

**ENVIRONMENTAL PROTECTION AGENCY**

**40 CFR Part 141**

[EPA-HQ-OW-2005-0025; FRL-8967-9]

RIN 2040-AE84

**National Primary Drinking Water Regulations: Drinking Water Regulations for Aircraft Public Water Systems**

**AGENCY:** Environmental Protection Agency (EPA).

**ACTION:** Final rule.

**SUMMARY:** The Environmental Protection Agency is establishing Federal drinking water requirements (known as national primary drinking water regulations or NPDWRs) for aircraft public water systems (hereafter, aircraft water systems) under the Safe Drinking Water Act (SDWA). Federal drinking water standards were primarily designed to regulate water quality in stationary public water systems, and the application of these requirements to mobile water systems with the capability of flying throughout the world has created implementation challenges. This final rule's requirements are intended to tailor existing health-based drinking water standards to the unique characteristics of aircraft water systems for the enhanced protection of public health

against illnesses attributable to microbiological contamination. EPA believes that this approach will better protect public health while building upon existing aircraft operations and maintenance programs, better coordinate Federal programs that regulate aircraft water systems, and minimize disruptions of aircraft flight schedules.

**DATES:** This rule is effective November 18, 2009. For judicial review purposes, this final rule is promulgated as of October 19, 2009.

**ADDRESSES:** EPA has established a docket for this action under Docket ID No. EPA-HQ-OW-2005-0025. All documents in the docket are listed on the <http://www.regulations.gov> Web site. Although listed in the index, some information is not publicly available, e.g., Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, is not placed on the Internet and will be publicly available only in hard copy form. Publicly available docket materials are available either electronically through <http://www.regulations.gov> or in hard copy at the Water Docket, EPA/DC, EPA West, Room 3334, 1301 Constitution Ave., NW., Washington, DC. The Public Reading Room is open from 8:30 a.m. to 4:30 p.m., Monday through Friday,

excluding legal holidays. The telephone number for the Public Reading Room is (202) 566-1744, and the telephone number for the Water Docket is (202) 566-2426.

**FOR FURTHER INFORMATION CONTACT:** Richard Naylor or Cindy Y. Mack, Drinking Water Protection Division, Office of Ground Water and Drinking Water (MC-4606M), Environmental Protection Agency, 1200 Pennsylvania Ave., NW., Washington, DC 20460; telephone numbers: Richard Naylor (202) 564-3847 or Cindy Y. Mack (202) 564-6280; e-mail addresses: [naylor.richard@epa.gov](mailto:naylor.richard@epa.gov) or [mack.cindy-y@epa.gov](mailto:mack.cindy-y@epa.gov). For general information, contact the Safe Drinking Water Hotline, telephone number: (800) 426-4791. The Safe Drinking Water Hotline is open Monday through Friday, excluding legal holidays, from 10 a.m. to 4 p.m., Eastern time.

**SUPPLEMENTARY INFORMATION:**

**I. General Information**

*A. Does this Action Apply to Me?*

Entities potentially regulated by the Aircraft Drinking Water Rule (ADWR) include air carriers that operate aircraft water systems using finished surface water, finished ground water under the direct influence of surface water (GWUDI), or finished ground water. Regulated categories and entities include:

Category	NAICS code	Examples of regulated entities
Scheduled passenger air transportation .....	481111	Air carriers.
Nonscheduled chartered passenger air transportation .....	481211	Air carriers.

This table is not intended to be exhaustive, but rather provides a guide for readers regarding entities likely to be regulated by this action. This table lists the types of entities that EPA is now aware could potentially be regulated by this action. Other types of entities not listed in this table could also be regulated. To determine whether your air carrier is regulated by this action, you should carefully examine the applicability criteria in § 141.800 of this final rule. If you have questions regarding the applicability of this action to a particular entity, consult the person listed in the preceding section entitled **FOR FURTHER INFORMATION CONTACT.**

*B. Abbreviations Used in This Notice*

ADWR: Aircraft Drinking Water Rule  
ANSI: American National Standards Institute  
AOCs: Administrative Orders on Consent  
ATA: Air Transport Association  
BMP: best management practice

CDC: Centers for Disease Control and Prevention  
CFR: Code of Federal Regulations  
CRMP: Comprehensive Representative Monitoring Plan  
CWS: community water system  
DBP: disinfection byproducts  
*E. coli: Escherichia coli*  
EO: Executive Order  
EPA: United States Environmental Protection Agency  
FAA: United States Federal Aviation Administration  
FDA: United States Food and Drug Administration  
FR: Federal Register  
GWS: ground water system  
GWUDI: ground water under the direct influence of surface water  
HACCP: Hazard Analysis and Critical Control Point  
HHS: Department of Health and Human Services  
HPC: heterotrophic plate count  
ICC: interstate carrier conveyance  
ICR: Information Collection Request

IESWTR: Interim Enhanced Surface Water Treatment Rule  
LIMS: laboratory information management system  
mL: milliliters  
MCL: maximum contaminant level  
MCLG: maximum contaminant level goal  
MDRL: maximum disinfectant residual level  
mg/L: milligrams per liter  
NAICS: North American Industrial Classification System  
NCWS: non-community water system  
NDWAC: National Drinking Water Advisory Committee  
NPDWR: national primary drinking water regulation  
NTNCWS: non-transient non-community water system  
NTTAA: National Technology Transfer and Advancement Act  
PWS: public water system  
OMB: Office of Management and Budget  
QAPP: Quality Assurance Project Plan  
RFA: Regulatory Flexibility Act  
SAB: Science Advisory Board  
SBA: Small Business Administration

SDWA: Safe Drinking Water Act  
 SDWIS: Safe Drinking Water Information System  
 SWTR: Surface Water Treatment Rule  
 TC: total coliform  
 TCR: Total Coliform Rule  
 TCRDSAC: Total Coliform Rule/Distribution System Advisory Committee  
 TNCWS: transient non-community water system  
 TT: treatment technique  
 UMRA: Unfunded Mandates Reform Act  
 US: United States  
 UV: Ultra Violet  
 WHO: World Health Organization  
 WSG: Water Supply Guidance  
 WSP: Water Safety Plan

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## II. Background

### A. Legal Authority

EPA is finalizing this regulation under the authority of the Safe Drinking Water Act (SDWA), as amended, 42 U.S.C. 300f *et seq.*, primarily sections 1401, 1411, 1412 and 1450. Under SDWA, EPA establishes minimum requirements for tap water provided to the public, known as the national primary drinking water regulations or NPDWRs; these standards are applicable to “public water systems.” SDWA section 1401 and EPA’s regulations define a “public water system” (PWS) as a system for providing water for human consumption to the public through pipes or other constructed conveyances and that regularly serves an average of at least twenty-five individuals daily, at least 60 days per year. 40 CFR 141.2.

All public water systems are subject to the NPDWRs unless they are excluded from regulatory requirements under SDWA section 1411. Section 1411 excludes from regulation any public water system that receives all of its water from another regulated public water system, does not sell or treat the water, and is not a “carrier which conveys passengers in interstate commerce.” The classes of interstate carrier conveyances (ICCs) include aircraft, trains, buses, and water vessels. As a result, all ICCs that regularly serve water to an average of at least twenty-five individuals daily, at least 60 days per year are public water systems and are currently subject to existing NPDWRs regardless of whether they treat or sell the water.

EPA’s NPDWRs establish different requirements based on the classification of the public water system (water system), including whether the system is a “community,” “non-transient non-community,” or “transient non-community” system, and whether the system uses surface water or groundwater. Aircraft water systems are considered transient non-community water systems (TNCWS) because they are not community water systems and they do not regularly serve an average of at least twenty-five of the same persons over six months per year (see 40

CFR 141.2). Also, aircraft are regulated as surface water systems because they are likely to board finished drinking water from other public water systems that use surface water in whole or in part. EPA considers water for human consumption to include water for drinking and food preparation as well as water for brushing teeth and hand washing (*see* 63 FR 41941; August 5, 1998). Therefore, if an aircraft has a sink in the lavatory, then the water provided to that sink must be suitable for human consumption.

### B. Purpose of the Rule

The primary purpose of the ADWR is to ensure that safe and reliable drinking water is provided to aircraft passengers and crew. This entails providing air carriers with a feasible and effective way to comply with SDWA and the NPDWRs. Due to the unique characteristics of aircraft water systems and demonstrated implementation challenges, EPA developed a new NPDWR specifically tailored to aircraft water systems, the Aircraft Drinking Water Rule (ADWR).

The ADWR has been developed to protect against disease-causing microbiological contaminants or pathogens through the required development and implementation of aircraft water system operation and maintenance plans that include best management practices, air carrier training requirements, and periodic sampling of the onboard drinking water.

### C. Scope and Applicability of Rule

This final rule only addresses aircraft regulated under SDWA. SDWA does not regulate aircraft water systems operating outside the U.S.; however, EPA is supporting an international effort led by the World Health Organization (WHO) to develop international guidelines for aircraft drinking water. The final rule applies to the onboard water system only. EPA defers to the United States Food and Drug Administration (FDA) with respect to regulating watering points such as water cabinets, carts, trucks, and hoses from which aircraft board water.

EPA assumes that only finished water is boarded for human consumption on aircraft. Finished water means water that is introduced into the distribution system of a public water system and is intended for distribution and consumption without further treatment, except as necessary to maintain water quality in the distribution system (*e.g.*, supplemental disinfection, addition of corrosion control chemicals) (40 CFR 141.2). The assumption that only finished water is boarded on aircraft is

based on an FDA requirement that only potable water may be provided for drinking and culinary purposes on interstate carrier conveyances (ICCs) (21 CFR 1240.80). However, aircraft water systems that are boarding water that is not finished water will continue to be subject to existing NPDWRs.

FDA requirements cover all ICC watering points (21 CFR 1240.83 (a)), (1) to ensure the water supply meets EPA's NPDWRs and (2) to ensure the methods (i.e., water transfer process) of and facilities (e.g., water cabinets, carts, trucks, containers, and hoses) for delivery of such water to the conveyance and the sanitary conditions surrounding such delivery prevent the introduction, transmission, or spread of communicable diseases. FDA requirements for watering points do not entail the individual certification of every potential source, method, facility, or system; however, ICC selected watering points must be in accordance with FDA requirements (21 CFR part 1240, subpart E).

Aircraft that do not provide water for human consumption or those with water systems that do not regularly serve an average of at least twenty-five individuals daily at least 60 days out of the year do not meet the definition of a public water system; these aircraft are not regulated under the NPDWRs or regulated under this final ADWR. EPA also does not regulate under SDWA water systems that only serve water outside the U.S. On the April 9, 2008, proposed ADWR, EPA received public comment as to the applicability of the ADWR to aircraft water systems based on ownership (e.g., foreign carrier, U.S. military). The final rule clarifies that the applicability of the ADWR is not based on ownership, but on the determination as to whether the aircraft water system is operating within the U.S., meets the definition of a public water system (PWS) under SDWA section 1401, and is not excluded from regulation under SDWA section 1411. An aircraft is not considered a public water system if it does not regularly serve an average of at least twenty-five individuals daily at least 60 days out of the year. The ADWR applies to aircraft (regardless of ownership) that fly routes between two or more locations within the U.S., while the aircraft is within U.S. jurisdiction. For instance, an aircraft flying an international route that serves only one U.S. location would not generally be considered a PWS. Another example is an aircraft that is used solely for military purposes, is not conveying passengers in interstate commerce, and meets all of the other exclusion criteria under SDWA section 1411; in this case,

the aircraft would also be excluded from regulation under the NPDWRs and the ADWR.

An estimated 63 air carriers and 7,327 aircraft water systems are regulated by this rule.

#### *D. Regulatory and Enforcement History*

SDWA, including the amendments of 1986 and 1996, requires EPA to promulgate NPDWRs to prevent tap water contamination that may adversely affect human health. As previously noted, aircraft are subject to certain NPDWRs specific to TNCWS. EPA published Water Supply Guidance 29 (WSG 29) in October 1986 to assist ICC operators, including air carriers, in complying with these standards (USEPA, 1986). Since then, EPA has determined that a new rule, the ADWR, specifically adapted to aircraft water systems would provide a clearer and more implementable regulatory framework for aircraft water systems. EPA suspended WSG 29 in 2003 and is no longer approving operation and maintenance programs in lieu of monitoring.

As discussed in the preamble to the proposed rule (73 FR 19323, April 9, 2008), in 2004, EPA found all aircraft water systems to be out of compliance with the NPDWRs. According to the air carriers, it is not feasible for them to comply with all of the monitoring that is required under the existing regulations. Subsequently, EPA tested 327 aircraft, of which 15 percent tested positive for total coliform. In response to these findings, EPA embarked on a process to tailor the existing regulations for aircraft water systems. In the interim, EPA placed 45 air carriers under Administrative Orders on Consent (AOCs) that will remain in effect until 24 months following publication of the final rule.

The ADWR adapts to aircraft water systems the applicable requirements from the Total Coliform Rule (TCR), the suite of surface water treatment regulations, and the Public Notification Rule.

The Total Coliform Rule (TCR) (USEPA, 1989) applies to all public water systems. Because monitoring water systems for every possible pathogenic organism is not feasible, coliform organisms are used as indicators of possible source water and distribution system contamination. Coliforms are easily detected in water and are used to indicate a water system's source and distribution system vulnerability to pathogens. In the TCR, EPA sets a Maximum Contaminant Level Goal (MCLG) of zero for total coliforms. EPA also sets a monthly

Maximum Contaminant Level (MCL) for total coliforms and requires testing of total coliform-positive cultures for the presence of fecal coliforms or *E. coli*. Fecal coliforms or *E. coli* indicate more immediate health risks from sewage or fecal contamination and are used as an indicator of acute contamination. In addition, the TCR requires sanitary surveys (i.e., onsite review of the water source, facilities, equipment, operation and maintenance of a PWS for the purpose of evaluating the adequacy of such source, facilities, equipment, operation and maintenance for producing and distributing safe drinking water). The TCR requires sanitary surveys by the State primacy agency every five years for systems that collect fewer than five total coliform samples per month (those serving 4,100 people or fewer). A TNCWS using surface water serving less than 1,000 individuals daily would typically be required to take one total coliform sample per month for routine sampling requirements.

Under the Public Notification Rule, public water systems must give notice to persons served by the water system for violations of NPDWRs and for other situations posing a risk to public health from drinking water. The term "NPDWR Violations" is used in the public notification regulations to include violations of the MCL, Maximum Residual Disinfectant Level (MRDL), treatment technique (TT), monitoring, and testing procedure requirements. Public notice requirements are divided into three tiers, which take into account the seriousness of the violation or situation and of any potential adverse health effects that may be involved. Due to the transient nature of the public served by TNCWSs, public notice is typically provided through posting of the notice at locations where the public may access drinking water from the water system.

In addition to the EPA requirements, air carriers have many different on-going programs and practices for assessing and correcting deficiencies and risks associated with the drinking water supply and related safety, security, and sanitation issues. For example, such programs and practices include FAA Airworthiness Standards: Transport Category Airplanes (airworthiness maintenance and inspection program) (14 CFR part 43, 14 CFR part 91, and 14 CFR part 121); vulnerability assessments/security programs; FDA regulations for Interstate Conveyance Sanitation (USFDA, 2005); FDA sanitary surveys of watering points and servicing areas; and FDA requirements of aircraft sanitation systems including potable (finished)

water, sewage, and galleys. These programs may contribute valuable information related to the condition of the aircraft water system and water quality. Throughout the rule's development, EPA has worked closely with FDA and FAA to ensure that the ADWR is integrated with these programs to avoid unnecessary duplication.

**III. Final Rule Development**

**A. Stakeholder Involvement**

As discussed in the proposed ADWR, EPA announced in 2004 that it had initiated a rulemaking process to develop regulations for aircraft water systems. (73 FR 19324, April 9, 2008). The Agency committed to working collaboratively with other Federal agencies (e.g., FDA and FAA) overseeing the air carrier industry, industry representatives, and interested stakeholders to identify appropriate requirements to ensure safe drinking water onboard aircraft. This collaborative rule development process has allowed EPA an opportunity to obtain information from, and hear the concerns and questions of, stakeholders who would be affected by this rule in an organized and formal process prior to development of this final ADWR.

EPA held three public meetings: These were held in June 2005, January 2006, and March 2007. All three events

were well-attended by stakeholders representing a diverse group of interests including air carriers, airports, flight attendants, pilots, passengers, public health officials, environmental groups, States, public water systems, water treatment and equipment vendors, laboratories, foreign government agencies, and other Federal agencies. This pre-proposal input greatly assisted EPA in the rule's development.

EPA proposed the ADWR on April 9, 2008 (73 FR 19320), and requested public comment. The ADWR adapts to aircraft water systems the applicable requirements from the Total Coliform Rule, the suite of surface water treatment regulations, and the Public Notification Rule. EPA received comments on the proposal and has made revisions to this final rule that increases regulatory flexibility and adaptability to the airline industry's operations, while ensuring public health protection. Section IV of this notice describes how EPA incorporated public comments into revisions to the final rule. A Response to Comments Document is available in the docket for today's action.

**B. Aircraft Drinking Water Quality**

**1. Data Collection Efforts**

To better understand aircraft drinking water quality, EPA analyzed sampling results submitted by air carriers under

Administrative Orders on Consent (AOCs) from 2005–2008. As detailed in the proposed ADWR, EPA also drew upon the results of the following three studies: (1) A voluntary monitoring study completed by the Air Transport Association (ATA) in Fall 2003; (2) an EPA study of aircraft NPDWR compliance completed in 2004; and (3) the Canadian Inspection Program monitoring results completed in 2006 (73 FR 19324).

The AOCs established interim aircraft water testing and disinfection protocols. As part of the AOCs' requirements, air carriers were required to submit two documents for EPA approval, which set the stage for monitoring and disinfection protocols/procedures: A Comprehensive Representative Monitoring Plan (CRMP) and a Quality Assurance Project Plan (QAPP). The CRMP describes the air carrier's sampling and disinfection processes and protocols for collecting samples within a 12-month period. The QAPP describes the air carrier's Quality Assurance/Quality Control processes to ensure good quality data. As reflected in Table III–1, air carriers followed slightly different monitoring and disinfection protocols based on their fleet size.

TABLE III–1—MONITORING AND DISINFECTION PROTOCOLS AS REQUIRED UNDER THE AOCs

	Air carriers with greater than 20 aircraft	Air carriers with less than or equal to 20 aircraft
<b>MONITORING:</b> <sup>1</sup>		
For each sample event, collect at least one sample from a galley and one from a lavatory for total coliform and disinfectant residual (total residual chlorine) .....	✓	✓
Sample 25% of fleet quarterly .....	✓	.....
Sample all fleet quarterly .....	.....	✓
<b>DISINFECTING AND FLUSHING:</b> <sup>2</sup>		
Disinfect and flush each aircraft's water system no less than quarterly .....	✓	✓
Disinfect and flush watering points (e.g., water trucks, carts, cabinets, hoses) no less than monthly .....	✓	✓

<sup>1</sup> The air carrier was required to use State- or EPA-certified laboratories and EPA-approved analytical methods for analyzing drinking water samples.

<sup>2</sup> If the air carrier had a pre-AOCs monitoring and disinfecting program requiring a higher frequency, the air carrier was required to continue in accordance with their program, unless modification was requested and approved by EPA.

**2. Microbiological Occurrence for the Estimated Baseline**

As of December 31, 2008, EPA has processed drinking water sampling data from 25 of the 45 air carriers under the AOCs. From these 25 air carriers, EPA processed a total of 20,156 total coliform samples (13,872 routine and 6,284 repeat) and 17,267 chlorine residual samples. These 25 air carriers represent 78 percent of the total estimated AOCs' fleet size (5,558 aircraft) and 79 percent

of the total expected annual number of routine samples. However, data for air carriers with an EPA-approved QAPP and CRMP are only available from 2 air carriers in 2005, 5 air carriers in 2006, 8 air carriers in 2007, and 12 air carriers in 2008.

The following data summaries are from air carriers with an EPA-approved QAPP and CRMP. As noted above, not all 25 air carriers provided data collected under an EPA-approved QAPP

and CRMP for all four years. Therefore, insufficient data are currently available to support statistical evaluation of the data sets. However, the data were used to provide an observational indication of trends. It should be noted that total coliform repeat samples by nature have a higher probability of being positive since repeat samples are taken after a routine sample is total coliform-positive. Consequently, the occurrence baseline for total coliform and *E. coli*/

fecal coliform occurrence was based on routine samples only. Table III-2 presents data for routine total coliform samples collected under EPA-approved QAPPs and CRMPs.

Of the total 20,156 total coliform samples received, 93 percent or 18,724 samples (12,794 routine and 5,930 repeat samples) were from air carriers with an EPA-approved QAPP and CRMP. Of the 12,794 routine samples, 3.6 percent (463 samples) were positive for total coliform and 3.9 percent (18

samples) of the total coliform-positive samples were *E. coli*/fecal coliform-positive. Of the 463 total coliform-positive routine samples, 413 were collected in the lavatory, 47 were collected in the galley, and one was a composite sample of galley and lavatory sources; the location of the remaining two positive results are unknown. Although the lavatory samples had a higher total coliform-positive occurrence rate (5.9 percent, or 413 of 7,027 lavatory samples) than the galley

samples (0.8 percent, or 47 of 5,695 galley samples), the galley samples had a higher *E. coli*/fecal coliform occurrence of 12.8 percent (6 of 47 total coliform-positive samples), compared to 2.9 percent (12 of 413 total coliform-positive samples) in the lavatories. More details on the routine coliform data set by calendar quarter and by sample collection location on the aircraft are presented in the following table (Table III-2).

TABLE III-2—AOCs OCCURRENCE BASELINE DATA—ROUTINE TOTAL COLIFORM SAMPLES OF AIR CARRIERS WITH EPA-APPROVED QAPPs AND CRMPs (YEARS 2005–2008)

	Percent TC+	Of the TC+ samples, percent EC+ or FC+	Total # of TC+ samples	Total # of TC+ samples that are EC+ or FC+	Total # of TC samples
<b>Total Coliform Data by Calendar Quarter</b>					
Calendar Qtr 1 .....	3.2	4.0	100	4	3,145
Calendar Qtr 2 .....	3.5	3.5	198	7	5,641
Calendar Qtr 3 .....	4.1	0.0	79	0	1,930
Calendar Qtr 4 .....	4.1	8.1	86	7	2,078
Total .....	3.6	3.9	463	18	12,794
<b>Total Coliform Data by Sample Location</b>					
Galley .....	0.8	12.8	47	6	5,695
Lavatory .....	5.9	2.9	413	12	7,027
Composite* .....	14.3	0	1	0	7
Unknown Sample Site .....	3.1	0	2	0	65
Total .....	3.6	3.9	463	18	12,794

\* Composite sample of Galley and Lavatory sources.

Note: "TC+" means total coliform-positive; "EC+ or FC+" means *E. coli*-positive or fecal coliform-positive.

Note: For air carriers with EPA-Approved QAPPs and CRMPs (Years 2005–2008), out of a total number of 12,794 routine samples, a total of 18 samples (0.14%) were EC+ or FC+.

