U.S. Environmental Protection Agency
Science Advisory Board
Drinking Water Committee (DWC)
Consultation on Proposed Aircraft Drinking Water Rule (ADWR)

Date and Time:	July 24, 2008, 1:00 to 4:45 pm EDT
Purpose:	To comment on the characterization of safe drinking water on board aircraft, given the changing composition of water in the tank and emerging non-chlorine based technologies.
Location:	Teleconference only
Committee Members:	Dr. Joan B. Rose, Chair Dr. Penelope Fenner-Crisp Dr. Stanley B. Grant Dr. Jeffrey Griffiths Dr. Joseph Landolph Dr. Desmond F. Lawler Dr. Christine Owen Dr. Richard Sakaji Dr. Gary Sayler Dr. Gina Solomon

Summary of Meeting:

Introductions, Review Agenda, and Purpose of Meeting

After Dr. Resha Putzrath, Designated Federal Officer (DFO), convened the meeting and called the roll, Dr. Joan Rose, Chair, welcomed the participants and reviewed the agenda, charge questions, and the purpose of the meeting.

Presentations by Agency

Mr. Richard Naylor from the Drinking Water Protection Division of the Office of Ground Water & Drinking Water in EPA's Office of Water presented, "Aircraft Sampling Data" and "Overview of the Proposed Aircraft Drinking Water Rule." In the former, he provided a summary of the provisions of and the rationale for the proposed rule. He mentioned that they were trying to tailor the drinking water rules from those designed for stationary sources to aircraft that board water at many locations, including some outside EPA jurisdiction. Sampling of the water systems also depends on when the aircraft are available. EPA is responsible for regulating on-board water; FDA covers other aspects. However, EPA and FDA work together, and are part of an international effort. The proposed rule states that disinfection and flushing frequency should be as

recommended by the manufacturer, so as not to harm the equipment. Oversight is with FAA, and EPA is working with FAA to coordinate these efforts.

With regard to the second presentation, Mr. Naylor said that the person who generated the data on the statistical analyses was not able to be on the call. There was a discussion by the Committee members about the number of self-inspections and questions regarding the number of passengers who might be affected. EPA responded that the inspections were analogous to a sanitary survey, and the numbers of discrete individuals on these planes was difficult to obtain, but that the economic analysis had some estimates. Mr. Naylor said that FDA reviews the plans and specifications, and gives the certifications. In response to member's question, he said that the average amount of water consumed is quite small per person, because water is heavy, so airlines do not like to carry more than necessary. However, this practice also leads to frequent top-offs of the water tanks. The kitchen water supplies, e.g., coffee and tea water, are hard plumbed and likely heated by flash or point of use. Some galleys only have hot water, which is the reason for the second charge question. WSG29 that attempted to fix this issue was taken out of service for various reasons prior to this rulemaking action.

Responding to Committee members' questions, EPA stated that current ranges for flushing and disinfecting were generally quarterly, and that it can take many hours to flush the system on a large plane. Most aircraft have the potential to routinely fly overseas and board water, even from countries where water supplies are less well regulated. Mr. Naylor said that most of the data on total coliform were from an enforcement action and, therefore, not a scientific study. Thus, EPA can't address risk factors from the 2004 data. This enforcement action and consent agreement led to this proposed rule. The current Total Coliform Rule (TCR) was felt to require too many samples, and it was thought that monthly sampling would generate a lot of samples without providing much useful information. ADWR was designed to trade off sampling with a flushing and disinfection regime, i.e., best management and treatment practices, to get a feasible and protective procedure. No useful pattern has developed in the data analyzed so far, but not all of the data have yet been analyzed. Also, the sampling patterns varied. The first samples were only from galleys, while the second set that included lavatories and galleys produced a higher percentage of positives. A member asked how this proposed rule might be affected by the TCR's 6-year revisions. EPA responded that the TCR work was on-going and in parallel, and he doesn't know how that might affect this proposed rule.

When a member asked about just requiring on-board, UV treatment, EPA responded that retrofitting on aircraft is a big deal. There is only one UV system made that has a certificate to be used on aircraft, and only Air Force 1 and 2 and some private aircraft have installed it. It is hard to get a certificate from FAA, although there is lots of interest in getting certificates for use of ozone and UV for new aircraft. Members raised concerns that, without incentives to move toward on-board treatment, the situation might be the same years from now when we next evaluate aircraft drinking water. EPA indicated that it is likely to go in that direction anyway, especially as lavatory water, by law, must be potable.

The Committee members questioned whether, since the TC was only an indicator, all appropriate pathogens, e.g., viruses, would be monitored. When queried, no one on the teleconference could recall an outbreak of disease from the water on aircraft (noting that ice is boarded from another source); it was noted that, as the passengers disperse, it might be difficult to determine. One member suggested that the available data on total coliform versus *E. coli* comes within the context of standard water utilities in US, and not all water sources. Therefore, it would be difficult to determine what correlations might apply to water from outside the US.

Public Comments

The organization that indicated it was interested in presenting public comments was not on the teleconference. In response to an email sent by the DFO during the teleconference, they indicated that they would not be making public comments on the teleconference.

