

**SUPPORTING STATEMENT**  
**Request to Conduct Focus Groups**  
**Drinking Water Survey**  
**August 31, 2007**

**(1) Title of the Information Collection**

Avoiding Exposure to Arsenic in Drinking Water

**(2) Short Characterization/Abstract**

Approximately 50 percent of the United States population relies on groundwater as their primary source of drinking water (Ryker 2003). Recent population growth trends in the United States may cause this reliance to grow, as growth rates have been higher in areas that rely on groundwater for drinking water. Arsenic levels in groundwater exhibit considerable variation across the United States. Higher levels (greater than 10 parts per billion) of arsenic are common in the groundwater of several regions, including New England, the Great Lakes region, and the western United States (Ryker 2003; Ayotte, et al. 2003; Ayotte, et al. 2006). In Maine about half of the population depends on private wells for drinking water and about three-quarters of these wells are drilled into bedrock formations, which have been associated with higher levels of arsenic. Recent testing of well water indicates that about 10 percent of the private wells in Maine have arsenic concentrations above the Federal drinking water standard of 0.010 mg/l and approximately 2 percent of these wells exceed the previous standard of 0.050 mg/l (Loiselle, et al. 2002). This project examines household averting behavior and willingness to pay to reduce exposure to arsenic in drinking water. The results from this project will be influential and advance scientific understanding of these issues, but will not feed directly into a rule making. This particular supporting statement provides background material for a request to conduct up to 8 (eight) focus groups to test a draft survey instrument. Findings from these focus groups will inform future research on the behavioral responses to arsenic in drinking water.

**(3) Need for the Collection**

Although people on public water supplies are protected from elevated levels of arsenic in their tap water via the Safe Drinking Water Act, households with private wells are not afforded such protection. Chronic exposure to low concentrations of arsenic through drinking-water causes cancer, and arsenic is the only carcinogen with a demonstrated causal link between drinking-water exposure and bladder and lung cancer (USEPA 1998). The National Research Council states there is sufficient epidemiological evidence to conclude that chronic ingestion of inorganic arsenic causes bladder and lung cancer, in addition to the previously established link between arsenic and skin cancer (1999, 2001).

Households relying on private wells for drinking water are responsible for maintaining the safety of their drinking water. Accordingly, these households are an excellent population to study, as they are regularly making tradeoffs regarding their health, private

consumption, and other factors. Households with elevated levels of arsenic in their well water can undertake a variety of actions to avoid exposure. They can purchase bottled water to drink or install point-of-use (e.g., kitchen sink) or point-of-entry (e.g., complete household) systems (Sargent-Michaud et al. 2006). By observing the behavior of Maine households, we will learn about their willingness to pay for reductions in arsenic exposure. In addition, we will begin to understand the extent of possible information failures. There is a potential lack of information or awareness on the part of the household concerning both the exposure and risks associated with arsenic in drinking water. Because of the lack of federal oversight many households are unaware of their exposure or potential risks. Full information would allow households to make informed decisions regarding treatment or other averting behavior actions. Thus, while state and federal regulators do not necessarily have statutory authority to regulate exposures at private wells, there is a need to understand how households make decisions related to the safety of their drinking water to ensure that households have adequate information to make informed self-protection decisions. Little is known about the values households place on reduced exposure to arsenic in drinking water. In order to assist policymakers in deciding whether and how to go forward with any information or awareness program, it is necessary to examine household averting behavior and to consider the benefits households place on reduced exposure.

Researchers at the U.S. Environmental Protection Agency (EPA) and the University of Maine are developing a survey to characterize averting behavior and willingness to pay related to maintaining the safety of drinking water. Questions in the survey focus on general safety precautions and targeted actions to reduce arsenic. The survey instrument collects detailed information on past and current averting behavior and generates responses to a contingent averting behavior scenario. The survey instrument considers subjective and objective risk perceptions as well as information effects on these perceptions. The survey responses will enable an improved understanding of the variation in averting behaviors across households and will support generation of multiple estimates of household willingness to pay for reduced exposure to arsenic in drinking water drawn from private wells. The results of this research will enable states, such as Maine or others with naturally occurring arsenic, to understand how households make decisions and to analyze household willingness to pay for policies aimed at safer drinking water. Secondly, we will learn more about public willingness to pay for fatal cancer risk reductions, information that can be used in a variety of ways in benefits analysis. This will help expand the body of knowledge about these types of risks.

The purpose of this supporting statement is to provide background information on the request to conduct eight (8) focus groups to test the survey instrument. In particular, the focus group testing will: (1) assist in determining the feasibility of asking both averting behavior and stated preference questions, and the extent to which there is sufficient information to generate meaningful values, possibly through a joint modeling approach; (2) determine how best to elicit risk preferences through the testing of several different visual aids to communicate risk; (3) provide information on the other joint products households purchase through their averting behavior or treatment of tap water, and the extent to which this information can be incorporated into the modeling of household

values; and (4) aid in determining the overall feasibility and clarity of the survey instrument in generating meaningful information to estimate household willingness to pay for risk reductions.