3. Residual Chlorine Estimated Baseline

Table III-3 presents data for disinfectant residual samples collected under EPA-approved QAPPs and CRMPs during routine and repeat total coliform sampling events. Of the 18,724 routine and repeat total coliform sample events reported, 16,109 disinfectant residual sample results were also reported. Results were reported as either "detect" with the residual value recorded, or "non-detect." Disinfectant residual data were not provided for 2,615 coliform sample events.

Disinfectant residual data are presented for the total of routine and repeat sample collection events because repeat samples have no higher or lower probability of having a detectable residual than routine samples.

For air carriers with approved QAPPs and CRMPs, approximately 18.2 percent (2,927 samples) of the 16,109 disinfectant residual results processed from 2005 to 2008 had a non-detectable disinfectant residual. Non-detectable levels were similar in galleys (17.3 percent) and lavatories (18.9 percent), while 22.4 percent (73 out of 326

samples) of the composite samples were non-detects. A sample location was not identified for 13 samples with a detectable residual. While not statistically significant, the occurrence of non-detectable disinfectant residuals appeared to increase in months with warmer weather. Quarter 3 (*i.e.*, July to September) had the highest percentage of samples with a non-detectable disinfectant residual (30.2%), although as shown in Table III-2, Quarter 3 routine total coliform sample results showed no appreciable increase in the percentage of coliform-positive samples.

TABLE III-3—AOCs OCCURRENCE BASELINE DATA—DISINFECTANT RESIDUAL ROUTINE AND REPEAT SAMPLES OF AIR CARRIERS WITH EPA-APPROVED QAPPs AND CRMPs (YEARS 2005–2008)

	Percent disinfectant residual non-detect	Total # of disinfectant residual non-detect	Total # of disinfectant residual detect	Total # of disinfectant residual samples
<b>Disinfectant Residual Data by Calendar Quarter</b>				
Unknown Calendar Qtr .....	0	0	0	0
Calendar Qtr 1 .....	22.8	864	2,933	3,797

TABLE III-3—AOCs OCCURRENCE BASELINE DATA—DISINFECTANT RESIDUAL ROUTINE AND REPEAT SAMPLES OF AIR CARRIERS WITH EPA-APPROVED QAPPS AND CRMPs (YEARS 2005–2008)—Continued

	Percent disinfectant residual non-detect	Total # of disinfectant residual non-detect	Total # of disinfectant residual detect	Total # of disinfectant residual samples
Calendar Qtr 2 .....	9.3	632	6,128	6,760
Calendar Qtr 3 .....	30.2	813	1,879	2,692
Calendar Qtr 4 .....	21.6	618	2,242	2,860
Total .....	18.2	2,927	13,182	16,109

  

Disinfectant Residual Data by Sample Location				
Galley .....	17.3	1,336	6,386	7,722
Lavatory .....	18.9	1,518	6,530	8,048
Composite* .....	22.4	73	253	326
Unknown Sample Site .....	0.0	0	13	13
Total .....	18.2	2,927	13,182	16,109

\* Composite sample of Galley and Lavatory sources

It appears that a non-detectable disinfectant residual is not associated with an increase in total coliform-positive samples. Of the 801 total routine and repeat samples that were total coliform-positive, 24 did not include any data on a disinfectant residual. Of the remaining 777 total coliform-positive routine and repeat samples, 584 samples (75 percent) had a detectable disinfectant residual and 193 samples (25 percent) did not have a detectable disinfectant residual. Twenty-one (3.6 percent) of the 584 total coliform-positive routine and repeat samples with a detectable residual (the lowest measuring 0.05 mg/L) also tested positive for *E. coli*/fecal coliforms. Only one (0.5 percent) of the 193 total coliform-positive samples did not have a detectable residual and tested positive for *E. coli*/fecal coliforms.

Seventy-three samples had non-detectable disinfectant residual and were reported to have carbon filters installed on the water lines to the sample tap; two of those samples were total coliform-positive. For comparison, 364 samples with detectable disinfectant residual were reported to use carbon filters; three of those samples were total coliform-positive. Aside from charcoal/carbon, and particle removal filters in some galleys and lavatories, the majority of aircraft do not provide additional treatment for boarded water.

For more details on aircraft drinking water sample results under the AOCs, see Chapter 3 and Appendix B of the *Economic and Supporting Analyses for the Final ADWR*.

#### IV. Elements of the Final Aircraft Drinking Water Rule

The following sections describe the elements of the final rule as developed

by EPA. EPA specifically designed the rule to allow air carriers to be consistent with the manufacturer recommendations for disinfecting and flushing aircraft water systems, instead of prescribing the frequency, chemical type and concentration to be used. By allowing air carriers to be consistent with the manufacturer recommendations for disinfection and flushing, the rule requirements will automatically evolve with technological improvements in aircraft water tank lining and piping materials, and as new more effective disinfectants are developed.

EPA requested comment on all aspects of the rule in its proposal of April 9, 2008 (73 FR 19320); however, EPA did not request and did not consider comments on any aspect of the TCR, surface water treatment regulations, Public Notification Rule, or any other NPDWR other than as applied to aircraft water systems in the proposed rule. In addition to rule requirements, EPA identified specific requests for comment on subject matters pertaining to the proposed rule. The public comment period for the April 9, 2008, proposed ADWR closed on July 8, 2008. The following sections of this preamble explain the final rule and present, when applicable, a summary of the major public comments received. In addition, EPA has responded to all of the public comments in its Response to Comment document, which can be found in the docket for this rule (see ADDRESSES of this notice to obtain information on accessing the docket).

##### A. Definitions (§ 141.801)

All definitions included in the proposed rule (73 FR 19343), remain the

same in today's final rule except for the definitions for *Aircraft Water System Operations and Maintenance Plan* and *Watering Point*.

In the proposed rule, the definition for *Aircraft Water System Operations and Maintenance Plan* reads, "Aircraft Water System Operations and Maintenance Plan means the schedules and procedures for operating, monitoring, and maintaining an aircraft water system that is included in an aircraft operations and maintenance program approved or accepted by the Federal Aviation Administration (FAA)." Since the publication of the proposed rule, the Agency has learned that FAA does not "approve" the air carrier operations and maintenance programs, and that describing these programs as "FAA-accepted" programs is more accurate. Thus, in the final rule, EPA removes the word "approved" from the definition.

In the proposed rule, the definition for *Watering Point* reads, "Watering Point means a facility where finished water is transferred from a water supply to the aircraft. These facilities may include water trucks, carts, cabinets, and hoses." However, the Agency received comments concerning selection of watering points in § 141.804. The commenters (details under Section IV. F of this notice) believed that EPA intended to alter Food and Drug Administration (FDA) regulations applicable to watering points. EPA did not intend to alter these regulations, and clarifies in today's final rule that it is the Agency's intent to keep the rule consistent with existing FDA regulations. Thus, the Agency is revising the definition for *Watering Point* to read, "Watering Point means

the water supply, methods, and facilities used for delivery of finished water to the aircraft. These facilities may include water trucks, carts, cabinets and hoses.”

*B. Sampling Requirements (§§ 141.802 and 141.803)*

This section begins with a summary of the major sampling requirements of the final ADWR, then addresses public comments received on the proposed ADWR related to changes EPA has made to the final rule requirements. Finally, EPA provides responses to the “Request for Comment” issues posed in the proposal designed to aid the Agency in developing requirements under the final ADWR.

In keeping with the TCR, today’s rule reiterates that air carriers need only determine the presence or absence of total coliforms in water samples collected from aircraft water systems; a determination of total coliform density is not required. In addition, this final rule specifies that only analytical methodologies approved by EPA are to be used for sample analysis. For routine total coliform monitoring, each aircraft water system water sample must be 100 mL. For most systems, one sample must be collected from a lavatory and one sample from a galley. Each sample must be analyzed for total coliforms. If total coliforms are detected, the sample must further be analyzed for *E. coli*. Under this rule, *E. coli* is the indicator that fecal contamination may have occurred. If only one water tap is located in the aircraft water system due to aircraft model type and construction, then a single tap may be used to collect two separate 100 mL samples to be analyzed for total coliforms. If an aircraft water system has a removable/portable tank, that is drained at least every day of passenger service and there is one tap on the aircraft, the air carrier may collect one 100 mL sample from the available tap (*i.e.*, galley or lavatory).

1. Coliform Sampling Plan (§ 141.802)

EPA proposed to allow six months for air carriers to develop a coliform sampling plan for each aircraft following publication of the rule. However, the Agency received several comments requesting that the compliance date be extended in order to allow more time for air carriers to restructure maintenance programs between the AOCs and the final rule. The comments and the Agency’s response are explained in more detail in section IV. L of this notice. EPA agrees that more time may be needed for air carriers to develop a coliform sampling plan. Therefore, today’s final rule

extends the compliance date for development of the coliform sampling plan to 18 months after publication of the final rule.

Under the proposed and final rules, an air carrier must develop a coliform sampling plan for each aircraft water system it owns and operates. The coliform sampling plan must be included in the Aircraft Water System Operations and Maintenance Plan required in § 141.804. The air carrier need not develop a separate coliform sampling plan for each aircraft, but the air carrier must ensure that each aircraft it owns and operates is covered by a plan. For example, if the air carrier operates several of the same type of aircraft water system with the same coliform sampling frequency, procedures, sampling tap locations, etc., the air carrier may choose to develop one coliform sampling plan that applies to all aircraft of this type in the air carrier’s fleet.

While most of the sampling plan requirements are the same in the proposed and final rules, the Agency received comments that the proposed rule was unclear as to whether and how air carriers could amend their operations and maintenance plans or their coliform sampling plans. EPA agrees that the final rule should more clearly state the requirements for making changes to these plans. Thus, in the final rule, EPA addresses this concern by clarifying that any subsequent changes to the coliform sampling plan must also be included in the Aircraft Water System Operations and Maintenance Plan. Changes to the coliform sampling plan could include changes to any of the requirements listed in this section, including changes to the frequency of routine coliform sample collection. In addition, both the reporting requirements and the requirements for the operations and maintenance plan have been revised to respond to these comments.

2. Coliform Sampling Requirements (§ 141.803)

In the proposed rule, all air carriers would be required to collect the same volume and number of samples regardless of aircraft size:

- For routine samples—collect two 100 mL samples: one from a lavatory and one from a galley. If only one tap is available—collect two “separate” 100 mL samples.
- For repeat samples—collect four 100 mL samples: one from the positive tap, one other lavatory, one other galley, and one other tap. If less than four taps are available—collect four 100 mL samples from the available taps.

In the proposed rule, routine sampling frequencies were based on the routine disinfection and flushing frequency as detailed in the following table (Table IV–1):

TABLE IV–1—PROPOSED RULE REQUIREMENTS FOR ROUTINE DISINFECTION AND FLUSHING AND SAMPLING

Disinfection & flushing frequency per aircraft PWS	Coliform sampling frequency per aircraft PWS
Once per Quarter (4 times per year).	Annually.
Once to 3 times per year.	Quarterly.
Less than once per year.	Monthly.
If <i>not</i> specified by the manufacturer, disinfection and flushing must be no less frequent than once per quarter.	

Public comments on the proposed rule raised several concerns related to (1) the lavatory as a sampling location site, and (2) the routine frequencies for disinfection and flushing, and coliform monitoring. EPA received several public comments regarding the elimination of lavatory samples. Several commenters stated that lavatory sampling should be eliminated because it is not representative of the water actually consumed for drinking purposes on aircraft and, requiring the sampling of lavatories mischaracterizes risks unless (1) there are no other sampling locations available on the aircraft; and/or (2) the airline takes affirmative steps to offer water in the lavatories for drinking purposes, such as providing drinking cups. EPA disagrees with these comments. In today’s rule, air carriers must collect a total coliform sample from one galley and one lavatory, when available. Collection of samples from the lavatory is necessary since this water may be used for human consumption (*e.g.*, brushing teeth, hand washing). Additionally, lavatory samples are as representative of the aircraft drinking water quality as galley samples when proper collection techniques/procedures are used to minimize the frequency of positive results due to surface contamination or improper collection procedures. EPA plans to discuss these issues further in its separate ADWR technical guidance.

EPA received the following two major comments regarding routine disinfection and flushing, and coliform monitoring frequencies: (1) Reduce the sample collection for small volume aircraft water systems (*e.g.*, regional jets with 5-gallon removable tanks), and (2)

extend the minimum disinfection intervals to accommodate for less frequent disinfection based on sampling results.

With respect to sampling number and volume, commenters expressed concern that the proposed ADWR was unduly complicated (e.g., number of total coliform samples collected was too much) for small tanks (e.g., regional jets with 5 gallons) that are removable/portable and are drained daily; and that the rule does not account for varying sizes of aircraft. EPA agrees with the comments regarding aircraft with small drinking water tanks and today's rule incorporates the following changes:

- For aircraft water systems that have a removable/portable drinking water tank that is drained every day of passenger service, and the aircraft has only one tap, air carriers may collect one 100 mL routine sample from the available tap; and

- Collect three 100 mL repeat samples when performing the corrective action upon the receipt of a total coliform-positive sample. This reduction in repeat samples also applies to all tank types.

EPA believes these reductions are appropriate because the complexity of aircraft water systems with removable/portable tanks and one tap on the aircraft is low (e.g., few feet of tubing/pipes; few potential points for cross contamination); and the reductions maintain consistency with the recommendations of the Federal Advisory Committee—The Total Coliform Rule/Distribution System Advisory Committee (TCRDSAC)—to reduce sampling volume and frequency for small non-community stationary systems (see docket for the TCRDSAC Agreement in Principle, signed September 18, 2008). EPA also believes that the economic and logistical burden

on air carriers, particularly small regional jets, will be minimized by taking fewer samples.

Public comment on the proposed ADWR disinfection and flushing, and monitoring frequencies centered around two main issues: (1) Extend the minimum disinfection intervals to accommodate an approach that focuses on risk and allows for less frequent disinfection based on sampling results, and (2) set “reasonable minimum” disinfection timelines consistent with the AOCs of some major air carriers to align a semi-annual disinfection schedule with an annual sampling schedule, thereby reducing the “significant” economic cost to restructure in-place disinfection programs. EPA agrees that some changes are warranted and today's rule includes revised requirements to the routine frequencies as presented in Table IV–2:

TABLE IV–2—FINAL RULE REQUIREMENTS FOR ROUTINE DISINFECTION AND FLUSHING AND ROUTINE SAMPLING FREQUENCIES

Minimum routine disinfection & flushing per aircraft	Minimum frequency of routine samples per aircraft
At least 4 times per year = At least once within every three-month period (quarterly).	At least 1 time per year = At least once within every twelve-month period (annually).
At least 3 times per year = At least once within every four-month period.	At least 2 times per year = At least once within every six-month period (semi-annually).
At least 2 times per year = At least once within every six-month period (semi-annually).	At least 4 times per year = At least once within every three-month period (quarterly).
At least 1 time per year or less = At least once within every twelve-month period (annually) or less.	At least 12 times per year = At least once every month (monthly).

If not specified by the manufacturer, select any frequency that is no less stringent than these four disinfection and flushing frequencies which meet the aircraft's unique operational needs.

EPA considers disinfection and flushing to be a more protective and pro-active public health measure than monitoring. Therefore, EPA re-aligned the disinfection and flushing and monitoring frequencies in order to emphasize the importance of disinfection and flushing in comparison to monitoring. As a result, those air carriers that conduct more frequent disinfection and flushing do not have to monitor as frequently. Today's final rule requires an air carrier that conducts disinfection and flushing three times per year to perform sampling twice a year instead of four times per year. And an air carrier that conducts disinfection and flushing once per year or less must sample monthly. With respect to the commenter's concern about accommodating a semi-annual disinfection and flushing frequency with annual sampling (as allowed under some AOCs), the ADWR continues to accommodate the semi-annual disinfection and flushing schedule.

However, EPA believes that linking this with annual sampling would be inconsistent with the importance of disinfection and flushing as the preferred, pro-active measure. As reflected in Table IV–2, today's rule continues to require air carriers that conduct disinfection and flushing semi-annually to conduct monitoring four times per year.

While the frequencies in Table IV–2 provide air carriers with enough flexibility to schedule both routine disinfection and flushing and routine monitoring in a way that avoids disruption to passenger service, EPA intends for air carriers to schedule routine disinfection and flushing and routine monitoring at regular intervals throughout the calendar year. Routine disinfection and flushing should be scheduled so that the amount of time between each disinfection and flushing event is approximately equal. EPA believes that this will maximize the effectiveness of the disinfection and

flushing event. Similarly, routine monitoring should be scheduled so that the amount of time between each monitoring event is approximately equal. EPA does not intend for routine disinfection and flushing events to take place back-to-back such that disinfection and flushing occurs at the end of one disinfection and flushing period and again at the beginning of the following period. Nor should air carriers schedule routine monitoring events to take place back-to-back such that samples are taken at the end of one monitoring period and again at the beginning of the following period.

In addition, the Agency received comment that the requirement to disinfect and flush quarterly, when no manufacturer recommendations were available, did not provide flexibility. In today's rule, EPA removed this requirement (as reflected in Table IV–2) so that when there is no manufacturer recommendation, air carriers can select any of the routine frequencies that best

meet their unique operations and maintenance needs.

EPA was unable to make a determination on a risk-based approach that supports a reduced frequency for disinfection and flushing based on sampling results, because no new data were provided beyond the AOCs' data. The AOCs' data protocols were not designed to establish risk-based frequencies. AOCs are interim measures used to aid air carriers to meet compliance with SDWA and provide an understanding of aircraft drinking water quality. At this time, EPA believes the final rule frequencies provide the minimum requirements necessary for public health protection, while also providing adequate flexibility to meet the evolving needs of the industry, such as transitioning from the AOCs' requirements to the ADWR.

### 3. Analytical Methods (§ 141.803(a))

In the proposed rule, EPA stated that air carriers must use EPA-approved analytical methodologies for the analysis of coliform bacteria. Public comment was received regarding the specific use of concurrent analytical methods that test for total coliforms and *E. coli* simultaneously. The commenter named several concurrent methods that they felt provide "great benefit" to the industry, because the methods are timely and accurate. Although some of these noted methods are EPA-approved, the final rule reiterates and clarifies that air carriers must use only the EPA-approved analytical methods for analyzing total coliforms and/or *E. coli* in drinking water samples as specified in § 141.21(f)(3) and § 141.21(f)(6) of the *Code of Federal Regulations*, or their equivalent as approved by EPA to demonstrate compliance with the ADWR sampling requirements. EPA has approved several methods for use that allow the simultaneous detection of both total coliforms and *E. coli*. These methods are also approved for use under this rule.

In the proposed rule, EPA required air carriers to use a State- or EPA-certified laboratory for analysis of drinking water samples. For compliance with the ADWR, one commenter encouraged EPA to allow the use of foreign laboratories to conduct analysis on drinking water samples as permitted under the Administrative Orders on Consent (AOCs). In addition, the commenter noted that air carriers should be allowed to conduct disinfection of their aircraft water systems "at locations outside the U.S." The final rule clarifies and reiterates that drinking water microbiological samples submitted for compliance with the ADWR must be

analyzed by a certified laboratory to ensure the use of approved analytical methods and approved quality control procedures for checking analytical data for completeness and correctness. A certified laboratory is a laboratory that is certified by EPA or a State. "State" refers to a U.S. State or Tribe that has received primacy for public water systems (other than aircraft water systems) under section 1413 of the SDWA. By allowing the use of any laboratory that is certified by a State or EPA for analysis of drinking water samples, the ADWR provides air carriers with greater flexibility in designing their sampling programs while maintaining protection of public health.

In one AOC, for a specific set of the fleet (i.e., 47 aircraft) an air carrier was permitted to use a foreign laboratory, which was neither EPA- nor State-certified, to perform analysis of drinking water samples provided that the samples were analyzed using EPA-approved analytical methods. The commenter incorrectly assumed that this allowance would fulfill SDWA compliance. In today's notice, the Agency makes clear that this allowance was not intended for compliance purposes under the SDWA. The ADWR does not prevent collection of samples outside the U.S. However, foreign laboratories must be an EPA- or a State-certified laboratory in order to analyze the drinking water samples for compliance with the ADWR. EPA plans on addressing these issues in more detail in its ADWR technical guidance. EPA notes that the ADWR requirements do not prevent air carriers from performing disinfection and flushing outside the U.S. for compliance with the ADWR.

### C. Responses to Sampling Results (§ 141.803)

As specified in the proposed rule, air carriers would need only determine the presence or absence of total coliforms in water samples collected from aircraft water systems; a determination of total coliform density would not be required. Under the proposal, upon receipt of a total coliform-positive result, air carriers would be required to further analyze the positive sample for the presence of fecal coliforms, except that the system could test for *E. coli* in lieu of fecal coliforms. EPA received public comment requesting the removal of fecal coliforms as indicators. EPA agrees with this comment and today's rule eliminates the use of fecal coliforms as indicators of potential fecal contamination. As a consequence, the final rule specifies that upon receipt of a total coliform-positive result, air

carriers must further analyze that sample for *E. coli* only. The fecal coliform group (also referred to as thermotolerant coliforms) has been found to sometimes contain environmental bacteria that are not of fecal origin. Thus, the presence of fecal coliform bacteria in a water sample is not necessarily indicative of the potential for fecal contaminants being present. Thus, analyzing for *E. coli* provides more meaningful data to protect public health. This change is consistent with the recommendations of the Federal Advisory Committee—TCRDSAC.

In the proposed rule, air carriers would be required to perform the following corrective actions based on a positive coliform result:

(1) If one routine sample was total coliform-positive and *E. coli*/fecal coliform-negative then the air carrier would be required to:

- Within 72 hours of receipt of the positive result from the laboratory, disinfect and flush the water system, and collect follow-up samples; or
- Within 24 hours of receipt of the positive result from the laboratory, collect four repeat samples.

(2) If two or more routine samples or any repeat samples were total coliform-positive and *E. coli*/fecal coliform-negative, or if any sample was *E. coli*/fecal coliform-positive then the air carrier was required to:

- Within 24 hours of receipt of the positive result from the laboratory, restrict public access. Restrict public access included the following activities for the aircraft in question: Physically disconnect or shut-off the water system where feasible; provide public notification to passengers and crew if the water system could not be shut-off, but if the system could be shut-off, then provide public notice to the crew only; and provide alternatives to the use of the water system such as antiseptic alcohol-based hand gels or wipes and bottled water (that reduce or eliminate the need to use the water system during the limited period before access is restored); and

- Within 72 hours of receipt of the positive result from the laboratory, disinfect and flush the water system and collect follow-up samples if the system could not be physically disconnected or shut-off. If the water system could be shut-off to prevent access to passenger and crew, disinfect and flush when able.

Public comment on the proposed ADWR noted several concerns related to the corrective actions upon receipt of a positive coliform result. Commenters stated that the proposed ADWR lacked flexibility to avoid passenger and

airspace disruptions that may occur when an aircraft cannot be pulled out-of-service to disinfect and flush in 72 hours (e.g., if results are received during an international flight). Commenters recommended EPA increase the timeframe from 72 hours to 96 or 120 hours to avoid inconveniencing travelers (due to delays, cost, or loss of service). Additionally, commenters stated that an aircraft should not be grounded "solely" for a problem associated with the aircraft water system. EPA agrees that some flexibility is warranted to avoid unnecessarily grounding the aircraft, and for the final rule, better aligned the corrective actions so that non-fecal microbiological occurrences have the same corrective actions regardless of the number of samples that test total coliform-positive and *E. coli*-negative.

