MERCATUS CENTER

REGULATORY STUDIES PROGRAM

Public Interest Comments on the U.S. Environmental Protection Agency's Proposed National Primary Drinking Water Regulations: Ground Water Rule[1]

The Regulatory Studies Program (RSP) of the Mercatus Center at George Mason University is dedicated to advancing knowledge of the impact of regulation on society. As part of its mission, RSP produces careful and independent analyses of agency rulemaking proposals from the perspective of the public interest. Thus, these comments on the U.S. Environmental Protection Agency's (EPA's) proposed Ground Water Rule do not represent the views of any particular affected party or special interest group, but are designed to evaluate the effect of the Agency's proposals on overall consumer welfare.

EPA proposed the Ground Water Rule on May 10, 2000 (40 CFR Parts 141 and 142, in the *Federal Register* at page 30194). The proposed rule is intended to offer public health risk reduction benefits for Americans who are served by public water systems (PWS) that rely on ground water. The focus of the rule is on preventing microbial contamination by bacterial and viral pathogens that can cause illness and, in some cases, premature mortality.

These comments raise and address a series of key questions regarding the proposed Ground Water Rule. Section I reviews the rule's key provisions and rationale. Section II examines the analysis underlying the proposal and reviews EPA's conclusions from that analysis. It also highlights how a closer look at EPA's estimated benefits and costs may suggest a different preferred option. Section III investigates whether the rule as proposed would provide meaningful protection of public health and generate the levels of benefit that EPA describes, at the costs it estimates. Section IV discusses how the rule might be improved to provide greater net social benefits, and Section V offers conclusions and recommendations.

I. EPA's Multiple-Barrier Approach Responds to a Statutory Mandate to Protect Ground Water Systems.

The Ground Water Rule was proposed in accordance with the Safe Drinking Water Act Amendments (SDWAA) of 1996, which required that EPA develop regulations specifying the appropriate use of disinfection in ground water systems "as necessary," and addressing other components of ground water systems that are needed to ensure protection of public health (section 1412(b)(8)). The SDWAA specify a deadline of 2002 for promulgation of the final rule, although EPA is hoping to finalize the Ground Water Rule before then.

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The Ground Water Rule is the result of many years of EPA efforts to address a series of complex issues related to microbial risks in ground water PWS. Originally envisioned as the "ground water disinfection rule," the name was in recent years generalized to the Ground Water Rule because the intent was not simply to mandate disinfection practices. Instead, the broader perspective was to include source water protection and other practices that, in addition to or in lieu of disinfection, might provide effective and economical protection from microbial risks.

The broader perspective toward microbial risk protection is evident in EPA's proposed regulatory option, which the Agency labels a "multiple-barrier" approach. This was selected over three alternatives, including an option to mandate disinfection for all ground water PWS. The proposed multiple-barrier option combines (1) periodic sanitary surveys to identify potential deficiencies in ground-water-based PWS, (2) hydrogeologic assessments to identify wells sensitive to fecal contamination, (3) source water monitoring for systems drawing from sensitive wells that are not treated or have other indications of risk, (4) mandated corrections of significant deficiencies (e.g., by installing treatment that achieves 4-log (99.99 percent) inactivation or removal of viruses), and (5) compliance monitoring of disinfection, where it is used, to ensure it is properly operated.[2]

At face value, the multiple-barrier option sounds like a prudent regulatory approach. It has several desirable features, including the appearance of flexibility (providing a range of performance-oriented ways in which a PWS can comply rather than a command and control treatment requirement), being targeted on those PWS that have evident elements of risk (only systems with risk elements incur the costs of some compliance elements), and providing multiple layers of protection (rather than being based on a single approach like disinfection). However, many important questions remain about the proposed rule that cast doubt on whether its public health protection goals would actually be achieved, and whether the costs borne would be justified by the benefits received.

II. The Analysis Underlying the Proposal Suggests a More Targeted Approach Would Offer Higher Net Benefits.

EPA's preamble (Federal Register, May 10, 2000) and Regulatory Impact Analysis (RIA, April 5, 1999) describe the rationale for the proposed rule, the options the Agency considered, and the benefit-cost analysis of the alternative options. This section reviews EPA's analysis and results. It presents the conclusions EPA has drawn from its analysis, and offers alternative conclusions that may be better supported by the data EPA provides.

