Assessing the Effect of the Proposed Radon Rule on the Affordability of Water Service

Scott J. Rubin
Attorney • Consultant
3 Lost Creek Drive
Selinsgrove, PA 17870
(570) 743-2233 • sjrubin@ptd.net

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Introduction

The Safe Drinking Water Act (SDWA) requires the Environmental Protection Agency (EPA) to consider the effect of new drinking water regulations on the affordability of water service in smaller communities.[1] In addition, Executive Order 12898 requires federal agencies to consider whether their actions will have a disproportionate effect on minority and low-income communities.[2]

On November 2, 1999, EPA published a proposed rule to regulate the presence of radon in drinking water.[3] At roughly the same time, EPA also published a regulatory impact analysis and cost analysis for the proposed rule.[4] The NPRM discusses the effect of the proposed rule on the affordability of water service.[5] That analysis is prepared on the national level, using the effect of the proposed rule on typical water systems (based on the size of the system) on median household income.

The purpose of this paper is to compare EPA's summary-level affordability analysis with more detailed information for specific water systems and communities that would be affected by the proposed rule. In particular, data will be analyzed for more than 400 communities in 12 states, each of which is served by a community water system that has reported the results of a sample indicating that it may have a radon level in excess of the maximum contaminant level (MCL) of 300 picocuries per liter (pCi/L) that is proposed in the NPRM.

Background

Examining the affordability of a new drinking water regulation is an important undertaking. It is not simply a legal or regulatory requirement. Rather, it is directly related to ensuring that the regulation will, in fact, achieve a public health benefit.

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[1] SDWA § 1412(b)(4)(E), 42 USC § 300g-1(b)(4)(E)
[2] Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, 59 *Fed. Reg.* 7629 (Feb. 16, 1994).
[3] EPA, National Primary Drinking Water Regulations; Radon-222, Notice of Proposed Rulemaking, 64 *Fed. Reg.* 59246-59378 (Nov. 2, 1999) (hereafter "NPRM").
[4] EPA, *Regulatory Impact Analysis and Revised Health Risk Reduction and Cost Analysis for Radon in Drinking Water* (Sept. 1999) (hereafter "RIA").
[5] NPRM at 59274-75 and 59326-28.

A potentially significant unintended consequence of a new regulation is that low-income households will make tradeoffs in order to pay their water bill. The literature is replete with studies that show that low-income households already are forced to make serious tradeoffs that affect the health and well-being of their members – including foregoing food and medical care.[6] [7] [8] [9] By diverting needed funds from these other necessities, a new drinking water regulation could adversely affect public health. Thus, the goal of an affordability analysis is not to compromise the safety of the water supply, but to ensure that any increased public health benefits from the water regulation are not negated by the tradeoffs that low-income households will make in order to pay for the regulation.

In theory, any new regulatory requirement that increases the cost of water service might raise an issue about the affordability of water for some low-income households in certain communities. If the impact is limited to a few communities because of their unusual characteristics, then the provisions of the SDWA allowing for variances and grants based on affordability criteria can be expected to address the problem.[10]

In contrast, if the costs associated with complying with a new regulation will create affordability concerns for many low-income households in many communities, then the effects should be addressed through the process of establishing the regulation. To do otherwise would lead to a the requests for affordability-based variances negating the effect of the rule as a whole.

There are no hard and fast standards for determining whether the effects of a proposed rule would lead to affordability concerns. It does not appear necessary to have a "bright line" test for whether a proposed regulation raises affordability concerns, but there must be some sense for whether costs are relatively affordable. An additional cost in the range of $4 to $5 per month ($48 to $60 per household per year) would seem to be affordable for even the lowest-income households. One comprehensive study of low-income household expenditures and strategies found that even at the lowest income levels where serious tradeoffs were being made, households spend an average of $3 per month on lottery tickets.[11] While the authors of that study properly note that such expenditures might be necessary for the psychic well-being of the individual, it is reasonable to conclude that expenditures of this magnitude could be diverted to paying the water bill without imposing serious public health consequences on the household.

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[6] Kurt Bauman, Direct Measures of Poverty as Indicators of Economic Need: Evidence from the Survey of Income and Program Participation, U.S. Census Bureau Population Division Technical Working Paper No. 30 (Nov. 1998), http://www.census.gov/population/www.documentation/twps0030/twps0030.html, as of Sept. 29, 1999 (showing that more than one-third of households with incomes under $10,000 were unable to meet at least one basic need).