Generally, most members of the total coliform bacterial group do not pose a risk to human health. The presence of total coliforms only (i.e., no *E. coli* are detected) presents a non-fecal potential health risk and is an indication of poor water quality that could be caused by stagnant water, a failure of treatment equipment intended to improve the aesthetic quality of the water (such as carbon filters) or inadequate routine maintenance of the water system, among others. However, EPA considers that an *E. coli*-positive result is an acute potential fecal health risk, and it is a necessary public health measure to ground the plane in 72 hours when the water system cannot be physically disconnected or the flow of water prevented through the taps. Therefore, no changes were made to the corrective actions for *E. coli*-positive results.

The final rule reflects corrective action changes to non-fecal coliform occurrence when an air carrier receives a total coliform-positive result that is also *E. coli*-negative. These changes are also consistent with recommendations of the Federal Advisory Committee—TCRDSAC for stationary systems under the Total Coliform Rule, whereby the occurrence of routine total coliform-positive results that are *E. coli*-negative should not be considered a maximum contaminant level (MCL) violation. Therefore, in a set of routine samples, if one or more are total coliform-positive and *E. coli*-negative, the air carrier can select any of the following corrective actions and follow through with that action until a set of total coliform samples is total coliform-negative:

(1) Within 72 hours of receipt of the routine positive result from the laboratory, the air carrier must disinfect and flush, and collect follow-up samples prior to providing water for

human consumption from the aircraft water system. From the time follow-up samples are taken and submitted for analysis to the time of receiving the results, air carriers may provide water for human consumption from the aircraft water system to passengers and crew. If any follow-up sample is total coliform-positive and *E. coli*-negative, the air carrier must perform all of the following:

a. Conduct the Restrict Public Access requirements within 72 hours, and;

b. Conduct a second disinfection and flushing, and;

c. Collect follow-up samples prior to providing water for human consumption from the aircraft water system. From the time follow-up samples are taken, as a result of the second disinfection and flushing, to the time of receiving the results, air carriers must continue all Restrict Public Access provisions. If the second set of follow-up results are total coliform-positive and *E. coli*-negative, then the air carrier must continue to disinfect and flush the aircraft water system until a set of total coliform samples is total coliform-negative; or

(2) Within 24 hours of receipt of the routine positive result from the laboratory, the air carrier must collect three repeat samples. From the time repeat samples are taken and submitted for analysis to the time of receiving the results, air carriers may provide water for human consumption from the aircraft water system to passengers and crew. If any repeat sample is total coliform-positive and *E. coli*-negative, the air carrier must perform one of the following:

a. Conduct disinfection and flushing within 72 hours, and collect follow-up samples prior to providing water for human consumption from the aircraft water system. From the time follow-up samples are taken and submitted for analysis to the time of receiving the results, air carriers may provide water for human consumption from the aircraft water system to passengers and crew. If any follow-up sample is total coliform-positive and *E. coli*-negative, the air carrier must conduct the Restrict Public Access requirements within 72 hours, and perform a second disinfection and flushing and collect follow-up samples. From the time follow-up samples are taken, as a result of the second disinfection and flushing, to the time of receiving the results, air carriers must continue all restrict public access provisions. If the second set of follow-up results are total coliform-positive and *E. coli*-negative, then the air carrier must continue to disinfect and flush the aircraft water system until

a set of total coliform samples is total coliform-negative. Or,

b. Conduct the Restrict Public Access requirements within 72 hours, and perform disinfection and flushing and collect follow-up samples prior to providing water for human consumption from the aircraft water system. From the time follow-up samples are taken and submitted for analysis to the time of receiving the results, air carriers may provide water for human consumption from the aircraft water system to passengers and crew. If any follow-up sample is total coliform-positive and *E. coli*-negative, the air carrier must conduct the Restrict Public Access requirements within 72 hours, and perform a second disinfection and flushing and collect follow-up samples. From the time follow-up samples are taken, as a result of the second disinfection and flushing, to the time of receiving the results, air carriers must continue all Restrict Public Access provisions. If the second set of follow-up results are total coliform-positive and *E. coli*-negative, then the air carrier must continue to disinfect and flush the aircraft water system until a set of total coliform samples is total coliform-negative. Or,

(3) Within 72 hours of receipt of the routine positive result from the laboratory, the air carrier must perform the Restrict Public Access requirements until operationally feasible to disinfect and flush, and collect follow-up samples. Once disinfection and flushing is performed, and a set of follow-up samples are taken and submitted for analysis, then the air carrier may cease the Restrict Public Access provisions and provide water for human consumption from the aircraft water system to passengers and crew. If the follow-up sample result from this first disinfection and flushing is total coliform-positive and *E. coli*-negative, the air carrier must perform all of the following:

a. Conduct the Restrict Public Access requirements within 72 hours, and

b. Conduct a second disinfection and flushing and collect follow-up samples. From the time follow-up samples are taken, as a result of the second disinfection and flushing, to the time of receiving the results, air carriers must continue all Restrict Public Access provisions. If the second set of follow-up results are total coliform-positive and *E. coli*-negative, then the air carrier must continue to disinfect and flush the aircraft water system until a set of total coliform samples is total coliform-negative.

As compared to the proposed ADWR, the changes made to the aforementioned

corrective actions for routine total coliform-positive samples that are *E. coli*-negative, include a third action to restrict public access, and the timeframe for the initial response has been changed from 24 hours to 72 hours to better align with the other two options for non-fecal routine occurrences. In addition, under any of the three corrective action options for non-fecal occurrences, upon completion of the first disinfection and flushing event, and follow-up samples are taken and submitted for analysis, the air carrier may provide water for human consumption to passengers and crew from the aircraft water system until laboratory results are received. Water is permitted to be served for human consumption after the first disinfection and flushing and follow-up samples are taken, because when the air carrier performs disinfection and flushing routinely and consistently with the manufacturer recommendations (this includes maintaining the full contact time of the disinfectant with the distribution system and affording the complete recommended flushing time) the quality of the water system should be returned to a total coliform-negative result. However, after the second or subsequent disinfection and flushing events occur due to follow-up samples that are total coliform-positive and *E. coli*-negative, water is not permitted to be served for human consumption because the results confirm an on-going microbiological occurrence problem that warrants further action and investigation until a set of follow-up samples is total coliform-negative. In the case where the water system cannot be physically disconnected or shut-off, or the flow of water prevented through the taps, air carriers are required to provide public notification to passengers and crew, so that the public is informed of an on-going non-fecal occurrence with the water system. EPA believes these changes are appropriate and public health protection is maintained while providing air carriers with the flexibility needed to perform corrective actions that meet their operational challenges.

In the proposed ADWR, corrective actions for failing to perform a requirement varied and were the following:

- Failure to perform routine disinfection and flushing would result in air carriers providing public notification to crew and passengers within 24 hours after discovery of the failure, until disinfection and flushing occurred;
- Failure to collect routine samples would result in air carriers providing public notification to crew and

passengers within 24 hours after discovery of the failure, and within 72 hours disinfect and flush, and collect follow-up samples;

- Failure to collect repeat or follow-up samples would result in air carriers restricting public access within 24 hours after discovery of the failure and included: If the aircraft water system cannot be shut-off, public notification was given to crew and passengers, but if the aircraft water system could be shut-off, public notification was given to crew only; and within 72 hours disinfect and flush, and collect follow-up samples;

- Boarding water from a watering point that is not approved by FDA would result in air carriers providing public notification to crew and passengers within 24 hours after boarding the water, and within 72 hours disinfect and flush, and collect follow-up samples;

- Boarding water that did not meet national primary drinking water regulations (NPDWRs), would result in air carriers performing all the corrective actions as applicable to an *E. coli*/fecal coliform-positive result; and

- Boarding water under any condition where the water system was not in compliance with the procedures specified in the aircraft operation and maintenance plan would result in the air carrier providing public notification to passengers and crew within 24 hours of discovery of the failure, and within 72 hours disinfect and flush, and collect follow-up samples.

In general, commenters to the proposed ADWR stated that these corrective actions for performance failures were confusing and “not commensurate with the potential health risk,” they were administratively and economically burdensome, and that EPA should instead require the use of “intermediate and/or diagnostic measures that allow carriers to determine whether an actual health risk was presented by the failure to meet the requirement.” Based on the issues raised by the commenters, EPA determined that some changes are needed. The final rule provides more clarity and flexibility to aid in reducing economic and administrative burden while ensuring public health protection by aligning the corrective actions based on (1) a fecal occurrence (*i.e.*, *E. coli*-positive event) and failing to perform the applicable required corrective actions (*e.g.*, fails to collect and submit for analysis the follow-up samples or boards water that that does not meet the NPDWRs applicable to transient non-community water systems when there is an *E. coli*-positive event); and (2) a non-

fecal occurrence (*e.g.*, total coliform-positive and *E. coli*-negative event, or boards water that does not meet NPDWRs applicable to transient non-community water systems) and failing to perform the applicable required routine and/or corrective actions. Consequently, when the air carrier becomes aware that it has failed to perform required routine disinfection and flushing, or collect required routine samples, or collect the required repeat or follow-up samples for a total coliform-positive and *E. coli*-negative result; or boards water from a watering point not in accordance with FDA regulations; or boards water that does not meet NPDWRs applicable to transient non-community water systems; or that is otherwise determined to be unsafe due to non-compliance with the procedures specified in the operations and maintenance plan, the air carrier must perform the corrective actions associated with a total coliform-positive/*E. coli*-negative result for the Restrict Public Access provisions:

- Within 72 hours of receipt of discovery of the failure or after being notified by EPA of the failure, the air carrier must perform the Restrict Public Access requirements until operationally feasible to disinfect and flush, and collect follow-up samples. Once disinfection and flushing is performed, and a set of follow-up samples are taken and submitted for analysis, then the air carrier may cease the Restrict Public Access provisions and provide water for human consumption from the aircraft water system to passengers and crew. If the follow-up sample result from this first disinfection and flushing is total coliform-positive and *E. coli*-negative, the air carrier must perform all of the following:

- Conduct the Restrict Public Access requirements within 72 hours, and
- Conduct a second disinfection and flushing and collect follow-up samples. From the time follow-up samples are taken, as a result of the second disinfection and flushing, to the time of receiving the results, air carriers must continue all Restrict Public Access provisions. If the second set of follow-up results are total coliform-positive and *E. coli*-negative, then the air carrier must continue to disinfect and flush the aircraft water system until a set of total coliform samples is total coliform-negative.

- If any follow-up sample is *E. coli*-positive, the air carrier must follow all the corrective actions for an *E. coli*-positive result. These actions must continue until a set of follow-up samples is total coliform-negative.

When the air carrier becomes aware that it has failed to collect the required follow-up samples due to an *E. coli*-positive result, or boards water that does not meet NPDWR applicable to transient non-community water systems for an *E. coli*-positive result, then the air carrier must follow all of the *E. coli*-positive corrective actions within 24 hours of discovery of the failure or after being notified by EPA of the failure. These actions must continue until a set of follow-up samples is total coliform-negative.

EPA determined that these corrective actions are appropriate because the ADWR relies on best management practices (e.g., disinfection and flushing, following operations and maintenance plan procedures, etc.) in lieu of the monthly total coliform sampling as performed by stationary systems under the Total Coliform Rule. These best management practices are part of the minimum requirements that ensure safe and reliable drinking water to aircraft passengers and crew. If an air carrier fails to perform these minimum requirements, then either a known problem has not been promptly addressed or the quality of the aircraft water used for human consumption is in question.

In the proposed rule, air carriers were allowed to use water for hand washing purposes when the water was boarded from a watering point not approved by FDA or when required routine monitoring or disinfection and flushing was not conducted. Due to re-aligned corrective actions (as discussed earlier in this section) that provide air carriers with more flexibility to reduce the economic and administrative burden of grounding the plane to disinfect and flush within a set timeframe, the allowance of hand washing under these conditions no longer apply in the final ADWR. In addition, corresponding changes were also made to the applicable public notification sections of the rule (i.e., removed reference from the health effects language that allowed "hand washing" under these conditions).

#### D. Restricted Access to the Water System

EPA proposed that in any situation where there is an affirmative indicator of actual or potential fecal contamination occurrence (e.g., a single *E. coli*-positive sample, water that has been boarded from a known contaminated source or not in accordance with FDA regulations, etc.), the carrier would be required to restrict access to the water system as expeditiously as possible, but in no case

more than 24 hours after the event triggering the requirement (e.g., receipt of an *E. coli*-positive sample result). Ideally, under these conditions, access to all taps used to provide water for human consumption (e.g., galleys, lavatories, water fountains, built in coffee/tea makers, etc.) should be physically disconnected or shut-off to prevent exposure. In the proposed rule, restrict public access included: (1) Physically disconnect or shut-off the water system; (2) provide public notification to passengers and crew if the water system cannot be physically disconnected or shut-off, and if the water system can be shut-off, then public notification must be provided to crew only; and (3) provide alternatives to the restricted use of the aircraft water system, such as bottled water for drinking and coffee preparation and alcohol-based antiseptic gels and wipes in the galleys and lavatories, and other feasible measures that reduce or eliminate the need to use the aircraft water system.

Public comments on the proposed ADWR raised concerns over physically disconnecting the water system and the use of alcohol-based antiseptic gels and wipes. With respect to physically disconnecting the water system, commenters stated the provision was in conflict with FDA's requirement to provide food handlers with hand washing facilities, and the provision did not account for situations where the water system cannot be physically disconnected or shut-off but other means can be used to prevent the flow of water through taps. In response to these comments, the final rule clarifies the Agency's intent to prevent passenger and crew exposure to the water. Therefore, EPA has adjusted the final rule language by adding another option to the Restrict Public Access requirements. In the final rule, as part of the Restrict Public Access requirements, air carriers can use other means to prevent the flow of water through the taps in addition to physically disconnecting or shutting-off the water system. EPA believes this change is a necessary step towards public health protection in the event of an actual or potential fecal contamination occurrence. If the event is due to a fecal occurrence, public access restrictions must remain in-place until the water system is disinfected and flushed and a complete set of follow-up samples is total coliform-negative. If the event is due to a non-fecal occurrence, public access restrictions must remain in-place until the water system is disinfected and flushed and a set of

follow-up samples is collected and submitted for analysis. After this initial disinfection and flushing is performed, if any subsequent ones are needed, public access restrictions must remain in-place until a complete set of follow-up samples is total coliform-negative. FDA requirements permit air carriers to temporarily suspend the use of the aircraft drinking water system during emergencies. The ADWR provisions that restrict public access to the aircraft water system would be considered an emergency situation and, therefore, do not conflict with FDA regulations to provide food handlers with hand washing facilities.

In addition, due to the corrective action changes made to better align corrective actions based on non-fecal and fecal occurrences, EPA adjusted the 24-hour timeframe to initiate the Restrict Public Access requirements to 72 hours for non-fecal events. Therefore, if an air carrier fails to perform a requirement in the case of a non-fecal occurrence (e.g., fails to perform a routine disinfection and flushing), the air carrier has 72 hours to initiate the Restrict Public Access requirements from discovery of the failure, or EPA's notification of the failure, or receipt of the non-fecal positive result. However, in the event of any failure to perform a requirement in the case of a fecal-occurrence (e.g., fails to collect the follow-up samples, or boarding water that that does not meet NPDWRs for *E. coli*), EPA did not change the timeframe and the air carrier has 24 hours to initiate Restrict Public Access requirements from discovery of the failure, or EPA's notification of the failure, or receipt of the fecal positive result.

In determining whether it is "feasible" to physically disconnect or shut off the water system, EPA recognizes that in some cases carriers may need to consider binding operational constraints. For example, if the water system cannot be shut off without also shutting off water to the toilets, a carrier may determine that shutting off the water is not feasible and use the alternative Restrict Public Access provisions instead. EPA intends to provide further guidance on this issue in its ADWR technical guidance.

Regarding the requirement to provide alcohol-based antiseptic hand gels or wipes, commenters stated that it was too limiting and did not allow for the use of other alternative products as specified in FDA's monograph governing "Topical Antimicrobial Drug Products for Over-the-Counter Human Use; Tentative Final Monograph (TFM) for Health-Care Antiseptic Drug

Products.” In the final rule, EPA has changed the Restrict Public Access provision to include any antiseptic hand gels or wipes in accordance with FDA regulations under 21 CFR part 333—“Topical Antimicrobial Drug Products for Over-the-Counter Human Use.” In this way, the provision evolves with technology and new products, and maintains consistency with FDA regulations regarding these products.

#### *E. Response to Proposed Rule Requests for Comment*

##### 1. Microbiological Indicators

In the proposed ADWR, EPA requested specific comment on whether bacterial presence measured by heterotrophic plate count (HPC) should be allowed, required, or not considered as an indicator of water quality in addition to total coliform monitoring. One commenter responded that HPC should be allowed as an indicator of water quality in addition to total coliform monitoring. However, several commenters responded that HPC is not a reliable indicator in aircraft water systems, that the sample holding time between collection and analysis of six hours if the sample is unrefrigerated is impractical, and that it provides no additional benefit justifying the regulatory burden of conducting HPC sampling. EPA agrees with commenters that the use of HPC in the ADWR is impractical due to the restrictions on sample holding times and the limitations of the information the HPC test results would provide. Therefore, today's rule does not require HPC monitoring. Additionally, HPC testing is used as a surrogate for disinfectant residual testing for stationary systems and since disinfectant residual testing is not an ADWR requirement, HPC testing is unnecessary under the ADWR.

##### 2. Potential for Bacterial Growth

EPA requested specific comment on whether the final rule should include provisions to address extended periods during which the aircraft water would remain stagnant, experience high water temperatures, or other situations that may contribute to concern regarding bacterial growth. Although most aircraft water tanks are either topped off or drained on an almost daily basis, occasional situations occur when the water may sit stagnant for an extended period of time or otherwise not be turned over, and thus could be at risk for biofilm development or other bacterial growth. EPA received several public comments both in favor of and opposed to regulatory requirements for dealing with extended stagnant periods,

or other situations that may be of concern regarding bacterial growth. Commenters in favor of such provisions, in general, agreed with EPA's analysis of the potential for bacterial growth. The comments ranged from stating that the provisions should be data-driven to “The Agency should confirm the effectiveness of disinfection and flushing in eliminating contaminants and biofilm by evaluating all aspects of closed circulation, airline water systems.” Commenters opposed to the requirements raised two main concerns: (1) Aircraft do not have the current means to measure the temperature of the water in the storage tank and retrofitting the aircraft to do this would be an immense project, economically and logistically, for air carriers and manufacturers; and (2) Air carriers already implement procedures that guard against the risk of bacterial growth such as draining, disinfecting, and flushing the water tanks if the aircraft has been out-of-service for extended lengths of time. Based on these collective comments, the final rule does not include provisions to address extended stagnant periods, high water temperatures, or other situations that may augment concern for bacterial growth. Instead, EPA plans on addressing these issues in its ADWR technical guidance.

##### 3. Temperature of Water From Sample Taps

EPA requested specific comment on whether sampling should only be limited to cold water taps when they are available. EPA also requested comment on whether or not, in the event that a sample is taken from a hot water tap, the temperature should also be measured to provide some indication of whether the temperature achieved is high enough to alter the microbiological results. EPA received several comments both in favor of and opposed to sampling only from cold water taps and measuring the temperature of water collected from hot water taps. The comments ranged from (1) the ADWR should include collecting samples from both cold water as well as hot water taps, and taking the temperature of water from hot water taps does not provide an accurate measurement of microbiological safety, to (2) sampling should be from taps that are most representative of the water consumed by passengers which, in many cases, comes from galleys that are only equipped with hot water taps. Also, a commenter indicated that it would be impractical to set “minimum temperature” requirements that apply to “all hot water taps not only because of the variety of aircraft in service, but also

the effect that altitude has on [water] temperatures. On the ground, where sampling will occur, a tap would register a different temperature than it would at an aircraft's cruising altitude, which is when that tap is most likely to be used to serve coffee/tea.”

EPA agrees that sample locations should be those most representative of water used for human consumption by passengers and crew. However, since there is a potential for the temperature in the hot water taps to kill existing microorganisms, and this might mask whether there is a microbiological problem in the aircraft system, samples should be taken from cold water taps when they are available, except e.g., in the case when only a hot water tap is available in the galley. In this case, the galley sample should be taken from the hot water tap. In addition, EPA plans to further discuss tap sampling in its ADWR technical guidance.

##### 4. Statistical Sampling of an Air Carrier Fleet

EPA requested specific comment on the use of statistical sampling methodologies, specifically on what type of monitoring scheme would allow a statistical sample to be representative of an entire air carrier fleet. EPA was especially interested in receiving input on whether such methodologies, if allowed, should only be used in conjunction with onboard or other supplemental treatment, such as adding a chemical disinfectant or ultraviolet light. EPA also requested input regarding the support for such an option, given the cost and logistical implications a positive coliform result would have on the statistical sample by triggering follow-up action in the entire fleet. The majority of the public comments were in favor of statistical sampling, but they did not provide any examples of a statistical method or data to support their position. In opposition to statistical sampling, a commenter expressed concern over the use of statistical sampling because of the variability of the quality of the water that could be boarded from various sources, and because, “when blended, all of the chemical and microbiological parameters would change and data generated would become inaccurate.” One commenter in favor of statistical sampling stated that EPA should allow the use of statistical sampling because there was substantive evidence that aircraft in a fleet, or a subset of a fleet, behaved similarly with respect to avoiding positive tests for total coliforms. However, new data beyond the AOCs' data was not provided to support this statement, and the AOCs'

data are not sufficiently robust to support such an analysis. Another commenter suggested that statistical sampling could be used to minimize the sample collection volumes and frequency; however, no sampling scheme or data was provided. Yet another commenter suggested EPA incorporate into the rule the allowance of a procedure whereby an individual carrier could propose a statistical sampling method, present a proposed program for doing so along with technical analyses demonstrating its representativeness and efficacy, and request EPA to review and approve the plan.

Today's rule does not include provisions for statistical sampling because EPA did not receive data to change its opinion that sampling a fraction of aircraft water systems does not identify all of the aircraft that may be operating with a contaminated water system. Therefore, the potential still exists that the un-sampled aircraft may be operating with a contaminated water system, possibly for years, until it is randomly selected and tested. EPA considers that its approach is appropriate, because each aircraft water system is a unique system that may board water from a potentially large number and variety of sources and distribution systems, and the volume of water that is boarded may vary on a daily basis or more often. Under current practices, the sources of water for an individual aircraft are so varied, in addition to variability in the quality of operation and maintenance practices, it would be difficult for a statistical sample to provide an accurate representation of all water being served on an air carrier's fleet. In addition, the majority of the committee members of EPA's Science Advisory Board (SAB) were not in favor of statistical sampling of aircraft drinking water because the available data is too sparse to interpret results for the whole fleet. As a result, the final rule does not allow for statistical sampling.

