



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

JAN 11 2007

THE ADMINISTRATOR

M. Granger Morgan, Ph.D.  
Chair, Science Advisory Board  
U.S. Environmental Protection Agency  
1200 Pennsylvania Avenue, N.W.  
Washington, D.C. 20460

Dear Dr. Morgan:

Thank you for writing to me about Science Advisory Board Homeland Security Advisory Committee's consultation on the U.S. Environmental Protection Agency's WaterSentinel Program and Standard Analytical Methods document (SAB-06-000-4628). I appreciate the significant time and effort the Committee spent preparing for and conducting this consultation.

Ensuring the safety and security of the nation's critical water infrastructure is a key element of the Agency's overall homeland security mission. The WaterSentinel program and Standard Analytical Methods document represent important components of our water security efforts. The many significant comments we received from the Committee during the consultation have been valuable in shaping the future direction of these efforts. The Office of Water and the Office of Research and Development have worked to develop brief responses to the Committee's comments. Copies are enclosed.

Again, thank you for your assistance with these important efforts to ensure the security of our nation. If you have any additional questions, please contact Benjamin Grumbles, Office of Water, at (202) 564-2700 regarding WaterSentinel or George Gray or Jonathan Herrmann, Office of Research and Development at (202)564-6620 or (513) 569-7839 regarding the Standard Analytical Methods.

Sincerely,

A handwritten signature in black ink, appearing to read "S. L. Johnson".

Stephen L. Johnson

Enclosures

Cc: Dr. Baruch Fischhoff, Chair, SAB Homeland Security Advisory Committee

## Attachment A

### EPA Responses to Science Advisory Board Discussion Points on WaterSentinel

The following are brief responses by EPA to discussion points from the Science Advisory Board Homeland Security Advisory Committee consultation on the WaterSentinel program that occurred on January 30, 2006. Drs. Morgan and Fischhoff provided these points in their March 20, 2006, letter to the Administrator.

SAB: *It is difficult to consider the strategic priorities that underlie the program without access to the intelligence analyses that guide it. As a result, none of the committee members' comments should be construed as endorsing or criticizing the overall allocation of resources to the WS program or to its architecture. Members could only comment on the completeness and cost-effectiveness of the program designed to meet those objectives.*

EPA Response: EPA recognizes that the Committee was not asked to review intelligence analyses that guide strategic priorities and has viewed the Committee's comments in this context. The WaterSentinel program stems from the following conclusions: the distribution system is the most vulnerable component of a drinking water system; many contaminants are readily available in quantities that could contaminate large areas; consequences of contamination could be staggering; and without a reliable contamination warning system, a utility has little ability to respond to water contamination in a timely manner. Consequently, the focus of the review EPA requested from the Committee was the effectiveness and completeness of the WaterSentinel program to address this vulnerability.

SAB: *Some aspects of the program were well specified and thoughtfully presented, such as the optimization model for a subset of the situations that the WS might face and a subset of the objectives that it must address. Others were not as fully addressed. As a result, it is difficult to assess the overall system integration and optimization. It was not, for example, possible to understand how the optimization model would scale up to consider a broader range of issues (although its precision allowed a lively discussion of possible approaches).*

EPA Response: The design of the WaterSentinel program is based on the integration of multiple and diverse contaminant detection components (e.g. water quality monitoring, consumer complaint and public health surveillance). This integrated approach is intended to achieve timely detection (both primary and confirmatory) of a broad range of contaminants in a system that is sustainable. Integration of information from different detection components largely occurs through the process of Consequence Management, which EPA has developed significantly since the Committee review.

Further, EPA has continued to use and refine optimization models where applicable to the WaterSentinel program. These applications include the locations of water quality sensors in the distribution system and prioritizations of physical security enhancements. EPA recognizes that the range of scenarios that any model can capture is inherently limited. However, EPA believes that the optimization modeling performed in support of the WaterSentinel program demonstrates that the system design can be effective in mitigating consequences from a broad range of potential contamination incidents.

*SAB: The program pays no obvious scientific attention to organizational aspects of the program, including how information will be communicated among responsible parties, how common interpretations and response protocols will be assured, and how decisions will be made regarding the activation and deactivation of emergency procedures. It is quite possible that these will pose different challenges for large and small water systems.*

EPA Response: EPA understands the importance of establishing clear protocols for communication and response under the WaterSentinel program. Since the Committee's review, EPA has established standard operating procedures for each of the contaminant detection components. These specify the flow of information and communication responsibilities associated with routine monitoring and detection of a possible contamination event. Following a possible contamination event, the Consequence Management Plan establishes procedures, including communication pathways, information integration, and decision-making, for confirming contamination, responding, and returning to routine operation.

*SAB: The program pays no obvious scientific attention to the needs of first responders (broadly defined), who need training, response protocols, usable equipment, etc., in order to extract the value of the system, in order to protect the public, while also protecting themselves.*

EPA Response: The WaterSentinel program does recognize and address the needs of first responders in the context of detecting and responding to drinking water contamination events. For example, since the SAB review, EPA has conducted information training sessions for local law enforcement and public health personnel on the program, installed wireless transmitters to speed the analysis of Emergency Medical Service reports (which could lead to the detection of a contamination event), installed Priority Dispatch software at a 911 call center to improve call classification and analysis, and developed a site characterization protocol for personnel at a location where a possible contamination event has occurred.