[7] Kurt J. Bauman, Extended Measures of Well-Being: Meeting Basic Needs, U.S. Census Bureau Current Population Reports, P70-67 (June 1999) ("In 1995, … about 1 person in 5 lived in a household that had at least one difficulty meeting basic needs. These included households that didn't pay utility bills, didn't pay mortgage or rent, needed to see the doctor or dentist but didn't go, had telephone or utility service shut off, were evicted, didn't get enough to eat, or otherwise didn't meet essential expenses.")

[8] Kathyrn Edin and Laura Lein, *Making Ends Meet: How Single Mothers Survive Welfare and Low-Wage Work* (Russell Sage Foundation 1997).

[9] U.S. Department of Agriculture, *Household Food Security in the United States in 1995: Summary Report of the Food Security Measurement Project* (1997).

[10] SDWA § 1412(b)(15), 42 USC § 300g-1(b)(15); SDWA § 1415(e), 42 USC § 300g-4(e); SDWA § 1452, 42 USC § 300j-12.

[11] Edin and Lein, *Making Ends Meet, supra.*

On the other hand, expenditures that approached $8 to $10 per month or more ($96 to $120 per household per year) could raise serious affordability concerns for a low-income household. For example, Edin and Lein write that single mothers receiving welfare payments reported spending only $18 per month on medical care. So an increased expenditure for water of $8 to $10 per month would represent nearly half of the household's budget for medical care. Similarly, they reported that the average telephone bill was $31 per month, but "about one-third of the welfare-reliant mothers had their telephone disconnected or went without any phone service throughout the previous year." An $8 to $10 expenditure would represent one-quarter to one-third of the telephone bill which already is seriously at risk of going unpaid for many low-income households.

Another approach to evaluating affordability is to examine the effect on median household income in a community. Rather than focusing on the effect on the lowest-income households, this approach evaluates the impact on the community as a whole. Under this approach, if the total cost for water is on the order of 1.5 percent of median household income in the community, then water service should be affordable (Beecher and Shanaghan indicate that some states use other figures, ranging from 1.0 to 2.0 percent of median household income). [12]

For purposes of this study, it will be assumed that an impact of less than $50 per household per year is affordable for a low-income household, while an impact of $100 or more per year could raise serious affordability concerns which might require a low-income household to make a tradeoff that would be detrimental to its members' health or welfare. As noted, these are not hard and fast numbers, but they should provide an indication of the potential scope and magnitude of the effects of a proposed regulation on low-income households.

Alternatively, using the community-wide approach, it will be assumed that a regulation that increases the cost of water by 0.5 percent of median household income in a community might raise an affordability concern. This percentage is selected based on the author's previous work which showed that the typical water bill, for a household with median income, was 0.9 percent of income in 1989, with water rates increasing faster than the rate of growth in income. [13] Thus, an increased cost of 0.5 percent of median income would be more than a 50% increase in the water bill and would bring it close to 1.5 percent of median income overall.

The selection of these ranges also is based on other considerations, including the fact that many low-income households do not pay directly for water. The author's previous study has shown that the percentage of low-income households that pay directly for water (rather than having it included in the rent) varies tremendously from one state to another. For example, nationwide about one-half of households with incomes less than $10,000 pay directly for water, but in some states the percentage exceeds 70%, while in others it is less than 15%.[14] Selecting target ranges for affordability on a per-household level recognizes that many of the lowest-income households

[12] Janice A. Beecher and Peter E. Shanaghan, Water Affordability and the DWSRF, *Journal American Water Works Association*, Vol. 90, No. 5, 68-75 (1998).
[13] Scott J. Rubin, A Nationwide Look at the Affordability of Water Service, *Proceedings 1998 Annual Conference of the American Water Works Association*, Water Research Vol. C, 113-129.
[14] *Id.*

will not be directly affected, though they do run the risk of paying these costs indirectly (through increases in rent or through landlords changing their policy and beginning to charge separately for water).