#### 5. Option for Repeat Sampling

EPA requested specific comment on whether to disallow the option for repeat sampling in response to a routine total coliform-positive sample if the aircraft has boarded water since the routine sample was taken. EPA noted that the repeat samples may not be providing an accurate picture of the water quality since it is not characterizing the same water as the routine sample. EPA received comments that were both in favor of and opposed to disallowing the option for repeat sampling in response to a routine total

coliform-positive sample. Commenters in favor of repeat sampling noted that it was a reliable method of investigating the extent of bacterial problems in the water system, and another commenter stated that it allows an air carrier to pinpoint a source of contamination and should be permitted. In opposition to repeat sampling, a commenter noted that it should not be allowed because the process takes several days, which extends the time period for passengers and crew to be exposed to a potential health risk. In today's rule, EPA maintains the option to collect repeat samples as a corrective action to a total coliform-positive routine sample that is *E. coli*-negative. EPA believes repeat sampling is a valuable option because it can indicate whether the problem reflected by the routine sample result is no longer present, or whether the problem has persisted and requires further corrective action; therefore, EPA is allowing the option for repeat sampling in response to a routine total coliform-positive sample that is *E. coli*-negative in this ADWR.

#### 6. Disinfectant Residual Monitoring

EPA requested specific comment on whether it is appropriate to require monitoring of routine disinfectant residuals and if so, the frequency for monitoring and the corrective action required if sufficient disinfectant residuals are not detected. EPA received approximately the same number of comments in favor of and opposed to adding a requirement for routine monitoring of a disinfectant residual. In favor of monitoring for disinfectant residuals, a commenter stated that flight attendants should be trained in the use of chlorine residual testing equipment, and that the rule should maintain the AOCs' disinfectant residual monitoring requirements, because having a detectable residual is effective against bacterial growth. Commenters who opposed routine monitoring of a disinfectant residual thought that (1) it was unnecessary and does not provide a meaningful representation of risks or system integrity; (2) since air carriers receive finished water from PWSs, the level of disinfectant residual in the water supply is outside of the control of the air carriers; meaning, there is no benefit to requiring the carriers to monitor for disinfectant residual since the air carriers cannot take action to increase it on a system-wide basis; and (3) since water turns over very quickly in aircraft water systems, monitoring of residual disinfectant provides no added benefit.

The final rule does not require monitoring of a disinfectant residual for

several reasons. First, the Surface Water Treatment Rule requires public water systems using surface water as a source to maintain a detectable disinfectant residual in the distribution system to ensure that disinfection is maintained throughout the water system. If a stationary system has a non-detectable disinfectant residual it may increase the amount of disinfectant added at the treatment facility, routinely flush water from dead-end or low water use areas of the distribution system, or add additional disinfection to a specific area of the system by installing booster-disinfection equipment to increase the disinfectant residual. Adding disinfectant booster equipment is not practicable or feasible for aircraft water systems due to tank design challenges. In addition, any corrective action requiring manual addition of water with a disinfectant residual would result in major disruptions to flight schedules (e.g., to drain and refill or flush and disinfect the aircraft water tank). Second, since aircraft may board water more than once per day from a variety of sources, some of which may be groundwater that is not disinfected, EPA is uncertain whether monthly (or less frequent) disinfectant residual monitoring would provide useful information for aircraft water systems. At the same time, EPA believes that more frequent flushing and disinfection of the entire aircraft water system as a treatment technique combined with other barriers incorporated into the ADWR (e.g., operations and maintenance plans, etc.) will ensure that microbiologically safe tap water is provided on the aircraft even without the residual disinfectant requirements applicable to stationary public water systems. Finally, the rule specifies that aircraft water systems are to board only finished water (i.e., drinking water intended for distribution and consumption without further treatment). Therefore, it is the responsibility of the PWS from which the aircraft receives water to provide finished water that meets all the NPDWRs. Under the NPDWRs, if that PWS uses groundwater as its ambient source, then the finished water is not required to have a detectable disinfectant residual. Trying to determine if boarded water is required to have a disinfectant residual, and then trying to correct it if monitoring yields a non-detectable disinfectant residual result, would be an economic and operational burden for the air carrier.

## 7. Timeframe for Disinfection and Flushing

EPA requested specific comment on the appropriateness of the 72-hour timeframe to disinfect and flush, upon receipt of two total-coliform-positive sample results or a single fecal coliform- or *E. coli*-positive result, since disinfection and flushing requires taking the aircraft out-of-service to a designated maintenance facility. The majority of the public comments received favored the 72-hour timeframe with some concerns. For example, one commenter expressed that the timeframe is a “sensible” and necessary response, but such unscheduled activities will be costly and burdensome to the air carriers and create an unfavorable reaction from passengers to the restricted access to the water and flight delays. On the same note, another commenter stated that the 72-hour timeframe is appropriate under normal conditions; however, in situations where weather or other airspace system delays renders compliance with the 72-hour timeframe impractical, the Agency should provide an extension to 96 hours. Another commenter noted “while in the abstract” the timeframe appears to be achievable, the Agency needs to provide “reasonable accommodation for scheduling” in cases where the air carrier may receive sample results while the aircraft is overseas and is unable to return to the U.S. and to the maintenance facility in 72 hours. EPA recognizes that its proposed timeframe of 72 hours has the potential to disrupt some passenger services, and may cause logistical challenges such as receiving results while on an international route. Therefore, the final rule includes an optional corrective action intended to provide air carriers with more disinfection and flushing flexibility when routine and/or repeat coliform samples are total-coliform-positive but *E. coli*-negative. The option in the final rule allows the air carrier to perform the Restrict Public Access requirements within 72 hours of learning of the total coliform-positive result(s) that is *E. coli*-negative and conduct disinfection and flushing when it is operationally feasible. If the air carrier performs the Restrict Public Access Requirements, it does not have to disinfect and flush the aircraft in 72 hours, even if the aircraft water system cannot be physically disconnected or shut off, or the flow of water prevented through the taps. This option allows an air carrier to avoid service disruptions. The air carrier must collect follow-up samples prior to providing water for human

consumption from the aircraft water system.

The presence of total coliforms only (when no *E. coli* is detected) presents a non-fecal potential health risk and is an indication of poor water quality. Since the water is of poor quality, the passengers and crew have a right-to-know. Hence, public notification is an emphasized component of this option. However, EPA considers an *E. coli*-positive result to be an acute potential fecal health risk, and it is a necessary public health measure to ground the plane in 72 hours when the water system cannot be physically disconnected or shut-off, or the flow of water prevented through the taps. Therefore, no changes were made in the final rule to the corrective actions for *E. coli*-positive results.

## 8. Supplemental Treatment

EPA requested specific comment on whether to require supplemental disinfection of water boarded onto aircraft, and whether to require monitoring for disinfectant residuals either in addition to or in lieu of supplemental disinfection. In addition, EPA requested comment on the feasibility of using other types of supplemental disinfection, such as UV treatment onboard aircraft, including providing incentives such as reduced routine monitoring or routine disinfection and flushing if an air carrier provides supplemental treatment. EPA received public comments both for and against the required use of supplemental treatment. Concern was expressed that supplemental treatment would increase costs for installation, extra weight, maintenance, and revision of aircraft operation and maintenance programs to accommodate a system that was not a part of the aircraft manufacturer’s final product. Comments in support of supplemental treatment indicated that it may be viewed as the ultimate barrier against the risk of illness due to contaminated drinking water, and that there could be economic savings associated with reduced monitoring, reduced routine disinfection and flushing of aircraft water systems, and reduced remedial activity due to fewer positive test results. In addition, the commenter expressed that supplemental treatment could possibly reduce or eliminate the need for bottled water.

In the final ADWR, supplemental treatment is not required to be used with finished water that has been boarded on the aircraft. EPA believes it has prescribed the minimum requirements necessary to provide safe drinking water to passengers and crew onboard aircraft, including the

requirement to board finished water. However, supplemental treatment can provide an additional barrier of protection in the event of a failure in any of the basic protection barriers required under this rule (e.g., boarding finished water in accordance with FDA requirements; transferring the water from the watering point to the aircraft in a manner that ensures it will not become contaminated during the transfer; appropriate training of personnel; implementation of a water system operation and maintenance plan; etc.).

EPA believes the basic requirements of the ADWR, when performed consistently and diligently by the air carriers and their agents, provide assurance that drinking water onboard aircraft is safe for passengers and crew. Based on the information that EPA has at the time of this rulemaking, there is not sufficient information or data to support a requirement of supplemental treatment for aircraft water systems or for reducing any of the minimum requirements based on the installation of supplemental treatment. However, EPA plans to revisit this issue as part of the Six-Year review of this rule under SDWA section 1412(b)(9) and as more data become available. EPA also plans to address supplemental treatment issues in its ADWR technical guidance.

## 9. Recording the Boarding of Water

EPA requested specific comment on whether the potential benefit of recording information of where, how much, and when water is boarded outweighs the information collection burden. The boarding of water is usually done on an as-needed and as-requested basis, and EPA is not aware of any current requirements for capturing this type of information. EPA received public comments both for and against recording the information (e.g., where, how much, and when water is boarded). One commenter stated that this information may be helpful in determining the cause of contamination events. Another commenter noted that requiring carriers to record this information would increase delays and costs. EPA has not received sufficient information or data that show a benefit to recording information on the boarding of water that would justify the additional recordkeeping burden on the air carrier. A single aircraft may board water several times a day from multiple airports. During the boarding of water, water from more than one source is usually commingled in the aircraft water system since the tanks may not be completely drained between fillings. Maintaining a log of this information

may not necessarily help in identifying the source of contamination of an aircraft water system because there could be multiple causes for contamination of such systems. Requiring a log would generate multiple daily records for each aircraft without a known health benefit. Consequently, the final rule does not require recording information of where, how much, and when water is boarded.

#### 10. Follow-Up Sampling To Confirm the Effectiveness of Routine Disinfection and Flushing

EPA requested specific comment on whether follow-up sampling should be required to confirm the effectiveness of routine disinfection and flushing, and if so, the frequency/number of samples by which this monitoring should occur. EPA received comment in favor of and against requiring follow-up sampling after routine disinfection and flushing. A comment in favor of a requirement specifically noted, "follow-up sampling should be required to confirm the effectiveness of routine disinfection and flushing, at least until a body of evidence can be established that clearly indicates that routine disinfection and flushing is reliably effective in removing biofilm from the aircraft water system." Another commenter believed, "Once the aircraft has been disinfected and flushed, it may be necessary to test the water (again) to be sure that the disinfection has been successful and any problem of bacterial contamination has been solved. Sampling immediately after the disinfection and flushing may not show any hidden contamination problems. Hence, it is very important to wait a minimum time requirement (7–10 days) after disinfecting in order to recommence the regular water testing regime." A commenter against such follow-up sampling as a regulatory requirement noted the following concerns: (1) It would be "inconsistent with and undermine the [routine] disinfection and monitoring frequency schedules"; (2) "Inasmuch as routine disinfection does not involve evidence of a system problem, but is simply a preventative measure, there is no risk-based benefit to post-disinfection routine sampling"; (3) it would "impose significant logistical and cost burdens on the airlines and unduly delay the return of aircraft to service while sampling results were processed"; and (4) "Imposing additional sampling costs would be arbitrary and unreasonable in situations that do not suggest any compromise of system integrity, but rather are routine measures."

As discussed in the proposed rule, EPA established that, to ensure the

results of routine samples are not inadvertently skewed by sampling too close to a disinfection event, routine coliform samples must not be collected within 72 hours after completing routine disinfection and flushing procedures. Collecting a coliform sample within 72 hours of routine disinfection and flushing is not representative of the general conditions of the aircraft water system. This required 72-hour time interval has not been changed in the final rule. However, EPA does agree that such follow-up samples do aid in determining the success of disinfection and flushing, and encourages additional or special coliform sampling. Today's rule does not require follow-up sampling to confirm the effectiveness of routine disinfection and flushing. EPA has not received sufficient information or data that show that such monitoring is necessary, and believes spacing routine samples evenly across monitoring periods is more representative of aircraft drinking water quality and normal aircraft water system operations.

#### F. Aircraft Water System Operations and Maintenance Plan (§ 141.804)

Both the proposed rule and today's final rule require each air carrier to develop and implement an aircraft water system operations and maintenance plan for each aircraft water system operated by the air carrier. The air carrier need not develop a separate plan for each aircraft, but the air carrier must ensure that each aircraft it owns and operates is covered by a plan. For example, if the air carrier operates several of the same type of aircraft with the same type of water system, the air carrier may choose to develop one operations and maintenance plan that applies to aircraft of this type in its fleet.

In the proposed rule, air carriers would be required to include the aircraft water system operations and maintenance plans in a Federal Aviation Administration (FAA)-approved or -accepted air carrier operations and maintenance program. The Agency received several public comments against including this requirement in the final rule. Commenters expressed concern that this cast FAA in an inappropriate regulatory role, and that inclusion of the aircraft water system operations and maintenance plans in a FAA-approved or -accepted air carrier operations and maintenance program could cause significant reworking of existing maintenance program documents and may cause a duplication of effort in terms of regulatory oversight.

EPA disagrees with these comments and continues to believe that including

the aircraft water system operations and maintenance plans in a FAA-accepted air carrier operations and maintenance program is a critical element of the final rule. FAA views proper operation and maintenance of the water system as an operational safety issue and agrees with EPA that it is appropriate to have the water system operations and maintenance plans included in the FAA-accepted operations and maintenance program. FAA requires all maintenance and operational procedures to be formally documented for each aircraft, and a failure by an air carrier to perform the prescribed program requirements may result in forfeiture of air carrier operating certificates and/or fines. In addition, properly integrating aircraft water system operations and maintenance procedures with other FAA-accepted operations and maintenance procedures is the most reliable way to ensure effective implementation of the plan and maximize effective oversight by EPA and FAA. This will help to minimize duplication of effort by the two agencies.

Though this requirement remains in the final rule, the Agency made one minor change to the language in this paragraph. Since the publication of the proposed rule, the Agency has learned that FAA does not "approve" the air carrier operations and maintenance programs, and that describing these programs as "FAA-accepted" programs is more accurate. Thus, the final rule requires that air carriers include the aircraft water system operations and maintenance plan in an FAA-accepted operations and maintenance program.

In the proposed rule, EPA proposed to allow air carriers only six months to develop an aircraft water system operations and maintenance plan for each existing aircraft. However, the Agency received several comments requesting that the compliance date be extended in order to allow for more time for air carriers to restructure maintenance programs between the AOCs and the final rule. The comments and the Agency's response are explained in more detail in section IV.L of this notice. EPA agrees that more time may be needed for air carriers to develop aircraft water system operations and maintenance plans for existing aircraft. Therefore, today's final rule extends the compliance date for development of the aircraft water system operations and maintenance plan for existing aircraft from six months to 18 months after publication of the final rule.

The Agency also received comments that the proposed rule was unclear as to

whether and how air carriers could amend their operations and maintenance plans or their coliform sampling plans. EPA agrees that the final rule should more clearly state the requirements for making changes to these plans. Thus, in the final rule, EPA addresses this concern by clarifying that any subsequent changes to the aircraft water system operations and maintenance plan must also be included in the FAA-accepted air carrier operations and maintenance program. For example, changes to the aircraft water system operations and maintenance plan could include, but are not limited to, changes to the procedures for disinfecting and flushing, including changes to the routine disinfection and flushing frequency, changes to training requirements, changes to self-inspection procedures, or changes to procedures for boarding water. The reporting requirements and the requirements for the coliform sampling plan have also been revised to respond to these comments.

The following is a discussion of elements of the aircraft water system operations and maintenance plan for which EPA received comment and/or made changes to the final rule.

The proposed rule would require that the operations and maintenance plan ensure all water boarded within the United States is from an FDA-approved watering point as required under 21 CFR 1240.80. The Agency received several comments on this requirement. Some commenters believed that EPA intended this requirement to alter FDA regulations applicable to watering points. The commenters also pointed out a possible inconsistency with this requirement and existing FDA regulations for watering points.

The Agency continues to acknowledge the joint oversight role of EPA and FDA in ensuring safe drinking water on aircraft. Therefore, this requirement does not seek to change any of FDA's regulations regarding watering points. Rather, EPA continues to defer to FDA with respect to regulating watering points. FDA will continue to ensure that the water supply meets the standards prescribed in EPA's NPDWRs, and ensure the methods of delivery, facilities for delivery, and the sanitary conditions surrounding the delivery of water to the aircraft in order to prevent the introduction, transmission, or spread of communicable diseases. Therefore, EPA revised the final rule to clearly communicate the Agency's intent. The final rule requires that all watering points must be selected in accordance with FDA regulations (21

CFR part 1240, subpart E). Today's final rule also requires that the operations and maintenance plan include procedures for ensuring that the air carrier board water from a watering point in accordance with FDA regulations (21 CFR part 1240, subpart E). These changes remove any inconsistency between the final rule and existing FDA regulations. It also ensures that all FDA regulations regarding watering points, including those applicable to watering points permitted for temporary use, are referenced in the final rule.

The proposed rule stated that in no event must air carriers knowingly serve water that violates the NPDWRs. It also provided that if it was necessary to board water that violated the NPDWRs, the air carrier must perform the corrective action requirements applicable to *E. coli*-positive coliform sample results. Today's final rule clarifies that in no event must air carriers knowingly provide water for human consumption that violates the NPDWRs applicable to transient non-community water systems. The Agency understands that sometimes unsafe water must be boarded in order to operate other essential systems, but at no time are air carriers to provide such water to passengers and crew in the form of beverages (*e.g.*, coffee, tea, etc.); nor may passengers and crew be allowed access to the water system (*i.e.*, the water system must be shut-off or the flow of water prevented through the taps); nor may the water be used for food preparation or any other consumptive use.

The proposed rule would require that the operations and maintenance plan describe emergency procedures to be used in the event that water is boarded to operate essential systems, such as toilets, but is not boarded from an FDA-approved or otherwise safe watering point. In the final rule, EPA continues to require that the operations and maintenance plan include a description of emergency procedures to be used in the event that unsafe water is boarded to operate essential systems. In today's final rule, the operations and maintenance plan must include a description of emergency procedures used when the air carrier becomes aware that unsafe water is boarded. Unsafe water includes:

- Water boarded from a watering point not in accordance with FDA regulations;
- Water that does not meet NPDWRs applicable to transient non-community water systems; or
- Water that is otherwise determined to be unsafe due to non-compliance

with the procedures for boarding water specified in the operations and maintenance plan.

#### *G. Notification Requirements to Passengers and Crew (§ 141.805)*

##### 1. Situations Requiring Public Notification

In EPA's proposed rule, public notification would be required in the following situations: (1) Where access to the aircraft water system is required to be restricted (*e.g.*, fecal coliform/*E. coli*-positive sample result); (2) where there was a failure to collect required samples; (3) when the quality of the water cannot be assured, for example, when water has been boarded from a watering point not approved by FDA, or in a manner that does not otherwise comply with the air carrier's procedures for ensuring safe water outside the United States; or (4) in any other situation where the Administrator, air carrier, or crew determines that notification is necessary to protect public health.

The Agency received several comments that prompted EPA to make changes to the situations described in the proposed rule. Some of the changes were a result of comments directly related to the public notification requirements of this section, while other changes were a result of comments applicable to other sections of the rule which subsequently affected these public notification requirements.

First, in the final rule, the Agency restructured the corrective action requirements in § 141.803 in response to comments discussed previously. Under the final corrective action provisions, public notification not only applies to an *E. coli*-positive sample result, but also when an air carrier chooses to restrict public access in response to a sample result that is total coliform-positive and *E. coli*-negative, and failure to perform required ADWR provisions.

Second, the Agency received comments stating that the situations requiring notification listed in the proposed rule in § 141.810 (*i.e.*, Violations) conflict with the situations listed in proposed § 141.805 (*i.e.*, Notification of passengers and crew). The comments suggested that to avoid confusion and inconsistency, EPA should delete the public notification requirements in § 141.810 or make conforming changes to the two sections. EPA agrees that the reference to public notification requirements in § 141.805 is confusing and inconsistent with § 141.810. Therefore, EPA removed all references to public notification from § 141.810 and made conforming changes

to § 141.805 of the final rule. As a result, air carriers are now required to give public notification when there has been a failure to perform required routine disinfection and flushing; or failure to collect routine, repeat or follow-up samples; or a failure to perform a corrective action associated with a fecal occurrence event.

Third, the Agency received several comments on the watering point selection requirement and the requirement to board water from FDA-approved watering points in § 141.804. These comments and EPA's response are discussed elsewhere in today's notice. As a result, the Agency clarified both of these requirements in § 141.804 of the final rule, and made the following changes under which air carriers must provide public notification when the air carrier becomes aware that the quality of water cannot be assured:

- Where water has been boarded from a watering point not in accordance with FDA regulations;
- Where water that has been boarded does not meet NPDWRs applicable to transient non-community water systems; and
- Where water is otherwise determined to be unsafe due to non-compliance with the procedures specified in § 141.804(b)(6).

## 2. Method of Notification Delivery

Both the proposed rule and today's final rule require that air carriers provide notification in a form and manner reasonably calculated to reach all passengers and crew. Using a variety of delivery methods for these notifications will help ensure that all passengers, including those with visual or hearing impairments, or non-English speakers, will have access to relevant public health information.

## 3. Cessation of Public Notification

The proposed rule would require that all public notification continue until all follow-up samples are total coliform-negative. As a result of clarifications made to the corrective action requirements in § 141.803 of the final rule, EPA also clarifies that an air carrier must continue to provide public notification until the aircraft water system is returned to unrestricted public access.

For instance, when the initial corrective action disinfection and flushing is conducted in response to a routine total coliform-positive sample result that is *E. coli*-negative, or there is a failure to perform required actions as a result of non-fecal events, public notification may cease when the aircraft water system is disinfected and flushed

and follow-up samples have been collected. At this time, the water system may be returned to unrestricted public access; however, when corrective action disinfection and flushing is conducted more than once (*i.e.*, disinfection and flushing is conducted in response to a follow-up sample that is total coliform-positive and *E. coli*-negative), public access restrictions, including public notification, must remain in-place until a later set of follow-up samples is total coliform-negative.

If initial corrective action disinfection and flushing is conducted as a result of an *E. coli*-positive sample result, or a failure to perform required actions as a result of fecal events, public access restrictions, including public notification, must remain in-place until a complete set of follow-up samples is total coliform-negative (not just until they are collected and sent for analysis, as in the case where the corrective action is triggered by a total coliform-positive but *E. coli*-negative sample).

In both cases, when public access is restricted due to an *E. coli*-positive sample or a total coliform-positive sample that is *E. coli*-negative, if the air carrier can shut off the water system or restrict the flow of water through the taps, then public notification need only be conducted for the crew and not to the passengers.

## 4. Type of Notice Required When Public Access Is Restricted

Commenters noted that the public notification requirements in the proposed rule were confusing, and it was difficult to determine which requirements were applicable in situations where public access was restricted. In the final rule, the Agency better aligns the public notification requirements based on three categories: sample results (*i.e.*, a total coliform-positive and *E. coli*-negative result or an *E. coli*-positive result), non-fecal occurrence failures and events (*e.g.*, failure to conduct repeat sampling), and fecal occurrence failures and events (*e.g.*, failure to collect follow-up samples after the aircraft water system tests positive for *E. coli*, or the air carrier becomes aware that *E. coli*-positive water was boarded from a watering point not in accordance with FDA regulations, etc.).

