

Aircraft Drinking Water Rule Training



Outline of ADWR Training

- Key Aspects of the ADWR
- Coliform Monitoring and Sampling Plans
- Operation and Maintenance Plans
- Public Notification
- Reporting and Recordkeeping
- Supplemental Treatment
- Violations of the Rule
- ADWR Reporting & Compliance System
 - Updates, changes, and things you should know
- Demo FDA's Internet Accessible Aircraft Watering Point List
- Additional Discussion, Questions & Answers

US EPA ADWR Training

ADWR Requirements Training

- November 2010 & Spring 2011
- Discuss details of ADWR requirements and implementation

ADWR Reporting and Compliance System (ARCS) Training

- Spring 2011 – Phase II of ARCS
 - Demonstrate reporting and compliance tools and Web User Interface
 - Discuss data elements
 - Discuss compliance determination functions (i.e. violations, enforcement)

3

Key Aspects of the Final Aircraft Drinking Water Rule: Overview

4

ADWR Overview

- Legal Authority
- Purpose of the ADWR
- Public Health and Safety Reasons for ADWR
- Applicability
- Classification of Aircraft Water Systems
- Aircraft Water Quality
- Aircraft Water Supply and Transfer Chain
- Components of the Aircraft Water System
- Public Health Protection Measures
- Compliance Dates
- Aircraft Status as 'Active' or 'Inactive'
- EPA HQ and Regions - Compliance Oversight Roles and Responsibilities

5

The goal of this training is to discuss these key aspects of the ADWR.

Legal Authority

- Aircraft classified as public water systems are subject to the requirements of the Safe Drinking Water Act (SDWA)
 - SDWA requires EPA to set standards for drinking water quality
 - Standards are National Primary Drinking Water Regulations (NPDWRs)
 - NPDWRs written for stationary public water systems have proven difficult to implement for aircraft

6

Aircraft classified as public water systems are subject to the requirements of the Safe Drinking Water Act (SDWA). Under SDWA, the US EPA sets national health-based standards for drinking water quality and enforcement of those standards. The health-based standards are National Primary Drinking Water Regulations (NPDWRs). NPDWRs include maximum allowable levels of contaminants, treatment requirements, and monitoring and reporting requirements.

Until the ADWR was developed, safe drinking water regulations had been written with traditional stationary public water systems in mind. Examples of stationary public water systems include large municipal utilities and schools and restaurants that are served by their own sources of water. The regulations for stationary systems have proven difficult to implement for aircraft due to the unique characteristics of aircraft water systems. For example, aircraft operate under rigorous flight schedules, fly to multiple destinations over the course of one day, and may board drinking water at many of these locations.

Purpose of the ADWR

- Ensure that a safe and reliable supply of drinking water is provided to aircraft passengers and crew by...
 - Making it feasible for air carriers to comply with the Safe Drinking Water Act and the National Primary Drinking Water Regulations; and
 - Tailoring the NPDWRs to the unique characteristics of aircraft water systems



7

The primary purpose of the Aircraft Drinking Water Rule (ADWR or Rule) is to ensure that a safe and reliable supply of drinking water is provided to aircraft passengers and crew. The Rule applies to aircraft that are public water systems (PWSs) and requires that the water provided through lavatory and galley faucets and drinking fountains on the aircraft must meet standards for human consumption. The ADWR does not require that water be provided on an aircraft.

The ADWR tailors drinking water regulations to provide a feasible way for air carriers to comply with NPDWRs. The ADWR adapts to aircraft water systems the applicable requirements of the Total Coliform Rule, the suite of Surface Water Treatment Rules, the Maximum Residual Disinfectant Level (MRDL) for chlorine dioxide, and the Public Notification Rule of the NPDWRs.

Public Health and Safety Reasons for the ADWR

- The requirements of the ADWR are intended to enhance the protection of public health against illness resulting from waterborne contaminants that cause acute health effects.
 - Acute health effects occur within a short time period after exposure to the contaminant.
- Contaminants causing acute health effects include, but are not limited to:
 - Chemical contaminants - nitrate and nitrite, and
 - Microbiological contaminants - bacteria, viruses, and protozoan parasites

8

In addition to acute contaminants, public water systems that provide water to residential or non-transient users must also meet regulations for contaminants that cause illness after long-term exposure. Most public water systems from which aircraft obtain their water will be required to meet these more stringent regulations.

