

U.S. ENVIRONMENTAL PROTECTION AGENCY

AIRCRAFT PUBLIC WATER SYSTEMS

PUBLIC MEETING

SUMMARY REPORT

HAMILTON CROWNE PLAZA HOTEL
14TH AND K STREETS, NW
WASHINGTON, DC

JUNE 1, 2005



*This U.S. Environmental Protection Agency
Aircraft Public Water Systems Public Meeting
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WELCOME, INTRODUCTIONS, REVIEW AGENDA

OPENING—GAIL BINGHAM

Gail Bingham, President of RESOLVE and facilitator for the U.S. Environmental Protection Agency (EPA) Aircraft Public Water Systems Public Meeting, opened the meeting and called on Steve Heare to give the official welcome. She stated that she would review the objectives, agenda and logistics for the meeting following Steve Heare's opening remarks.

WELCOME—STEPHEN HEARE

Stephen F. Heare, Director of the EPA Drinking Water Protection Division Office of Groundwater and Drinking Water, welcomed participants to the meeting to kick off the process to develop regulations tailored to aircraft drinking water systems. He stated that his office, which is charged with implementation of the Safe Drinking Water Act, has been involved with the issue for the past two years. Today's meeting is designed to get the interested public's views and participation in the process so that the new rule proposed by EPA reflects the unique characteristics of aircraft water systems and meets the needs of the traveling public. EPA is committed to a collaborative process for determining the best way to regulate aircraft drinking water systems and understands that they differ significantly from the public water systems that occupy most of the agency's attention. There are about 165,000 public water systems in the country and most of EPA's time is spent regulating those systems so the current process is something different from their normal involvement. Gail Bingham, President of RESOLVE, a firm that specializes in consensus building, has been retained to assist EPA with the collaborative process and Gail will facilitate today's meeting.

Steve gave a short background on the issues leading to today's meeting, stating that water systems on most commercial aircraft that carry over 25 passengers are covered under the Safe Drinking Water Act. Interstate conveyance carriers are specifically mentioned under the act and are subject to EPA rules primarily geared to public drinking water systems. In February 2002, EPA formed a work group to begin looking at issues around interstate carrier conveyances, including planes, trains, water vessels and buses and all other passenger vehicles containing a water system and involved in interstate commerce. The work group also involved EPA's regions and the Food and Drug Administration (FDA). They began to focus on aircraft because their operational considerations are somewhat different than other types of interstate carrier conveyances (ICCs). In November 2002, a *Wall Street Journal* article questioned the safety of airline drinking water, which energized their work and in 2003, EPA began a dialogue with FDA and the Air Transport Association (ATA) on the quality of aircraft drinking water. In fall 2003, working with ATA and its members, they collected samples from about 265 aircraft. In the summer and fall 2004, EPA conducted additional sampling on their own and sampled about 327 aircraft. Based on the results that came out of both samplings, EPA announced they would start an accelerated rulemaking process to deal with the issue of aircraft drinking water. Plans are to work collaboratively on the issue with their federal partners, the industry and stakeholders.

REVIEW OF OBJECTIVES, AGENDA AND LOGISTICS—GAIL BINGHAM

Following the welcome, Gail reviewed the objectives, agenda and logistics for the meeting. The three meeting objectives were listed as:

- Present information relevant to the proposed rulemaking;
- Provide an opportunity for affected stakeholders and the interested public to raise issues for consideration in the development of the proposed rule; and
- Provide an opportunity for stakeholders and interested public to comment on options for a collaborative process to develop the rule.

The meeting agenda corresponded with the objectives. (1) During the first part of the agenda, the EPA and FDA will present information they have collected, which they think should be part of the rulemaking process. (2) Meeting participants will be invited to share with EPA any issues they feel should be considered in the rulemaking process during the second part of the meeting. (3) The various ways to structure stakeholder participation in the rulemaking process will be discussed in the final part of the agenda. Participants will also be asked to comment on the different approaches to the collaborative process. The meeting is not designed to get into the actual regulatory policies and issues. Instead, it is designed to be an information and planning meeting. Meeting logistics were given and participants were asked to give their name and the organization they represented.

Q: A participant asked if the summary from the meeting would be posted on the Internet at the site where participants registered.

A: The summary will be available to everyone who registered for the meeting. (An electronic version of the Summary Report for the Aircraft Public Water Systems Public Meeting held on June 1, 2005 in Washington, DC, is available through EPA Dockets (EDOCKET) at <http://www.epa.gov/edocket/>. The docket number is OW-2005-0025. Once in the system, select “Quick Search,” then key in the docket ID number.)

PANEL: BACKGROUND ON PROPOSED RULEMAKING

REGULATIONS: TECHNICAL AREA—RICHARD NAYLOR

Richard Naylor, EPA Office of Groundwater and Drinking Water, stated that he works for Steve Heare in the Drinking Water Protection Branch and will serve as the rule manager for the development of the new aircraft drinking water system regulations. Rick discussed: (1) EPA needs to tailor the drinking water regulations to aircraft water systems; (2) the existing regulations and how they correspond (or do not correspond) to aircraft drinking water systems; and (3) the background baseline sampling that has been done to date.

Why New Regulations?

Rick stated that while working on the airline drinking water issue over the past two years, EPA has come to realize that they need to change the regulations and tailor them to meet the unique operating characteristics of aircraft and water systems. In answer to the question: “Why New Regulations?” he said:

- Existing National Primary Drinking Water Regulations (NPDWRs) are designed for traditional, stationary water systems;
- Aircraft board water from multiple sources, some of which are foreign sources that are not subject to EPA drinking water standards;
- Frequent transfer of water provides opportunities for cross-contamination. The water is transferred via carts, hoses and cabinets onto aircraft and this presents an opportunity for contamination that typically doesn't exist with traditional types of water systems.

Statutory Authority

Rick reiterated that EPA statutory authority for regulating water systems comes from the Safe Drinking Water Act, which defines a public water system as a system that regularly serves an average of at least 25 people daily, at least 60 days per year. Most commercial passenger aircraft would fit into that classification, which makes them a public water system and therefore subject to the National Primary Drinking Water Regulations. The statute specifically addresses ICCs, which includes airplanes, trains, water vessels and some buses that carry drinking water.