In today's rule, EPA makes clear for all three public notification categories that if the aircraft water system can be physically disconnected, shut-off, or the flow of water is prevented through the taps, air carriers are required to provide public notification to the crew only. However, if the aircraft water system cannot be physically disconnected,

shut-off, or the flow of water cannot be prevented through the taps, air carriers are required to provide public notification to passengers and crew. This is allowable for all three public notification categories.

In addition, today's rule requires that when an air carrier becomes aware that unsafe water was boarded, the public notice must include when and where the unsafe water was boarded. For the purpose of this requirement, unsafe water includes water that was boarded from a watering point not in accordance with FDA regulations (21 CFR part 1240 subpart E), or water that does not meet NPDWRs applicable to TNCWSs, or water that is otherwise determined to be unsafe due to non-compliance with the procedures specified in § 141.804(b)(6).

## 5. Standard Health Effects Language

Due to the removal of fecal coliforms as a fecal indicator (as discussed in section IV.C *Responses to Sample Results*), all references to "fecal coliforms" have been removed from the health effects language. In addition, in order to better align the health effects language in § 141.805 to the restructured corrective action requirements in § 141.803, the Agency clarified that there is specific health effects language applicable when public notification is triggered by an *E. coli*-positive sample result, a sample result that is total coliform-positive and *E. coli*-negative, or a non-fecal occurrence failure or event. In addition, new health effects language was added when public notification is triggered by a fecal occurrence failure or event.

The specific health effects language was also revised to conform to revisions to § 141.804. In the final rule, the watering point statement reads, "Water was boarded from a watering point not in accordance with FDA regulations," rather than, "Water was boarded from a watering point not approved by FDA."

## H. Reporting Requirements (§ 141.806)

EPA proposed that air carriers report the following to the Administrator within six months of publication of the final rule in the **Federal Register**:

- That a coliform sampling plan was developed for each existing aircraft;
- The frequency for routine coliform sampling identified in the coliform sampling plan developed for each existing aircraft; and
- That an operations and maintenance plan was developed for each existing aircraft.

The Agency received several comments requesting that the compliance date be extended in order to allow for more time for air carriers to

restructure maintenance programs between the AOCs and the final rule. EPA agrees that more time may be needed for air carriers to comply with these reporting requirements. Therefore, today's rule requires that air carriers comply with these requirements 18 months after publication of the final rule. The comments and the Agency's response are explained in more detail in section IV.L of this notice.

EPA proposed that air carriers report a complete inventory of aircraft that are public water systems within six months of publication of the final rule. However, the Agency received several comments requesting that this compliance date be extended. EPA agrees that more time may be needed for air carriers to report a complete inventory of aircraft that are public water systems. Therefore, today's final rule extends the compliance date for development and reporting of the inventory to 18 months after publication of the final rule. The comments and the Agency's response are explained in more detail in section IV.L of this notice.

The Agency received comments requesting clarification on the aircraft inventory requirement to report changes in an aircraft's status from active to inactive or vice versa. In the final rule, EPA clarifies that active or inactive status refers to the aircraft's status as an aircraft water system. Thus, an aircraft that meets the definition of an aircraft water system is considered "active," while one that does not meet this definition is considered "inactive." For example, an aircraft may be considered "inactive" in situations where an aircraft is out of passenger service for extended maintenance, or where an aircraft is in passenger service, but flying strictly international routes where SDWA does not apply. Therefore, in the final rule, the Agency clarifies that air carriers must report, no later than 10 days following the calendar month in which the change occurred, the status, or the change in status, of any aircraft as an aircraft water system as defined in § 141.801.

In addition, EPA corrects the final rule by adding § 141.806(b)(2)(iv). This paragraph requires air carriers to report changes in the ability to physically shut off or disconnect the water system. This requirement was referred to in the preamble of the proposed rule, but omitted from the rule text. Restoring this requirement to the rule eliminates the inconsistency.

The Agency received comments that the proposed rule was unclear as to whether and how air carriers could amend their operations and

maintenance plans or their coliform sampling plans. In the final rule, EPA addresses this concern by amending the final rule in several places, including by adding paragraph § 141.806(b)(6). This paragraph requires that the new frequency be reported to the Administrator no later than 10 days following the calendar month in which the change occurred. It also requires that these changes be included in the aircraft water system operations and maintenance plan that is included in the air carrier operations and maintenance program accepted by FAA.

In the proposed rule, the Agency noted for each aircraft water system the air carriers must include the routine disinfection and flushing frequency in the operations and maintenance plan, and air carriers must keep records of disinfection and flushing events. However, the Agency did not specifically note under § 141.806 that disinfection and flushing events must be reported to the Administrator. Since the Agency's intent included reporting disinfection and flushing events to the Administrator, the following was added to § 141.806 *Reporting Requirements* for consistency and clarification:

- For each existing aircraft water system, the air carrier must report to the Administrator the frequency for routine disinfection and flushing by 18 months after the final rule is published.
- For each new aircraft water system, the air carrier must report the frequency for routine disinfection and flushing, within the first calendar quarter of initial operation of the aircraft.
- Routine disinfection and flushing events must be reported no later than 10 calendar days following the disinfection and flushing period in which the disinfection and flushing occurred (*e.g.*, quarterly, semi-annually).
- Changes to the disinfection and flushing frequencies must be reported no later than 10 days following the calendar month in which the change occurred.

In addition, the final rule further clarifies the Agency's intent to require reporting of all events that require non-routine sampling.

#### *I. Recordkeeping Requirements (§ 141.807)*

In both the proposed rule and today's final rule, EPA requires that air carriers retain certain information for the aircraft water systems that they own or operate. The following is a discussion of recordkeeping requirements for which EPA received comment and/or made changes to the final rule.

In the proposed rule, the Agency did not specify the types of records related

to disinfection and flushing and self-inspections that must be kept in order to meet the recordkeeping requirements. One commenter suggested that air carriers be required to "keep records confirming performance of required disinfection" and "keep records confirming performance of self-inspections." In general, the commenter stated that requiring air carriers to keep more detailed records does not conform with current FAA-supervised maintenance activities, and adds unnecessary burdens and confusion with respect to compliance with the requirements.

EPA disagrees with amending these paragraphs in the manner suggested in the comments because the Agency considers these requirements to be the minimum necessary to ensure accountability and facilitate regulatory oversight to ensure compliance with the rule. In addition, EPA believes that detailed records of self-inspections are necessary to inform the Agency about the condition of the water system components at the time of the inspection and any deficiencies identified during the inspection. A record simply confirming performance of a self-inspection would not be sufficient. While EPA disagrees with amending this paragraph in the manner suggested in the comments, the Agency believes that adding more specificity to these recordkeeping requirements will help to avoid confusion with respect to compliance. Therefore, in today's rule, the Agency clarified this section by adding that at a minimum, records of disinfection and flushing must include the following: Date and time of the disinfection and flushing, and the type of disinfection and flushing (*i.e.*, routine or corrective action). The recordkeeping requirements for self-inspections were also amended to align with existing recordkeeping requirements for sanitary surveys conducted by owners and operators of stationary public water systems. In the final rule, at a minimum, records of self-inspection must include the following: Completion date of the self-inspection, and copies of any written reports, summaries or communications related to the self-inspection.

In the proposed rule, air carriers were required to keep public notices to passengers and crew for at least three years after issuance. However, the Agency received comments requesting that EPA amend the proposed rule to require air carriers to merely "keep a record of notices to passengers and crew" because the requirement to keep physical notices would be operationally difficult for air carriers. EPA disagrees

with amending this paragraph in the manner suggested in the comments because the Agency believes a copy of the physical notice is necessary to allow the Agency to determine compliance with the public notification requirements of this rule. In addition, EPA does not believe that this requirement is burdensome or operationally difficult because the copies need not be in paper format. Air carriers may keep electronic copies of these notices in lieu of paper copies. Thus, in the final rule, EPA clarifies that the air carrier must keep copies of the public notices given to passengers and crew.

**J. Audit and Self-Inspection Requirements (§ 141.808)**

In place of the sanitary survey that is required every five years for other transient non-community public water systems using surface water, the proposed and final rules require that a self-inspection be conducted by the air carrier for each aircraft water system no less frequently than once every five calendar years. An inspection of the entire aircraft water system need not be completed in one day; the air carrier need only ensure that all water system components are inspected once every five calendar years.

**K. Violations (§ 141.810)**

The Agency received several comments on the proposed rule stating that the notification requirements in § 141.810 conflict with the notification requirements proposed in § 141.805, and that to avoid confusion and inconsistency, EPA should delete the public notification requirements in this section or make conforming changes to

both sections. EPA agrees that the reference to public notification requirements in this section is confusing and inconsistent with § 141.805. Therefore, as noted previously, EPA removed all references to public notification from § 141.810 and made conforming changes to § 141.805.

In addition, due to the removal of fecal coliforms as a fecal indicator (as discussed in section IV.C *Responses to Sample Results*), all references to fecal coliforms have been removed from the violations to conform with the revision. Other than the changes mentioned here, the specific violations remain the same in the final rule.

**L. Compliance Date**

In the proposed rule, air carriers would be required to comply with the rule within six months from the date of publication for several reporting and planning requirements, and 12 months from the date of publication for the rest of the rule requirements. While SDWA section 1412(b)(10) generally requires a three-year delay before new or amended rules are effective, that provision also authorizes EPA to set an earlier compliance date if the Agency determines that the earlier date is practicable. At the time of the proposal the Agency believed these dates were practicable because EPA will implement the rule, making it unnecessary to allow time for States to obtain enforcement authority prior to implementation of the rule. In addition, most air carriers are currently under AOCs which have similar requirements to this rule. Thus, EPA believed complying with the ADWR should not require significant changes in terms of operations and maintenance procedures. However, the

Agency received several comments requesting that the compliance dates be extended to be more consistent with the three-year compliance date for new or revised NPDWRs under SDWA (section 1412(b)(10)). Also, some commenters expressed concern that the six-month compliance date would be impracticable because air carriers need more time to restructure maintenance programs between the AOCs and the final ADWR. Commenters suggested compliance dates of 18 months from the date of publication for the reporting and planning requirements, and 24 months from the date of publication for the rest of the rule.

The Agency agrees that the original timeline for compliance in the proposed rule may be too short for some air carriers to meet, and more time may be needed for air carriers to comply with the requirements of the final rule. Therefore, today's rule requires air carriers to comply with the requirements of the rule within 18 months from the date of publication for the reporting and planning requirements and 24 months from the date of publication for the rest of the rule requirements (see Table IV-3). The 18-month compliance date applies to the following:

- Develop a coliform sampling plan for existing aircraft and report to EPA that the plans were developed;
- Report the coliform sampling frequency included in the coliform sampling plans;
- Develop an Aircraft Water System Operations and Maintenance Plan for existing aircraft and report to EPA that the plans were developed;
- Report a complete inventory of existing aircraft water systems.

TABLE IV-3—COMPLIANCE AND REPORTING DATES

Requirement	Within the first 18 months following publication of the final rule	Within the first calendar quarter of initial operation	Within 10 days following the calendar month in which the change occurred	Beginning 24 months after publication of the final rule
Aircraft Water System Operations and Maintenance Plan:				
Existing <sup>1</sup> Aircraft—develop the plan and report that it has been developed .....	X	.....	.....	.....
New <sup>2</sup> Aircraft—develop the plan and report that it has been developed .....	.....	X	.....	.....
Aircraft Coliform Sampling Plan:				
Existing <sup>1</sup> Aircraft—develop the plan and report that it has been developed .....	X	.....	.....	.....
New <sup>2</sup> Aircraft—develop the plan and report that it has been developed .....	.....	X	.....	.....
Aircraft Frequency of Coliform Sampling and Routine Disinfection and Flushing:				
Existing <sup>1</sup> Aircraft—report the routine frequency .....	X	.....	.....	.....
New <sup>2</sup> Aircraft—report the routine frequency .....	.....	X	.....	.....
Report any change <sup>3</sup> in routine frequency .....	.....	.....	X	.....
Aircraft Inventory:				
Existing Aircraft—report the inventory .....	X	.....	.....	.....

TABLE IV-3—COMPLIANCE AND REPORTING DATES—Continued

Requirement	Within the first 18 months following publication of the final rule	Within the first calendar quarter of initial operation	Within 10 days following the calendar month in which the change occurred	Beginning 24 months after publication of the final rule
Report any change <sup>3</sup> to aircraft inventory .....	.....	.....	X	.....
Aircraft Routine Requirements:				
Conduct routine monitoring .....	.....	.....	.....	X
Conduct routine disinfection and flushing .....	.....	.....	.....	X

<sup>1</sup> Existing Aircraft: means any aircraft that is in operation when the final rule is published or is brought into operation within the first 18 months after the final rule is published.

<sup>2</sup> New Aircraft: means any aircraft that is brought into operation after the 18th month following publication of the final rule.

<sup>3</sup> Any changes made after the 18th month following publication of the final rule.

**V. Cost Analysis**

In estimating the costs of this rule, EPA considered impacts on aircraft water systems and air carriers, air carrier passengers, as well as Agency costs for rule implementation. Agency costs are included in lieu of State costs because implementation of the ADWR is the responsibility of EPA as a regulation applicable only to aircraft water

systems. EPA also considered certain aspects of the ADWR that are non-quantified costs and that contribute to uncertainties in the cost estimates.

*A. National Cost Estimates*

EPA estimates that the total annualized implementation cost to the air carriers of carrying out the activities required in this ADWR is \$7.04 million at a 3 percent discount rate and \$6.95

million at a 7 percent discount rate. Table V-1 presents the itemized and total annualized implementation costs to air carriers (airlines) and EPA for the ADWR at 3 and 7 percent discount rates. Unit costs were multiplied by the number of air carriers or aircraft performing each requirement of the final rule, and results were summed for all components.

TABLE V-1—TOTAL ANNUALIZED PRESENT VALUE IMPLEMENTATION COSTS FOR THE FINAL ADWR  
[\$Millions, 2008\$]

	Air carriers	Agency	Total	Air carriers	Agency	Total
	3%			7%		
Implementation .....	\$0.002	\$0.01	\$0.01	\$0.004	\$0.01	\$0.02
Annual Administration .....	.....	0.24	0.24	.....	0.23	0.23
Sampling Plan .....	0.002	0.001	0.002	0.002	0.001	0.003
O&M Plan .....	0.01	0.0001	0.01	0.02	0.0001	0.02
Coliform Monitoring .....	4.89	0.04	4.93	4.82	0.04	4.86
Routine Disinfection and Flushing .....	2.08	.....	2.08	2.05	.....	2.05
Corrective Action Disinfection and Flushing .....	0.05	.....	0.05	0.05	.....	0.05
Compliance Audit .....	0.01	0.01	0.02	0.01	0.01	0.02
<b>Total .....</b>	<b>7.04</b>	<b>0.30</b>	<b>7.34</b>	<b>6.95</b>	<b>0.30</b>	<b>7.25</b>

As discussed more fully in the preamble for the proposed rule (73 FR 19337), EPA notes that the cost of the proposed ADWR was significantly less than the current regulatory requirements of the NPDWRs. The current NPDWR requirements, considered to be the baseline against which to compare the set of regulatory requirements of the ADWR, would continue to apply to the

aircraft water system industry if the requirements of the ADWR were not promulgated. The reduction in cost (i.e., the incremental savings of the ADWR compared to the regulatory baseline) is the result of tailoring the current regulations for transient non-community public water systems to the specific operational characteristics of aircraft drinking water systems.

EPA estimates that the total annualized incremental savings of this ADWR is \$22.15 million at a 3 percent discount rate and \$21.83 million at a 7 percent discount rate, as presented in Table V-2. The incremental savings represent the difference in total annualized implementation costs between the baseline (i.e., the existing NPDWRs) and the final rule provisions.

TABLE V-2—TOTAL ANNUALIZED INCREMENTAL COST: EXISTING NPDWRs AND THE ADWR  
[\$Millions, 2008\$]

	Alt 1 (Existing NPDWRs)	Alt 4 (Final Rule)	Incremental Cost (Alt 4 - Alt 1)	Alt 1 (Existing NPDWRs)	Alt 4 (Final Rule)	Incremental Cost (Alt 4 - Alt 1)
	3%			7%		

TABLE V-2—TOTAL ANNUALIZED INCREMENTAL COST: EXISTING NPDWRs AND THE ADWR—Continued  
[\$Millions, 2008\$]

Implementation .....	0.01	0.01	0	0.02	0.02	0
Annual Administration .....	0.24	0.24	0	0.23	0.23	0
Monitoring Plan .....	0.002	0.002	0	0.004	0.003	(0.001)
O&M Plan .....		0.01	0.01		0.02	0.02
Coliform Monitoring .....	25.37	4.93	(20.44)	25.02	4.86	(20.16)
Disinfectant Residual Monitoring .....	3.17		(3.17)	3.13		(3.13)
Routine Disinfection and Flushing .....		2.08	2.08		2.05	2.05
Corrective Action Disinfection and Flushing .....		0.05	0.05		0.05	0.05
Sanitary Survey/Compliance Audit .....	0.7	0.02	(0.68)	0.69	0.02	(0.67)
Turbidity Monitoring .....						
<b>Total .....</b>	<b>29.49</b>	<b>7.34</b>	<b>(22.15)</b>	<b>29.08</b>	<b>7.25</b>	<b>(21.83)</b>

The regulatory baseline does not reflect the Administrative Orders on Consent (AOCs), which are interim enforcement actions applying to 45 air carriers. As discussed earlier in this notice, in 2004, EPA found all aircraft that were public water systems to be out of compliance with the NPDWRs. EPA subsequently placed 45 air carriers under AOCs that will remain in effect until the tailored aircraft drinking water regulations are final. The air carrier AOCs combine sampling, best management practices, corrective action, public notification, and reporting and recordkeeping to ensure public health protection. With respect to sampling under the AOCs, air carriers with greater than 20 aircraft were required to sample 25 percent of their fleet quarterly, while air carriers with 20 or fewer aircraft were required to sample the entire fleet quarterly. Because the majority of the air carriers are currently subject to the requirements of the AOCs, EPA notes that if the requirements similar to the AOCs (*i.e.*, Alternative 2 in the EA) were used as an alternative baseline, the incremental cost of the final ADWR would be \$0.18 million at the 3 percent discount rate and \$0.18 million at the 7 percent discount rate.

As described in section V.C, the final rule provides additional cost savings to air carriers over the proposed rule.

*B. Estimated Impacts of the Final ADWR to Air Carrier Passengers*

EPA assumes that air carriers will pass on some or all of the costs of a new regulation to their passengers in the form of ticket price increases. For purposes of this analysis, EPA estimates that an average of 708.4 million passengers travel each year on aircraft that are affected by the ADWR. (*See* Column E, Exhibit 5.3 of the *Economic and Supporting Analysis Document for the Final ADWR*, (USEPA, 2009)). The cost passed on to passengers can be roughly estimated by dividing the air carriers' annualized implementation costs incurred by the number of passengers traveling each year. Based on this approximation, EPA estimates that passengers could face a relatively negligible increase of about one cent per ticket. The Agency has chosen to use the same number of passengers and flights estimated for the proposed rule for the final rule analysis in order to facilitate cost comparisons between the proposed and final rule provisions. This should not significantly affect the cost per passenger analysis.

*C. Comparison of Costs From Proposed Rule to Final Rule*

As discussed in section III.A of this notice, a collaborative rule development process was used for the proposed ADWR. This process provided an opportunity for stakeholders to inform the Agency about existing operations and maintenance practices for aircraft water systems and to convey concerns

regarding existing regulations applicable to aircraft water systems, public health issues, fleet operations issues that are unique to the air carrier industry, and potential rule alternatives. Public comment was received on the proposed rule, and modifications have been incorporated into the final ADWR. Some of the modifications to the proposed rule that are incorporated into the final rule affected the estimated cost of implementing the regulation; other changes had no net effect on cost as modeled or are non-quantified costs. This section provides a discussion of the cost of the elements of the final ADWR that changed in comparison to the proposed rule and summarizes the assumptions that have been incorporated into the cost estimates.

The total annualized present value implementation costs at 3 percent and 7 percent discount rates for the rule provisions are shown in Table V-3 for the proposed and final rules. The total estimated annual quantified costs for implementing the ADWR have changed from the proposal costs of \$8.13 million and \$8.24 million (year 2008 dollars, using 3 and 7 percent discount rates, respectively) to \$7.34 million and \$7.25 million (year 2008 dollars, using 3 and 7 percent discount rates, respectively). The costs reported for the ADWR are from Table V-1; the costs for the proposed rule include adjustments for the general cost assumptions and methodology applied to the ADWR (*e.g.*, labor rates), with all costs adjusted to 2008 dollars.

TABLE V-3—COMPARISON OF PROPOSED AND FINAL ADWR TOTAL ANNUALIZED PRESENT VALUE IMPLEMENTATION COSTS  
[\$Millions, 2008\$]

	3% Proposal	3% Final	7% Proposal	7% Final
Implementation .....	0.01	0.01	0.01	0.02
Annual Administration .....	0.25	0.24	0.25	0.23
Monitoring Plan .....	0.002	0.002	0.004	0.003
O&M Plan .....	0.01	0.01	0.02	0.02

TABLE V-3—COMPARISON OF PROPOSED AND FINAL ADWR TOTAL ANNUALIZED PRESENT VALUE IMPLEMENTATION COSTS—Continued  
[\$Millions, 2008\$]

	3% Proposal	3% Final	7% Proposal	7% Final
Coliform Monitoring .....	5.50	4.93	5.57	4.86
Routine Disinfection and Flushing .....	2.21	2.08	2.23	2.05
Corrective Action Disinfection and Flushing .....	0.13	0.05	0.13	0.05
Compliance Audit .....	0.02	0.02	0.02	0.02
Total .....	* 8.13	7.34	* 8.24	7.25

\*For the proposal, the total annualized present value cost at a 3% discount rate is less than at a 7% discount rate by a small amount. Changes in the implementation schedule (later implementation) for the final rule result in a larger calculated difference in present value costs, which results in total annualized present value costs slightly greater at a 3% discount rate than at a 7% rate.

The change in quantified costs between the proposed and final ADWR primarily is due to the additional flexibility in the ADWR provided to air carriers in choosing one of four options for flushing and disinfection frequency. Additional cost savings are due to changes in EPA's estimate of the cost to air carriers for implementation based on the percentage of aircraft that will select each option, the percentage of routine and repeat total coliform monitoring samples that are anticipated to be total coliform-positive, and the options available to air carriers for addressing total coliform-positive test results. These assumptions and regulatory impacts are discussed below and in more detail in the final ADWR Economic Analysis.

The final rule includes an extension of the compliance dates to 18 months after rule publication for the coliform sampling plan, operations and maintenance plan, and the aircraft inventory; the proposed rule specified a 6-month timeframe for these requirements. In addition, the final rule adjusts the timeframe for beginning to conduct sampling and other compliance requirements to 24 months after final rule publication from 12 months specified in the proposed rule. These delays in compliance dates have a slight effect on the timing of the costs represented by the 25-year compliance period captured by these estimates.