The results of this survey will provide meaningful information on household willingness to pay for reduced exposure to arsenic in drinking water, as well as allow for the estimation and comparison of values derived from averting behaviors and stated preferences.

#### **(4) Non-duplication**

To the best of our knowledge this survey is unique and does not duplicate other efforts. While there have been a number of studies that estimate values for protecting the quality of drinking water supplies obtained from groundwater, most have focused on nitrate contamination from agriculture, which is arguably a different contaminant than naturally-occurring arsenic (Poe, et al., 2001; Edwards, 1988; Jordan and Elnagheeb, 1993). A summary of earlier valuation studies on public or well drinking water safety can be found in Whitehead and van Houtven (1997).

No existing studies were found that provide an assessment of private willingness to pay for exposure to arsenic in drinking water. Shaw, et al. (2007) have developed and implemented a survey to estimate willingness to pay for reduced exposure to arsenic in drinking water, however the focus of their research differs from ours and the results are not currently available. They are comparing values across both private well and public water supply households, whereas our focus is exclusively on households on private wells. Those on public water supply are afforded protection by the Safe Drinking Water Act and therefore may behave differently than other households. In addition, the Shaw, et al. work examines a number of states other than Maine. The focus exclusively on Maine will avoid confounding factors associated with cross-state differences, but also provide a useful complement to the Shaw, et al. work once it is completed. Shaw, et al. (2005) summarize the results of a simple binary logit model describing treatment decisions of households residing in an arsenic “hot-spot” in Nevada. They find that the higher the cost of treatment, the less likely households will treat. In addition, home ownership and higher levels of arsenic in tap water result in a greater likelihood of a household treating their water, as can be expected. They do not, however, estimate the value households place on risk reductions, a useful contribution of our research.

Another line of literature related to this work concerns the joint production that occurs when averting or treating drinking water. Bottled water or the use of a water filter may do more than just reduce exposure to a particular contaminant (e.g., arsenic). Households may engage in such activities because of taste, odor, or the color associated with their untreated tap water. Some studies have attempted to tease out these effects. Notably, Abrahams, et al. (2000) estimate averting behaviors while accounting for the joint production from the use of bottled or filtered tap water. While they do not focus exclusively on any particular contaminant, their results do provide a useful modeling protocol that we may find appropriate for this study. In addition, we will explore the

potential joint products associated with averting or treating for arsenic, based on the information provided in Abrahams, et al. (2000).

Finally, Adamowicz, et al. (2004) discuss a methodology for estimating household values associated with reduced morbidity and mortality risks from trade-offs between cancer and bacterial risks in drinking water. We follow many of these same steps in our study and this paper provides useful background information.

Some research does exist to value cancer risk reductions, but this research remains unpublished and focuses on other health endpoints or routes of exposure than those considered here. Therefore, this study will provide unique information.

## **(5) Consultations**

Effort has been taken to consult with persons outside the agency on a regular basis throughout the development of the survey. The main investigators are academic researchers who work for the University of Maine, Dr. Kathleen Bell and Dr. Mario Teisl, as well as Dr. Ju-Chin Huang at the University of New Hampshire. Dr. Kelly Maguire at the U.S. Environmental Protection Agency serves as the project officer and contributor to this research.

**Dr. Kathleen P. Bell** is an assistant professor in the Department of Resource Economics and Policy at the University of Maine and the Principal Investigator on this project. Dr. Bell's primary research focus is on environmental and natural resource economics. Her areas of expertise include environmental and natural resource economics and spatial economic modeling. She is especially interested in the spatial aspects of economic decisions.

Dr. Bell received her Ph.D. in Economics from the University of Maryland in 1997, with fields in environmental economics and public finance. She began her professional career with the U.S. Environmental Protection Agency in Washington, DC and then was a postdoctoral research associate at the University of Washington, Seattle. She joined the faculty of the University of Maine in July 2001, where she conducts research on a variety of environmental and community economic development topics and teaches environmental policy, environmental and natural resource economics, econometrics, and GIS courses.

**Dr. Mario Teisl** is an associate professor in the Department of Resource Economics and Policy at the University of Maine. Dr. Teisl's research examines the interplay between information, policy and market. Recent grants include measuring the private and social benefits of nutrition information, the costs and benefits of product identification, certification and labeling, the economics of food safety, the economic effect of environmental (social) marketing programs.

Dr. Teisl has over 50 journal articles and monographs, and over 75 presentations related to the economics of nutrition labeling and promotion, health-claims policy and food

safety or environmental labeling and marketing policy. The papers have been published in some of the top journals while many of the presentations have been as invited papers at economic or health related professional meetings, or as testimony at Federal or State hearings.

**Dr. Ju-Chin Huang** is an Associate professor of economics in the Whitmore School of Business and Economics at the University of New Hampshire. Her research interests include environmental economics and applied econometrics. She has published on topics such as combining revealed and stated preference data, construct validity and scope effects in contingent valuation surveys, and the incentive compatibility of hypothetical referenda. Her work appears in top level journals including *Land Economics*, *Journal of Political Economy*, and *Journal of Environmental Economics and Management*. Dr. Huang spent the 2006-07 academic year on sabbatical at the U.S. Environmental Protection Agency.