ICC Program Administration

The ICC program is jointly administered by the EPA and FDA. EPA is responsible for source water that serves the airports, traditionally from public water systems. The public water systems would be regulated by the state or EPA and have to comply with EPA's drinking water regulations. FDA is responsible for the watering points to transfer water onboard the aircraft, which includes the cabinets, carts, trucks and hoses. Once the water is onboard the aircraft, EPA and FDA have complimentary responsibilities, with EPA being responsible for drinking water and FDA being responsible for culinary water, or water used in the preparation of food and beverages and for sanitation.

Classification of Aircraft PWSs under NPDWRs

- **Transient non-community water systems:** Aircraft are classified as a transient non-community water system under the National Primary Drinking Water Regulations. A non-community water system is basically a system that does not serve a residential population. In the case of aircraft, they are further classified as transient in that they do not regularly serve the same 25 people on a daily basis. (The consumers to a transient non-community water system typically have short-term exposure. Current requirements only call for complying with the acute contaminants—those that would cause an immediate health threat based on a short-term exposure.)
- **Surface water systems:** Aircraft are also classified as surface water systems, meaning they would use surface water, in whole or in part, or groundwater under the direct influence of surface water. Aircraft fill up on water from some of their stops and are getting it from many different places. Some places where the aircraft get water use surface water and are under the requirements for the surface water treatment rules.
- **Population served 1,000 persons or fewer per day:** The majority of passenger aircraft fit into the category of serving 1,000 persons or fewer per day.

NPDWR Requirements for Transient Non-community Water Systems using Surface Water (Serving 1000 or fewer)

In applying the National Primary Drinking Water Regulations to a transient non-community water system using surface water and serving 1,000 or fewer people, the current requirements call for:

- One (1) total coliform sample per month
- One (1) nitrate sample per year
- One (1) nitrite sample every three years
- One (1) sanitary survey every five years
- Surface Water Treatment Rule/Long Term One (1) requirements
 - 1 disinfectant residual sample/month
 - 2 log (99%) removal of *Cryptosporidium* with filtration
 - 3 log (99.9%) removal of *Giardia* with filtration and disinfection
 - 4 log (99.99%) removal of viruses with filtration and disinfection
 - Turbidity monitoring at the filters (performance standard depends on technology used)

Water Supply Guidance

EPA's water supply guidance for aircraft first came out in 1979 and was later revised in 1986. The effort was to tailor the drinking water program to interstate carrier conveyances. It included acute monitoring requirements for transient water systems. It also included an option which allowed ICCs to have an approved operation and maintenance program in lieu of monitoring, which was a best management practice to ensure the aircraft water systems, water cabinets and hoses were maintained properly by flushing and disinfecting on a regular basis. EPA has suspended any more approvals under this water supply guidance.

Existing Regulatory Authority to Modify NPDWR Requirements

Rick stated that when the work group looked at the regulations to determine how the requirements could be modified to apply more appropriately for aircraft, they examined a provision concerning consecutive systems, which reads: "when a public water system supplies water to one or more other public water systems, the state (in this case EPA) may modify the monitoring requirements to the extent that the interconnection justifies treating them as a single system for monitoring purposes." A problem with this is that the majority of the aircraft have the potential to fly overseas and therefore would be boarding water from non-public water systems and therefore would not be consecutive systems.

Following his presentation, Rick invited participants' questions and comments:

Q: Are we talking about potable and non-potable systems?

A: We are talking today about potable drinking water systems.

Q: A participant questioned the accuracy of the statement that a "majority of aircraft" fly internationally, stating that of the 900 daily flights flown by his company, about 35-to-40

are international flights. He suggested that other airlines would show a similar ratio for international flights. He said that, if the concept that a “majority of aircraft” fly internationally is what is driving the process, the figures need to be checked because EPA might be using a misguided baseline.

A: Rick Naylor responded that although a lot of aircraft do not fly overseas, the information they received from ATA stated that about 90 percent of ATA member aircraft have the potential to fly overseas. However, one of the reasons for engaging stakeholders in this process is to make sure these types of issues are commented on.

Discussion: In follow-up discussion, it was stated that any aircraft that can get airborne is capable of going across the borders of Canada or Mexico. Another comment was that whether a flight was national or international, the water it uses still has to be treated as public drinking water and meet certain criteria. Rick Naylor responded that EPA is moving toward a more holistic approach that looks at the appropriate monitoring that needs to be done and the best management practices.

Q: Is there some regulatory basis for waiving monitoring requirements and regulations in guidance documents?

A: Rick Naylor stated not that he is aware of any.

Q: Has EPA gone back and reviewed compliance with those operation maintenance programs and reviewed monitoring results?

A: Rick Naylor stated that part of the problem is they do not have a lot of those records, which is why they are initiating this process.

BASELINE SAMPLING—LAURIE DUBRIEL

Laurie Dubriel, Office of Enforcement and Compliance Assurance, described the baseline sampling that has been done to date and the administrative orders on consent that EPA is working on with the airlines. The administrative orders will serve as a bridge from now to the point the new rule takes effect.

Baseline Sampling

Laurie stated that in 2003, EPA worked with ATA to get some basic baseline information about water quality on aircraft. Aside from the *Wall Street Journal* article there had been an absence of information about the issue. ATA members sampled 265 of its aircraft. Of those aircraft, 2.7 percent were total coliform positive and 100 percent of the aircraft were *E. coli* negative. In summer 2004 and fall 2004, EPA conducted follow-up samplings to the ATA sampling. A total of 327 aircraft were sampled, which showed 15 percent of the aircraft tested were total coliform positive and two of the aircraft were *E. coli* positive. In the summer samples, EPA only took samples from one location and most of the samples were taken from lavatories, although there were some galley and drinking fountain samples taken. In the fall samples, they took samples from both galley and lavatory locations whenever possible. In both sets of samples, they tested for disinfectant residual. The ATA sample results showed 41 percent of the tested aircraft did not have a detectable disinfectant residual. The raw data from the EPA sampling showed that about 21 percent of the samples did not have a detectable disinfectant residual. None

of the samples tested either by EPA or ATA exceeded the limits for turbidity, nitrate or nitrite.

Laurie responded to participant questions and comments following the Baseline Sampling part of her presentation:

Q: Did EPA have a reason to believe that the ATA sample results were falsely low and is this why EPA went back and did its own sampling?

A: Laurie Dubriel said EPA had no reason to believe that the ATA sample results were falsely low. EPA is uncertain about the difference between the sampling results.

