



Welcome

- Logistics
- Introductions
- Agenda

Agenda

Aircraft Drinking Water Symposium & EXPO

December 5, 2013

7:30-12:30 Registration

8:15-9:45 **The Aircraft Drinking Water Rule: Part I**
Whether you are new to the Rule or just want a recap, all aspects of the ADWR will be covered to bring you up to speed on what is required and why.
Steve Clark, *The Vannet Group, LLC, Author of the ADWR*

9:45-10:15 Break & Expo: Sponsored by: 

10:15-11:30 **The Aircraft Drinking Water Rule: Part II (CONTINUED)**
Steve Clark, *The Vannet Group, LLC, Author of the ADWR*

11:30-1:00 Lunch Session: Sponsored by: 

Agenda

1:00-2:40 ***“State of the Aircraft Drinking Water Rule-ADWR”***

EPA: Mr. Kevin Ryan, EPA Region 9

FDA: Speaker Invited, Consumer Safety Officer, Interstate travel

FAA: Speaker Invited, FAA Headquarters, Safety Division

2:40-3:10 **Break & Expo: Sponsored by:**



3:10-4:00 **Coliform Control, Monitoring & Sample Collection**

Getting total coliform positives more frequently than expected? Want to learn ways to control them? Biofilm got you nervous? Learn about how to deal with this issue and come out on top.

Dr. Neeraj Khanna, Director, Biocide International

4:00-4:45 **How Much Does the ADWR Cost?**

A thorough breakdown of all costs associated with implementing the ADWR for almost any sized airline. Currently, the average cost is approximately \$1038 per aircraft. How much is it costing you?

Steve Clark, The Vannet Group, LLC, Author of the ADWR

Agenda

December 6, 2013

- 8:15- 9:30** **Performing an Internal Audit**
How well is my program performing? Am I doing everything required of the Rule? Am I doing everything I said I was going to do in my O&M Plan?
Steve Clark, The Vannet Group, LLC, Author of the ADWR
- 9:30-10:00** **EPA ADWR Compliance Audits**
Now that we are in the 3rd year of the ADWR, many airlines are receiving visits from their regional regulators. What is involved and how to best prepare will be discussed.
Mr. Kevin Ryan, USEPA Region 9
- 10:00-10:30** **Break & Expo Sponsored by:** 
- 10:30-12:00** **Airport-Airline Communication**
What happens when the local water system supplying your airport is under a boil water notice? Will you get notified in time to prevent loading of unsafe water? Several incidents have occurred this past year already. What will you do?
Facilitated by Steve Clark, The Vannet Group, LLC, Author of the ADWR
- 12:00** **Adjourn**

Why are We Here?



LOGISTICS & TRANSPORTATION | 10/15/2013 @ 9:31AM | 190,681 views

Why Airline Crews Skip The Coffee And Tea On Board

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 33 comments, 18 called-out[+ Comment Now](#) [+ Follow Comments](#)

With all that free coffee and tea available to pilots and flight attendants, have you ever wondered why so many crewmembers can be seen boarding flights with their own cups of java? Well, the dirty little secret of flying is that the water used to make the coffee and tea is, well, dirty. A recent NBC investigative report confirms what airline employees have known for years. Think twice about drinking the water – unless you see it served from a bottle, preferably one you open yourself.

The NBC report obtained documents from the EPA which confirm that years after the EPA began a program to clean up airplane water, the problem of bacteria in the drinking water persists on a high percentage of airline flights. While the EPA first focused on



English: drinking water (Photo credit: Wikipedia)

Statistics: From EPA ARCS

From 2011 through July 2013:

Over 14,000 samples have been Collected & Reported

12.3% Industry Average for Total Coliform Positive's

As Low as 0% to as high as 46% TC+

Number of Samples TC+ by Year

2011- 362 samples

2012- 1076 samples

2013- 470 samples

**(23% estimated increase
when compared to last
years numbers at this time)**

Data Reflects Samples only through July 2013

VIOLATIONS

	Reporting	MCL	TT	Monitoring	OT
• 2011		2			
• 2012	95	14	43	11	2
• 2013	36	7	14	0	0
Totals:	131	21	57	11	2

EPA's Aircraft Drinking Water Rule



EPA's Aircraft Drinking Water Rule

What does it mean for the Airline Industry?