Other outside experts that have participated in various points in the project include, Dr. Kevin Boyle, Dr. Laura Taylor, Dr. Anna Alberini, Dr. Thomas Crocker, and Mr. Andy Smith. Of particular note, Dr. Kevin Boyle served as the Principal Investigator on the project until his move to Virginia Tech. Mr. Andy Smith is the chief toxicologist for the State of Maine and has provided extensive input into the science and policy relevance of this research for current work in Maine.

We also conducted one focus group earlier in the project to learn about household general views on arsenic in drinking water.

## **(6) Peer Review Plans**

It is our determination that this project should be designated as influential and our peer review is planned accordingly following the EPA Peer Review Handbook (3<sup>rd</sup> edition, 2006). In order to assess the quality of the survey instrument developed as part of the project we will subject the instrument to a peer-review consisting of at least one internal and three external reviewers. If available, a third party contract will be used to select experts within and outside the Agency to carry out the peer review to ensure objectivity. Both internal and external peer reviewers will be selected based on their experience conducting, analyzing and using averting behavior and/or stated preference surveys.

Reviewers will be asked to review the draft survey instrument prior to submission to the Office of Management and Budget (OMB) as part of the Paperwork Reduction Act approval process. A narrative of the development of the survey instrument including inputs from focus group participants will also be provided to the reviewers. Reviewers will be asked to comment on the ability of the survey instrument to capture data needed to estimate household willingness to pay for reduced exposure to arsenic in drinking water and the clarity of the survey instrument. Reviewers will be given three weeks to review the survey and provide written comments to the project team. The project team will provide reviewers with a written response to their comments and a revised courtesy copy of the survey instrument.

**(7) Confidentiality**

The survey instrument will fully conform to federal regulations – specifically the Privacy Act of 1974 (5 U.S.C. 552a), the Hawkins-Stafford Amendments of 1988 (P.L 100-297), and the Computer Security Act of 1987. Each prospective respondent will be informed that their participation in the survey is voluntary, and that their identities will be kept confidential by the investigators and not associated with their responses. EPA or any other federal or state agency will not have access to the names of respondents. No identifying information will be included in the final survey data provided to the EPA by the University of Maine.

**(8) Sensitive Questions**

There are no questions on sexual behavior and attitudes, religious beliefs, and other matters that are commonly considered private or sensitive in this survey instrument. Answers to standard demographic questions (i.e., age, income) will be included in this survey instrument. By conducting focus groups, we hope to gauge any concerns respondents may have regarding these questions and other questions.

**(9) Respondents**

We intend to conduct up to eight (8) focus groups as part of the testing of the survey instrument. The focus group testing will center on the degree to which respondents are able to comprehend and respond to the questions throughout the survey. In particular the focus will be on Section E, F, and G of the survey instrument in which we ask about risk perceptions and valuation of risk reductions. Different visual communication devices will be used in addition to the textual format included in the draft survey as part of this submission. Other devices will include a risk ladder and a grid to communicate and elicit views on risks.

Each focus group will consist of no more than 9 respondents. Individuals will be recruited from the area surrounding greater Bangor, Maine. This area reflects a cross-section of the potential respondents to the survey, including some areas that are considered arsenic “hotspots” (i.e., contain higher than average levels of arsenic in drinking water), while other areas are more representative of the average exposure in the state. We intend to stratify our sample in a similar manner. Respondents must be over the age of 18 and have some influence over household decision-making since the survey respondent will be answering questions for the household.

**(10) Collection Schedule**

The proposed timeline for the data collection is as follows.

Task:	Date:
After receiving approval, conduct focus groups	September 2007

Revise draft survey instrument according to focus group findings	November 2007
Conduct peer review of survey instrument	November 2007
Submit full ICR package to OMB	January 2008
After receiving approval to conduct survey, select sample and prepare survey material	March 2008
Mail survey to sample	April 2008
Allow 4-6 weeks for data collection	
Enter data and analyze data	Spring/Summer 2008
Prepare final report and papers	Summer 2008

### (11) Respondent Burden

We anticipate needing up to eight (8) focus groups in order to properly test the survey instrument. The exact number of focus groups will be determined by responses to initial groups. For example, if we find that the risk communication device is too burdensome then we will make revisions and test alternative, simpler devices. For each of the focus groups we will recruit 9 participants. Participants will be given directions to a conference room at the University of Maine in Orono, Maine where the focus group will occur. They will be provided a light snack and beverages, as well as \$40 compensation for their time. We anticipate that there will be some attrition between recruiting and the actual time of the focus group, so we anticipate 6 or 7 participants in each session.

For the purposes of calculating burden, the maximum total number of respondents is **72 (eight groups x 9 participants per group)**. Each individual will participate in a two-hour session. Therefore, the total number of respondent hours requested is **144 hours**.

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