation or even be evaluated for consolidation with a larger water utility entity.

A proactive process to identify potentially "troubled" CWSs could help avoid serious unanticipated service disruptions, water quality issues, or precipitous abandonments. Such a process would require close coordination between PURA and DPH. A "troubled" CWS could be a system with a high frequency of violations, a system facing high capital needs, or a system that is unable to meet its daily financial needs. Identifying and triaging them before a major crisis could provide for greater continuity in water service.

Some have expressed concerns in that providing financial support to the CWSs only prolongs their eventual collapse, inferring that they should be consolidated with larger utility entities sooner rather than later. However, not all CWSs are going to be good candidates for consolidation, either because of their geographic location or because their capital needs in proportion to their future revenue prospects are high. By establishing a process whereby CSWs can be monitored in advance to attempt to address these issues could create options for regulators in handling and managing the outcome. Once a CWS reaches a point where it cannot continue for technical, managerial, or financial reasons, the only option often available is an involuntary

consolidation with a larger water entity. If the investment costs and risks are larger for the acquiring entity than can be supported by the going- forward revenues to be obtained from the acquired CWS, then those risks and costs most likely will be transferred to the acquiring entity's existing customers. This situation can create equity balancing challenges for regulators and issues for some stakeholders. A steady progression of these situations could have significant rate implications for the acquiring entity's existing customers.

Recommendation

4. A concerted effort is needed to identify those CWSs that could have high future capital requirements or that are unable (or are struggling) to obtain adequate financial resources to meet their daily operational and maintenance needs and to provide them heightened oversight before a service quality or deliverability problems abruptly emerge that could limit their options.

VI. PHYSICAL CONDITION OF THE SMALL COMMUNITY WATER SYSTEMS

Background Process for Reviewing the DPH Triennial Inspection Reports

DPH is responsible for conducting sanitary inspections of the water plant facilities once every three years for all CWSs to help ensure compliance with the SDWA. In an effort to get a better understanding of the condition of CWSs serving populations less than 1,000, TCG requested 57 DPH inspection reports for review. The sample size is based on a simple random sampling of the 348 target group for a +/- 10% sampling error at 90% confidence level. To address possible concerns about the financial viability of CWSs serving senior housing facilities, TCG randomly selected an additional eight inspection reports specific to that group, bringing the total number of inspection reports to be reviewed to 65.

For each inspection report TCG separated the findings/recommendation into three areas: housekeeping, operation and maintenance, and improvements. TCG then rated each system as good, fair, or poor.

- A system providing service that meets standards was rated "good".

- A system that was currently able to provide adequate service to its customers but within the next few years would require improvements was rated as “fair”.
- A system that was not providing adequate service and needed to make major system improvements (source of supply, treatment, storage, distribution) was rated “poor”.

This review process was based only on the content of each inspection report. TCG also noted that starting in 2009 the inspection reports started including the following regarding the Groundwater Rule:

Effective December 1, 2009, public water systems (PWS's) are required to comply with the provisions of the Groundwater Rule (GWR). One of the requirements of the GWR is that immediate source water monitoring must be conducted any time a system is notified that a routine Total Coliform Rule sample is positive for total coliform bacteria. Please consult with your certified laboratory as soon as possible to ensure that arrangements are in place to ensure that the new requirements are met. Unless the Department indicates otherwise, source water samples must be collected at every active source within 24 hours and analyzed for E.coli in accordance with CFR 141.402(c). In order to meet this requirement, a dedicated sampling tap(s) need(s) to be installed to allow for collection of raw water sampling from the source of supply...

The following quotation from the United States Environmental Protection Agency's website⁵ provides some GWR background, which has the potential to have a significant cost impact to the 348 target group, since the majority of these systems rely on ground water sources:

The purpose of the GWR is to provide for increased protection against microbial pathogens (contamination) in public water systems that use groundwater sources. The GWR employs a targeted risk-based strategy to address risks through an approach that includes significant deficiencies identified during periodic sanitary surveys.

A significant deficiency includes, but is not limited to, a defect in design, operation, or maintenance, or a failure or malfunction of the sources, treatment, storage, or distribution

⁵ <http://water.epa.gov/lawsregs/rulesregs/sdwa/gwr/index.cfm>

system that DPH determines to be causing, or has the potential for causing, the introduction of contamination into the drinking water delivered to consumers. The GWR requires corrective action, within a stipulated timetable, for any system with a significant deficiency. A ground water system is subject to triggered source water monitoring if it does not already provide treatment to reliably achieve at least 99.99 percent (4-log) inactivation or removal of viruses.⁶

As stated above, if a CWS receives notice of a total coliform positive distribution system sample collected under the Total Coliform Rule, it must take a water sample from all sources within 24 hours. If any initial triggered source water sample is fecal indicator-positive, the CWS must collect an additional five repeat source water samples over the next 24 hours for each of the sites that was initially fecal indicator-positive. Such sampling continues until the cause is identified and corrected. Correcting such deficiencies is where the 348 member target group could incur significant cost to implement needed corrective actions.