Public Health and Safety Reasons for the ADWR, cont.

- The ADWR provides an upfront barrier against these contaminants by requiring that only finished water be boarded from safe watering points.
- This means that these contaminants have been controlled by the “parent” water system serving the airport watering point.

9

Finished water is ready for human consumption without further treatment, except as necessary to maintain the quality of water in the distribution system. The ADWR assumes that no additional treatment is necessary for aircraft water systems if finished water is boarded.

Public Health and Safety Reasons for the ADWR, cont.

- However, microbiological contamination can enter the aircraft water system through a variety of pathways and can be harbored within the water system.
 - The frequent boarding of water via temporary connections using water cabinets, carts, trucks, and hoses provides multiple opportunities for contamination during the water transfer process.
 - Inadequate maintenance of the water system and physical deficiencies in the system can allow contaminant entry.
 - Biofilm growth within the aircraft water system can harbor disease-causing organisms.

10

Preventing microbiological contamination is the emphasis of the ADWR, because it is extremely unlikely chemical contamination will occur during the water transfer process or through deficiencies in the aircraft water system.

Public Health and Safety Reasons for the ADWR, cont.

- The ADWR includes requirements that are meant to ensure that..
 - Only safe water is boarded onto the aircraft,
 - Contamination is prevented during boarding,
 - Onboard water quality is ensured through proper training, operation, maintenance, monitoring, inspection, and oversight of the aircraft water system, and
 - Passengers and crew are protected from and/or notified when the aircraft water system contains contaminated water or water of unknown quality.

11

ADWR Applicability to Aircraft

- Meet the definition of a public water system:
 - Provide piped water for human consumption
 - Human consumption includes drinking, bathing, showering, hand washing, teeth brushing, food preparation, dishwashing.
 - Regularly serve an average of at least 25 individuals daily at least 60 days/year

12

This rule applies to aircraft that meet the definition of a public water system. That is, an aircraft must have an onboard water system that provides water to the public for human consumption through pipes, and regularly serves an average of at least 25 individuals daily, at least 60 days out of the year.

Piped water for human consumption means the onboard water system provides water through taps (e.g., in a galley, a lavatory, or drinking fountain). The onboard water can be supplied to the aircraft via a fill port and piping, or by a removable tank.

Human consumption means drinking, bathing, showering, hand washing, teeth brushing food preparation, dishwashing.

ADWR Applicability to Aircraft, cont.

- Board only finished water
 - Finished water is intended for human consumption without further treatment, except as necessary to maintain water quality.
 - Aircraft that board less than finished water-quality must meet all of the applicable NPDWRs for a TNCWS (*defined later*) using surface water and serving 25 to 1,000 persons

13

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).

Aircraft that board water of less than finished quality must comply with all the applicable NPDWRs for treatment (i.e., provide filtration and disinfection and sample for Total Coliform and disinfectant residual monthly, Nitrate and Nitrite annually, and daily turbidity monitoring.)

ADWR Applicability to Aircraft, cont.

- Aircraft PWSs within U.S. jurisdiction
 - Aircraft (regardless of ownership) that fly routes between two or more locations within the US, while the aircraft is within US jurisdiction
- Aircraft PWSs that convey passengers in interstate commerce cannot be excluded from regulation

14

The ADWR applies to aircraft that fly international routes with two or more destinations within U.S. jurisdiction.

Aircraft that fly international routes that make only one stop in the U.S. solely for the purpose of unloading passengers transported from outside the U.S. and/or loading passengers for transportation to a destination outside the U.S. are excluded from ADWR regulations. Thus, under the ADWR, if an aircraft serves two or more U.S. destinations before returning to an international location, the aircraft is subject to the ADWR.

Classification of Aircraft Public Water Systems

- Classified as transient non-community water systems (TNCWS)
 - Does not regularly serve at least 25 of the same persons over six months per year.
 - Must address contaminants causing acute health effects

15

Aircraft public water systems are regulated as transient non-community water systems because they are non-community water systems that do not regularly serve at least 25 the same people over six months per year.

Since aircraft public water systems serve a transient population, they are subject only to regulations that address contaminants that cause acute health effects.