A. The Proposed Ground Water Rule Would Cover a Range of Public Water Systems.

The Ground Water Rule attempts to provide public health protection to those who consume water from any PWS that relies on ground water. These include Community

[2] *Federal Register*, p. 30194.

Water Systems (CWS) that serve year-round residential communities ranging from 25 persons served (or 15 full time connections) to systems serving more than one hundred thousand people. CWS are the primary focus of many SDWAA regulations because of the quantity of water consumed in homes and the extended duration of potential exposure. There are approximately 43,900 CWS that rely in whole or in part on ground water, serving 88.7 million Americans (RIA, p 1-5). A significant portion (90.1 percent) of these CWS are very small entities serving fewer than 3,300 persons.

Also included under the proposed Ground Water Rule are noncommunity systems (NCWS), some of which are "transient" systems and others that are "non-transient." Non transient-noncommunity systems (NT-NCWS) include schools, nursing homes, work places, and other locations that serve water mainly to the same group of 25 or more individuals for a period of more than six months per year. For these systems, there are frequent and sustained opportunities for exposure to any contaminants in the system's drinking water.

In contrast, transient systems (T-NCWS, which include roadside restaurants, rest areas, and the like) typically expose many people to whatever may be in their drinking water for only brief intervals.[3] There are 19,322 NT-NCWS and 93,618 T-NCWS in the US that rely on ground water, serving 5.3 million and 14.9 million persons, respectively.[4] Over 99.6 percent of NT-NCWS (and over 99.7 percent of T-NCWS) are very small entities, serving fewer than 3,300 persons.

B. The Goal of the Rule is to Protect Against Waterborne Diseases Caused by Fecal Contamination.

The Ground Water Rule is intended to reduce the risks posed by the bacterial and viral pathogens associated with fecal contamination of ground water supplies. Fecal contamination may arise from many sources (e.g., septic tanks, sewer lines), and travel through soils and aquifers to wells. EPA cites numerous studies to indicate that between 5 percent and 10 percent of wells contain bacterial or viral pathogens.

Waterborne pathogens are associated with a range of potential illnesses, some very modest in terms of their adverse health impacts, and some potentially fatal. EPA cites data from the Centers for Disease Control (CDC) that suggest that 371 waterborne disease outbreaks were recorded between 1971 and 1996, and many more outbreaks or illnesses due to waterborne pathogens are likely to have gone unreported. The CDC data also reveal that nearly as many outbreaks were recorded at PWS that disinfected their ground water (134) as in those that did not (163).[5]

The above information provides the basis for EPA's rationale for the Ground Water Rule: that actual or potential fecal contamination of ground water PWS is a reality, that it

[3] For example, aside from restaurant workers, most users have at most one or two glasses of water or water-based beverages, and then depart.
[4] EPA Regulatory Impact Analysis, pp. 1-5.
[5] CDC data as reported by EPA in the *Federal Register*.

makes people sick, and in some cases causes premature fatalities. Furthermore, the sources of this contamination are widespread and not reliably counteracted by disinfection alone. This indicates a need to consider a multi-faceted regulatory approach including source water protection and other elements.

C. EPA Examines Baseline Risks and Anticipated Benefits for Four Alternative Regulatory Options.

EPA estimates there are approximately 170,000 viral illnesses each year due to waterborne pathogens, and 15 premature fatalities. Based on casual inference from CDC data, EPA adds an additional 20 percent to reflect bacterial impacts.

The EPA analysis estimates that the multiple barrier regulatory option would reduce these baseline risks by over 96,000 viral illnesses and 9 of the premature fatalities per year.[6] EPA values these risk reductions using cost of illness (COI) estimates ranging from $158 to $19,711, depending on the level of severity of the illness and the age and sensitivity of the victim. EPA uses a $6.3 million (1999 dollars) estimate based on the value of a statistical life (VSL) to assign monetary values to the premature fatalities. This yields an estimated annual benefit of $205 million for the preferred option for acute illnesses and fatalities avoided (and unquantified potential benefits for chronic illness risk reductions).