Methodology

Data Selection

Radon samples from water systems in 16 states were obtained by the American Water Works Association in Microsoft Excel files. The first step of the analysis was to review the radon sample data to determine whether it was usable for conducting an affordability analysis. In order to conduct an affordability analysis, it would be necessary to match the radon data with the specific municipality that is served by the water system. This would make it possible to obtain income and other demographic data for the municipality from the U.S. Census Bureau's data bases.

Several of the state data sets did not contain a municipality name. However, most of these data sets did contain other identifying information that enabled the municipality name to be determined from the Safe Drinking Water Information System (SDWIS) maintained by EPA. Through a combination of information contained in the state data sets and information obtained from SDWIS, municipality information was obtained for 12 states. The states that fell out of the analysis because of an inability to obtain matching census data were Connecticut, Idaho, Maine, and Ohio.

Of the 12 states remaining, the analysis consists of calculating an average radon reading for each water system (where it was not already calculated), matching water systems to municipality and population served from SDWIS (where that information was not already in the state data set), extracting those systems with an average radon level of more than 300 pCi/L, then matching this information to information from the census.[15] Table 1 summarizes the results of this analysis.

Table 1: Summary of Raw Data Analysis

State	Total	With Name	Radon > 300	Census Match
CA	86	86	38	34
IA	150	150	41	37
KS	163	163	85	84
MD	244	235	155	111
MI	116	116	32	26
NH	721	460	412	399
NY	424	371	220	188
PA	490	430	293	196
SC	47	44	24	20
TX	127	127	30	19
WA	100	91	21	21
WI	617	617	273	213
Total	**3,285**	**2,890**	**1,624**	**1,348**

As shown in Table 1, usable municipality names for approximately 88% of the systems with radon test results were obtained. Of the 2,890 entries with a municipality identifier, 1,624 (56%) had a

[15] Unless otherwise noted, all census information is from the 1990 Census Summary Tape File 3A for each state.

radon level in excess of 300 pCi/L. Of these systems, a matching census entry was located for 1,348 (83%) of the systems.

One problem in conducting an affordability analysis, however, is the need to ensure that the income data and cost data apply to the same population. For purposes of this study, the following screen was used: The water system population served must be equal to at least 80% of the population for the municipality from the 1990 census and at least 80% of the housing units in the municipality must receive public water (as reported by the census). This screen provides reasonable assurance that there is an identity between the population served by the water system and the population residing in the municipality. Table 2 shows the results of applying this screen.

Table 2: Screen for Identity Between Water System and Municipality

State	Census Match	Pass Screen
CA	34	19
IA	37	36
KS	84	77
MD	111	11
MI	26	11
NH	399	28
NY	188	38
PA	196	61
SC	20	4
TX	19	6
WA	21	10
WI	213	136
Total	**1,348**	**437**

Table 2 shows that only about one-third of the water systems passed this screen, leaving 437 systems with radon levels above 300 pCi/L for which an affordability analysis can be conducted.

Compliance Cost

To determine the household compliance cost, a system-level compliance cost was developed which was then divided by the number of households from the 1990 census that receive public water. This results in a compliance cost per household.

The system-level compliance cost was derived in two parts: annual capital cost and annual operating & maintenance (O&M) cost. In order to develop the capital cost, it is necessary to estimate the capacity, in million gallons per day (MGD) of the treatment plant (or other water supply facility) that the water system would construct to comply with the proposed regulation. In order to derive the O&M cost, it is necessary to estimate the average daily consumption of water within the water system, also in MGD.

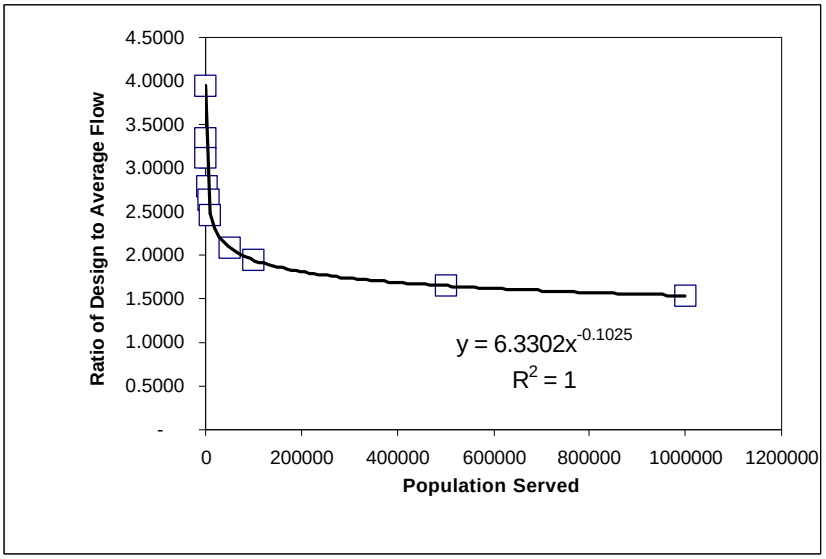
Average daily consumption was estimated using actual per capita water consumption in each state during 1995, rounded to the nearest gallon per person, as reported by the U.S. Geological Survey.[16] Average consumption was calculated for each water system using Equation 1.