Aircraft Water Quality

- Depends on a number of factors including:
 - Quality of the water to be boarded
 - Care used to board the water
 - Water transfer equipment sanitary condition
 - O&M of the onboard water system

16

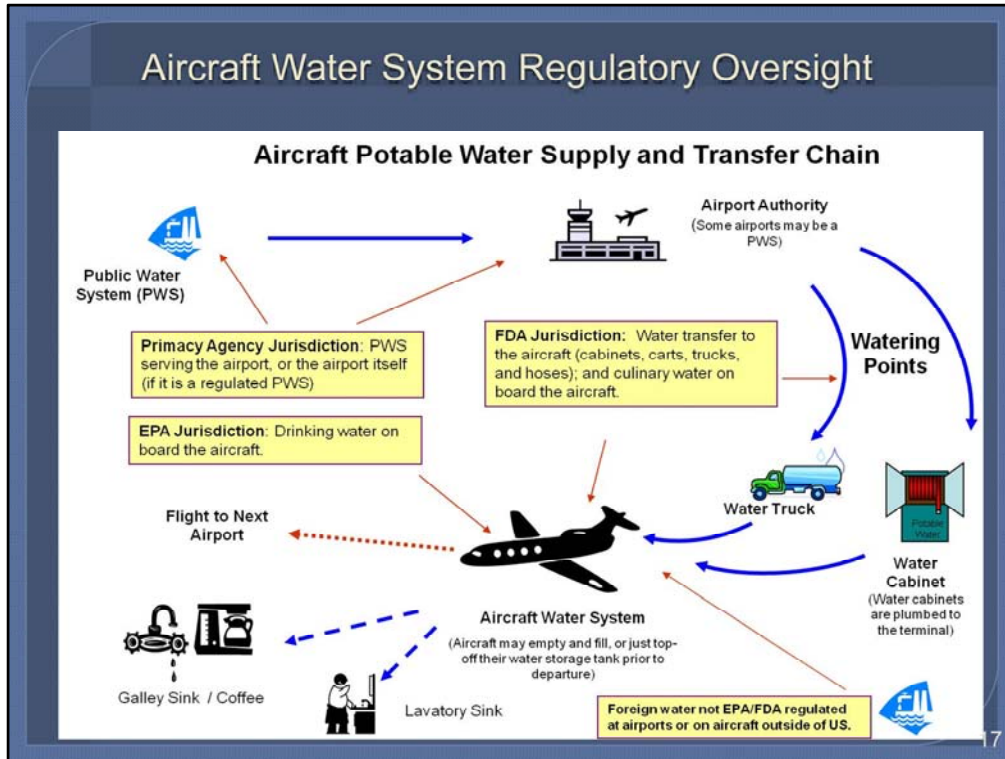
Because aircraft board water from multiple airport watering points via temporary connections often more than once a day, each water boarding event provides additional opportunities for contamination of the onboard water system.

Basically, the water quality depends on several factors. These factors include

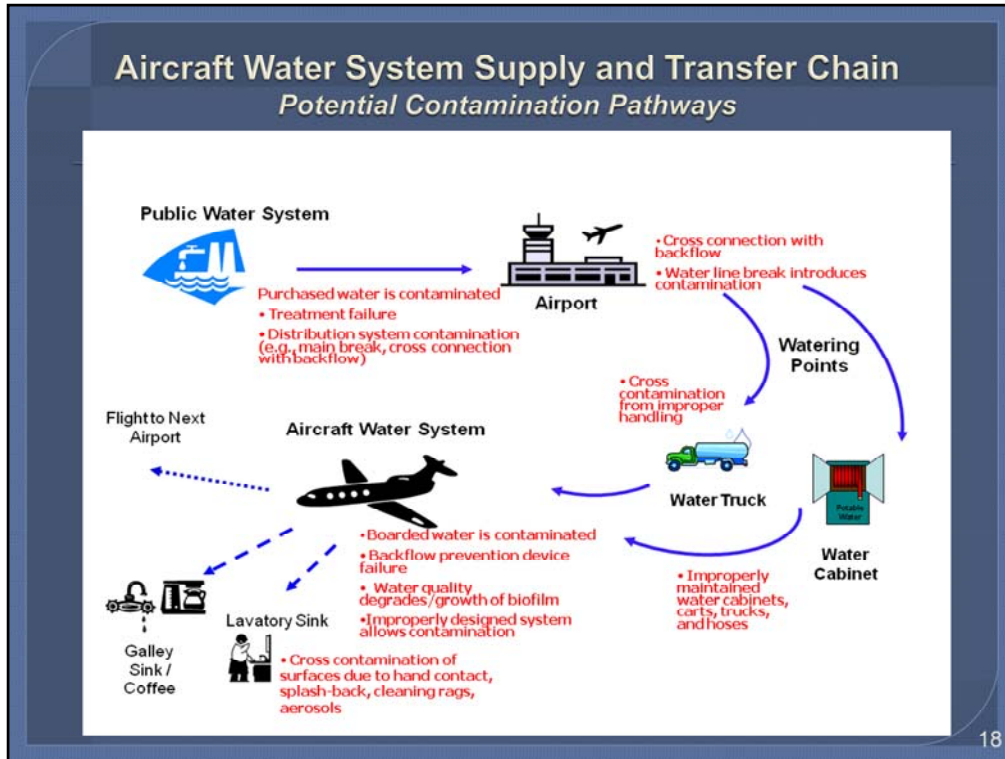
- the quality of the water boarded from each source,
- the care used to board the water,
- the condition of the water transfer equipment (such as water cabinets, trucks, carts, and hoses), and
- the operation and maintenance (O&M) of the onboard water system.