EPA also estimates risk reduction benefits for the three other options it considered. Two of these options were less comprehensive than the multiple barrier approach, and therefore yield lower benefits. The options offered by EPA include:

1. The least stringent option requires that states conduct sanitary surveys (every third or fifth year for CWS and NCWS, respectively), and that PWS correct any deficiencies identified by those surveys. This option yields expected annual benefits of $33 million.

2. A second option consists of combining the sanitary survey option with triggered microbial monitoring in source waters for those PWS that do not disinfect to 4-log removal/inactivation *and* that have a positive total coliform distribution system sample under the existing Total Coliform Rule. This option yields an EPA-estimated benefits estimate of $178 million per year.

3. The third option is the multiple barrier approach proposed by EPA. This includes the second option (sanitary survey and triggered monitoring) *and* routine source water monitoring for PWS drawing from settings that are deemed to be hydrogeologically sensitive to potential fecal contamination. PWS will be classified as being hydrogeologically sensitive on the basis of "hydrogeologic sensitivity assessments" that are to be performed by states for all PWS that do not treat to 4-log removal/inactivation of viruses. If source water monitoring (routine or triggered) indicates contamination, the PWS will be required either to treat to

[6] RIA, pp. 1-6.

4-log removal, or switch to an alternate water source within 90 days. As noted above, this proposed option has benefits estimated to be $205 million per year.

4. The fourth option requires across the board disinfection by all ground water PWS, and yields estimated annual benefits of $283 million.

D. EPA Relies on Average Benefit-Cost Comparisons to Support its Proposed Approach.

EPA estimates compliance costs for its four regulatory options to range from $72.7 to $866.0 million per year (using discount rates of 3 percent and 7 percent). The costs include EPA's estimates of capital and operating and maintenance expenses, monitoring and start-up costs, reporting and record keeping, and state administrative expenses.

Exhibit 1 summarizes the Agency's estimated compliance costs and benefits for the four regulatory options using the 7 percent rate.[7] The Agency's results reveal small but positive net benefits for the middle two options, but not the first (sanitary survey only) or fourth (universal disinfection).

Exhibit 1: EPA-Estimated Benefits and Costs for Ground Water Rule Regulatory Options
(Millions of 1999 Dollars per Year)

	Regulatory Options			
	Sanitary Survey	Sanitary Survey & Trigger Monitor	Multiple Barrier	Universal DIsinfection
Benefits	$ 33	$ 178	$ 205	$ 283
Costs	$ 76	$ 169	$ 199	$ 866
Net Benefits	**$ (43)**	**$ 9**	**$ 6**	**$ (583)**

E. The Incremental Costs and Benefits Implicit in EPA's Data Suggest a Different Preferred Option.

Exhibit 2 presents the incremental benefits and costs of EPA's four options. Though EPA does not portray this incremental analysis, it is directly derived from its data. We have included it here because it is the appropriate way to compare benefits to costs. Only the second option (sanitary surveys, plus monitoring that is triggered when a total coliform-positive sample is found in the distribution system) shows positive net incremental

[7] Seven percent, the rate recommended by OMB, is a more reasonable estimate of the cost of capital (borrowing costs) of PWS. Indeed, higher rates may apply for many of the predominantly small PWS affected by this rule.

benefits. The Agency-preferred multiple barrier option has negative incremental net benefits (near break-even).

Exhibit 2: Incremental Benefits and Costs for Ground Water Rule Regulatory Options
(Millions of 1999 Dollars per Year)

	Regulatory Options			
	Sanitary Survey	Sanitary Survey & Trigger Monitor	Multiple Barrier	Universal Disinfection
Incremental Benefits	$ 33	$ 145	$ 27	$ 78
Incremental Costs	$ 76	$ 93	$ 30	$ 667
Incremental Net Benefits	**$ (43)**	**$ 52**	**$ (3)**	**$ (589)**

F. The Proposal Will Have Different Economic Impacts on States and Public Water Systems Depending on Their Size and Characteristics.

The regulation will affect States, publicly-owned and investor-owned PWS that rely on ground water, and households served by those systems. States will not only need to take on monitoring and enforcement responsibilities as primacy agents, but they will also need to conduct sanitary surveys and hydrogeological sensitivity assessments under EPA's proposed option. This burden will fall harder on some states than others, because ground-water-based PWS are not uniformly distributed across the nation.