Discussion: In answer to further questions, Laurie Dubriel said EPA went through the sample results to see if there were trends; if the sampling results came mainly from aircraft coming in from foreign locations; or if the problem showed in larger body planes as opposed to smaller aircraft. They found no trends. They used the same analytical method—color disc sampling method and a pocket colorimeter for testing in the field.

Q: Do you have the breakout between the galley and the lavatory results?

A: Of the total 15 percent positive results, 4.3 percent of the samples were from either a galley or a drinking water fountain and 14 percent were taken from a lavatory sink.

Q: If the aircraft galley failed, was that viewed as one failure; and if the lavatory results failed, was that viewed as a second failure? Were the failures numbered by aircraft or by source?

A: Laurie Dubriel responded that if an aircraft tested positive in the lavatory and galley, it was counted as one aircraft and they did not count it twice. Also, the aircraft would count as having tested positive if you had a positive and a negative result was found in the galley but a positive result found in the lavatory or vice versa.

Q: How were chlorine residue measurements performed and were you measuring total chlorine only or were there other things being measured?

A: A pocket colorimeter was used to detect chlorine amounts. Total chlorine was being measured.

Q: Will they do both total coliform and cryptosporidium testing.

A: We are only doing total coliform testing. We are not doing the cryptosporidium testing.

ADMINISTRATIVE ORDERS—LAURIE DUBRIEL

Laurie stated that following the release of the first round of sampling results in September 2004, EPA announced they would be negotiating administrative orders on consent with the airlines for the procedures they needed to follow until the new rules take effect. As part of the administrative orders on consent, each airline has to do interim monitoring for each aircraft in its operating fleet and institute best management practices, which include routine disinfections of the aircraft and watering trucks. The administrative orders on consent outline the corrective action procedures for those with total coliform positive results and include a study of possible sources of contamination. The orders also require

all the airlines to submit information about their water boarding practices from domestic and foreign locations.

Q: Were other organizations besides ATA requested to come in to discuss the process (i.e., RAA represents a lot of carriers in the U.S. that ATA does not represent)? How was this process done if only ATA was involved in the discussion?

A: These are ongoing discussions with the airline carriers. The reason that the discussions were done with ATA first is because they came in first to discuss the issues. EPA has discussed the agreements with the other associations as well as with other airline associations. Typically, when EPA is taking enforcement actions, those discussions are with those whom the order affects and are not generally a public process.

Discussion: It was stated that EPA is committed to having all airline carriers with a public water system under administrative orders. Steve Heare added that EPA talked to virtually all of the air carrier associations they know of, including NACA, RAA, ATA and ACAA. He stated that it is less clear, in terms of the requirements of the order, what EPA's authority is over international airline carriers that are not headquartered in the U.S. They are still doing research on that question. It was also stated that when sampling was done in 2004, they sampled U.S. flag carriers and foreign flag carriers. To the extent they have jurisdiction, EPA will pursue foreign flag carriers as well.

Q: What is the plan for publicly announcing or releasing the orders for comments? Do you have data for all the airlines operating in the U.S. and how will you issue an administrative order to someone if you have no information on their compliance status?

A: Once the orders are signed, they will be publicly available because they will be public documents. Concerning the second question, we cannot speak to that specifically because we are still negotiating the orders. However, whether you actually have data or not, not having the monitoring and reporting information is a violation of the Safe Drinking Water Act.

Discussion: The negotiations began in November 2004. At that time, EPA announced they had the agreement in principle and ATA members signed the agreement.

Q: Would it be fair to say that outside of ATA you have not yet had any negotiations with RAA carriers?

A: Laurie Dubriel and Steve Heare replied that EPA has begun discussions with all of the ATA carriers and have met with all the airline associations. EPA briefed other airline associations, including RAA, and some of their member carriers were present.

Discussion: EPA will meet with each carrier prior to issuing a consent order. They plan to have the discussions wrapped up by August 2005. They estimate having to negotiate consent orders with about 50-70 individual carriers. The purpose of EPA's working first on an agreement in principle and then a model order was to speed the actual negotiations of the individual orders. They are now discovering that most carriers have some operational perceived or actual differences, which tends to make the discussions continue longer than previously thought. The consent orders are seen as a bridge to protect public health until the rulemaking is completed. It will be a multi-year process to get the regulations written. The current goal is to have everyone as much as possible on an equal playing field.

FDA AUTHORITY—DEAN DAVIDSON

Dean Davidson, Interstate Travel Program, Food and Drug Administration, stated that FDA authority in this area derives from the Public Health Service Act 361. Through the Act, they apply measures to prevent the transmission of communicable diseases. The FDA regulations reference the EPA Drinking Water Regulations with regard to potable water on conveyances. Before there was an EPA, there was an FDA and these things got divided up back in 1970s. That is why there exists an interwoven network of authorities and applications of law that do not seem so clear. From FDA's stand point every seaport and airport shall provide a supply of potable water from a watering point approved by the FDA in accordance with the standards in title 21-CFR 1240 and 1250. As well, all food and potable water taken onboard an aircraft intended for human use shall be obtained from a source approved in accordance with the FDA regulations, which reference the EPA regulations. Also, aircraft inbound or outbound or on an international voyage shall not discharge over the U.S. any wastewater or other polluting material. In addition, arriving aircraft shall discharge water and these other things only at service areas approved by the FDA. FDA also issues certificates of sanitary construction, which includes a review of the galley design, lavatories and onboard potable water systems. In the past, FDA was more frequently aboard aircraft but security issues and their funding abilities have restricted their ability to routinely check the sanitation onboard aircraft.

Dean Davidson responded to questions:

Q: Do these administrative orders of consent include any funding mechanisms for improving the ability of the FDA to go in and do the testing and the inspections that are required?

A: No, these administrative orders are how the airlines can address the monitoring requirements or compliance with the EPA drinking water regulations.

Discussion: EPA and FDA may experience benefits by working better together and having a standard for providing clean potable water, as well as water for hand washing on board aircraft. Steve Heare added that one of the things built into the orders and into the agreement in principle is the submission of a significant amount of data to them by the carriers.

Q: Historically, how has self-monitoring by the carriers been carried out and where do you see this leading to?

A: Dean Davidson stated that he is uncertain if FDA has ever included self-monitoring. Steve Heare stated the whole structure of EPA regulations is built on self-monitoring and submission of results. Virtually all of the 164,000 public water systems in this country do what you might term as self-monitoring. EPA does not send people out to public water systems to monitor. The regulated system does it themselves, and they submit the results. There is a mixed picture of how the requirements that were written for public water systems actually apply to aircraft. However, the concept of self-monitoring has always been a central piece of the way EPA regulates public water systems and this may be no different.