Results of the Analysis

The 65 inspection reports covered the years 2008 through 2013: 2 CWSs from 2008, 1 CWS from 2009, 18 CWSs from 2010, 13 CWSs from 2011, 16 CWSs from 2012, and 15 CWSs from 2013. TCG found that:

- 7, or 11%, of the CWSs were “good”
- 54, or 83%, of the CWSs were “fair”
- 4, or 6%, of the SCWSs were “poor”
- 3 of the 8 additional CWSs serving senior housing (added to the original sample of 57) were rated “good” and the remaining 5 were rated as “fair”.

Specific to the three areas investigated (housekeeping, operation and maintenance, and improvements) TCG found:

- 13, or 20%, of the CWSs were cited by DPH as having housekeeping deficiencies. These included excessive vegetation around well facilities, storage of material near well facilities not related to water operations, pump house door not properly locked to prevent vandalism, etc.

⁶ <http://water.epa.gov/lawwregs/rulesregs/sdwa/gwr/regulation.cfm>

- 61, or 98%, of the CWSs were cited by DPH for having operation and maintenance deficiencies. These included lack of: an annual flushing program, an essential valve maintenance program, recording of weekly instantaneous and total flows, etc.
- 19, or 29%, of the CWSs were identified by DPH as needing improvement. This included the need to develop additional capacity (via a new well, additional storage, and/or interconnection to a neighboring water system with excess capacity) to help meet demand and redundancy in the event of a well failure.

Below are TCG's Groundwater Rule findings:

- Most of the 65 CWSs did not have the required sampling tap(s) installed, which could result in them being subject to monitoring/reporting violations and potential civil penalties for failure to collect a raw water sample due to the lack of an appropriate raw water sample tap.
- None of the 65 CWSs appeared to have a DPH approved 4-log treatment system in service.
- 36, or 55%, of the CWSs were identified by DPH as having inadequate sanitary separation, watertight seals, vent screening, etc. In addition, wells were cited by DPH as being subject to surface runoff and backwash.

This information supports TCG's finding, discussed earlier, that the 348 member target group needs a significant capital infusion over the next five years and that the \$50 million cited earlier in this report is probably conservative.

Review of the DPH History for the Small Community Water Systems

As previously stated, DPH is responsible for conducting all of the community water system plant inspections. There are some 550 community systems and DPH is charged with inspecting all of them at least once every three years. The inspection reports prepared by DPH provide a description of the plant and violations found along with needed corrective actions. The inspection reports normally do not provide any description of the physical condition of plant.

For the most part, the 348 member target group is compliant. When the owners get the inspection reports they normally implement the identified corrective actions in several days. For owners that do not comply, DPH issues a formal order (consent order) to try and get them to comply. However, most, if not all, of the 348 member target group systems were constructed prior to 1971, which predates many of the EPA regulations.

If the corrective action requires a significant amount of money (e.g. relocation of a well because of possible surface water contamination), owners will have their attorneys check the property tax records to verify that their water system was built prior to 1971 and notify DPH that they are “grandfathered” and are not required to comply with “The Regulations of Connecticut, Sections 19-13-51a through 51m” related to water supply wells. DPH does not currently maintain information on the age of water systems.

None of the systems in the 348 member target group provide public fire protection. However, the systems serving schools and nursing homes may provide private fire protection (e.g. internal bldg. sprinklers).

The 348 member target group consists of many systems 40 or more years old that have not been well maintained. A major reason for the poor maintenance is that cost based rates have never been implemented that would provide revenue to cover expenses (e.g. electric, chemicals, a main flushing program, etc.) and a reserve fund for extraordinary repairs and system improvements.

Recommendations

5. A process should be developed and implemented that uses specified criteria (e.g. water quality problems, frequency of outages, etc.) to identify CWSs that are considered “fair” but, based on recent operating performance, have a high risk of system failure. This process would be proactive and involve both DPH and PURA working with the troubled CWSs to develop a corrective action plan that sets priorities to try and limit customer rate shock. This process would act as a safety net to avert a CWS crisis situation.
6. The current DPH triennial CWS inspection protocol mainly addresses issues pertaining to water quality, as required by Federal Law. It would be beneficial if data could also be collected on the condition of the water distribution infrastructure regarding system pressure, general condition, losses, etc. The triennial CWS inspection process could also be an opportunity to monitor the future capital needs of the systems and collect some general financial information pertaining to the financial viability of the CWSs, which could help to determine whether heightened oversight is warranted, including perhaps needs for rate regulation.

VII. PERCEIVED SUSTAINABILITY OF THE SMALL COMMUNITY WATER SYSTEMS

Survey participants were asked to indicate how optimistic they were about the long-term sustainability of their CWS. Over 50% indicated that they were optimistic while about 10% were pessimistic and the remainder (40%) indicated they were neither optimistic nor pessimistic. Of those that were pessimistic: 35% represented “other residential” systems which are typically small housing clusters; approximately 24% were condominiums and apartment complexes and another 24% homeowners associations and housing authorities; and, about 12% were schools.

When asked if their CWS had an Ownership/Management succession plan slightly over 40% stated they did however slightly less than 60% did not.

It appears that nearly one half of the CWSs believe they are sustainable and are anticipating to carry on for some time.