PWS will bear costs of compliance and other activities associated with the rulemaking. As noted above, the vast majority of ground water PWS are very small (serving fewer than 3,300 people). All systems serving fewer than 10,000 people meet the "small entity" criterion of the Regulatory Flexibility Act. Of the 156,846 PWS affected by the rule, 99 percent are thus small entities. The Agency therefore could not certify that the Ground Water Rule would not have "a significant economic impact on a substantial number of small entities."

EPA conducted a Small Business Advocacy Review (SBAR), and the SBAR Panel suggested that EPA attempt to target the rule to focus on those PWS that are most at risk.[8] However, even in the targeted approach intended under the multiple barrier option, all small systems must still address record keeping and reporting requirements regardless of vulnerability or performance. In addition, those small systems with monitoring, disinfection, and/or corrective action requirements will be hard pressed to find the funds, much less the technical expertise to carry out their responsibilities.

[8] RIA, Chapter 7.

EPA undertook an analysis to evaluate how the Ground Water Rule costs compared to the baseline expenses for small CWS. The results are interpreted by the Agency as indicating small incremental cost impacts (e.g., 12 percent in the smallest systems). However, this analysis is misleading because it reports annual averages in which compliance costs are spread evenly across all systems (not just those with real compliance issues). Further analysis provided in EPA's RIA indicates that 10 percent of the smaller CWS will see their costs more than double due to the Ground Water Rule. Second, the analysis is based on data from CWS only, thereby overlooking the NCWS that are probably even more vulnerable to cost impacts.

G. EPA's Analysis Reveals That a More Targeted Approach Would Achieve Greater Net Social Benefits.

Based on EPA's analyses, the Ground Water Rule is, at best, a "break-even" proposition in terms of benefits and costs at a national average level. However, EPA's own benefit-cost findings, when examined incrementally, indicate that the alternative option of sanitary surveys with triggered monitoring is a better investment in public health protection than the option proposed by the Agency. Taking the additional step proposed by the rule (routine source water monitoring for PWS drawing from sensitive settings) will impose more costs than it will return in expected public health benefits. Furthermore, the EPA data suggest that greater net social benefits may be attained by better targeting the Ground Water Rule, given the imbalance between costs and benefits at NCWS and in the smallest system size categories of CWS.

III. EPA's Estimated Benefits may be Overstated, and its Costs Understated.

The discussion above relied on EPA's own assessment of benefits and costs. However, there are several reasons to believe that the benefits may be overstated, and the costs understated by EPA. Concerns also remain about the soundness of the logic underlying some of the proposed Ground Water Rule's provisions.

A. The Rule May Not Realize the Intended Health Benefits.

There are several reasons why the rule as proposed may not provide meaningful public health protection. First, the rule pushes many systems ultimately to rely on disinfection at the well (or entry point to the distribution system where wells are clustered) as the single barrier against fecal contamination, even where data indicate other components of the system contain or are susceptible to fecal contamination. While well water disinfection can be a critical component of protecting consumers from fecal contaminants, it is far from a guarantee of safety.

For example, the CDC data EPA use as a rationale for the regulation indicate that nearly half of the outbreaks of waterborne illnesses occurred in systems that practiced disinfection. This is a clear indication that disinfection alone is no panacea. The rule may

push many systems to adopt disinfection measures rather than target the true source of— or provide an appropriate remedy for— fecal contamination risks.

Further, several outbreaks in the CDC data are the result of chemical rate overfeed, indicating that disinfection can create risks if not properly managed by suitably trained operators. Chlorine use also raises other risks, such as potential formation of disinfection byproducts (that may pose cancer and reproductive risks). In addition, the transport, storage, and handling of chlorine and related disinfection chemicals at numerous small system sites around the country may pose risks as well.

The rule also overlooks the need to provide disinfection residuals in the distribution system. If systems are going to make investments in source water protection and treatment, it seems prudent to ensure that sources of potential fecal contamination within the distribution system are also addressed. This is particularly true because the Ground Water Rule will often trigger the requirement to disinfect due to the presence of a positive sample from the distribution system, not the source water.