Let's take a look at the next slide, which is a graphic of the Aircraft Water System Supply and Transfer Chain and the *Potential Contamination Pathways*

Aircraft Water System Regulatory Oversight



This slide illustrates where the various jurisdictions lie among agencies that jointly regulate drinking water safety with EPA.



This diagram is also found on page 17 of the October 2010 *Guidance Manual for the Aircraft Drinking Water Rule – Interim Final*

Aircraft Water Supply and Transfer Chain

- EPA and FDA regulations complement each other
 - Address each of these factors in order to prevent possible contamination
- “Parent” Public Water System
 - Required to meet NPDWRs
 - Must notify customers when not in compliance with standards
 - Non-compliance with acute contaminants requires notification within 24 hours of learning of the violation

19

The ADWR, along with complementary U.S. Food and Drug Administration (FDA) regulations, addresses each of these factors in order to safeguard against possible contamination and to ensure that the water is suitable for human consumption.

Public Water System

The Public Water System is required by the NPDWRs to provide a reliable quality and quantity of finished water to all consumers. They must perform monitoring and must comply with reporting and recordkeeping requirements to document the quality of the water provided.

The ADWR requirements for finished water to be boarded are intended to ensure water will be available for boarding that is fully in compliance with drinking water quality standards. However, treatment failures or events within the distribution system of the public water system could result in contamination of the water supplied to the airport or watering point.

In the event the public water system that provides the water to be boarded is not in compliance with standards, it is required by the NPDWRs to notify all of its customers, which would include airport authorities and/or air carriers. Violations of drinking water standards for acute contaminants (which are the contaminants addressed by the ADWR) require notification to consumers within 24 hours of learning of the violation.

Aircraft Water Supply and Transfer Chain, cont.

- Airport Watering Points
 - Regulated by FDA
 - Inspections by FDA to ensure regulations are enforced
- Aircraft Water System
 - FDA approves design
 - Regulated by ADWR
 - Contamination can occur during boarding process or from stagnation in aircraft water system
 - Routine D&F and other O&M requirements are intended to ensure water quality is maintained

20

Airport Watering Points

Finished water from a regulated public water system is delivered to the airport and is accessible to aircraft and water service providers at watering points that are in accordance with FDA regulations [21 CFR 1240.83]. Water is transferred to the aircraft storage tank either by a direct hose connection from a water cabinet mounted on the terminal building, a mobile truck, or a cart, depending on the aircraft's relative location to the watering point.

FDA regulations for interstate carrier conveyance watering points require that the water supply meets the NPDWRs [21 CFR 1240.83]. FDA requirements also ensure that the methods and sanitary conditions for delivery of the water to the aircraft prevent the introduction, transmission, or spread of communicable diseases [21 CFR 1250.63]. FDA administers and enforces these requirements through inspections. FDA inspects watering points to ensure they are clean and sanitary. Potable water nozzles and hoses are inspected to ensure they are the appropriate size ($\frac{3}{4}$ " or less in diameter) to avoid any cross contamination with a sewage system. Also, the nozzles are protected with a cover when not in use and the hose has a 6" diameter ball or disk located near the nozzle to keep the nozzle off the ground should the hose be dropped. During inspections, FDA reviews maintenance logs to verify that hoses and nozzles are sanitized on a monthly basis.