*SAB: The program pays no obvious scientific attention to communication issues, especially regarding the public that will need to deal with actual emergencies, false alarms, and resumption of normal water use patterns, as well as the diagnosis and treatment of potential and actual health effects.*

EPA Response: EPA agrees about the importance of effective communication throughout the WaterSentinel program. Since the SAB review, EPA has developed a Crisis Communication Plan, which complements the overall Consequence Management Plan. This Crisis Communication Plan is focused on communication with the public when a possible contamination event is detected. It addresses situations like Do Not Drink or Use orders, disruption of service, and return to normal operation. In developing the communication plan, EPA considered the results of relevant public and risk communication research. EPA will continue to work with stakeholders with expertise in this area to build on and improve these efforts.

*SAB: The program pays no obvious scientific attention to the role of watershed protection and health in determining vulnerability to contamination and response.*

EPA Response: As described earlier, the WaterSentinel program is designed to address contamination that occurs in the distribution system due to the assessment that it is the most vulnerable component of a drinking water system. Consequently, this program does not deal with watershed protection. However, a number of other EPA programs promote watershed protection, which EPA recognizes as having a broad range of benefits.

SAB: *Specific aspects of the program where research was suggested included: prevention, crisis management, scenarios, timeline modeling, public health impact assessment (including potential losses of life, health, economic productivity, and well being).*

EPA Response: EPA continues to carry out and support a wide range of research activities related to the WaterSentinel program. These activities include projects to support contamination detection components, such as sensor response, event detection algorithms, hydraulic modeling, and analytical methods, as well as timeline modeling that assesses public health impacts. Further, EPA plans to conduct drills at the WaterSentinel pilot that will evaluate and allow for improvements in incident response times and consequence management procedures.

SAB: *There is the risk that implementing the best currently available technology for a problem will foreclose future better options because resources are consumed by servicing the installed base of an old technology. Answering this question will require the analysis of emerging technologies and the protection of research funds from being consumed by operations. This issue becomes more important to strategic planning, if one views our enemies as adaptive, capable of learning our protective measures and devising ways around them.*

EPA Response: EPA believes that available technologies can achieve a significant level of contamination risk reduction for drinking water utilities. Coupled with the vulnerability of drinking water distribution systems, this belief warrants proceeding with the WaterSentinel program to demonstrate how available contamination detection technologies can protect public health. EPA also agrees with the Committee's view that both technology and threats evolve. Accordingly, the Agency continues to invest in research on new and alternative methods and technologies related to detecting contamination. The WaterSentinel concept of operations provides the flexibility to incorporate new and different approaches to contamination detection as circumstances warrant.

SAB: *Homeland security risk management can involve both law enforcement and public health personnel. Coordinating their activities requires advance planning, if the program is to realize its potential.*

EPA Response: EPA agrees, and coordination among law enforcement and public health, as well as other local, state, and federal partners, is a key aspect of the WaterSentinel program. The Consequence Management Plan addresses the roles of these partners in WaterSentinel. Since the SAB review, EPA has conducted informational training sessions for public health and law enforcement personnel as part of the first WaterSentinel pilot. Additional training exercises and drills that will involve these and other local partners are planned. Public health plays a particularly important role in the WaterSentinel program insofar as public health surveillance is one of the primary contamination detection components.

SAB: *It was not clear, from the evidence presented, how these activities are coordinated with those of other relevant agencies. Discussion of seemingly relevant planning activities does not allow saying anything about the associated plans.*

EPA Response: As described earlier, an important aspect of the WaterSentinel program is coordination among local, state, and federal partners. In addition to the training and communication activities described earlier, EPA has formed the Sentinel Executive Committee to solicit input from other relevant agencies in the development of the WaterSentinel program. The SEC includes members from significant stakeholder entities like public health, law enforcement, drinking water utilities, and state agencies. In addition, representatives from associations and other federal agencies like the Department of Homeland Security and Centers for Disease Control and Prevention participate in an advisory capacity on the SEC.

## Attachment B

### Response to Science Advisory Board Comments on the Standard Analytical Methods Document

General: Below is a short response to each of the comments raised by the Science Advisory Board during the consultation provided on the Standard Analytical Methods document on January 31, 2006. The SAM is currently undergoing its third revision, and each of these comments will be included in the formal response to comments that will be generated concurrent with the document publication. The third revision of the SAM is anticipated to be released early in CY 2007. Specific responses to each comment are provided below:

*SAB: There would be value in having the Agency develop a comparable document for "real time" SAM, which may require different technologies and tradeoffs. Because early sample collection is very important, criteria for sample collection should be part of the SAM process. That guidance should consider the conditions faced by the diverse groups of first responders who might bear these critical (and potentially dangerous) responsibilities. Their equipment (and training) may vary from rudimentary to sophisticated.*

Response: The EPA National Homeland Security Research Center plans to develop a document that will deal with the analytical needs of the first responder during 2007. The focus of this document will be on equipment used by the first response community and its ability to detect materials identified in the SAM. During 2006, NHSRC began development of two documents that are intended for eventual use as companions to SAM. The first of these includes information regarding sample collection (e.g. equipment, preservation, holding times) needed to address each SAM analyte and sample type. The second document lists equipment that can be used in the field and/or laboratory for preliminary identification of the SAM analytes. During 2007, NHSRC will begin plans to expand these documents to build on these and other ongoing EPA efforts and include information regarding sample collection and analysis that may be needed during initial emergency response.