[16] U.S. Geological Survey, National Water Use Data (by state) for 1995, http://water.usgs.gov/watuse/spread95

Equation 1: $$\text{Average use } (MGD_{avg}) = \frac{\text{Population x per capita use}}{1{,}000{,}000}$$

Plant capacity was estimated using the relationship between capacity and average flow. EPA has developed such a relationship separately for publicly owned and privately owned systems.[17] For purposes of this analysis, however, a single equation was derived by plotting the average for public and private systems from EPA's equations for various consumption levels. Microsoft Excel's trendline function was then used to derive a best-fit curve and equation that represents this relationship between plant capacity and average use based on the population served. Figure 1 shows the plot of these data and the resulting equation which fit the data extremely well ($R^2 = 1.0$).

Figure 1: Ratio of Design Capacity to Average Consumption



Equation 2 shows the resulting equation to calculate plant capacity.

Equation 2: $$\text{Plant capacity } (MGD_{cap}) = MGD_{avg} \text{ x } 6.3302 \text{ x Population}^{-0.1025}$$

Both capital and O&M costs were calculated using equations derived by EPA's contractor, SAIC, for the development of the NPRM and RIA.[18] Four different equations are used for capital costs and four more are used for O&M costs, depending on the size of the water system and the level of treatment that is required. Figure 2 shows the capital cost and O&M equations that were used.

The resulting capital cost, which is a total construction cost, was then annualized using EPA's assumption that the costs would be repaid over 20 years at a 7% interest rate, which is equivalent to a capital cost recovery factor of 9.33% per year.[19]

[17] Draft HRRCA, Exhibit C-1
[18] SAIC, Technologies and Costs for the Removal of Radon from Drinking Water (May 1999), Table 4-11.
[19] NPRM at 59276

Figure 2: Capital Cost and O&M Cost Equations

Small System, Low Radon Level
$\text{Capital}: 6 \cdot 10^{6} x^{3} - 3 \cdot 10^{6} x^{2} + 738{,}360x + 14{,}224$
$\text{O \& M}: 7 \cdot 10^{6} x^{3} - 963{,}314x^{2} + 49{,}305x + 1{,}198.5$

Large System, Low Radon Level
$\text{Capital}: 1.2483x^{3} - 364.69x^{2} + 93{,}243x + 65{,}640$
$\text{O \& M}: .1896x^{3} - 13.891x^{2} + 9{,}833.2x + 1{,}944.8$

Small System, High Radon Level
$\text{Capital}: 6 \cdot 10^{6} x^{3} - 3 \cdot 10^{6} x^{2} + 836{,}934x + 19{,}816$
$\text{O \& M}: 7 \cdot 10^{6} x^{3} - 1{,}000{,}000x^{2} + 58{,}919x + 1{,}306.3$

Large System, High Radon Level
$\text{Capital}: -260.6x^{2} + 147{,}424x + 63{,}719$
$\text{O \& M}: 0.4487x^{3} - 42.909x^{2} + 16{,}030x + 1{,}720.1$

Small System: capacity ≤ 0.31 mgd, average consumption ≤ 0.091 mgd
Low Radon Level: radon ≤ 1500 pCi/L (utilizes 80% removal to meet 300 pCi/L standard)
x = capacity (in Capital equations) or average consumption (in O&M equations)

The sum of annual capital costs and O&M costs provides an estimate of the system-level radon compliance cost for each water system in 1997$. This system-level cost was then divided by the number of housing units that receive public water to develop a compliance cost per household.