There is a one-time cost for reading and understanding the rule, becoming familiar with its provisions, and training employees on the rule. The final ADWR provides a burden allowance for each air carrier to read and understand the rule of eight hours per carrier, increased from two hours per carrier in the proposed rule. This change was made in response to public comments received on the proposed rule which conveyed that air carriers would typically have more than one individual responsible for this aspect of rule implementation.

Commenters expressed concern that the proposed rule burden estimate of a single individual spending two hours to read and understand the rule did not adequately capture the true air carrier needs. In response to those concerns, the Agency assumes, on average, each air carrier will have four staff persons who will need to read and understand the rule at two hours estimated burden for each person. The eight hours per air carrier for staff training is unchanged from the proposed rule.

The coliform monitoring category includes cost estimates for routine sampling and repeat sampling; follow-up coliform monitoring is captured under corrective action disinfection and flushing cost estimates. Each aircraft routine coliform monitoring schedule is determined by the routine disinfection and flushing frequency that should be based on manufacturer's recommendations. EPA is providing air carriers with additional flexibility in the final rule by allowing air carriers to select any of the disinfection and flushing options in the absence of a manufacturer's recommendation. Although the specific routine monitoring frequency to be used by each aircraft is unknown, the Agency made assumptions on the frequencies they would follow and incorporated those assumptions into the cost model. Because selection of an option best suited to other operations and maintenance obligations of the aircraft is anticipated to help minimize flight disruption events but its effect is unknown, it is included in the uncertainties of the cost model.

The assumptions of the percentage of aircraft that would select each of the monitoring frequency options have been adjusted to incorporate the fourth option that is included in the final rule. As discussed previously, the addition of the fourth option for routine disinfection and flushing frequency was in response to public comment, which

would also result in fewer flight disruptions necessary for aircraft water system maintenance needs. For the final rule, the Agency assumed 10 percent of the aircraft would follow monthly monitoring with routine disinfection and flushing one time per year or less; 30 percent would follow monitoring quarterly with routine disinfection and flushing twice per year; 30 percent would follow monitoring twice per year with routine disinfection and flushing 3 times per year; and 30 percent would follow annual monitoring with routine disinfection and flushing on a quarterly basis. The proposed rule assumed 10 percent of the aircraft would monitor monthly, 45 percent quarterly, and 45 percent annually.

Several other provisions in the final rule and their related assumptions affect the estimated cost for coliform monitoring. Those provisions include a reduction of the number of repeat samples to three in the final rule from four in the proposed rule, and allowing repeat sampling if more than one routine sample is total coliform-positive but *E. coli*-negative. The proposed rule limited the option for repeat sampling to situations when no more than one routine sample was total coliform-positive.

The final ADWR utilized the coliform monitoring findings of the air carrier AOCs processed as of December 31, 2008, for estimates of the percentage of routine and repeat samples that are anticipated to be total coliform-positive and *E. coli*-positive. A discussion of the AOCs data is found in section III.B of this notice. For the final rule, a routine sample total coliform-positive rate of 3.6 percent and a repeat sample total coliform-positive rate of 5.7 percent are assumed based on the AOCs results. The proposed rule applied a routine sample rate of 3.1 percent based on data available at the time, and a repeat sample rate of 50 percent.

Assumptions pertaining to the number of corrective action disinfection and flushing events that would be incurred were recalculated based on whether the aircraft was anticipated to already be scheduled for routine disinfection and flushing in the immediate future. In addition, if the water system is physically shut-off to prevent public access to the water system within 24 hours of notification of the need to restrict public access, the final rule removed the requirement that an aircraft with total coliform-positive or *E. coli*-positive water samples must be disinfected and flushed within a prescribed time period.

The Agency assumed, based on comments received on the proposed rule, that air carriers would seek to minimize the number of times unscheduled disinfection and flushing events that would occur and would take advantage of the ability to perform corrective action as part of the routine disinfection and flushing activities. Carriers can do this by scheduling routine sampling just prior to routine disinfection and flushing. Then, if a total coliform- or *E. coli*-positive sample is found, carriers can address the situation immediately through disinfection and flushing that would have occurred anyway, thereby merely adding the step of follow-up sampling to confirm that the flushing and disinfection has resolved the problem. Further, EPA believes that if public access to the water system is physically prevented because the water system is

shut-off, more time is warranted to allow scheduling of the corrective action disinfection and flushing procedure to minimize flight disruptions.

Finally, the estimated reduction in the repeat sample total coliform-positive rate to 5.7 percent in the final rule from 50 percent in the proposed rule affected the anticipated costs for this category because fewer events were expected to be triggered by repeat sample results.

*D. Non-Quantified Costs and Uncertainties*

1. Non-Quantified Costs

Although EPA has estimated the majority of implementation costs of this ADWR, there are some costs that EPA was not able to quantify, such as:

- Air carrier costs due to unanticipated flight interruptions from aircraft water system corrective action maintenance needs. This includes the direct costs related to transporting an aircraft to a maintenance facility for the performance of disinfection and flushing corrective action events and any indirect costs of schedule disruptions or delays if an aircraft must be unexpectedly taken out of service.
- Passenger costs due to flight cancellations or delays related to unanticipated aircraft water system maintenance triggered solely by water quality issues.
- Air carrier costs to provide bottled water due to lack of onboard tap water during a restrict public access event.

- Air carrier customer service response to customer concerns following public notification that the water onboard an aircraft is not to be used for human consumption.

EPA has attempted to minimize costs by building flexibility into the ADWR, including various alternatives from which air carriers select compliance scenarios that best meet their flight schedules and other routine aircraft operations and maintenance needs. The final rule also includes provisions that minimize situations in which an aircraft is taken out of service solely due to drinking water system water quality issues, though this is sometimes necessary to protect consumers from water of unacceptable quality when the system cannot be physically shut-off or the flow of water through the tap(s) cannot be prevented.

Table V-4 presents the number of monitoring and disinfection and flushing events per year estimated for the proposed and final rules. EPA assumes routine coliform monitoring and routine disinfection and flushing of the water system would not disrupt service because the air carrier will incorporate these tasks into the aircraft operations and maintenance program. Only the unanticipated corrective action disinfection and flushing events shown in Column C of the table reflect the events that the Agency estimates could result in unscheduled disruptions to air carriers' schedules for the proposed or final rules.

TABLE V-4—ESTIMATED MONITORING AND DISINFECTION AND FLUSHING EVENTS FOR THE PROPOSED AND FINAL ADWR

	Routine coliform monitoring events/year	Routine disinfection and flushing events/year	Corrective action disinfection and flushing events/year	Total number of disinfection and flushing events/year
	A	B	C	D=B+C
Proposed Rule .....	26,593	20,516	1,175	21,691
Final Rule .....	25,436	20,516	395	20,911

(C) The number of potential unanticipated corrective action disinfection and flushing events is shown for the proposed and final rules. All other disinfection and flushing events, whether based on a routine schedule or in response to monitoring results, would occur during scheduled water system operations and maintenance.

The significant decrease in the number of corrective action disinfection and flushing events in the final ADWR shown in Column C reflects the anticipated practice that air carriers will maximize the scheduling of routine coliform sampling with routine disinfection and flushing. This would likely result in a decrease in unscheduled flight disruptions because total coliform-positive samples may be immediately addressed through water

system disinfection and flushing while the aircraft is already out of service. The final rule allows such disinfection and flushing to count toward both the corrective action and the routine procedures if follow-up total coliform samples required for corrective action are collected. Of the corrective action disinfection and flushing events noted in Column C, an unknown percentage will not disrupt service because the air carrier will either prevent public access

to the water by shutting-off the system, thereby obtaining more flexibility with respect to scheduling and performing the corrective action disinfection and flushing, or will be able to perform the action within the maximum time frame specified by the rule without disrupting service.

2. Uncertainties in Cost Estimates

Many factors contribute to uncertainty in the national cost estimates including:

- Percent of aircraft that will be subject to each total coliform monitoring option.

- Expected results from total coliform monitoring.

- Estimated time for air carrier management to read, understand, and decide how to best comply with the ADWR; and to develop a training program, train staff, and oversee compliance.

- Percent of aircraft that will collect routine total coliform samples while aircraft are out of service for routine maintenance.

- Labor burden necessary for self-inspections above what is necessary for FAA-related inspections.

- Labor burden and costs associated with correcting significant deficiencies that are identified during self-inspections above what is necessary for FAA-related inspections.

For simplicity, EPA assumed for this analysis that all air carriers subject to the final rule will spend equal management time on ADWR requirements, regardless of fleet size or aircraft type. Assuming equal burden for all air carriers to comply with these rule management and oversight requirements could result in an over- or under-estimate of the costs presented. Regarding the expected results for coliform monitoring, EPA assumed that during routine coliform monitoring, each total coliform-positive sample would prompt an action by the air carrier. This assumption potentially over-estimates the number of aircraft that need to undergo disinfection and flushing as corrective action or repeat monitoring in cases where more than one routine sample is total coliform-positive in a given monitoring period. For example, an aircraft with positive samples from both routine sampling points is treated as two corrective actions or repeat sample collection events in the cost model when only one disinfection and flushing event would be necessary in such a case. Also, the number of sample results that prompt corrective action or repeat sampling may decrease over time as air carriers correct problems that lead to total coliform-positive samples.

In developing costs for air carriers to comply with the self-inspection requirements, EPA assumed that with the exception of reporting and record-keeping burden, no additional costs for self-inspections are incurred by air carriers. Labor burden for self-inspections, which involve a thorough review and inspection of an aircraft water system as well as addressing any deficiencies, is already captured under current FAA requirements and therefore

is not included in the cost estimate for this rule. Additionally, EPA has assumed that deficiencies noted during self-inspections will be addressed during routine maintenance, and so has not accounted for costs associated with corrective actions stemming from deficiencies noted during self-inspections. This assumption potentially under-estimates air carrier burden for self-inspections.

## VI. Benefits Analysis

For the proposed rule, EPA conducted and presented a qualitative analysis comparing the risks for each regulatory alternative considered during the regulatory process (73 FR 19338). EPA did not conduct a risk assessment, and the qualitative analyses were not intended to provide any insights into either the nature or the magnitude of possible public health risks that are associated with the consumption of drinking water on aircraft, or with the expected reductions in those public health risks anticipated from implementation of this rule.

As of the time of publication of the final rule, only limited baseline data and partial data collected under the AOCs are available for analysis. Additionally, EPA has found no data on outbreaks of illness caused by drinking water on aircraft. Therefore, EPA has determined that it is not feasible to perform a quantitative relative risk analysis at this time. EPA will continue to assess aircraft water system monitoring data during the Agency's Six-Year review of NPDWRs and evaluate whether additional quantitative analyses represent an opportunity for revisions to the ADWR. (Section 1412 (b)(9) of the Safe Drinking Water Act requires that EPA, no less than every six years, review and if appropriate, revise existing drinking water standards.)

This rule has been developed to protect against disease-causing microbiological contaminants or pathogens through the required development and implementation of aircraft water system operation and maintenance plans that include best management practices, air carrier training requirements, and periodic sampling of the onboard drinking water. Testing drinking water for each individual pathogen is not practical, nor feasible. Instead, water quality and public health professionals use total coliform bacteria as indicator organisms. Total coliforms are a group of closely related, generally harmless bacteria that live in soil and water, as well as in the digestive tracts of animals, and are therefore present in feces. The presence of total coliforms in drinking water

suggests there has been a breach, failure, or other change in the integrity of the drinking water and that there may be fecal pathogens present in the water. Because some total coliform bacteria are naturally found in the environment, their presence in a drinking water distribution system may not indicate the presence of fecal contamination. In order to obtain more information on the likelihood of fecal contamination the total coliform-positive sample is analyzed for *E. coli*, a member of the total coliform group that is more likely to originate from warm-blooded animal fecal contamination.

Although EPA does not have data on outbreaks, that does not mean there is no illness because there is a high rate of underreporting of illnesses caused by drinking water contamination. Illness resulting from consuming contaminated aircraft water would be no exception to underreporting because the population onboard disperses after a flight and even if passengers develop gastrointestinal symptoms within hours of deplaning, they are unlikely to associate the illness with the aircraft water or to contact the air carrier or any government agency to report the illness. The effects of waterborne disease are usually acute, resulting from a single or small number of exposures. Waterborne pathogens are particularly harmful to sensitive populations, such as the immunocompromised, and can sometimes prove fatal.

Routine disinfection and flushing required by this rule is expected to inactivate pathogens and control biofilm which can harbor pathogens in the aircraft water storage tank and distribution system that can contribute to endemic disease. Likewise, disinfection and flushing associated with corrective action is also expected to inactivate pathogens that may have entered the distribution system, resulting in decreased chance of illness. By reducing the potential for illness contracted through exposure to aircraft drinking water, EPA expects that the implementation of the ADWR will reduce the occurrence of illness passed through secondary spread (the spread of a pathogen within a field after the initial or primary infection). Furthermore, EPA expects the additional barriers to pathogens required under the ADWR, including disinfection and flushing combined with monitoring, water system training requirements for air carrier personnel, and restricting public access to drinking water when necessary, will reduce the likelihood of outbreaks associated with aircraft drinking water.

## VII. Statutory and Executive Order Reviews

### A. Executive Order 12866: Regulatory Planning and Review

Under Executive Order (EO) 12866, (58 FR 51735, October 4, 1993), this action is a “significant regulatory action.” Accordingly, EPA submitted this action to the Office of Management and Budget (OMB) for review under EO 12866 and any changes made in response to OMB recommendations have been documented in the docket for this action.

### B. Paperwork Reduction Act

The information collection requirements in this rule have been submitted for approval to the Office of Management and Budget (OMB) under the *Paperwork Reduction Act*, 44 U.S.C. 3501 *et seq.* The information collection requirements are not enforceable until OMB approves them. The Information Collection Request (ICR) document prepared by EPA has been assigned EPA ICR number 2279.02.

EPA requires comprehensive and current information on total coliform monitoring and associated corrective action activities to implement its program oversight and enforcement responsibilities mandated by the Safe Drinking Water Act (SDWA). EPA will use the information collected as a result of this final rule to support the responsibilities directed by SDWA and the implementation of the ADWR in the areas of monitoring and disinfecting and flushing, best management practices, and public notification, while decreasing the risk to public health. The rule requirements described in section IV of this notice are intended to improve the implementation from that of the Total Coliform Rule (TCR) by tailoring the ADWR to fit the unique challenges in the maintenance and operation practices of air carriers, and do not alter the original maximum contaminant level goals or the fundamental approach to controlling total coliform in drinking water.

Section 1401(1)(D) of SDWA requires that there must be “criteria and procedures to assure a supply of drinking water which dependably complies with such maximum contaminant levels; including accepted methods for quality control and testing procedures to insure compliance with such levels and to insure proper operation and maintenance of the system, \* \* \*.” Furthermore, section 1445(a)(1) of SDWA requires that every person who is a supplier of water “shall establish and maintain such records, make such reports, conduct such

monitoring, and provide such information as the Administrator may reasonably require by regulation to assist the Administrator in establishing regulations \* \* \* in determining whether such person has acted or is acting in compliance” with this title.

Section 1412(b) of SDWA, as amended in 1996, requires the EPA to publish maximum contaminant level goals and promulgate NPDWRs for contaminants that may have an adverse effect on the health of persons, are known to or anticipated to occur in public water systems, and, in the opinion of the Administrator, present an opportunity for health risk reduction. The NPDWRs specify maximum contaminant levels or treatment techniques for drinking water contaminants (42 U.S.C. 300g–1). Section 1412(b)(9) requires that EPA, no less than every six years, review and if appropriate, revise existing drinking water standards. Currently, the Total Coliform Rule, which established the regulatory standards (i.e., maximum contaminant level goals and treatment techniques) by which this ADWR is based, is being revised in accordance with the finding of EPA’s first Six-Year Review (68 FR 42907, July 18, 2003). Publication of this final rule complies with these statutory requirements.

### Burden Estimate

The universe of respondents for the Information Collection Request (ICR) for this final rule comprises 63 air carriers that operate approximately 7,327 aircraft water systems, classified as Transient Non-Community Water Systems. The total burden associated with ADWR requirements over the 3 years covered by the ICR is 62,291 hours, an average of 20,764 hours per year. The total cost over the 3-year period is \$7.54 million, an average of \$2.5 million per year (simple average over 3 years). For air carriers, the total burden for the 3-year ICR period is 52,750 hours. The burden per response is .3 hours. During this period air carriers will undertake 179,773 responses. The respondent costs for the same period are \$7.06 million. The labor cost is \$1.90 million. The O&M cost (for sample analysis and shipping) is \$5.16 million. The capital cost is \$4,179. The air carrier average annual respondent burden is 17,583 hours, and the average cost per year is \$2.35 million. The cost per response is \$39. Burden is defined at 5 CFR 1320.3(b).

An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number. The OMB control

numbers for EPA’s regulations in 40 CFR are listed in 40 CFR part 9. When this ICR is approved by OMB, the EPA will publish a technical amendment to 40 CFR part 9 in the **Federal Register** to display the OMB control number for the approved information collection requirements contained in this final rule.

### C. Regulatory Flexibility Act

The Regulatory Flexibility Act (RFA) generally requires an agency to prepare a regulatory flexibility analysis of any rule subject to notice and comment rulemaking requirements under the Administrative Procedure Act or any other statute unless the agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. Small entities include small businesses, small organizations, and small governmental jurisdictions.

The RFA provides default definitions for each type of small entity. Small entities are defined as: (1) A small business as defined by the Small Business Administration’s (SBA) regulations at 13 CFR 121.201; (2) a small governmental jurisdiction that is a government of a city, county, town, school district or special district with a population of less than 50,000; and (3) a small organization that is any “not-for-profit enterprise which is independently owned and operated and is not dominant in its field.” However, the RFA also authorizes an agency to use alternative definitions for each category of small entity, “which are appropriate to the activities of the agency” after proposing the alternative definition(s) in the **Federal Register** and taking comment. 5 U.S.C. 601(3)–(5). In addition, to establish an alternative small business definition, agencies must consult with SBA’s Chief Counsel for Advocacy.

For purposes of assessing the economic impacts of this final rule on small entities, EPA proposed defining “small entity” using the SBA standard as air carriers (NAICS codes 481111 and 481211) having fewer than 1,500 employees (13 CFR 121.201) rather than using the definition EPA has used for small stationary public water systems (“a public water system that serves 10,000 or fewer people”). See 73 FR 19320, April 9, 2008.

The Agency has consulted with the SBA Chief Counsel for Advocacy on using the SBA small business definition of fewer than 1,500 employees for purposes of assessing the economic impacts of this rule on small entities. As a result of this consultation, SBA agrees with the Agency’s approach to the small

entity definition for air carriers for the proposed rule. However, SBA did request that EPA verify that they have captured the entire universe of small entities that may be impacted by the rule. SBA recommended that EPA contact two additional aviation and air transportation associations to determine whether there may be additional entities that may experience a significant economic impact as a result of this proposed rule, which were not accounted for in the Agency's earlier analysis. EPA contacted those associations and they confirmed the Agency's earlier findings from other sources, including the FAA, that EPA had taken into account all available information on the universe of small entities during the Agency's earlier analysis.

The Agency did not receive any comments on the use of this alternative definition of small entity in EPA's proposed rule of April 9, 2008 (73 FR 19320).

Today, EPA is establishing this alternative definition of "small entity" for purposes of its regulatory flexibility assessments under the RFA for this rule, any revisions to this rule, and any future drinking water regulations that address air carriers.

After considering the economic impacts of this final rule on small entities, I certify that this action will not have a significant economic impact on a substantial number of small entities. EPA has determined that the following businesses would be affected by the proposed Aircraft Drinking Water Rule: scheduled passenger air transportation (NAICS 481111) and nonscheduled chartered passenger air transportation (481211). EPA has estimated that 30 of the 63 air carriers subject to this final rule are small businesses. These 30 air carriers represent 48 percent of the universe of air carriers subject to the final rule, and all will be subject to the various provisions.

In evaluating whether this rule will have a significant impact on these small entities, EPA first determined the present value costs of the rule for these air carriers. EPA followed the same methodology as was used to develop the average annualized costs for the rule overall. EPA estimates a total annual implementation cost for all small air carriers of \$524,380 at a 3 percent discount rate and \$521,110 at a 7 percent discount rate. EPA also determined the average annual rule cost per small air carrier of \$17,543 (annualized at 3 percent).

EPA estimates the average annual incremental rule cost for small entities (the difference between the final rule

and the existing NPDWRs (presented as Alternative 1)) is a reduction of \$258,599 at a 3 percent discount rate for compliance with the ADWR. Because the majority of the air carriers are currently subject to the requirements of the AOCs, EPA notes that if the AOCs were considered to be an alternative baseline, the incremental average annual rule cost between the final rule and requirements similar to those of the AOCs, (presented as Alternative 2) is a reduction of \$32,188 (*i.e.*, cost savings).

Recognizing the variation of company sizes within this group, EPA has estimated the average annual incremental cost for small air carriers with fewer than 500 employees and for small air carriers with 500 or more employees. For the 17 air carriers with fewer than 500 employees, the annual incremental cost between the ADWR and Alternative 1 for each air carrier is a reduction of \$78,042 at a 3 percent discount rate, and the annual incremental average rule cost between the ADWR and Alternative 2 is a reduction of \$7,781 at a 3 percent discount rate. For the 13 small air carriers with 500 or more employees, the incremental cost between the ADWR and Alternative 1 for each air carrier is a reduction of \$230,712 at a 3 percent discount rate, and the incremental average rule cost between the ADWR and Alternative 2 is a reduction of \$20,104 at a 3 percent discount rate.

The final rule has been shown to offer a cost reduction over the existing regulations (*i.e.*, baseline), and so the annualized incremental costs are negative. Therefore, EPA has not compared the average annual incremental costs to small entities against the average annual revenue of the small entities as is normally done for this analysis.

Based on this analysis, EPA certifies that the final ADWR will not have a significant impact on a substantial number of small entities; therefore, the Agency did not develop an Initial Regulatory Flexibility Analysis for the rule.

#### *D. Unfunded Mandates Reform Act*

This rule does not contain a Federal mandate that may result in expenditures of \$100 million or more for State, local, and Tribal governments, in the aggregate, or the private sector in any one year. States, local, and Tribal governments will not incur annual costs associated with this final rule since oversight of air carriers (*i.e.*, interstate commerce carriers) is directly implemented by EPA and EPA will incur costs associated with this rulemaking. Thus, this rule is not

subject to the requirements of sections 202 or 205 of UMRA.

For these reasons, this rule is also not subject to the requirement of section 203 of UMRA because it contains no regulatory requirements that might significantly or uniquely affect small governments.

#### *E. Executive Order 13132: Federalism*

Executive Order 13132, entitled "Federalism" (64 FR 43255, August 10, 1999), requires EPA to develop an accountable process to ensure "meaningful and timely input by State and local officials in the development of regulatory policies that have Federalism implications." "Policies that have Federalism implications" is defined in the Executive Order to include regulations that have "substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government."