Indeed, the use of distribution system monitoring results as a trigger for source water monitoring is also suspect. Positive samples in the distribution system can arise for a wide range of reasons, which may have no relationship to source water quality. Indeed, the rule as proposed seems to draw inappropriate links across the three different aspects of fecal contamination risks:

1. Source water protection is a key element. For existing wells, it is prudent to site any new sources of potential fecal contamination carefully so that impacts on the PWS are minimized or eliminated. It also is prudent to ensure that new or existing sources use appropriate best management practices to minimize loadings. If a well is located in an area susceptible to contamination due to the potential contamination sources already present and/or hydrogeological sensitivity, then an alternate raw water source should be considered (perhaps a deeper well, a surface supply, etc), if feasible and economical.

2. The location and construction of the well, and treatment applied to the raw well water before it enters the distribution system, make up the second key element. Poor well siting and poor well construction (or maintenance) are perhaps the most common cause of contamination. Sanitary surveys can help identify these problems, and specify appropriate corrective actions. Suitable disinfection practices can also be a key component of controlling risk here, but may be inadequate as a sole remedy to low quality source waters, faulty well siting, or poor well construction.

3. The distribution system is the third component. Fecal contamination can arise in the distribution system from numerous sources, including introduction from source waters or through a poorly constructed well. However, contamination can also arise within the distribution system itself, through infiltration, main breaks and repairs, storage tank problems, inadequate flushing, sloughing from biofilms, and other causes. Creating a disinfection residual within the distribution system is

one way to ensure that fecal contamination risks are minimized within the system. Other best management practices for distribution system operation (e.g., flushing, main repair protocols) also can be critical components of a risk reduction plan.

There are several aspects of the Ground Water Rule that seem to overlook or confuse how these three elements are linked together. For example, the use of a positive coliform sample in the distribution system to trigger source water monitoring may divert many systems from examining and addressing the true source of the problem. A positive sample may or may not be attributable to source waters. Yet, even if source water monitoring reveals contamination in that setting, the rule has the potential to steer the PWS to a disinfection requirement that may not address the true problem source (e.g., if the risk is mostly attributable to the distribution system itself). Systems with disinfection in place but positive coliform samples do not have to monitor source waters, so it is unclear what remedy the rule achieves.

The hydrogeological sensitivity assessment portion of the proposed Ground Water Rule suffers from a similar logical flaw. If a PWS were deemed to be drawing from a source that is vulnerable to contamination, then it has to disinfect (or switch to an alternate source) under the proposed rule. As observed from CDC-recorded outbreaks of waterborne diseases, this does not necessarily guarantee incremental risk reduction for the cost incurred, since nearly as many outbreaks occur in ground water systems that disinfect as in those that do not.

Finally, it appears that the benefits of the rule may have been overstated by EPA (even assuming the above issues were not applicable) because of how exposure levels appear to have been estimated in NCWS. The documentation available for review was insufficiently detailed to enable more in-depth assessment; however, it appears that water consumption in T-NCWS may not reflect the typical one stop, one drink realities, rather EPA appears to have assumed 15 days of use, at an average of over 1 liter per day. This error has the potential to overstate risks (and, hence, the projected benefits) in T-NCWS by a factor of 30 or more (i.e., 15 days exposure instead of 1, plus over 1 liter per day instead of perhaps a half liter consumed). A correction of this magnitude makes the benefit-cost comparisons for T-NCWS even worse than currently portrayed by EPA.

B. The Costs May be Greater than Estimated by EPA.

There are several reasons to believe that EPA cost and impact estimates are understated.

1. The added disinfection costs need to be estimated for each "entry point to the distribution system" (EPDS) affected by the rule. For ground water systems, there may be numerous EPDS per system (i.e., sometimes one per well, or sometimes a few wells are clustered into one EPDS). EPA has been using estimates for EPDS that are too low for other rules (e.g., radon), and the same issue may apply here.[9]

[9] Cf., Stratus Consulting, January 2000.

2. It appears that land costs and chlorine handling costs are not included in the analysis. The addition of disinfection may require many utilities to expand the treatment facilities beyond current space limits. This may be especially relevant where some storage (e.g., in tanks) is required to provide for sufficient contact time of the disinfectant with the water. In addition, local building codes for handling of hazardous gases, like chlorine, will impose added costs.