Q: What proportion of public water systems opt for the operation and maintenance program instead of doing the monitoring?

A: Public water systems do not have that option. Traditional public water systems would not be able to completely drain and flush their systems on a regular basis like aircraft.

Q: Did most of the aircraft under the guidance for the carriers either publicly or to EPA assert that they were doing the operation and maintenance program instead of the monitoring or did this all fall between the cracks and we do not know what they are doing?

A: The latter is probably truer. Some carriers actually went through the process of submitting maintenance plans but all of them did not. We do not have a lot of records that show how many carriers were actively involved in submitting the maintenance plans and the annual plans.

KEY ISSUES FOR THE DEVELOPMENT OF A NEW AIRCRAFT DRINKING WATER RULE — RICK NAYLOR

Rick Naylor reviewed some of the key issues EPA will be working on over the next few months. The key issues were outlined as:

- Which contaminants are of concern for aircraft water systems that take on water from domestic sources only, or from both domestic and foreign sources?
- What is the appropriate monitoring frequency for aircraft water systems that take on water from domestic sources only, or both domestic and foreign sources?
- What is the appropriate frequency for disinfecting and flushing aircraft water systems?
- Should aircraft that obtain all of their water from another public water system be classified as a “consecutive” public water system that can obtain reduced monitoring requirements under EPA’s regulations (40-CFR141.29)?
- Are there feasible treatment technologies that can be used to treat drinking water onboard aircraft?
- What should be done to address the low disinfectant residual levels in the drinking water found on a high percentage of aircraft?
- How should EPA address aircraft water from sources outside of the U.S.?

STAKEHOLDER PERSPECTIVES: ISSUES FOR CONSIDERATION

Comment: A participant presented several concerns: (1) She was concerned about a lack of public health participation in the process. She felt there should be involvement by groups such as the CDC who is dealing with similar issues on cruise ships; the Council for State and Territorial Epidemiologists that puts together investigations when there are major outbreaks; and the Association of State and Territorial Health Officials that would do investigations and follow-up if there were a major incident. (2) Another reason to work with these groups is to develop surveillance and recording mechanisms to see if there are links between the outbreaks, investigations and levels of disease. It is important that this include GI illnesses of unknown origin because if there were a contamination

event and you had not tested, you would not be able to identify the infectious agent. (3) Also there are groups such as people with HIV/AIDS, people with transplants and other groups who regularly fly on airlines and who are at a high risk and should be communicated with so their needs are represented. (4) Also, it was stated that coffeemakers kill anything you have to be worried about, but is that true? Some basic research should be done about what actually happens to pathogens in airlines.

Comment: A participant said the issue concerning international air carriers and airlines that operate in the U.S. and carry American passengers should be discussed as part of the process. If the issue is not imbedded in the seventh point of the Key Issues, it should be added as an extra item.

Discussion: Steve Heare stated that EPA has initiated discussions with the International Civil Aviation Organization (ICAO) and IATA about the possibility of collaborating on protocols, practices or regulations to address the world's carriers. They have just begun those negotiations.

Comment: A participant read the following prepared statement: ATA works on a range of issues affecting the industry through a system of councils and committees made up of airline member representatives and the current chair of ATA's Environmental Council. Through the Environmental Council, the 14 passenger airline members of ATA have been actively engaged on the issue of aircraft drinking water for the past two years. The airlines care a great deal about aircraft drinking water because we are committed to ensuring the safety and health of our passengers and crew. In fact, we have confidence in the quality of the water we provide for drinking on the aircraft. Nonetheless, we recognize that the guidance developed by EPA for managing drinking water on aircraft and the measures we take to ensure that aircraft drinking water is safe are not well reflected in the regulations because those regulations were designed for municipal drinking water systems, which we have touched on today. Thus, we look forward to this rulemaking process. By the way of background, ATA has been involved in this issue for some time now. Back in 2003, ATA convened a meeting with EPA to discuss questions raised by the media and to discuss the status of EPA's aircraft drinking water guidance. ATA brought together environmental and technical experts from the airlines with an EPA internal working group on drinking water. And following up on that meeting and in response EPA's interest in gathering additional data, ATA conducted a study of aircraft drinking water under a protocol approved by EPA. In that study, ATA members sampled 265 aircraft, as acknowledged earlier, and made the results available to the public and to the EPA. The 2003 study demonstrated that aircraft drinking water does not pose health risks to passengers and crew and the well-established airline practices have been effective in ensuring a safe supply of drinking water onboard commercial aircraft. FDA reportedly had similar results in their sampling. EPA's follow-up sampling last year focused on aircraft lavatories in large part, an area where sample contamination is likely. While ATA questions the results of this sampling, we still have taken the results seriously and have responded by working with the agency to strengthen existing protocols and develop a program to provide additional data that will help to inform this rulemaking process. We are here today to demonstrate our continuing commitment to work with the EPA to ensure that aircraft drinking water remains safe. While the airlines have long standing

procedures in place that we believe are fully protective of public health we want to work with EPA to resolve the disconnect between the existing regulations and the way that aircraft operate. Until recently, airlines have been able to rely on EPA guidance, first issued in 1979 and updated in 1986, that bridged the gap between regulations developed for traditional public water systems and the special circumstances of our industry. Because this guidance was specific to the airlines and other modes of transport, ATA and its member airlines have not been involved in the intensive or extensive rulemakings under the Safe Drinking Water Act over the past 25 years aimed at traditional public water systems. As a result the regulations do not address the unique circumstances of aircraft and indeed, in many cases, cannot feasibly be applied to aircraft. In the absence of this guidance, we recognize the need to revise the regulations to ensure the continued protection of public health without placing unnecessary or unreasonable burdens on the airline industry. ATA and its members are committed to participating in this rulemaking effort so that the resulting regulations impose clear, reasonable and scientifically based requirements.

Comment: A participant made available a limited number of copies of the ATA study conducted in 2003. She also said the report might be available on their website. The report explained how ATA went about doing the sample collection and the protocol they followed. She stated that the results EPA and ATA found were actually similar if you compare apples to apples as opposed to apples to oranges.