It should be noted that the system-level compliance cost used in this analysis does not include either the lower costs associated with a multimedia reduction program, or the higher costs associated with additional types of treatment that EPA estimates would be required for systems with certain characteristics (such as disinfection or iron/manganese removal). The cost estimates used here also do not include any costs for monitoring, record keeping, and other administrative matters.

As such, the cost estimates used here will be lower than the system-specific compliance costs used by EPA, but will be higher than the costs that would be incurred if states adopt multimedia radon reduction programs.

Income and Demographic Data
The relevant census data – including population, number of households, household income distribution, median household income, and number of people in poverty – were extracted from the 1990 Census Summary Tape File 3A for each of the 437 municipalities.

All income amounts were then inflated using the change in the Consumer Price Index from year-end 1989 to year-end 1997 (an increase of 29.44%). This placed all income amounts in 1997$, the same units used for the compliance cost estimates. For example, assume that the 1990 census reports that 100 people in Municipality X had an income in the range of $10,000 to $12,499, which has a midpoint of $11,250. For purposes of this analysis, the midpoint was inflated by 29.44% to $14,562 and it was assumed that all 100 people had that level of income in 1997.

Similarly, the median household income that is reported by the Census Bureau was inflated by the same 29.44%.[20]

Finally, before conducting any further analysis, the characteristics of the group of 437 communities were compared to the United States as a whole.[21] Table 3 and Figure 3 show that the group is reasonably representative of the United States as a whole. The median household income for the group in 1989 was within $200 of the median household income for the United States in that year. Further, the income distribution curve shown in Figure 3 demonstrates that the distribution of income within the group was nearly identical to that of households in the United States as a whole. Finally, it should be noted that despite the overall similarity in income levels, the group had a higher incidence of poverty than the United States (16.8% vs. 12.8%) and had a slightly smaller average household size than the average for the entire country (2.6 people vs. 2.7 people). While it cannot be concluded that the group's characteristics precisely mirror those of the entire country, it appears reasonable to use data for the group to provide additional information that will be used to establish national drinking water policy.

Table 3: Comparison of Group to United States

	Group of 437 Communities	**All United States**
Number of households (1990)	1,699,236	91,993,582
Population (1990)	4,369,222	248,709,873
Avg. people per household (1990)	2.6	2.7
Median household income (1989)	$29,862	$30,056
Number of people in poverty (1990)	735,421	31,742,864
Percent of people in poverty (1990)	16.8%	12.8%

[20] Neither income distributions nor poverty distributions changed significantly between 1989 and 1997. U.S. Census Bureau, Changes in Median Household Income: 1969 to 1996, *Current Population Reports Special Studies*, P23-196 (1998); U.S. Census Bureau, Historical Poverty Tables – People, Table 5: Percent of People by Ratio of Income to Poverty Level: 1970 to 1997, last revised Feb. 3, 1999, http://www.census.gov/hhes/poverty/histpov/hstpov5.html. These studies and others also show that median and lower income levels barely kept pace with inflation during this period. See also Wages for Low-Paid Workers Rose in 1997, *Wall Street Journal*, Mar. 23, 1998, and Charting the Pain Behind the Gain, *Wall Street Journal*, Oct. 1, 1999. As a result, it appears reasonable to increase 1989 income data by the Consumer Price Index to estimate income levels and income distributions in 1997. Similarly, it appears reasonable to use 1989 data for the number of people in poverty to estimate the number of people in poverty in 1997.

[21] Data for the United States as a whole were extracted from the U.S. Census Bureau's database C90STF3C1, at http://venus.census.gov/cdrom/lookup