Because watering points and servicing areas for aircraft are regulated by FDA, the ADWR does not duplicate the FDA program. The ADWR aligns with the FDA program by requiring the aircraft water system operations and maintenance (O&M) plan to include procedures for boarding water that ensure the water will not become contaminated during transfer.

Aircraft Water System

The FDA approves the design of aircraft water systems [21 CFR 1250.41], treatment systems [21 CFR 1240.90], and requires that interstate carrier conveyances provide only potable water for drinking and culinary purposes [21 CFR 1240.80]. FDA's definition of potable water [21CFR1240.3] requires meeting EPA's NPDWRs.

Although protection measures exist for the boarding of water, the opportunity exists for microbiological organisms to be introduced during the process of boarding water. Contamination of the aircraft water system by microbiological or chemical contaminants can occur inadvertently if water is boarded onto an aircraft that is not known at the time to be in violation of drinking water standards, or if water that does not meet standards is knowingly boarded to operate essential systems such as toilets. Water quality can also deteriorate if water is held in the airport's distribution system or in the aircraft's water system for too long. As the water ages, coliform bacteria and other bacteria, although generally harmless, can accumulate on pipe and storage tank interior surfaces forming biofilm, a layer of microorganisms that can provide shelter for pathogens if they were to enter the system.

Routine disinfection and flushing procedures and other O&M requirements are intended to control biofilm growth and ensure water quality is maintained.

Components of the Aircraft Water System

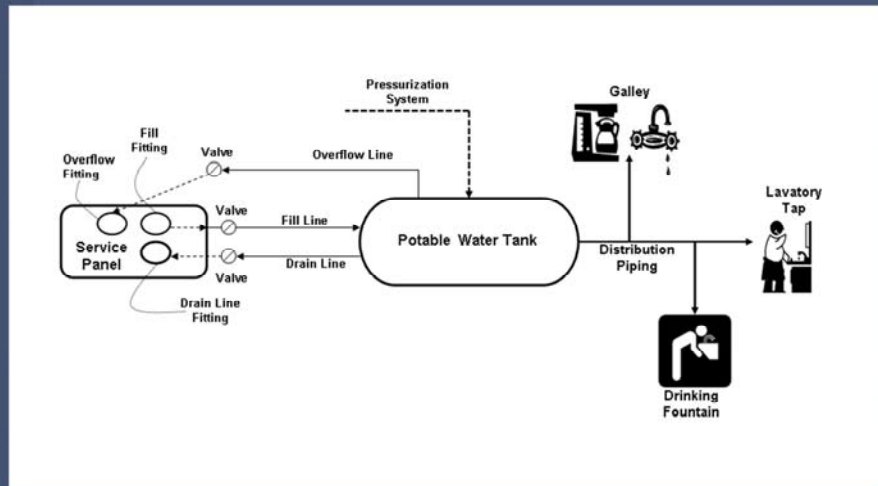
- Water service panel
- Filler neck of the aircraft finished water storage tank
- Onboard water storage tank(s)
- Piping
- Supplemental treatment equipment
- Galley and lavatory faucets
- Other plumbing fixtures that supply water to passengers or crew



21

The ADWR applies only to the onboard water system. The components of an aircraft water system include the water service panel, the filler neck of the aircraft finished water storage tank, the onboard water storage tank(s), piping, treatment equipment, galley and lavatory faucets, and any other plumbing fixtures that supply water to passengers or crew. These components are included in the definition of an aircraft water system in 40 CFR 141.801.

Components of the Aircraft Water System, cont.



22

This diagram illustrates the components of an aircraft water system as covered by the ADWR.

The components include the lavatory taps, all faucets and all fixtures, as well as the taps providing hot water to coffee makers or the hot water tap in the galley.

Public Health Protection Measures

- Water System O&M and Coliform Sampling Plans
 - Routine Disinfection and Flushing based on manufacturer recommendations
 - Routine Coliform Sampling based on frequency of D&F
- Boarding Water Procedures
- Training Requirements
- Corrective Action
- Public Notification
- Self-Inspections
- EPA compliance audits
- Reporting and Recordkeeping
- Violations for Failure to Comply

23

It is impractical for aircraft to monitor the water for microbiological contaminants every time water is boarded because several samples may be necessary in one day for some aircraft, and coliform bacteria analytical results would not be available for at least 24 hours after sample analysis has begun. Therefore, results would not be known until long after the water was consumed.