3. The addition of chemical disinfection will often also require iron and manganese removal in order to control levels oxidized by the disinfectant. Absent removal, with the addition of disinfection, these compounds oxidize into the water and may reach unacceptably high concentrations. These and other water quality-related costs that are a direct consequence of disinfection need to be included, and can be appreciable.

4. The costs of addressing deficiencies uncovered in sanitary surveys do not appear to be included. These corrective actions may be very worthwhile, but their costs should be factored into the benefit-cost analysis.

5. EPA-estimated costs per household seem reasonable for the most part. However, these costs are national averages, and do not reflect the differential costs borne by those households (or enterprises) that need to take on added monitoring or treatment activities under the rule as proposed.

6. Finally, the Agency uses too low a cost of capital when discounting investments in treatment facilities. EPA confuses the discount rate (intended to reflect the social rate of time preference for benefits and costs in the future relative to today) with the opportunity cost of capital (intended to reflect what it really costs to borrow money and divert capital away from alternative investments). The true cost of capital for small PWS may be much higher than the 3 percent or 7 percent rates applied by EPA.

IV. EPA Could Achieve Greater Net Social Benefits with More Targeted Monitoring, and Different Requirements for Transient and Small Systems.

The Ground Water Rule is well intentioned but may be significantly flawed. Even overlooking the potential scientific flaws and uncertainties, or the logical inconsistencies in how the three components of ground water PWS risk management are intermingled by EPA, the Agency's own benefit-cost estimates cast doubt on this rule.

EPA relies on total, average costs and benefits to justify its preferred option. However, total, average costs and benefits obscure important information. As shown in Exhibit 2 above, the incremental costs of EPA's preferred approach exceed the incremental benefits. Furthermore, an examination of the costs and benefits by type of public water system reveal important differences. For example, it is not evident that the Ground Water Rule should be applied to noncommunity systems, and in particular, T-NCWS. Exhibit 3 provides a breakdown of costs and benefits, as derived from data in the Agency's RIA,

according to type of PWS. Net benefits are clearly negative (and nontrivial) for each option in the T-NCWS.

Exhibit 3: Benefits and Costs by System Type
(Millions of 1999 Dollars per Year, EPA Estimates)

Regulatory Option	System Type		
	CWS	**NT-NCWS**	**T-NCWS**
1. Sanitary Surveys			
Benefits	$ 28.0	$ 3.9	$ 0.3
Costs	$ 39.1	$ 5.6	$ 24.1
Net Benefits	**$ (11.2)**	**$ (1.7)**	**$(23.7)**
2. Sanitary Surveys and Target Monitor			
Benefits	$ 96.7	$ 15.3	$5.9
Costs	$ 61.5	$ 15.9	$ 83.5
Net Benefits	**$ 35.1**	**$ (0.6)**	**$(77.6)**
3. Multiple Barrier			
Benefits	$168.1	$ 26.7	$ 10.3
Costs	$ 72.8	$ 18.8	$ 96.7
Net Benefits	**$ 95.3**	**$ 7.8**	**$ (86.5)**
4. Universal Disinfection			
Benefits	$232.1	$ 36.8	$ 14.2
Costs	$426.4	$ 93.5	$315.9
Net Benefits	**$ (194.3)**	**$ (56.7)**	**$ (301.7)**

The applicability of the Ground Water Rule to very small CWS also deserves scrutiny. While customers of very small systems deserve public health protection, EPA's own estimates reveal that all of the regulatory options yield negative net benefits for CWS with fewer than 500 consumers.[10] There are negative incremental net benefits for the

[10] EPA RIA, Exhibit 8-6.

EPA-selected option for systems of 1,000 served or fewer.[11] An alternative approach is called for with respect to these smallest of systems.