Q: A participant asked Laurie to clarify what proportion of the total EPA samples were lavatory samples and what were galley samples? In what number of aircraft were galley samples taken, and what percentage of those were positive? Similarly, in what number of aircraft were lavatory samples taken, and what percentage of those were positive?

A: Laurie Dubriel stated that out of the total number of samples they took, 4.3 percent of the galley and drinking fountain water were positive for total coliform. She stated that she would look up the statistic concerning what proportion of the total samples were galley and drinking fountain samples, compared to what proportion were lavatory samples.

Q: A participant asked what is the appropriate monitoring frequency for aircraft water systems and what would be a consistent testing method? Will everyone who is supplying EPA with data use a similar testing method?

A: Laurie Dubriel responded that ATA and EPA used the exact same protocol. She said they will use an EPA approved analytical method under the regulations and that there is more than one analytical method that can be used. The analytical method is not part of the scoping of the rulemaking because it is addressed in a separate rule.

Comment: A participant said his company is a manufacturer of portable water cabinets and they service watering points for the airlines. They are sponsoring three studies this summer at the University of Wisconsin on biofilm development and prevention in water systems for their water cabinets and for aircraft water systems. He will make the data available to all interested parties when the studies are complete. They expect to have the data around September.

Q: A participant expressed a concern related to water in the lavatories, stating that a number of carriers in the past have placed placards, saying their lavatory water is non-potable. What are the consent decrees doing to deal with this problem and where is the problem addressed in the seven key issues?

A: Steve Heare stated that issue is something that needs to be addressed in the rulemaking process. Currently, the rule reads that the water in the lavatory has to be the same quality as water in the galley. EPA defines drinking water as water for hand washing, teeth brushing and those types of things. Dean Davidson added that FDA would prefer there not be a distinction made on the placarding. There was something in the WSG-29 that talked about placarding under certain circumstances but that should not be occurring. Laurie Dubriel stated that in the context of the order, they are not treating the water in the lavatory any differently than the water from the galley. It is all treated as drinking water.

Comment: A participant said his company is a principal supplier of the waste and water systems on most aircraft today. They are currently under contract to both Boeing and Airbus to develop active water purification systems that will go onboard aircraft. Their first systems will launch on A-380s for Airbus in 2006 and on 787s for Boeing in 2008. They are going to be active systems at three different points and address the bio-film issues developed in the tanks and point of use. They are designed for total kill, up to and including a bio-terrorism type of attack on the aircraft. He also addressed the earlier question about coffee makers, saying they are a supplier of coffee makers in the industry and that coffee makers on aircraft at altitude do not operate at temperatures that would kill everything that is being discussed at the meeting.

Q: A participant said there is an important distinction between water in a typical public water supply that is stationary than water taken from entirely different sources across the globe. Does monitoring frequency of once a quarter or once a month really make any sense with water taken from around the globe? There are significant questions about that because the water source is going to vary almost on a daily basis. Therefore testing for coliform today may have absolutely nothing to say about the water you take on in some other part of the world tomorrow. In terms of treatment, if it is a non-regulated U.S. supply, it is an issue we would like to put on the table. If there is water being boarded from a non-public water supply, is there going to be any treatment requirement for that water. That has got to be an issue that is addressed. In addition, there is a significant question in our minds as to whether disinfections and treatment of the plane is enough if you have got significant issues with the cabinets and the transfer and the other facilities that are at an airport either overseas or here in the U.S. Finally, we would like to ask what kind of public notice is going to be required explicitly for interstate carrier conveyances. Why are there not public notices on every airline or every aircraft? What about consumer confidence reports? Also, what about public access to monitoring and reporting results? Is that going to be posted on the website as it is often for other public water supplies?

Comment: A participant said his organization represents over 4,000 of the more traditional public water systems and have about 57,000 members. Concerning total coliform and other issues raised, he said he would offer the resources of AWWA and the work that they have done on these issues, as well as the resources of their sister organization the American Water Works Research Foundation.

Q: A participant said a lot of the supply systems are airport systems. Is this rule going to treat that interaction between the airlines and the airports? In addition to ATA, has EPA been talking to Airport Councils International and other airport representative bodies to get their views on the regulation?

A: Steve Heare said that is part of this process. It is to identify other organizations, which we are not aware of. We are interested in hearing from stakeholders and other groups we need to contact. In answer to the other question, he said that a water system run by the airport would have to be a public water system regulated by the state or EPA and would have to meet EPA's regulations.

Discussion: In response to a question presuming the connecting system was owned by the airport, Steve Heare responded that the way the orders are currently set up for this interim period, the hoses and cabinets are required to be disinfected on a monthly basis. They are being addressed under the Water Supply Guidance 29 and it is being carried over into the administrative orders.

Q: A participant asked what the role is for EPA vs. the role for a state primacy agency and under this rule, who is going to be more responsible for the reporting and the direct regulation?

A: Rick Naylor said the interstate carrier conveyance program is an EPA responsibility because it covers multiple states. This is called a direct implementation program for the drinking water rule for aircraft systems. For the municipal water systems serving the airports—in all but one state—the states have what EPA calls primacy and has delegated primacy enforcement responsibility to the state.

Q: A participant asked if sampling within the public water system for total coliform is done at a sampling point? What is the concept as far as insuring the quality of water from a normal sampling point? Where is that line of demarcation as far as when it is no longer public?

A: Rick Naylor stated that the municipal public water system usually serves up to the property line of the airport. At that point it's an onsite system, in most cases, becomes the airport's responsibility on private property. The airport will have something like a water cabinet or water truck where there is a connection and the plane can be filled up right there at the gate. There will be a potable water hose used. The FDA does the watering points, trucks, water cabinets/carts and hoses.

Comment: A participant said they have met already with EPA and would like to continue meeting and learning even though they are not now subject to the rulemaking. The railroad has been covered by the rule for a long time and has had a very successful working relationship with EPA Region 3. They do quarterly reporting and have an O&M plan. There are some major differences between airplanes and trains but they also have

dining cars, which have different uses for water than probably most airplanes have in terms of food service. He said there are some things they can learn and that the R&D is important. Issues about lavatory sinks and their improved design are important to him. There is also some technology that might be used for onboard treatment.

Q: A participant asked Rick Naylor if the monthly disinfection of the carts and hoses was specific to the conveyance system or would it also apply to the stationary water system.

A: Rick Naylor stated that it does not apply to a typical water system. They do not use temporary connections to get their water from one source to another. They are piped conveyance systems. Monthly disinfections were developed specifically for interstate carrier conveyances like planes, trains and water vessels.