*SAB: The document should be clearer about its scope, in particular that it does not address real-time needs, in the event of a disaster. For example, it will not help to determine if an area is safe for access for first responders or if evacuation is required. Care must be taken that potential users do not rely on it for those purposes, in their planning or their actions.*

Response: The scope of the SAM will be clarified. It is not intended for use during the initial phases of an emergency response, but rather during the remediation phases when large numbers of samples are anticipated. Pending comments received on the draft SAM Revision 3.0 document, the title of SAM is being revised as follows: "Standardized Analytical Methods for Environmental Evaluation Following Homeland Security Incidents." The scope of SAM also will be clarified to explain that the document is not intended to address sample collection or emergency response activities; the methods listed have been selected to address confirmatory analyses of environmental samples that will be required by EPA or EPA-contracted laboratories during site assessment through site clearance following a homeland security incident.

*SAB: The organizational context for SAM is not well articulated in the documents made*

*available to the committee. The science and engineering in the guidelines will have little value unless they can be used under realistic circumstances. Some issues could be addressed by design. For example, it would be especially valuable to have a "road map" that states which method would be used in a given situation, how the output should be used, what detection limits must be considered when managing risks, etc. Other issues will require organizational and behavioral research (e.g. making decisions, communicating results, ensuring quality control of sample selection).*

Response: A "roadmap" as discussed will be included with the next revision of the SAM. Several of the topics such as method detection and quality control are included in supplemental documents that were not included in the SAB review. A "roadmap" will be included in the next revision of SAM to clarify at what point following a homeland security incident, SAM methods are used. Information regarding analytical results (i.e. output), decision making, risk management, and communication are event- or site-specific and not within the scope of the SAM document. Information regarding method detection levels and quality control are provided, when available, in the method summaries included in the document text sections corresponding to each appendix.

SAB: *Because of the widespread interest already generated in the SAM document (as seen in web-site downloads), it merits an investment in usability. Several specific suggestions were improving: (a) the language regarding its use (including when it should not be used), (b) the accessibility of specific methods in the document (which is presented as an annotated bibliography of methods), (c) electronic access, and (d) the presentation of tables and use of acronyms.*

Response: Modifications in the next revision will be made to address these recommendations. Additionally, during 2007 plans will be made to create a web-based presence for the SAM and its supporting documents to streamline access and updating.

SAB: *Several topics arose regarding the science underlying the conclusions: (a) Polymerase chain reaction (PCR) methods are missing for some bacterial agents; (b) For radionuclides, total alpha and gamma are listed, but not total beta; (c) A discussion of efficiency is needed to complete the characterization of imprecise extraction methods; (d) The document should note where methods are in development and, to the extent possible, a forecast of when they might be available; (e) The criteria for selecting methods are not presented, making it hard to evaluate SAM's appropriateness for different settings.*

Response: Revision 3 of the SAM will address most of these issues. For example, gross alpha, beta, and gamma have been added to the radiochemistry methods appendix as analyte classes; information regarding the limitations of sample prep or extraction methods will be included in method summaries, where available; and a flowchart describing method selection steps and criteria will be added. A statement also will be included to explain that, for biological analytes, viability methods have been selected when available; if PCR techniques include viability evaluations, the PCR techniques are listed in the appendix. Regarding the status of method development and testing, a decision has been made not to include detailed method validation status due to security concerns. Also, the focus of the overall laboratory program is to validate

all the SAM methods as quickly as possible even though this may take some time.

*SAB: Even though the goal of SAM is to develop standardized methods, it addresses the flexibility that emergency situations might require. That effort might be relatively easy for an area like biologicals where the set of feasible methods is small, allowing it to provide guidance on the strengths and weaknesses of those methods, so that risk managers know what they can (and cannot do) with the resources at hand.*

Response: Information regarding strengths and weaknesses of the general methods are included in the supplemental documentation for each method that is being prepared. We agree that, while providing standard analytical methods for use across multiple laboratories, SAM also allows for flexibility in cases where the methods may not prove appropriate for a specific sample type. In some cases, specific method limitations are mentioned in the method summaries included in SAM. In other cases, limitations are not known at this time. For all cases, SAM states that "In those cases where method procedures are determined to be insufficient for a particular situation, EPA will provide guidance regarding appropriate actions. This will be an ongoing process as EPA will strive to establish a consistent level of validation for all listed analytes." SAM also provides a list of contacts for resolution of analytical problems.