How much will it burden the Industry?

FAA- FDA- EPA??? <Geesh> ----

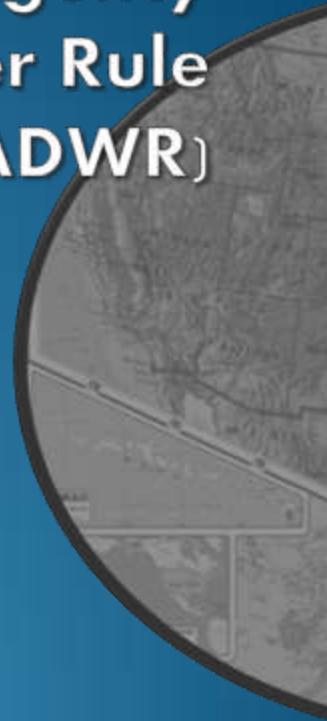
Haven't we had enough regulation in the airline industry



**United States
Environmental Protection Agency
Aircraft Drinking Water Rule
[ADWR]**

Rule Overview Part I

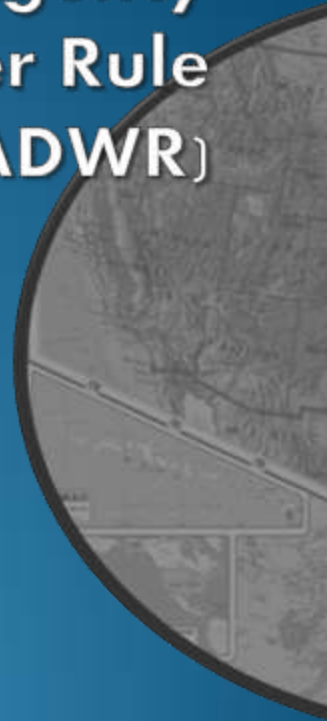
- ❖ Purpose of the Rule
- ❖ History of the Rule
- ❖ Glossary of Acronyms
- ❖ Applicability
- ❖ Classification of Aircraft Water Systems
- ❖ Inventory Reporting
- ❖ Aircraft Status: Inactive vs. Active
- ❖ Aircraft Water Quality
- ❖ Aircraft Water Supply and Transfer
- ❖ How to Collect a Coliform Sample



**United States
Environmental Protection Agency
Aircraft Drinking Water Rule
[ADWR]**

Rule Overview Part II

- ❖ Coliform Monitoring
- ❖ D&F Frequency = Sampling Frequency
- ❖ O&M Plans
- ❖ Public Notifications
- ❖ Self Inspections
- ❖ Record Keeping & Audits
- ❖ Violations of the Rule
- ❖ Compliance Dates Revisited
- ❖ Recap of the ADWR



Keeping You Awake

- What do these 3 have in common?
 - Superman
 - Cabbage Patch Dolls
 - Moses from the Bible

PURPOSE OF THE ADW RULE



EPA's Documented Purpose

- To ensure that safe and reliable drinking water is provided to aircraft passengers and crew
- This entails providing air carriers with a feasible way to comply with SDWA since existing NPDWRs were designed for traditional, stationary water systems

Issues Addressed by the ADWR

- Aircraft operational characteristics and constraints:
 - Board water from many different sources, often many times a day
 - Maintain rigorous flight schedules and tight security
 - Board water via temporary connections (e.g., water carts, trucks and hoses)

How did we get here?