This final rule does not have Federalism implications. It will not have substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government, as specified in Executive Order 13132. States are not directly affected by any requirements in this rule, since oversight of air carriers (*i.e.*, interstate commerce carriers) is implemented by EPA. Thus, Executive Order 13132 does not apply to this rule.

In the spirit of Executive Order 13132, and consistent with EPA policy to promote communications between EPA and State and local governments, EPA specifically solicited comment on the proposed rule from State and local officials, and the comments can be found in the docket for this rule and is addressed in the Response to Comment document (816-R0-9008).

#### *F. Executive Order 13175: Consultation and Coordination With Indian Tribal Governments*

This action does not have tribal implications as specified in Executive Order 13175 (65 FR 67249, November 9, 2000). The provisions of this final rule apply to all aircraft transient non-community water systems. At present, EPA has not identified any Tribal governments that may be owners/air carriers of such systems. Thus, Executive Order 13175 does not apply to this action.

*G. Executive Order 13045: Protection of Children From Environmental Health and Safety Risks*

This action is not subject to EO 13045 (62 FR 19885, April 23, 1997) because it is not economically significant as defined in EO 12866.

While this final rule is not subject to the Executive Order because it is not economically significant as defined in Executive Order 12866, we nonetheless have reason to believe that the environmental health or safety risk addressed by this action can have an effect on children. This final rule does not change the core Total Coliform Rule requirements in place to assure the protection of children from the effects of contaminants in drinking water. Rather this final rule, which is tailored to meet the specific challenges in the maintenance and operations of aircraft water systems, will improve the implementation of the current provisions under the Total Coliform Rule for aircraft water systems, and thereby, is expected to ensure and enhance more effective protection of public health, including the health of children who are aircraft passengers.

*H. Executive Order 13211: Actions That Significantly Affect Energy Supply, Distribution, or Use*

This action is not a "significant energy action" as defined in Executive Order 13211 (66 FR 18355 (May 22, 2001)), because it is not likely to have a significant adverse effect on the supply, distribution, or use of energy. Additionally, none of the final rule requirements involve installation of treatment or other components that use a measurable amount of energy.

*I. National Technology Transfer and Advancement Act*

Section 12(d) of the National Technology Transfer and Advancement Act of 1995 ("NTTAA"), Public Law 104-113, 12(d) (15 U.S.C. 272 note) directs EPA to use voluntary consensus standards in its regulatory activities unless to do so would be inconsistent with applicable law or otherwise impractical. Voluntary consensus standards are technical standards (e.g., materials specifications, test methods, sampling procedures, and business practices) that are developed or adopted by voluntary consensus standards bodies. NTTAA directs EPA to provide Congress, through OMB, explanations when the Agency decides not to use available and applicable voluntary consensus standards.

This final rule involves voluntary consensus standards in that it would

require monitoring for total coliform and *E. coli*, and monitoring and sample analysis methodologies are often based on voluntary consensus standards. However, the final rule does not change any methodological requirements for monitoring or sample analysis as are indicated in the Total Coliform Rule; only, in some cases, the required frequency and number of samples. Also, EPA's approved monitoring and sampling protocols generally include voluntary consensus standards developed by agencies such as the American National Standards Institute (ANSI) and other such bodies wherever EPA deems these methodologies appropriate for compliance monitoring.

*J. Executive Order 12898: Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations*

Executive Order (EO) 12898 (59 FR 7629, February 16, 1994) establishes Federal executive policy on environmental justice. Its main provision directs Federal agencies, to the greatest extent practicable and permitted by law, to make environmental justice part of their mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations in the United States.

EPA has determined that this final rule will not have disproportionately high and adverse human health or environmental effects on minority or low-income populations because it increases the level of environmental protection for all affected populations without having any disproportionately high and adverse human health or environmental effects on any population, including any minority or low-income population.

This final rule, which is tailored to meet the specific challenges in the maintenance and operations of aircraft water systems, will improve the implementation of the current provisions under the Total Coliform Rule for aircraft water systems, and thereby, is expected to ensure and enhance more effective protection of public health, including any minority or low-income population who are aircraft passengers.

*K. Consultations With the Science Advisory Board, National Drinking Water Advisory Council, and the Secretary of Health and Human Services*

In accordance with sections 1412(d) and 1412(e) of the Safe Drinking Water

Act (SDWA), the Agency consulted with the National Drinking Water Advisory Council (NDWAC or the Council); the Secretary of Health and Human Services; and the Science Advisory Board (SAB), Drinking Water Committee.

EPA met with the SAB's Committee on July 24, 2008, and received comments from the Committee on October 1, 2008. The Committee's comments were valuable and taken into consideration in shaping the future direction of the final ADWR with regards to statistical sampling and hot water tap sampling. As previously mentioned, the majority of the Committee members of EPA's Science Advisory Board were not in favor of statistical sampling of aircraft drinking water quality at this time because the available data is too sparse to interpret results for the whole fleet. The Committee members did indicate that future data collected during implementation of ADWR may provide information on how to stratify samples. In addition, some members of the Committee indicated a preference to sampling cold water taps only; EPA agrees with some Committee members that there may be a potential for the temperature in the hot water taps to kill existing microorganisms, and this might mask whether there is a microbiological problem in the aircraft system. Thus, samples should be taken from cold water taps when they are available, except in the case when only hot water taps are available in the galley. In this case, the galley sample should be taken from the hot water tap because that water is being served to passengers and crew, EPA plans to further discuss tap sampling in its ADWR technical guidance.

The Agency consulted with NDWAC during the Council's May 25-27, 2007, meeting, and consulted with the Council on May 28, 2009. In general, in the May 2007 meeting, NDWAC recommended that EPA consider and request public comment on best management practices (BMPs) and public notification requirements, which may be feasible alternatives for the air carrier industry while providing greater public health protection. EPA has incorporated these recommendations into the ADWR by providing flexible BMP alternatives and timely notification requirements which have been tailored specifically to meet the unique operational characteristics of aircraft public systems and the air carrier industry. During the May 2009 NDWAC meeting, EPA presented the key issues raised by commenters on the proposal and areas of decision faced by the

Agency. No substantive comments were provided by NDWAC.

On August 8, 2007, EPA consulted with the Department of Health and Human Services (HHS) on the proposed rule. EPA also consulted with HHS on the final rule and received a favorable response to the Agency's novel approach and development of the ADWR and no issues were raised as a result of the consultation.

#### L. Plain Language

Executive Order 12866 encourages Federal agencies to write rules in plain language. Whenever possible, EPA wrote the action in active voice, with simplified language, and displayed information in tables to make it easier for the public to read and understand.

#### M. Congressional Review Act

The Congressional Review Act, 5 U.S.C. 801 *et seq.*, as added by the Small Business Regulatory Enforcement Fairness Act of 1996, generally provides that before a rule may take effect, the agency promulgating the rule must submit a rule report, which includes a copy of the rule, to each House of the Congress and to the Comptroller General of the United States. EPA will submit a report containing this rule and other required information to the U.S. Senate, the U.S. House of Representatives, and the Comptroller General of the United States prior to publication of the rule in the **Federal Register**. A Major rule cannot take effect until 60 days after it is published in the **Federal Register**. This action is not a "major rule" as defined by 5 U.S.C. 804(2). This rule will be effective November 18, 2009.

#### N. Analysis of the Likely Effect of Compliance With the ADWR on the Technical, Financial, and Managerial Capacity of Public Water Systems

Section 1420(d)(3) of SDWA, as amended, requires that, in promulgating a NPDWR, the Administrator shall include an analysis of the likely effect of compliance with the regulation on the technical, managerial, and financial (TMF) capacity of regulated entities. This analysis can be found in the Economic and Supporting Analyses document in EPA's public docket. Analyses reflect only the impact of new or revised requirements, as established by the ADWR; the impacts of previously established requirements are not considered.

#### VIII. References

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#### List of Subjects in 40 CFR Part 141

Environmental protection, Chemicals, Indian-lands, Intergovernmental relations, Radiation protection, Reporting and recordkeeping requirements, Water supply.

Dated: October 5, 2009.

**Lisa P. Jackson**,  
Administrator.

■ For the reasons set out in the preamble, title 40, chapter 1 of the Code of Federal Regulations is to be amended as follows:

#### PART 141—NATIONAL PRIMARY DRINKING WATER REGULATIONS

■ 1. The authority citation for part 141 continues to read as follows:

**Authority:** 42 U.S.C. 300f, 300g–1, 300g–2, 300g–3, 300g–4, 300g–5, 300g–6, 300j–4, 300j–9, and 300j–11.

■ 2. Part 141 is amended by adding a new subpart X to read as follows:

#### Subpart X—Aircraft Drinking Water Rule

Sec.

- 141.800 Applicability and compliance date.
- 141.801 Definitions.
- 141.802 Coliform sampling plan.
- 141.803 Coliform sampling.
- 141.804 Aircraft water system operations and maintenance plan.
- 141.805 Notification to passengers and crew.
- 141.806 Reporting requirements.
- 141.807 Recordkeeping requirements.
- 141.808 Audits and inspections.
- 141.809 Supplemental treatment.
- 141.810 Violations.

#### Subpart X—Aircraft Drinking Water Rule

##### § 141.800 Applicability and compliance date.

(a) *Applicability*. The requirements of this subpart constitute the National Primary Drinking Water Regulations for aircraft that are public water systems and that board only finished water for human consumption. Aircraft public water systems are considered transient non-community water systems (TNCWS). To the extent there is a conflict between the requirements in this subpart and the regulatory requirements established elsewhere in this part, this subpart governs.

(b) *Compliance Date*. Aircraft public water systems must comply, unless otherwise noted, with the requirements of this subpart beginning October 19, 2011. Until this compliance date, air carriers remain subject to existing national primary drinking water regulations.

##### § 141.801 Definitions.

As used in this subpart, the term: *Administrator* means the Administrator of the United States Environmental Protection Agency or his/her authorized representative.

*Air Carrier* means a person who undertakes directly by lease, or other arrangement, to engage in air transportation. The air carrier is responsible for ensuring all of the aircraft it owns or operates that are public water systems comply with all provisions of this subpart.

*Aircraft* means a device that is used or intended to be used for flight in the air.

*Aircraft Water System* means an aircraft that qualifies as a public water system under the Safe Drinking Water Act and the national primary drinking water regulations. The components of

an aircraft water system include the water service panel, the filler neck of the aircraft finished water storage tank, and all finished water storage tanks, piping, treatment equipment, and plumbing fixtures within the aircraft that supply water for human consumption to passengers or crew.

*Aircraft Water System Operations and Maintenance Plan* means the schedules and procedures for operating, monitoring, and maintaining an aircraft water system that is included in an aircraft operation and maintenance program accepted by the Federal Aviation Administration. (14 CFR part 43, 14 CFR part 91, 14 CFR part 121)

*Finished Water* means water that is introduced into the distribution system of a public water system and is intended for distribution and consumption without further treatment, except as treatment necessary to maintain water quality in the distribution system (e.g., supplemental disinfection, addition of corrosion control chemicals). (40 CFR 141.2)

*Human Consumption* means drinking, bathing, showering, hand washing, teeth brushing, food preparation, dishwashing, and maintaining oral hygiene.

*Self Inspection* means an onsite review of the aircraft water system, including the water service panel, the filler neck of the aircraft finished water storage tank; all finished water storage tanks, piping, treatment equipment, and plumbing fixtures; and a review of the aircraft operations, maintenance, monitoring, and recordkeeping for the purpose of evaluating the adequacy of such water system components and practices for providing safe drinking water to passengers and crew.

*Watering point* means the water supply, methods, and facilities used for the delivery of finished water to the aircraft. These facilities may include water trucks, carts, cabinets, and hoses.

**§ 141.802 Coliform sampling plan.**

(a) Each air carrier under this subpart must develop a coliform sampling plan covering each aircraft water system owned or operated by the air carrier that identifies the following:

(1) Coliform sample collection procedures that are consistent with the requirements of § 141.803(a) and (b).

(2) Sample tap location(s) representative of the aircraft water system as specified in § 141.803(b)(2) and (b)(4).

(3) Frequency and number of routine coliform samples to be collected as specified in § 141.803(b)(3).

(4) Frequency of routine disinfection and flushing as specified in the operations and maintenance plan under § 141.804.

(5) Procedures for communicating sample results promptly so that any required actions, including repeat and follow-up sampling, corrective action, and notification of passengers and crew, will be conducted in a timely manner.

(b) Each air carrier must develop a coliform sampling plan for each aircraft with a water system meeting the definition of a public water system by April 19, 2011.

(c) The coliform sampling plan must be included in the Aircraft Water System Operations and Maintenance Plan required in § 141.804. Any subsequent changes to the coliform sampling plan must also be included in the Aircraft Water System Operations and Maintenance Plan required in § 141.804.

**§ 141.803 Coliform sampling.**

(a) *Analytical Methodology.* Air carriers must follow the sampling and analysis requirements under this section.

(1) The standard sample volume required for total coliform analysis, regardless of analytical method used, is 100 mL.

(2) Air carriers need determine only the presence or absence of total coliforms and/or *E. coli*; a determination of density of these organisms is not required.

(3) Air carriers must conduct analyses for total coliform and *E. coli* in accordance with the analytical methods approved in § 141.21(f)(3) and 141.21(f)(6).

(4) The time from sample collection to initiation of analysis may not exceed 30 hours. Systems are encouraged but not required to hold samples below 10°C during transit.

(5) The invalidation of a total coliform sample result can be made only by the Administrator in accordance with

§ 141.21(c)(1)(i), (ii), or (iii) or by the certified laboratory in accordance with § 141.21(c)(2).

(6) Certified laboratories. For the purpose of determining compliance with this subpart, samples may be considered only if they have been analyzed by a laboratory certified by a State or EPA. For the purposes of this paragraph, “State” refers to a State or Tribe that has received primacy for public water systems (other than aircraft water systems) under section 1413 of SDWA.

(b) *Routine Monitoring.* For each aircraft water system, the sampling frequency must be determined by the disinfection and flushing frequency recommended by the aircraft water system manufacturer, when available, and as identified in the operations and maintenance plan in § 141.804.

(1) Except as provided in paragraph (b)(2) of this section, the air carrier must collect two 100 mL total coliform routine samples at the frequency specified in the sampling plan in § 141.802 and in accordance with paragraph (b)(3) of this section;

(2) The air carrier may collect one 100 mL total coliform routine sample at the frequency specified in the sampling plan in § 141.802 for aircraft with a removable or portable tank that is drained every day of passenger service, and the aircraft has only one tap. Aircraft meeting the requirements of this paragraph do not have to comply with paragraph (b)(4) of this section.

(3) Air carriers must perform routine monitoring for total coliform at a frequency corresponding to the frequency of routine disinfection and flushing as specified in the Table b–1 (Routine Disinfection and Flushing and Routine Sample Frequencies). Air carriers must follow the disinfection and flushing frequency recommended by the aircraft water system manufacturer, when available. Where the aircraft water system manufacturer does not specify a recommended routine disinfection and flushing frequency, the air carrier must choose a frequency from Table b–1 (Routine Disinfection and Flushing and Routine Sample Frequencies):

TABLE B–1—ROUTINE DISINFECTION AND FLUSHING AND ROUTINE SAMPLE FREQUENCIES

Minimum routine disinfection & flushing per aircraft	Minimum frequency of routine samples per aircraft
At least 4 times per year = At least once within every three-month period (quarterly).	At least 1 time per year = At least once within every twelve-month period (annually).
At least 3 times per year = At least once within every four-month period.	At least 2 times per year = At least once within every six-month period (semi-annually).

TABLE B-1—ROUTINE DISINFECTION AND FLUSHING AND ROUTINE SAMPLE FREQUENCIES—Continued

Minimum routine disinfection & flushing per aircraft	Minimum frequency of routine samples per aircraft
At least 2 times per year = At least once within every six-month period (semi-annually). At least 1 time per year or less = At least once within every twelve-month period (annually) or less.	At least 4 times per year = At least once within every three-month period (quarterly). At least 12 times per year = At least once every month (monthly).

(4) One sample must be taken from a lavatory and one from a galley; each sample must be analyzed for total coliform. If only one water tap is located in the aircraft water system due to aircraft model type and construction, then a single tap may be used to collect two separate 100 mL samples.

(5) If any routine, repeat, or follow-up coliform sample is total coliform-positive, the air carrier must analyze that total coliform-positive culture medium to determine if *E. coli* is present.

(6) Routine total coliform samples must not be collected within 72 hours after completing routine disinfection and flushing procedures.

(c) *Routine Coliform Sample Results.*

(1) Negative Routine Coliform Sample Results. If all routine sample results are total coliform-negative, then the air carrier must maintain the routine monitoring frequency for total coliform as specified in the sampling plan in § 141.802.

(2) Positive Routine *E. coli* Sample Results. If any routine sample is *E. coli*-positive, the air carrier must perform all of the following:

(i) *Restrict Public Access.* Restrict public access to the aircraft water system in accordance with paragraph (d) of this section as expeditiously as possible, but in no case later than 24 hours after the laboratory notifies the air carrier of the *E. coli*-positive result or discovery of the applicable failure as specified in paragraphs (g) and (h) of this section. All public access restrictions, including applicable public notification requirements, must remain in-place until the aircraft water system has been disinfected and flushed and a complete set of follow-up samples is total coliform-negative; and

(ii) *Disinfect and Flush.* Conduct disinfection and flushing in accordance with § 141.804(b)(2). If the aircraft water system cannot be physically disconnected or shut-off, or the flow of water otherwise prevented through the tap(s), then the air carrier must disinfect and flush the system no later than 72 hours after the laboratory notifies the air carrier of the *E. coli*-positive result or discovery of the applicable failure as

specified in paragraphs (g) and (h) of this section; and

(iii) *Follow-up Sampling.* Collect follow-up samples in accordance with paragraph (e) of this section. A complete set of follow-up sample results must be total coliform-negative before the air carrier provides water for human consumption from the aircraft water system and returns to the routine monitoring frequency as specified in the sampling plan required by § 141.802.

(3) Positive Routine Total Coliform Sample Results. If any routine sample is total coliform-positive and *E. coli*-negative, then the air carrier must perform at least one of the following three corrective actions and continue through with that action until a complete set of follow-up or repeat samples is total coliform-negative:

(i) *Disinfect and Flush.* In accordance with § 141.804(b)(2), conduct disinfection and flushing of the system no later than 72 hours after the laboratory notifies the air carrier of the total coliform-positive and *E. coli*-negative result. After disinfection and flushing is completed, the air carrier must collect follow-up samples in accordance with paragraph (e) of this section prior to providing water for human consumption from the aircraft water system. A complete set of follow-up sample results must be total coliform-negative before the air carrier returns to the routine monitoring frequency as specified in the sampling plan required by § 141.802; or

(ii) *Restrict Public Access.* In accordance with paragraph (d) of this section, restrict public access to the aircraft water system as expeditiously as possible, but in no case later than 72 hours after the laboratory notifies the air carrier of the total coliform-positive and *E. coli*-negative result or discovery of the applicable failure as specified in paragraphs (f), (g), and, (i) of this section. All public access restrictions, including applicable public notification requirements, must remain in-place until the aircraft water system has been disinfected and flushed, and a complete set of follow-up samples has been collected. The air carrier must conduct disinfection and flushing in accordance with § 141.804(b)(2). After disinfection

and flushing is completed, the air carrier must collect follow-up samples in accordance with paragraph (e) of this section prior to providing water for human consumption from the aircraft water system. A complete set of follow-up sample results must be total coliform-negative before the air carrier returns to the routine monitoring frequency as specified in the sampling plan required by § 141.802; or

(iii) *Repeat Sampling.* Collect three 100 mL repeat samples no later than 24 hours after the laboratory notifies the air carrier of the routine total coliform-positive and *E. coli*-negative result. Repeat samples must be collected and analyzed from three taps within the aircraft as follows: The tap which resulted in the total coliform-positive sample, one other lavatory tap, and one other galley tap. If fewer than three taps exist, then a total of three 100 mL samples must be collected and analyzed from the available taps within the aircraft water system.

(A) If all repeat samples are total coliform-negative, then the air carrier must maintain the routine monitoring frequency for total coliform as specified in the sampling plan in § 141.802.

(B) If any repeat sample is *E. coli*-positive, the air carrier must perform all the corrective actions as specified in paragraphs (c)(2)(i), (c)(2)(ii), and (c)(2)(iii) of this section.

(C) If any repeat sample is total coliform-positive and *E. coli*-negative, then the air carrier must perform the corrective actions specified in paragraphs (c)(3)(i) or (c)(3)(ii) of this section, and continue through with that action until a complete set of follow-up samples is total coliform-negative.

(d) *Restriction of public access.* Restriction of public access to the aircraft water system includes, but need not be limited to, the following:

(1) Physically disconnecting or shutting off the aircraft water system, where feasible, or otherwise preventing the flow of water through the tap(s);

(2) Providing public notification to passengers and crew in accordance with § 141.805.

(3) Providing alternatives to water from the aircraft water system, such as bottled water for drinking and coffee or

tea preparation; antiseptic hand gels or wipes in accordance with 21 CFR part 333—“Topical Anti-microbial Drug Products for Over-the-Counter Human Use” in the galleys and lavatories; and other feasible measures that reduce or eliminate the need to use the aircraft water system during the limited period before public use of the aircraft water system is unrestricted.

(e) *Post Disinfection and Flushing Follow-up Sampling.* Following corrective action disinfection and flushing, air carriers must comply with post disinfection and flushing follow-up sampling procedures that, at a minimum, consist of the following:

(1) For each aircraft water system, the air carrier must collect a complete set of total coliform follow-up samples consisting of two 100 mL total coliform samples at the same routine sample locations as identified in paragraphs (b)(2) and (b)(4) of this section.

(2) Follow-up samples must be collected prior to providing water to the public for human consumption from the aircraft water system.

(3) If a complete set of follow-up samples is total coliform-negative, the air carrier must return to the routine monitoring frequency for total coliform as specified in the sampling plan required by § 141.802.

(4) If any follow-up sample is *E. coli*-positive, the air carrier must perform all the corrective actions as specified in paragraphs (c)(2)(i), (c)(2)(ii), and (c)(2)(iii) of this section.

(5) If any follow-up sample is total coliform-positive and *E. coli*-negative the air carrier must restrict public access to the aircraft water system in accordance with paragraph (d) of this section as expeditiously as possible, but in no case later than 72 hours after the laboratory notifies the air carrier of the total coliform-positive and *E. coli*-negative result. All public access restrictions, including applicable public notification requirements, must remain in-place until the aircraft water system has been disinfected and flushed in accordance with § 141.804(b)(2) and a complete set of follow-up samples is total coliform-negative. The air carrier must collect follow-up samples in accordance with paragraph (e) of this section. A complete set of follow-up sample results must be total coliform-negative before the air carrier provides water for human consumption from the aircraft water system and returns to the routine monitoring frequency for coliform as specified in § 141.802.

(f) *Failure to Perform Required Routine Disinfection and Flushing or Failure to Collect Required Routine Samples.* If the air carrier fails to

perform routine disinfection and flushing or fails to collect and analyze the required number of routine coliform samples, the air carrier must perform all the corrective actions as specified in paragraph (c)(3)(ii) of this section.