Q: A participant said a lot has been said about microbiological testing but asked has there been any discussion relative to disinfection by-products testing.

A: It was stated that for transient systems, unless they use chlorine dioxide, they are not required to monitor for disinfection by-products.

Q: A participant asked if enforcement and compliance mechanism were imbedded in the Key Issues and said it might be useful to segregate that as a key issue.

A: Laurie Dubriel stated that in developing the rule, enforcement and compliance is always a component of every rule development.

Q: A participant asked if there are any planned changes for the accreditation of the laboratories during the testing and analysis and if so, has there been any discussion about requiring or using ISO or IEC 17025, which is standard for competence of testing and calibration labs. He said using that standard might help facilitate the acceptance of lab data across international borders.

Q: A participant said he understood that the new rule applied to both scheduled carriers and non-scheduled carriers, such as charter operators. He asked if charter operators would be addressed in the rule.

A: It was stated that charter operators would be addressed if they fit the definition of a public water system by serving 25 people daily on a regular basis.

Q: A participant asked if charter operators would fit under this rule if they carry 10 passengers through three flights in a day, which would be 30 people.

A: Steve Heare said there would be an explanation in the rules to explain all of the different permutations. The issue is a valid one and it may take some figuring out. During EPA's discussions with the association they know of—NACA, which represents a number of charter carriers—it appeared that most of the aircraft they operate are good size planes and have the potential to fall under the rule. Rick added that the issue comes up with more traditional types of water systems as well, such as seasonal systems in resort areas or a campground that is open for a short period of time.

Comment: A participant said he was not quite clear about the role of the FDA at the airport. We see there are a lot of emerging issues where the public water system ends and

water goes into a building. The private plumbing systems are starting to emerge as maybe more of a problem. What happens where the PWS ends through the huge airport campuses? There is an enormous potential for recontamination there. Also, how is that airport system managed before the water is delivered to the plane is a question that might need to be thought about because the actual quality of the water taken onboard may not be what the public water system delivers. He said he did not know if the airlines have quality of service contracts in place with the airports to supply a certain quality of water or not, but in just looking at the aircraft there appears to be a big gap. The size of the airport is also a factor. If I were an airline, I would be saying to the airport: "Prove to me that the water was good when I brought it onboard."

Comment: A participant said you need to keep in mind the distinct roles and responsibilities of the airport to airlines and service providers to the airlines themselves, looking at the way airports themselves are managed. In some instances airports do not even own some of the terminal buildings that are used by the airlines. They are contracted out to other management companies. The port authority at New York JFK does not own any of those terminal buildings.

Q: Gail Bingham asked if he knew at JFK and other places, who owned the buildings? Is there some other stakeholder?

A: The participant said there are management companies like British Air with BAA, which is manager-owned. They may operate Terminal 7, which is the international terminal at JFK that was recently built. Every airport owns and operates their properties differently.

Q: A participant asked about the role of service providers who actually bring the food and water onto the planes and if they are involved in the process? He said they were a critical link.

A: Dean Davidson said the Air Flight Food Service Association is the trade organization for airline catering companies. Some of the catering trucks provide water; however, it is not done that frequently anymore and most of it is now done with the aircraft servicing. However the airline catering companies will be brought into the process if necessary. In response to Gail's question, Dean said he would find out if the aircraft-servicing people had an association of their own.

Comment: A participant said in the U.S. carriers have what is called the right of self-handling; however, they may contract with somebody to provide those services to them. Very few of our members would actually provide ground-handling services to a carrier but a few do. You have got to think through that whole chain of supply and make sure we understand who is going to be responsible for what portion of the chain.

A: Rick Naylor stated that is why they are tackling one type of carrier at a time. A lot of the scientific type of information they learn about bio-films and things like that maybe applicable to the other carriers but because of the complexity and the different operating characteristics of the different carriers, they decided to focus on one type of carrier at a time. Hopefully, EPA will be able to apply a lot of what they learn in this first effort for aircraft to trains and water vessels as well.

Q: A participant asked if FAA was going to participate in the process and if so, he asked that they touch on their role?

A: Rick Naylor stated that EPA has a contact they are working on with FAA and that FAA is going to participate in the process. They could not be present for today's meeting. The person we are working with had a prior commitment but they will stay informed throughout the process. Any changes that are made to operations and maintenance programs ultimately must be approved by FAA.

Comment: A participant asked if EPA looked at potential differences resulting from aircraft maintenance when they tested the water. He suggested they do a control maintenance procedure on a small group of aircraft to see exactly what has been done on maintenance and to determine the test results from the aircraft. That might be helpful in determining what would be appropriate maintenance requirements in the future.

Comment: A participant said EPA should consider oversight of food handlers. Recently four people on Northwest Airlines got sick because of the food they ate. A follow-up inspection found flies, roaches and pink slime on the door of the icemaker and food handlers were scooping ice with their hands. Although it is not the water, that is a source of contamination on the aircraft. She also would like to see teeth in the enforcement process.

Q: A participant asked if the sanitary surveys would be part of the rulemaking process and what in EPA's view are the current requirements for the sanitary survey of an aircraft?

A: Rick Naylor stated that sanitary surveys will be considered in the development of the rule. It is a requirement for the type of category that aircraft water systems fit into. They are currently not designed for an aircraft water system. That needs to be looked at in the development of the rule.

Discussion: In answer to follow-up questions, Rick Naylor agreed that transient non-community water systems have to have the sanitary survey but the current regulations are not targeted at aircraft and the sanitary surveys have not been done by EPA.

Q: A participant stated that to his knowledge, the FDA and ICC have jurisdiction over the design and construction of water systems onboard vehicle conveyances. How is this rule going to do anything about the FDA's jurisdiction over those facilities onboard aircraft when there are a lot of aircraft being built now that actually do not have flowing water in their lavatories? These are generally smaller regional aircraft. Is this something that is going to be dealt with? It is an FDA issue but there is a lot of jurisdictional crosscutting so how is EPA going to treat this sort of cross-jurisdictional issue?

A: Dean Davidson stated it is too early in the process to decide what they are going to do. If there were a change in the EPA regulation that references FDA's regulations, then it would cause FDA to amend their regulation. In response to the question concerning aircraft with no water in lavatories, Dean Davidson said those aircraft in many cases came from foreign manufacturers and they arrive in the U.S. bought by the airlines. FDA was never a part of the equation and they would like to see that changed.