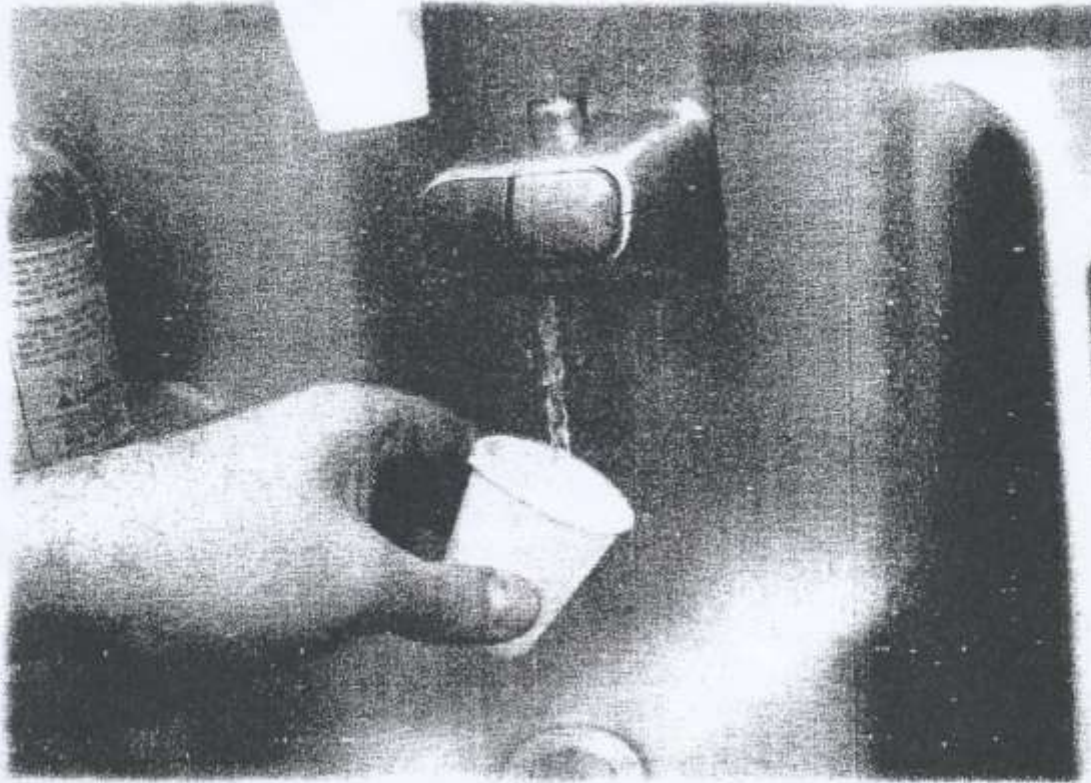


History of Airline DW Regulation

- In 1974, the USEPA released the SDWA which included Airplane Monitoring
- Between 1978 and 1986, USEPA and the airline industry collaborated on an acceptable alternative for Air Carriers and other ICC's
- They established recommended guidelines, but were not legally allowed to exercise them since guidelines do not replace actual rules. Legalities.

THE WALL STREET JOURNAL.

How Safe Is Airline Water?



Airlines say their galley and lavatory water is drinkable. But we did our own test in the skies—and found a host of bacteria and even insect eggs. Nancy Keates and Jane Costello report.

WHEN JUANITA GREEN needed to take some medication on a flight to Los Angeles, she washed down the pill with a cup of water from the plane's bathroom sink. It tasted funny, but she

results of our water-quality snapshot: a long list of microscopic life you don't want to drink, from *Salmonella* and *Staphylococcus* to tiny insect eggs. Worse, contamination was the rule, not the exception: Almost all of the bacteria levels were tens, sometimes hundreds, of times

History of Airline DW Regulation

- In 2002, an independent study was conducted which showed very unnerving results of a high # of positives- 72% TC +, 15% Ecoli +
- Both the airline industry and the EPA were on the Hill



History of Airline DW Regulation

- In 2004, EPA found all aircraft PWSs to be out of compliance with the NPDWRs
- Air carriers complained that it was not feasible to comply with the required monitoring
- EPA tested 327 aircraft of which 15% tested positive for total coliform

EPA Response to Findings

- EPA embarked on an accelerated process to tailor existing regulations for aircraft PWSs
- In the interim, EPA placed 46 air carriers under administrative orders on consent (AOCs)
- AOCs were to remain in effect until aircraft drinking water regulations became final

1st Rule of its Kind (at least in Drinking Water)

Only Rule to trigger a “Corrective Action”

Combines Several Programs and Rules under the SDWA:

- **Total Coliform Rule**
- **Operator Certification Program**
- **Public Notification Rule**
- **Interim Enhanced Surface Water Treatment Rule**
- **Capacity Development Program**

Glossary of Main Terms

- Safe Drinking Water Act: (SDWA) Federal Rules for Drinking Water
- Aircraft Drinking Water Rule (ADWR)

Glossary



- **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 to passengers or crew.