(g) *Failure to Collect Repeat or Follow-up Samples.* If the air carrier fails to collect and analyze the required follow-up samples as a result of an *E. coli*-positive result, then the air carrier must perform all the corrective actions as specified in paragraphs (c)(2)(i), (c)(2)(ii), and (c)(2)(iii) of this section. If the air carrier fails to collect and analyze the required repeat samples or follow-up samples as a result of a total coliform-positive and *E. coli*-negative result, then the air carrier must perform all the corrective actions as specified in paragraph (c)(3)(ii) of this section.

(h) *Failure to Board Water from a Safe Watering Point (E. coli-positive).* For the aircraft water system, the air carrier must perform all the corrective actions specified in paragraphs (c)(2)(i), (c)(2)(ii), and (c)(2)(iii) of this section when it becomes aware of an *E. coli*-positive event resulting from:

(1) Boarding water from a watering point not in accordance with FDA regulations (21 CFR part 1240 subpart E), or

(2) Boarding water that does not meet NPDWRs applicable to transient non-community water systems (§§ 141.62 and 141.63, as applied to TNCWS),

(3) Boarding water that is otherwise determined to be unsafe due to non-compliance with the procedures specified in § 141.804(b)(6).

(i) *Failure to Board Water from a Safe Watering Point (non-E. coli-positive).* For the aircraft water system, the air carrier must perform all the corrective actions specified in paragraphs (c)(3)(ii) of this section when it becomes aware of a non-*E. coli*-positive event resulting from:

(1) Boarding water from a watering point not in accordance with FDA regulations (21 CFR part 1240, subpart E),

(2) Boarding water that does not meet NPDWRs applicable to transient non-community water systems (§§ 141.62 and 141.63, as applied to TNCWS), or

(3) Boarding water that is otherwise determined to be unsafe due to non-compliance with the procedures specified in § 141.804(b)(6).

#### **§ 141.804 Aircraft water system operations and maintenance plan.**

(a) Each air carrier must develop and implement an aircraft water system operations and maintenance plan for each aircraft water system that it owns or operates. This plan must be included

in a Federal Aviation Administration (FAA)-accepted air carrier operations and maintenance program (14 CFR part 43, 14 CFR part 91, 14 CFR part 121).

(b) Each aircraft water system operations and maintenance plan must include the following:

(1) Watering Point Selection Requirement. All watering points must be selected in accordance with Food and Drug Administration (FDA) regulations (21 CFR part 1240, subpart E).

(2) Procedures for Disinfection and Flushing. The plan must include the following requirements for procedures for disinfection and flushing of aircraft water system.

(i) The air carrier must conduct disinfection and flushing of the aircraft water system in accordance with, or is consistent with, the water system manufacturer's recommendations. The air carrier may conduct disinfection and flushing more frequently, but not less frequently, than the manufacturer recommends.

(ii) The operations and maintenance plan must identify the disinfection frequency, type of disinfecting agent, disinfectant concentration to be used, and the disinfectant contact time, and flushing volume or flushing time.

(iii) In cases where a recommended routine disinfection and flushing frequency is not specified by the aircraft water system manufacturer, the air carrier must choose a disinfection and flushing, and corresponding monitoring frequency specified in § 141.803(b)(3).

(3) Follow-up Sampling. The plan must include the procedures for follow-up sampling in accordance with § 141.803(e).

(4) Training Requirements. Training for all personnel involved with the aircraft water system operation and maintenance provisions of this regulation must include, but is not limited to the following:

(i) Boarding water procedures;

(ii) Sample collection procedures;

(iii) Disinfection and flushing procedures;

(iv) Public health and safety reasons for the requirements of this subpart.

(5) Procedures for Conducting Self-inspections of the Aircraft Water System. Procedures must include, but are not limited to, inspection of storage tank, distribution system, supplemental treatment, fixtures, valves, and backflow prevention devices.

(6) Procedures for Boarding Water.

The plan must include the following requirements and procedures for boarding water:

(i) Within the United States, the air carrier must board water from watering

points in accordance with Food and Drug Administration (FDA) regulations (21 CFR part 1240, subpart E).

(ii) A description of how the water will be transferred from the watering point to the aircraft in a manner that ensures it will not become contaminated during the transfer.

(iii) A description of how the carrier will ensure that water boarded outside the United States is safe for human consumption.

(iv) A description of emergency procedures that meet the requirements in § 141.803(h) and (i) that must be used in the event that the air carrier becomes aware that water was boarded to operate essential systems, such as toilets, but was boarded from a watering point not in accordance with FDA regulations, does not meet NPDWRs applicable to transient non-community water systems (§§ 141.62 and 141.63, as applied to TNCWSs), or is otherwise unsafe.

(7) Coliform Sampling Plan. The air carrier must include the coliform sampling plan prepared in accordance with § 141.802.

(8) Aircraft Water System Disconnect/ Shut-off, or Prevent Flow of Water Through the Tap(s) Statement. An explanation of whether the aircraft water system can be physically disconnected/shut-off, or the flow of water otherwise prevented through the tap(s) to the crew and passengers.

(c) For existing aircraft, the air carrier must develop the water system operations and maintenance plan required by this section by April 19, 2011;

(d) For new aircraft, the air carrier must develop the operations and maintenance plan required in this section within the first calendar quarter of initial operation of the aircraft.

(e) Any changes to the aircraft water system operations and maintenance plan must be included in the FAA-accepted air carrier operations and maintenance program.

**§ 141.805 Notification to passengers and crew.**

(a) Air carriers must give public notice for each aircraft in all of the following situations:

(1) Public access to the aircraft water system is restricted in response to a routine, repeat or follow-up total coliform-positive or *E. coli*-positive sample result in accordance with § 141.803(d);

(2) Failure to perform required routine disinfection and flushing or failure to collect required routine samples in accordance with § 141.803(f);

(3) Failure to collect the required follow-up samples in response to a

sample result that is *E. coli*-positive in accordance with § 141.803(g);

(4) Failure to collect the required repeat samples or failure to collect the required follow-up samples in response to a sample result that is total coliform-positive and *E. coli*-negative in accordance with § 141.803(g);

(5) In accordance with § 141.803(h), the air carrier becomes aware of an *E. coli*-positive event resulting from water that has been boarded from a watering point not in accordance with FDA regulations (21 CFR part 1240, subpart E), or that does not meet NPDWRs applicable to transient non-community water systems, or that is otherwise determined to be unsafe due to non-compliance with the procedures specified in § 141.804(b)(6);

(6) In accordance with § 141.803(i), the air carrier becomes aware of a non-*E. coli*-positive event resulting from water that has been boarded from a watering point not in accordance with FDA regulations (21 CFR part 1240, subpart E), or that does not meet NPDWRs applicable to transient non-community water systems, or that is otherwise determined to be unsafe due to non-compliance with the procedures specified in § 141.804(b)(6).

(7) The Administrator, the carrier, or the crew otherwise determines that notification is necessary to protect public health.

(b) Public notification:

(1) Must be displayed in a conspicuous way when printed or posted;

(2) Must not contain overly technical language or very small print;

(3) Must not be formatted in a way that defeats the purpose of the notice;

(4) Must not contain language that nullifies the purpose of the notice;

(5) Must contain information in the appropriate language(s) regarding the importance of the notice, reflecting a good faith effort to reach the non-English speaking population served, including, where applicable, an easily recognized symbol for non-potable water.

(c) Public notification for paragraph (a)(1) of this section must meet the requirements of paragraph (b) of this section in addition to the following:

(1) Public notification must include a prominently displayed, clear statement in each lavatory indicating that the water is non-potable and should not be used for drinking, food or beverage preparation, hand washing, teeth brushing, or any other consumptive use; and

(2) A prominent notice in the galley directed at the crew which includes:

(i) A clear statement that the water is non-potable and should not be used for drinking, food or beverage preparation, hand washing, teeth brushing, or any other consumptive use;

(ii) A description of the violation or situation triggering the notice, including the contaminant(s) of concern;

(iii) When the violation or situation occurred;

(iv) Any potential adverse health effects from the violation or situation, as appropriate, under paragraph (g) of this section;

(v) The population at risk, including sensitive subpopulations particularly vulnerable if exposed to the contaminant in the drinking water;

(vi) What the air carrier is doing to correct the violation or situation; and

(vii) When the air carrier expects to return the system to unrestricted public access.

(3) If passenger access to the water system is physically prevented through disconnecting or shutting off the water, or the flow of water prevented through the tap(s), or if water is supplied only to lavatory toilets, and not to any lavatory or galley taps, then only the notice specified in paragraph (c)(2) of this section is required.

(4) Air carriers must initiate public notification when restriction of public access is initiated in accordance with § 141.803(d) and must continue until the aircraft water system is returned to unrestricted public access.

(d) Public notification for paragraphs (a)(2), (a)(4), and (a)(6) of this section must meet the requirements of paragraph (b) of this section in addition to the following:

(1) Public notification must include a prominently displayed, clear statement in each lavatory indicating that the water is non-potable and should not be used for drinking, food or beverage preparation, hand washing, teeth brushing, or any other consumptive use; and

(2) A prominent notice in the galley directed at the crew which includes:

(i) A clear statement that the water is non-potable and should not be used for drinking, food or beverage preparation, hand washing, teeth brushing, or any other consumptive use;

(ii) A clear statement that it is not known whether the water is contaminated because there was a failure to perform required routine disinfection and flushing; or a failure to perform required monitoring; or water was boarded from a watering point not in accordance with FDA regulations, or that does not meet NPDWRs applicable to transient noncommunity water systems, or that is otherwise determined

to be unsafe due to noncompliance with the procedures specified in § 141.804(b)(6);

(iii) When and where the unsafe water was boarded or when the specific monitoring or disinfection and flushing requirement was not met;

(iv) Any potential adverse health effects from exposure to waterborne pathogens that might be in the water, as appropriate, under paragraph (g) of this section;

(v) The population at risk, including sensitive subpopulations particularly vulnerable if exposed to the contaminant in the drinking water; and

(vi) A statement indicating when the system will be disinfected and flushed and returned to unrestricted public access.

(3) If passenger access to the water system is physically prevented through disconnecting or shutting off the water, or the flow of water prevented through the tap(s), or if water is supplied only to lavatory toilets, and not to any lavatory or galley taps, then only the notice specified in paragraph (d)(2) of this section is required.

(4) Air carriers must initiate public notification when restriction of public access is initiated in accordance with § 141.803(d) and must continue until the aircraft water system is returned to unrestricted public access.

(e) Public notification for paragraphs (a)(3) and (a)(5) of this section must meet the requirements of paragraph (b) of this section in addition to the following:

(1) Public notification must include a prominently displayed, clear statement in each lavatory indicating that the water is non-potable and should not be used for drinking, food or beverage preparation, hand washing, teeth brushing, or any other consumptive use; and

(2) A prominent notice in the galley directed at the crew which includes:

(i) A clear statement that the water is non-potable and should not be used for drinking, food or beverage preparation, hand washing, teeth brushing, or any other consumptive use;

(ii) A clear statement that the water is contaminated and there was a failure to conduct required monitoring; or a clear statement that water is contaminated because water was boarded from a watering point not in accordance with FDA regulations, or that does not meet NPDWRs applicable to transient noncommunity water systems, or that is otherwise determined to be unsafe due to noncompliance with the procedures specified in § 141.804(b)(6);

(iii) A description of the contaminant(s) of concern;

(iv) When and where the unsafe water was boarded or when the specific monitoring requirement was not met;

(v) Any potential adverse health effects from the situation, as appropriate, under paragraph (g) of this section;

(vi) The population at risk, including sensitive subpopulations particularly vulnerable if exposed to the contaminant in the drinking water;

(vii) A statement indicating what the air carrier is doing to correct the situation; and

(viii) When the air carrier expects to return the system to unrestricted public access.

(3) If passenger access to the water system is physically prevented through disconnecting or shutting off the water, or the flow of water prevented through the tap(s), or if water is supplied only to lavatory toilets, and not to any lavatory or galley taps, then only the notice specified in paragraph (e)(2) of this section is required.

(4) Air carriers must initiate public notification when restriction of public access is initiated in accordance with § 141.803(d) and must continue public notification until a complete set of required follow-up samples are total coliform-negative.

(f) Public notification for paragraph (a)(7) of this section must meet the requirements of paragraph (b) of this section in addition to the following:

(1) Notification must be in a form and manner reasonably calculated to reach all passengers and crew while on board the aircraft by using one or more of the following forms of delivery:

(i) Broadcast over public announcement system on aircraft;

(ii) Posting of the notice in conspicuous locations throughout the area served by the water system. These locations would normally be the galleys and in the lavatories of each aircraft requiring posting;

(iii) Hand delivery of the notice to passengers and crew;

(iv) Another delivery method approved in writing by the Administrator.

(2) Air carriers must initiate public notification within 24 hours of being informed by EPA to perform notification and must continue notification for the duration determined by EPA.

(g) In each public notice to the crew, air carriers must use the following standard health effects language that corresponds to the situations in paragraphs (a)(1) through (a)(6) of this section.

(1) Health effects language to be used when public notice is initiated due to the detection of total coliforms only (not

*E. coli*) in accordance with paragraph (a)(1) of this section:

Coliform are bacteria that are naturally present in the environment and are used as an indicator that other, potentially harmful, bacteria may be present. Coliforms were found in [INSERT NUMBER OF SAMPLES DETECTED] samples collected and this is a warning of potential problems. If human pathogens are present, they can cause short-term health effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems.

(2) Health effects language to be used when public notice is initiated due to any *E. coli*-positive routine, repeat, or follow-up sample in accordance with paragraph (a)(1) of this section:

*E. coli* are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short-term health effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems.

(3) Health effects language to be used when public notice is initiated due to a failure to conduct routine monitoring or routine disinfection and flushing in accordance with paragraph (a)(2) of this section; or when there is a failure to conduct repeat or follow-up sampling in accordance with paragraph (a)(4) of this section; or in accordance with paragraph (a)(6) of this section, when the air carrier becomes aware of a non-*E. coli*-positive event that is the result of water that was boarded from a watering point not in accordance with FDA regulations (21 CFR part 1240, subpart E), or that does not meet NPDWRs applicable to transient non-community water systems, or that is otherwise determined to be unsafe due to non-compliance with the procedures specified in § 141.804(b)(6):

Because [REQUIRED MONITORING AND ANALYSIS WAS NOT CONDUCTED], [REQUIRED DISINFECTION AND FLUSHING WAS NOT CONDUCTED] [WATER WAS BOARDED FROM A WATERING POINT NOT IN ACCORDANCE WITH FDA REGULATIONS (21 CR 1240 SUBPART E)], or [OTHER APPROPRIATE EXPLANATION], we cannot be sure of the quality of the drinking water at this time. However, drinking water contaminated with human pathogens can cause short-term health effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems.

(4) Health effects language to be used when public notice is initiated due to a

failure to conduct required follow-up monitoring in response to a sample result that is *E. coli*-positive in accordance with paragraph (a)(3) of this section; or in accordance with paragraph (a)(5) of this section, when the air carrier becomes aware of an *E. coli*-positive event that is the result of water that was boarded from a watering point not in accordance with FDA regulations (21 CFR part 1240, subpart E), or that does not meet NPDWRs applicable to transient non-community water systems, or that is otherwise determined to be unsafe due to non-compliance with the procedures specified in § 141.804(b)(6):

Because required follow-up monitoring and analysis was not conducted after the aircraft water system tested positive for *E. coli*, we cannot be sure of the quality of the drinking water at this time. *E. coli* are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short-term health effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems.

OR

Water was boarded that is contaminated with *E. coli* because [WATER WAS BOARDED FROM A WATERING POINT NOT IN ACCORDANCE WITH FDA REGULATIONS (21 CR 1240 SUBPART E)], or [OTHER APPROPRIATE EXPLANATION]. *E. coli* are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes can cause short-term health effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems.

#### § 141.806 Reporting requirements.

(a) The air carrier must comply with the following requirements regarding reporting of the development of the coliform sampling plan, the operations and maintenance plan, and the disinfection and flushing and coliform sampling frequencies.

(1) The air carrier must report to the Administrator that it has developed the coliform sampling plan required by § 141.802, which covers each existing aircraft water system, as well as report the frequency for routine coliform sampling identified in the coliform sampling plan by April 19, 2011. The air carrier must report to the Administrator that it has developed its operations and maintenance plan required by § 141.804 and report the frequency for routine disinfection and flushing by April 19, 2011;

(2) For each new aircraft meeting the definition of an aircraft water system, which becomes operational after publication of this subpart, the air carrier must report to the Administrator that it has developed the coliform sampling plan required by § 141.802, as well as report the frequency for routine coliform sampling identified in the coliform sampling plan, within the first calendar quarter of initial operation of the aircraft. The air carrier must report to the Administrator that it has developed the aircraft water system operations and maintenance plan required by § 141.804, and report the frequency for routine disinfection and flushing within the first calendar quarter of initial operation of the aircraft.

(b) The air carrier must report the following information to the Administrator:

(1) A complete inventory of aircraft that are public water systems by April 19, 2011. Inventory information includes, at a minimum, the following:

(i) The unique aircraft identifier number;

(ii) The status (active or inactive) of any aircraft as an aircraft water system as defined in § 141.801;

(iii) The type and location of any supplemental treatment equipment installed on the water system; and

(iv) Whether the aircraft water system can be physically disconnected or shut-off, or the flow of water prevented through the tap(s).

(2) Changes in aircraft inventory no later than 10 days following the calendar month in which the change occurred. Changes in inventory information include, at a minimum, the following:

(i) Change in the unique identifier number for any new aircraft, or any aircraft removed from the carrier's fleet;

(ii) Change in status (active or inactive) of any aircraft as an aircraft water system as defined in § 141.801; and

(iii) Change to the type and location of any supplemental treatment equipment added to or removed from the water system.

(iv) Change to whether the aircraft water system can be physically disconnected or shut-off, or the flow of water prevented through the tap(s).

(3) All sampling results no later than 10 calendar days following the monitoring period in which the sampling occurred. The monitoring period is based on the monitoring frequency identified in the coliform sampling plan required under § 141.802. Routine disinfection and flushing events must be reported no later than 10

calendar days following the disinfection and flushing period in which the disinfection and flushing occurred. The disinfection and flushing period is based on the frequency identified in the operations and maintenance plan required under § 141.804.

(4) All events requiring notification to passengers or crew, or non-routine disinfection and flushing, or non-routine sampling, within 10 days of the event (e.g., notification of positive sample result by laboratory), including information on whether required notification was provided to passengers or crew or both.

(5) Failure to comply with the monitoring or disinfection and flushing requirements of this subpart within 10 calendar days of discovery of the failure.

(6) Changes in disinfection and flushing and coliform sampling frequencies no later than 10 days following the calendar month in which the change occurred. Changes to an aircraft's routine coliform sampling frequency and routine disinfection and flushing frequency must be included in the aircraft water system operation and maintenance plan that is included in the air carrier operations and maintenance program accepted by FAA in accordance with § 141.804.

(c) The air carrier must provide evidence of a self-inspection to the Administrator within 90 days of completion of the self-inspection required under § 141.808(b), including reporting whether all deficiencies were addressed in accordance with § 141.808(c). The air carrier must also report to the Administrator within 90 days that any deficiency identified during a compliance audit conducted in accordance with § 141.808(a) has been addressed. If any deficiency has not been addressed within 90 days of identification of the deficiency, the report must also include a description of the deficiency, an explanation as to why it has not yet been addressed, and a schedule for addressing it as expeditiously as possible.

(d) All information required to be reported to the Administrator under this subpart must be in an electronic format established or approved by the Administrator. If an air carrier is unable to report electronically, the air carrier may use an alternative approach that the Administrator approves.

#### § 141.807 Recordkeeping requirements.

(a) The air carrier must keep records of bacteriological analyses for at least 5 years and must include the following information:

(1) The date, time, and place of sampling, and the name of the person who collected the sample;

(2) Identification of the sample as a routine, repeat, follow-up, or other special purpose sample;

(3) Date of the analysis;

(4) Laboratory and person responsible for performing the analysis;

(5) The analytical technique/method used; and

(6) The results of the analysis.

(b) The air carrier must keep records of any disinfection and flushing for at least 5 years and must include the following information:

(1) The date and time of the disinfection and flushing; and

(2) The type of disinfection and flushing (*i.e.*, routine or corrective action).

(c) The air carrier must keep records of a self-inspection for at least 10 years and must include the following information:

(1) The completion date of the self-inspection; and

(2) Copies of any written reports, summaries, or communications related to the self-inspection.

(d) The air carrier must maintain sampling plans and make such plans available for review by the Administrator upon request, including during compliance audits.

(e) The air carrier must maintain aircraft water system operations and maintenance plans in accordance with FAA requirements, and make such plans available for review by the Administrator upon request, including during compliance audits.

(f) The air carrier must keep copies of public notices to passengers and crew issued as required by this subpart for at least 3 years after issuance.

#### § 141.808 Audits and inspections.

(a) The Administrator may conduct routine compliance audits as deemed necessary in providing regulatory oversight to ensure proper implementation of the requirements in this subpart. Compliance audits may include, but are not limited to:

(1) Bacteriological sampling of aircraft water system;

(2) Reviews and audits of records as they pertain to water system operations and maintenance such as log entries, disinfection and flushing procedures, and sampling results; and

(3) Observation of procedures involving the handling of finished water, watering point selection, boarding of water, operation, disinfection and flushing, and general maintenance and self-inspections of aircraft water system.

(b) Air carriers or their representatives must perform a self-inspection of all water system components for each aircraft water system no less frequently than once every 5 years.

(c) The air carrier must address any deficiency identified during compliance audits or routine self-inspections within 90 days of identification of the deficiency, or where such deficiency is identified during extended or heavy maintenance, before the aircraft is put back into service. This includes any deficiency in the water system's design, construction, operation, maintenance, or administration, as well as any failure or malfunction of any system component that has the potential to cause an unacceptable risk to health or that could affect the reliable delivery of safe drinking water.

#### § 141.809 Supplemental treatment.

(a) Any supplemental drinking water treatment units installed onboard existing or new aircraft must be acceptable to FAA and FDA; and must be installed, operated, and maintained in accordance with the manufacturer's plans and specifications and FAA requirements.

(b) Water supplemental treatment and production equipment must produce water that meets the standards prescribed in this part.

#### § 141.810 Violations.

An air carrier is in violation of this subpart when, for any aircraft water system it owns or operates, any of the following occur:

(a) It fails to perform any of the requirements in accordance with § 141.803 or § 141.804.

(b) It has an *E. coli*-positive sample in any monitoring period (routine and repeat samples are used in this determination).

(c) It fails to provide notification to passengers and crew in accordance with § 141.805.

(d) It fails to comply with the reporting and recordkeeping requirements of this subpart.

(e) It fails to conduct a self-inspection or address a deficiency in accordance with § 141.808.

(f) It fails to develop a coliform sampling plan in accordance with § 141.802, or fails to have and follow an operations and maintenance plan, which is included in a FAA accepted program in accordance with § 141.804.

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