Discussion: A participant stated that to be operated, those planes have to have an FAA certificate, which means they conform to Part 23 of the design standards.

Q: A participant asked about the weight that EPA will give to the various elements of the current rule, guidance document and administrative orders and how much weight will the information from stakeholders and other groups carry in their consideration.

A: Steve Heare responded that the agreement in principle and model order they are working on, as well as the individual orders they are beginning to negotiate, reflect what they have learned about current practices in the industry. To the degree that they get information through the process, that will inform their course of action. They are starting over from scratch in terms of what ought to be.

Q: A participant asked is the water tested in a downtown Washington, DC restaurant given the same criteria? Is it a level playing field between an airplane and a restaurant?

A: Rick Naylor responded that the restaurants around here would not be a public water system because they are a customer of the Washington, DC water system. However, a restaurant out on the highway that has its own well and water system could be a public water system and fit into the category.

Discussion: A participant said he thinks the bacteria and other issues that cause the problems in the airplanes breed in faucets of both the aircraft and restaurants and asked is the plumbing system tested? Monitoring is conducted in the distribution system and at the treatment plant and that is how they determine compliance. There is a difference in that when EPA tests aircraft, they test galley and lavatory faucets and places where they can get the water.

**PRESENTATION: OPTIONS FOR A COLLABORATIVE APPROACH TO THE RULEMAKING—
GAIL BINGHAM**

Gail Bingham outlined the three dimensions of the upcoming rulemaking process, which would begin with: (1) Consultation and Assessment with stakeholders about what would constitute an effective collaborative approach; (2) a discussion of Process Options with EPA looking at what they have done in other rulemaking situations in the past; and (3) a conversation with stakeholders to discuss a possible approach. The presentation outlined the various steps in the assessment approach and a timeline for the assessment, starting with the Public Meeting being held on June 1, 2005. Stakeholder Interviews will be held in June-July 2005, and the process recommendations will be made in July 2005. The characteristics of collaborative processes were discussed, looking at what type of process to use. Participants asked questions and made comments about the process following the presentation:

Q: A participant asked who could convene a collaborative approach to the rulemaking process and would that be dependent on the stakeholders or the agency.

A: Gail Bingham responded that most types of processes could be convened either by the agency or an outside group as long as everyone felt that was a credible approach. (A formal negotiated rulemaking would be an exception.)

Comment: A participant stated that a collaborative process, in itself, does not really get to an important dimension. What you really need is more data in terms of what the problems are in the airline industry, and I think your initial surveys just kind of scratched this. I think that with the agreements that are going on, you are getting more test data. You are getting that data from the airport water sources. You need that kind of data to determine what measures are appropriate for proceeding. I think in the collaborative process you will not get that much new—if it is not based upon the data.

A: Gail Bingham said that adequate data can be a criterion for a good process and that data collection can be one of the purposes of collaboration.

Q: A participant questioned the accuracy of data from self reporting and expressed a concern that airports and carriers will answer to protect themselves. EPA is not going to end up with the information they really need at the end of the day.

A: Gail Bingham said it's possible to address concerns about liability in an information exchange process.

Discussion: Laurie Dubriel said part of the purpose of the administrative orders on consent that is being done with the airlines is to get a lot of the information. I do not have the authority to speak for the Assistant Administrator for Enforcement but what I can say is that we are looking for compliance with the orders in this intermediate period while the rule development process is ongoing. If carriers have additional information that is not contemplated by the orders that they think would be helpful to the rulemaking process, they should give that information to the agency. The agency is not looking to get you. This is not a “got you” situation. We are all interested in the same thing, which is reaching a rule at the end of the day that works for the airline industry and protects the traveling public.

Discussion: A participant responded that if you want the information flow, you have got to come up with some way to say to the carrier that if your dirty laundry gets out there, you are still protected. That has to be done as we go into the consent orders.

Q: A participant said the term “consent order” in the FAA world is not collaborative. It is something to be avoided at all costs. What does the term consent order mean in the EPA context?

A: Laurie Dubriel said in order for the agency to issue an administrative order you have to have some type of finding of non-compliance. Some type of violation has to be there. In this context, this is an administrative order on consent, meaning that EPA has talked to the party who would be getting the order and worked through the logistical issues for the airline industry within the context of the order. The other option the agency has is to issue an administrative order unilaterally, without reaching an agreement. That is not the type of order that has been issued here. EPA has consulted with the airline industry. The other option that EPA has is a consent decree, which is through the judicial process. That also is not the process that is currently being used.

Q: A participant responded to an earlier comment about the risks and determining whether the risk is acceptable. She said we have not heard the numbers yet, showing that half the aircraft were sampled in the galley and half were sampled in the lab. I am curious to know how those numbers compare independent of the lab testing, which is

considerably higher, and how those numbers compare to coliform testing for stationary water sources. That might be an interesting comparison in terms of determining the risks and comparing it to other sources.

A: Steve Heare said EPA tracks national compliance with primary drinking water regulations, health based violations of the national drinking water regulations for community water systems, which are a subset. In general for the 54,000 community water systems that we track, I would say our compliance with health based standards for populations served by community water systems is around 95 percent.

Q: A participant asked is the focus of this process going to be solely on the airlines or might it include other ICCs?

A: Rick Naylor said EPA is responsible for all ICCs; they include aircraft, water vessels, trains and buses. We are focusing in this initial effort on aircraft water systems.

Discussion: During the discussion, several information points were made. FDA covers the same modes of transportation. Similar issues are involved, including the connection between the public water system and the mobile water system. The big difference between vessels and aircraft is that many vessels have their own treatment system onboard. Although there are nuances between ICCs, hopefully a lot of the information such as on bio-films may be relevant and make the process a little bit easier in the future when considering regulating the other ICCs.

Q: A participant asked if airlines are following disinfection schedules and how is EPA going to deal with that during this process. Are you going to go beyond just collecting information about the cleanliness of the water to actually looking at the steps that are being taken at the airports and by the airlines? Are they doing their operations and maintenance procedures to make sure things are being done correctly?

A: Laurie Dubriel stated that as part of the orders, EPA is collecting information about the maintenance and disinfection procedures and are requiring routine disinfections. We will be tracking their compliance with disinfection of the aircraft and the watering points as well. We are requesting information if they have a third party handler who does your water service. We have the corrective action for procedures in place for when there is a positive test result and we are following up on those results as well, requiring that that information be submitted to us in a timely manner. We review it and follow-up with each of those instances. We are requiring public notification under the orders and following that information as well.