Figure 3: Income Distribution for Group and United States

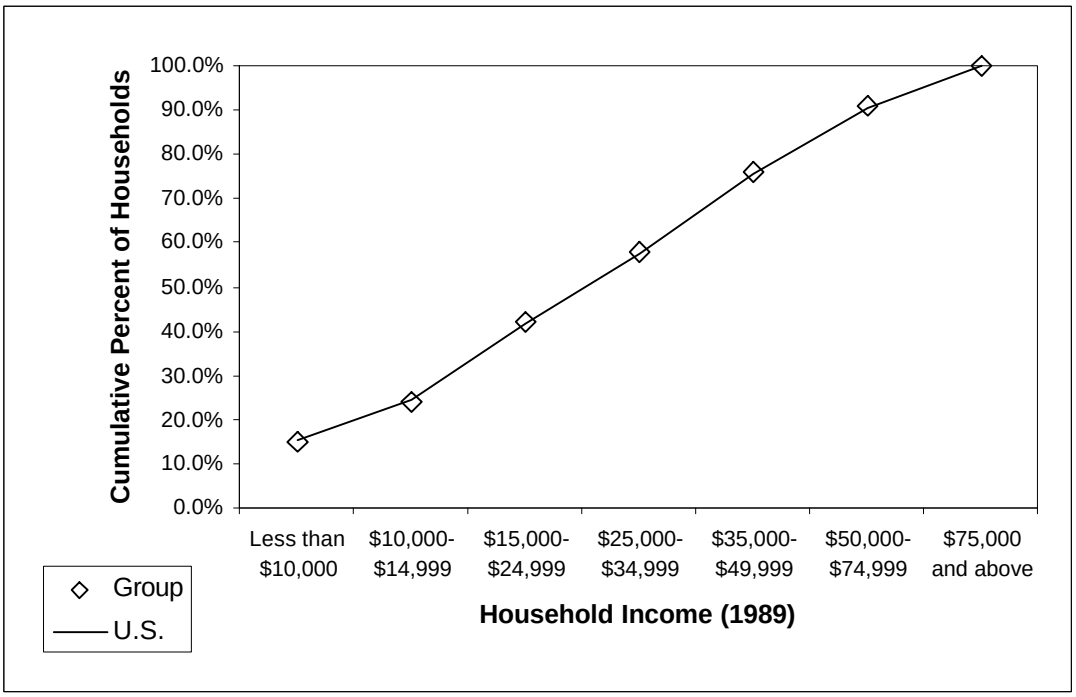


Table 4 shows a comparison of the size of water systems in the group of 437 communities to water systems nationwide. The communities in the group are substantially larger than the overall population of groundwater systems in the United States. As a consequence, it should be recognized that any conclusions drawn about the affordability of service for the group of systems is likely to understate any affordability concerns for the United States as a whole. This is a result of the significantly higher costs per household as the size of the system declines (as noted by EPA at pages 59327-28 of the NPRM).

Table 4: Comparison of Water System Size in Group to United States

Population	Group of 437 Communities	All Community Groundwater Systems in U.S.[22]
10,000 or more	57 (13%)	1,536 (3%)
3,300 to 10,000	71 (16%)	2,538 (6%)
500 to 3,300	221 (51%)	10,286 (23%)
100 to 500	83 (19%)	14,896 (34%)
25 to 100	5 (1%)	14,651 (33%)

Results

The potential impact of the proposed radon rule on the affordability of water service can be evaluated in terms of the effect on communities, households, and people who are living in poverty. While each of these points of view rely on the same underlying data – the estimated

[22] NPRM at 59310

cost for a water system to comply with the proposed regulation – each presents a slightly different picture of any potential affordability concern.

Table 5 shows the community-wide impacts of the NPRM. These results show that most communities in this group will have a per-household compliance cost that is less than the rough threshold we have established of $50 per household per year. Further, all but 4 communities in the group are estimated to have a compliance cost that is less than 0.5% of median household income in that community. Three of those communities have a population that is less than 100 people, while the other has a population of about 160 people.

Table 5: Community Impacts

Number of communities	437
Communities with compliance cost < $50 per household per year	382 (87.4%)
Communities with compliance cost $50 - $100 per household per year	49 (11.2%)
Communities with compliance cost > $100 per household per year	6 (1.4%)
Communities with compliance cost < 0.5% of median household income	433 (99.1%)
Communities with compliance cost > 0.5% of median household income	4 (0.9%)

The household impacts are summarized in Table 6. That table shows that nearly all households are estimated to spend less than $50 per year to comply with the proposed rule. Further, all but a few of the households reside in communities where the anticipated compliance cost is less than 0.5% of median household income. Once again, those few households that might present an affordability concern are in very small communities, where the estimated compliance cost per household is substantially higher than it is in larger communities.