Charge Question #1:

Statistical Sampling: Each aircraft water system is a unique system that draws water from a potentially large number and combination of sources and distribution systems, which may vary on a daily basis, or even more often. The proposed ADWR requires corrective action based on monitoring results for each individual water system to directly address the risks to that system. Some stakeholders have suggested that a representative number of aircraft be sampled, resulting in a statistical sample of the air carrier fleet instead of all aircraft being sampled. Under current practices, the source(s) of water for an individual aircraft are so varied that it is difficult for a statistical sample to provide an accurate representation of all water being served on the aircraft. In addition, if the Agency did have enough evidence that allowed an extrapolation of the statistical sample to the entire fleet, the implication is that any positive coliform result in the statistical sample would trigger additional monitoring and/or corrective action in the entire fleet, as the statistical sample would be used as an indicator for a systemic problem. **EPA asks for SAB's recommendation on: (1) the use of statistical sampling methodologies, specifically on what type of monitoring scheme would allow a statistical sample to be representative of the whole fleet, and whether such methodologies, if allowed, should only be used in conjunction with onboard or other supplemental treatment such as adding a disinfectant or ultraviolet light; and (2) if allowed, what should be the statistical sample occurrence triggers for total coliform and/or E.coli/fecal coliform that would require follow-up action in the entire fleet, and what should the follow-up action entail.**

The Lead Discussants reviewed the complications of sampling a changing water system with ever-changing water sources. They raised the question of whether any statistical sampling could be considered "representative." It might make sense to co-ordinate sampling with the 24- to 48-hour servicing. The monitoring paradigm in the proposed rule seems reasonable, given that we don't have outbreaks from aircraft. There is no statistical basis for sampling, as the samples are from a heterogeneous source.

Statistical sample of heterogeneity can be done, but would need to rely on an analysis of some prior data.

One member was concerned about the potential for interaction among waters that had been disinfected by various methods, in particular, water sources that have free chlorine with water sources that have residual chloramines. They would counteract each other, leading to no residual disinfectant. Furthermore, if a statistical sampling method were used and there were a positive result, would this mean that the entire fleet would be affected?

Another member suggested that the proposed rule might be an overly complex solution to the problem. It might make more sense to first obtain information on what diseases might be a problem, by looking at the worse-case of water systems and trying to better define the situation. Another said that the same questions apply to the revisions of the TCR, but we don't have a good idea of disease rates, because the passengers scatter. Since even land-based drinking water utilities are unclear how to measure the problem, how can we do statistics when we don't know how to do land-based system? We need to develop a logical, best available technology (BAT) approach that has monitoring, and use those data to inform future. While several members said that they would like more data, there was general agreement that the current situation would not allow statistical sampling as representative of the whole fleet.

The Committee then discussed how often and when the sampling should occur. Right before flushing was proposed as having the greatest likelihood to observe if a problem occurred, and would allow the quickest fix. A problem with sampling before flushing, however, is that, while it would catch wrong doers, it might not protect the public since they would have been exposed prior to the sampling. The suggestion was made to sample quarterly (or according the manufacturer's instructions) and to also sample during flushing and disinfection. Mr. Naylor said that they were trying to get representative sample and, therefore, prohibited the airlines from taking the sample too close to the flushing and disinfecting. There were suggestions from some of the members that EPA consider now, before the data are obtained, how to use the data: (1) to determine what factors influence the positive results and (2) to estimate risk and to improve protection of public health.

At the request of Committee members, a short break was taken. Dr. Putzrath then reconvened the meeting and called the roll. Dr. Rose moved the discussion to the second charge question.

Charge Question #2 :

Temperature of Sample Taps: In the proposed ADWR, routine monitoring includes taking a total coliform sample from the galley tap and a lavatory tap. In some aircraft, the only sampling point in the galley is the coffee maker and/or hot water tap that is hard-wired and cannot be adjusted. The proposed ADWR does not specify whether samples should be taken from hot or cold taps. Some concern exists about sampling from hot taps since hot water could kill microorganisms, masking whether there is a microbiological problem in the aircraft system. **EPA asks for SAB's recommendation on: (1) whether sampling should only be limited to cold taps when they are available; and (2) if a cold tap is not available in the galley, should the air carrier measure and provide the sample temperature to EPA to provide some indication of whether the temperature achieved is high enough to alter the microbiological results.**

The Lead Discussants posed several questions to EPA including: what is the nature of the hot water taps, what is their temperature and the length of the holding time? It was posited that, in some cases, hot water could encourage the growth of some pathogens, especially biofilms. The members questioned the value of information of sample from hot taps, i.e., it might always be negative and therefore useless. EPA noted that the airlines would need to record the temperature of the sample when it was taken. They said their concern was that people would drink water from that tap. Members raised concerns about hot water taps that weren't working properly and might be at a lower temperature than expected. Concerns were raised about only sampling from the lavatory taps that could be contaminated from sources other than the water supply. All agreed that sampling cold taps was legitimate. The value of sampling from hot water taps was generally considered of little to no value, but some members thought that some data should be gathered before a decision was made.

This discussion was felt to further support the argument for on-board treatment in future. Members suggested approaches for putting some pressure on airlines to take this approach, as the only ultimate solution for the problem. EPA indicated that it might be too late to make such a suggestion for this proposed rule, but it might be included in the preamble of the rule.

At the request of Dr. Rose, Dr. Putzrath reminded the members that their individual comments would constitute the recommendations from this consultation. The members agreed to send their comments to Drs. Rose and Putzrath by August 13th.

Concluding Remarks

Dr. Rose thanked the Committee and the presenters. The meeting was adjourned by Dr. Putzrath.

Respectfully Submitted:

/s/

Dr. Resha M. Putzrath
Designated Federal Officer

Certified as True:

/s/

Dr. Joan B. Rose, Chair
Drinking Water Committee