Q: Gail Bingham asked is there anyone or any stakeholder group that is not here today that any of you would suggest ought to be contacted about this rulemaking? Is there anybody missing who should be informed?

A: The response was the aircraft manufacturers, Boeing and Airbus, and the Aircraft Industries Association.

Q: A participant expressed a concern about under reporting. The data reported so far suggests a very high rate of non-compliance compared to other water systems. (AWWA could share information on that.) I think these are pretty high numbers, which is why we are somewhat concerned. Also, the implications for other ICCs deserve serious

consideration. I think there is a risk in going down this very long road for 4 or 5 years of rulemaking and coming up with a new rule that only applies to airlines and then later find out that buses and perhaps trains and others might be suffering from exactly the same problems. You will have lost the economies of scale that you would have won by bringing them into the process now. I am not advocating that you bring them into the process but I think a serious look at some of the ICCs is probably going to result in fairly similar findings. Does EPA have monitoring data on the other ICCs?

A: Rick Naylor answered not that he knows other than Amtrak.

Discussion: A participant said they have been doing the O&M plan since the late 1980s but tracking it since 1992. Yes, they do routine monitoring for coliform. Their results are better than the results presented at the meeting.

Q: A participant addressed the rates of compliance issue, saying the regulation assumes a certain number of samples are being taken over time. So the compliance rate that was referred to of 1-in-20 or 5 percent is based on a number of samples taken from the same public water system. EPA views each aircraft as a separate public water system. So when EPA uses a 15 percent number or the 4.3 percent number, that is not analogous to an individual public water system's rate of positives. It is analogous to overall—the number 95 percent was cited here today—public water systems across the country. We attempted to try and apply the regulations to our sampling results and as you will see from our report one of the problems is the regulations do not quite fit what we do. We cannot monitor upstream, for example, when we get a positive the way that traditional water systems are directed to do. So it is not an exactly analogous situation where you can just compare the numbers.

Comment: Laurie added that the numbers being talked about are just the initial samples and do not include repeat sampling.

Q: A participant asked if the operators of water supplies were present as stakeholders.

Comment: Gail Bingham asked if those who operate the water trucks and water hoses were represented at the meeting. No one responded as being a representative of either group.

Q: A participant asked that if a collaborative approach is decided upon and meetings are going to be carried out, who is going to coordinate and oversee the process and chair the meetings? Will that be someone within EPA or is RESOLVE being considered to do it? When are you going to make that decision? Is this going to be after the interview process? How long will it take before you decide on the process and those questions that you look at?

A: Gail Bingham said they will ask meeting participants as part of the assessment process who they want to facilitate the process; who should convene it; how should it be facilitated; and by whom. Their views will be conveyed to EPA. She is assuming EPA's decision about facilitation or chairing of the process will happen after the interviews because they will be asking participants for your thoughts.

A: Rick Naylor also said they are aiming to have the report with the stakeholder process recommendation by the end of July.

Comment: Gail Bingham answered that she will attempt to have the report and recommendation ready by mid-July, assuming she can get to talk with all those at the meeting and other stakeholders. She said it is RESOLVE's practice that their reports are public documents because they want the report to accurately reflect what they have heard. Then EPA will decide in some period of time after they issue the report about whether to go forward with their recommendations and how.

Comment: Steve Heare said he cannot give an exact day but EPA's goal is to get the regulation written as quickly as possibly. They are already looking at 4 years and 7 months if Rick Naylor's schedule holds.

Q: A participant asked whether or not they would go with a FACA-type process.

A: Gail described the Federal Advisory Committee Act (FACA) process as being where EPA formally convenes a process with the objective to get consensus advice from stakeholders. It often involves a very intense degree of collaboration. They must do that under the auspices of the Federal Advisory Committee. (There are some process designs where stakeholders could seek to reach consensus recommendations developed in a voluntarily not under the agency's auspices.) One of the concerns about, the Federal Advisory Committee Act is the amount of time it might take to go through the procedural steps to get a charter. In this case, we may not have enough time in the time schedule to use the Federal Advisory Committee Act. One of the advantages of consensus might be increased certainty to plan investments required to comply with the regulations.

Q: A participant asked Gail Bingham if she is going to contact the stakeholders mentioned earlier, such as the Industrial Hygiene Association and CDC, to find out if they would like to participate in this process or is it going to be a passive situation where some of the participants have to contact them and suggest that they might want to contact Gail and get involved in this process? How is this going to work to incorporate other stakeholders into the process?

A: Rick Naylor said that all of those ways should be used. They encourage stakeholders to contact fellow stakeholders to participate in the process. Gail Bingham and EPA will follow up on suggestions already made. The approach is to be as inclusive as possible.

Q: A participant asked if the interviews will be conducted by RESOLVE, EPA or both groups?

A: The interviews will be conducted by RESOLVE. If someone wants to talk to RESOLVE, they can contact Gail Bingham, Kathy Grant or another colleague, Marsha Greenbaum who is in Boston or they can contact EPA who will put them in contact with RESOLVE.

Q: A participant said he was not aware of any requirement imposed upon people who handle water for the airlines. I look back at this complex problem of fluid handling and I relate it to the beginning of the jet age. When the airlines first started to hand out jet fuel—when the 707 first came out—they discovered it had an affinity for water and they discovered it had an affinity for microbes. They had problems with it for custody transfer because it went from pipelines to storage tanks to trucks to hydrant systems or other trucks into the airplane. And the opportunity for contamination at every handling was

very evident. One of the biggest variables they had with jet fuel handling was the people that handled it. I do not think they have a thorough understanding of the care that needs to be taken with the handling of water. I read a book on longevity and how the life expectancy of Americans is going up. One of the chief attributing factors to the increase of life expectancy—and I would have thought it would have been modern medicine—but they said it was the Safe Water Drinking Act. Because there were so many waterborne pathogens that caused so many maladies and diseases, now a generation or two generations later, we are not even aware of them anymore. I would submit that the people who are handling the water in this industry are not any more aware of water quality problems than the average man on the street. They have not lived it. The Safe Water Drinking Act has always been there for them. I do not think they are properly educated to know how to handle the water. I wonder if eliminating one of the variables in this water quality issue—just the training and education in our expectations of the people handling water—would not go a long way towards reducing the water quality problems we have.