Table 6: Household Impacts

Number of households	1,699,236
Households with compliance cost < $50 per year	1,694,306 (99.7%)
Households with compliance cost $50 - $100 per year	4,691 (0.3%)
Households with compliance cost > $100 per year	239 (0.0%)
Households in communities with compliance cost < 0.5% of median household income	1,699,091 (100%)
Households in communities with compliance cost > 0.5% of median household income	145 (0.0%)

Table 7 summarizes the estimated impacts of the proposal on people who live in households that have incomes below the poverty threshold. Here again, it appears that any affordability concerns associated with the proposed rule would be limited to people in poverty who live in very small communities. In the group of 437 communities that was analyzed, this amounted to just a fraction of 1% of the people living in poverty. Nearly all of the people living in poverty where the per-household cost was $50 or more per year were in communities with fewer than 500 people.

Table 7: Impacts on People in Poverty

Number of people in poverty	735,421
People in poverty with compliance cost < $50 per household per year	732,746 (99.6%)
People in poverty with compliance cost $50 - $100 per household per year	2,600 (0.4%)
People in poverty with compliance cost > $100 per household per year	75 (0.0%)

Table 8 compares the compliance cost to the actual distribution of household incomes in the community. This part of the analysis shows that most households will see their costs increase by less than 0.5% of their income. However, there will be a small percentage of households – again, primarily located in very small communities – that will need to spend 1% of more of their income in order to comply with the proposed regulation.

Table 8: Percentage of Household Income Spent for Compliance

Number of households	1,699,236
Households spending < 0.5% of income	1,692,437 (99.6%)
Households spending 0.5% to 1.0% of income	5,514 (0.3%)
Households spending 1.0% to 2.0% of income	1,171 (0.1%)
Households spending > 2.0% of income	114 (0.0%)

The tremendous differences among communities depending on their size can be seen in Table 9. Simply, there is no concern with affordability for households that are in communities with more than 1,000 people and a very minimal concern in communities with between 500 and 1,000 people (about 1% of households and less than 1% of the people in poverty are estimated to have water bills increase by between $50 and $100 per year). However, in small communities the impact appears to be much more severe. In the smallest communities, more than one-half of the households resided in a community where the compliance cost exceeded 0.5% of median household income. Further, in these very small communities, about one-half of the people living in poverty would face an increased expenditure of more than $100 per year, and all would face an increased expenditure of more than $50 per year.

Table 9: Comparison of Affordability Impacts by Size of Community

	25-100	100-500	500-1,000	1,000-3,300	3,300-10,000	> 10,000	Total
Communities							
Number	5	83	77	144	71	57	437
Cost < .5% MHI	2	82	77	144	71	57	433
Cost > .5% MHI	3	1	-	-	-	-	4
Households							
Number	136	10,400	22,381	98,629	158,233	1,409,457	1,699,236
Cost < $50		5,815	22,172	98,629	158,233	1,409,457	1,699,091
Cost $50-100	29	4,453	209	-	-	-	4,691
Cost > $100	107	132	-	-	-	-	239
People in Poverty							
Number	53	5,426	9,042	38,627	55,033	627,240	735,421
Cost < $50	-	2,877	8,969	38,627	55,033	627,240	732,746
Cost $50-100	28	2,499	73	-	-	-	2,600
Cost > $100	25	50	-	-	-	-	75
Average Cost	$130	$55	$34	$21	$11	$8	$9

Conclusion

The group of 437 communities included in this analysis contains just a few of the smallest water systems (only 5 out of the 437 communities), while nationwide about 33% of all groundwater systems fall in the very smallest size category. Consequently, it is not possible to draw a

conclusion about the impact on the affordability of service from the proposed rule in the very smallest communities. There are indications that the compliance cost in these communities may be of a magnitude that would raise serious affordability concerns on a widespread level. For example, the NPRM estimates a compliance cost of more than $200 per household per year and more than 1% of median household income in communities with fewer than 100 people.[23] In the few very small systems included in this analysis, an average compliance cost of $130 per household per year was estimated, with all households in these communities facing an increased cost of more than $50 per year.

In all but the smallest communities, (that is, those communities with a population of 100 people or more), however, it does not appear that the proposed rule would raise an affordability concern on a broad scale. Nearly all systems with 100 people or more had average compliance costs that were less than 0.5% of median household income and that were less than $50 per household per year. There may be scattered systems that exceed these thresholds, but those concerns should be resolved through the variance and grant provisions in the SDWA, rather than by changing the rule for the entire country.

[23] NPRM at 59327-28.