To provide meaningful public health protection, the ADWR requires air carriers to board only finished water and to develop a comprehensive O&M plan with a Coliform Sampling Plan for each aircraft water system to minimize opportunities for contamination. The plan must include procedures for routine disinfection and flushing, which must be performed at frequencies recommended by the aircraft water system manufacturer. Periodic testing for total coliform bacteria is required to confirm the effectiveness of O&M procedures. The plan must also include procedures for safely boarding water. The ADWR also identifies minimum training content and requires training of key personnel [40 CFR 141.804].

In the event that an air carrier becomes aware of contamination on an aircraft, the ADWR requires corrective action and public notification of passengers and/or crew, when appropriate.

In addition to the O&M plan, the ADWR requires self-inspections by air carriers of each aircraft water system and provides for EPA compliance audits. Lastly, the Rule requires reporting and recordkeeping to facilitate compliance tracking and Rule implementation.

Compliance Dates

- By April 19, 2011, each air carrier must report
 - A complete inventory of existing aircraft
 - That it has developed a coliform sampling plan and an operations and maintenance plan that cover each existing aircraft
 - The frequency for routine coliform sampling and routine D&F for each existing aircraft
- By October 19, 2011, air carriers must comply with all remaining requirements including
 - Conducting and reporting routine D&F and routine sampling

24

The two important compliance dates for the ADWR are April 19, 2011 and October 19, 2011.

Each air carrier must report their entire inventory of existing aircraft to EPA by April 19, 2011, and must also report that it has developed a sampling plan and O&M plan. It must also report the frequency for routine sampling, and for disinfection and flushing.

By October 19, 2011, air carriers must comply with all remaining requirements.

Aircraft Water System Operating Status

- For purposes of compliance determination, aircraft water systems may be designated as either active or inactive in the ADWR Reporting and Compliance System (ARCS)
- Active Status
 - Aircraft water system is in normal operation providing water service to passengers and crew

25

Active status refers to time periods during which an aircraft water system is in normal operation (i.e., the aircraft is flying routes in the U.S.). EPA anticipates that this will be the default for most of the operating life of an aircraft water system.

Aircraft Water System Operating Status, cont.

○ Inactive Status

- **Passenger access to the water system must be prevented by**

- (1) disconnecting or shutting off the water,
- (2) preventing the flow of water through the tap(s);
- (3) allowing water to be supplied only to lavatory toilets, and not to any lavatory or galley tap; or
- (4) removing the aircraft from passenger service;

- **To avoid a violation being issued**

- Aircraft water system must be identified in ARCS as “inactive” by the end of the compliance period in which the monitoring or disinfection and flushing requirement is due to be performed; AND
- Any missed requirements must be performed prior to the aircraft water system serving water to the public

26

There may be some periods within the operating life of the aircraft where the aircraft water system may be considered inactive. In order for an aircraft to be considered “inactive” for purposes of compliance determination under the ADWR, the following conditions must be met: [READ SLIDE]

Compliance Oversight Responsibilities: EPA HQ and EPA Regions

• EPA HQ will...

- Develop national implementation documents and provide applicable training
- Manage and maintain the national ADWR website
- Manage and maintain the ADWR Reporting and Compliance System (ARCS)
- Provide technical assistance to air carriers
- Generate violations and develop compliance reports for EPA Region review

27

Compliance Oversight Responsibilities: EPA HQ and EPA Regions

National ADWR website

water.epa.gov/lawsregs/rulesregs/sdwa/airlinewater/index.cfm

ADWR Reporting and Compliance System
(ARCS)

water.epa.gov/lawsregs/rulesregs/sdwa/airlinewater/reporting.cfm

28

Compliance Oversight Responsibilities: EPA HQ and EPA Regions, cont.

- EPA Regions will:
 - Directly implement the ADWR for air carriers within their region
 - Serve as the primary program contact for air carriers
 - Provide compliance and technical assistance
 - Review ARCS compliance reports and provide follow-up action with air carriers
 - Determine and conduct enforcement actions
 - Conduct compliance audits as deemed necessary

NOTE: Jurisdiction is determined by the Region in which the air carrier is headquartered

29

US EPA Regions



EPA has ten regional offices across the country, each will directly implement the ADWR with the air carriers. *Jurisdiction determined by the Region in which an air carrier is headquartered.*