V. Recommendations and Conclusions

The Ground Water Rule is an attempt to provide users of ground-water-based PWS with protection from the risks of potential fecal contamination. EPA has tried to embrace several good regulatory design practices into its construct for the proposed rule, including elements of targeting based on risk, and a set of flexible strategies for complying with the proposed rule. Regrettably, EPA's preferred approach—the proposed multiple barrier option—may generate benefits that fall short of anticipated costs. Even without making any adjustment to EPA's benefit and cost data, the routine monitoring required by this option is likely in total to impose more costs than benefits on water systems and (ultimately) on their consumers. Moreover, transient non-community water systems and smaller systems will be particularly burdened by the proposed requirements, suggesting that they will be the least likely to enjoy benefits while sharing disproportionately in the costs of the rule. Therefore, it is unlikely that the proposed rule can be justified on a benefit-cost basis unless it is better targeted (e.g., not on T-NCWS and perhaps not on the smallest CWS).

In addition to the problems apparent in the benefit-cost comparison, there may be more fundamental problems with the rule as proposed. These have been described above, and include the over-reliance on disinfection over other elements of the rule. While disinfection can be a highly valuable component of the Ground Water Rule, it is not a panacea, and it is over emphasized in the proposed approach at the expense of other needs. The focus must remain on using safe water sources and simple yet sound sanitary practices including well construction and siting. Especially for the smaller systems, EPA should consider a more basic approach; one that more carefully weighs what can be achieved through disinfection against the costs, and targets treatment accordingly.

[11] Loc. cit.

Appendix I
RSP Checklist
Proposed Ground Water Rule

Element	Agency Approach	RSP Comments
1. Has the agency identified a significant market failure?	In addition to statutory mandate, EPA cites the natural monopoly power of water systems, and the notes the information burden associated with having consumers self regulate drinking water risks. **Grade: B**	The natural monopoly argument is less valid today, given that consumers having opportunities to drink bottled water or purchase home treatment units. The information barrier has some validity, as it would be costly for consumers to assemble the facts about the challenging issues of microbial risk assessment and drinking water.
2. Has the agency identified an appropriate federal role?	The implied federal role is to establish procedures and standards that state primacy agents and PWS will have to implement. **Grade: C**	While the proposed rule has some flexibility, states are given fairly explicit and burdensome prescriptions. Likewise, PWS have some flexibility regarding compliance with certain aspects of the rule, but in reality their options are heavily constrained. Greater discretion by the states would be beneficial in terms of targeting systems and prioritizing risk-targeted corrective actions for PWS.
3. Has the agency examined alternative approaches?	EPA describes and provides benefit-cost information for 3 options in addition to the proposed multiple barrier approach. **Grade: C**	A broader and more meaningful set of alternatives should have been developed and analyzed. The options laid out by EPA are not independent of one another, and so there is very limited opportunity to evaluate the true alternatives. EPA ignored several key alternatives developed by stakeholders (e.g., ASDWA) in formulating its alternatives.

Element	Agency Approach	RSP Comments
4. Does the agency attempt to maximize net benefits?	The Agency selected an option with positive net benefits, according to its own analysis of benefits and costs. **Grade: D**	Our analysis indicates that the Agency could have redesigned the rule to better maximize net benefits. Incremental analysis was not applied, and the results used by EPA were aggregated such that the reported national averages obscured the considerable variability in costs and benefits across system sizes and types.
5. Does the proposal have a strong scientific or technical basis?	Occurrence, outbreak, and risk issues are addressed based on a range of available studies. Benefits valuation applies standard economic practices. **Grade: D**	The studies used, and EPA's interpretation of them, have been highly criticized by many well-informed stakeholders. The outbreak data and the occurrence studies used by EPA may have been misinterpreted in important ways. Many important considerations were ignored, such as the poor track record of disinfection alone in precluding waterborne illness outbreaks.
6. Are distributional effects clearly understood?	No, there is little indication of how this rule would affect people of different economic strata, or small-scale systems. **Grade: F**	Potentially significant impacts on small enterprises and small communities are inadequately assessed. EPA's use of national averages serves to obscure what may be a major ramification of this rulemaking.
7. Are individual choices and property impacts understood?	No. The approach is highly prescriptive. **Grade: D**	With increased opportunities for individuals to make informed choices over drinking water (e.g., bottled supplies, in-home treatment), there is decreasing justification for nationally-imposed approaches. This is especially true for the smallest systems (and T-NCWS) where any benefits received by consumers are likely to be greatly outweighed by the costs imposed by a nationwide regulatory approach.