Glossary (con't)



- *Aircraft water system operation 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.

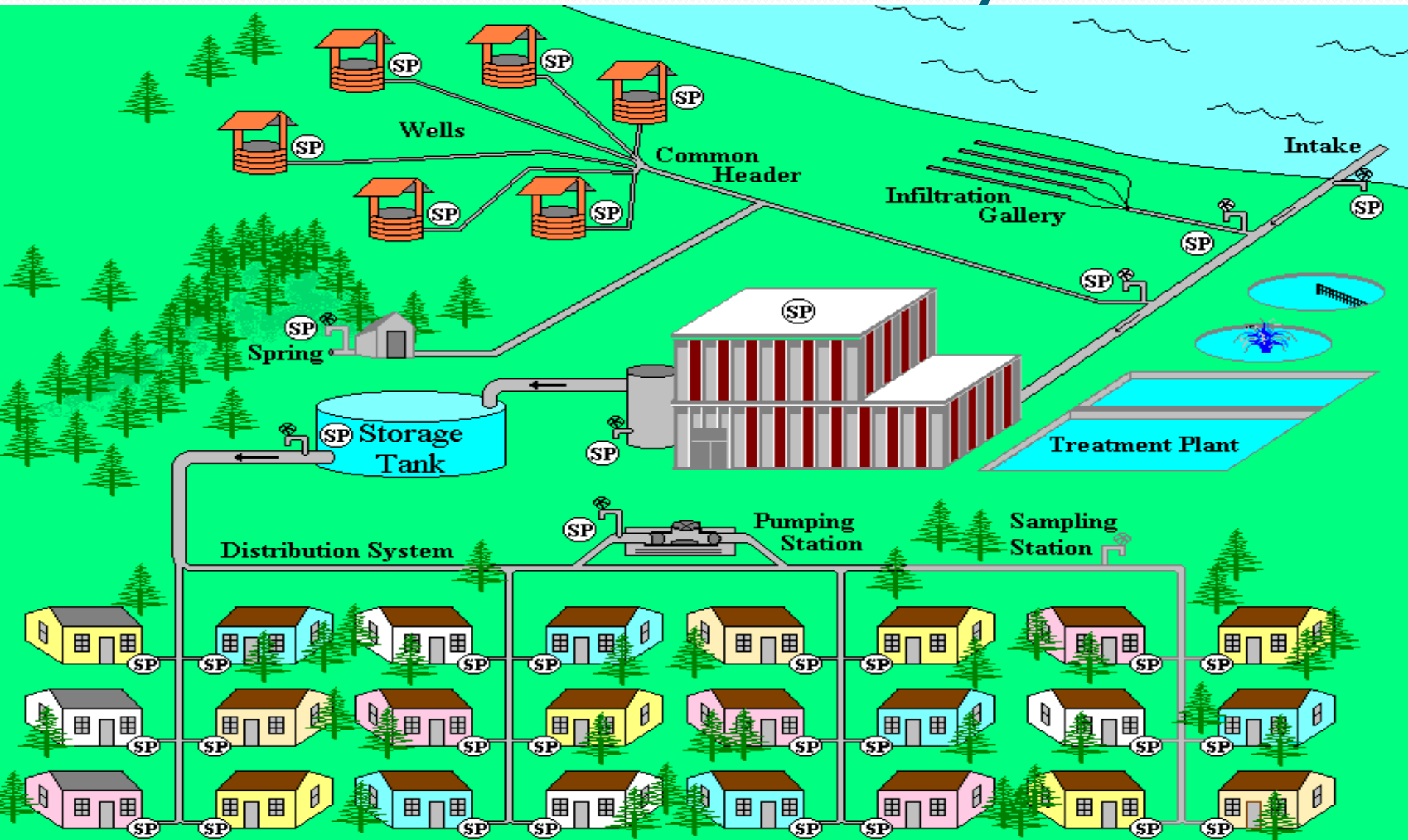
Definitions (con't)



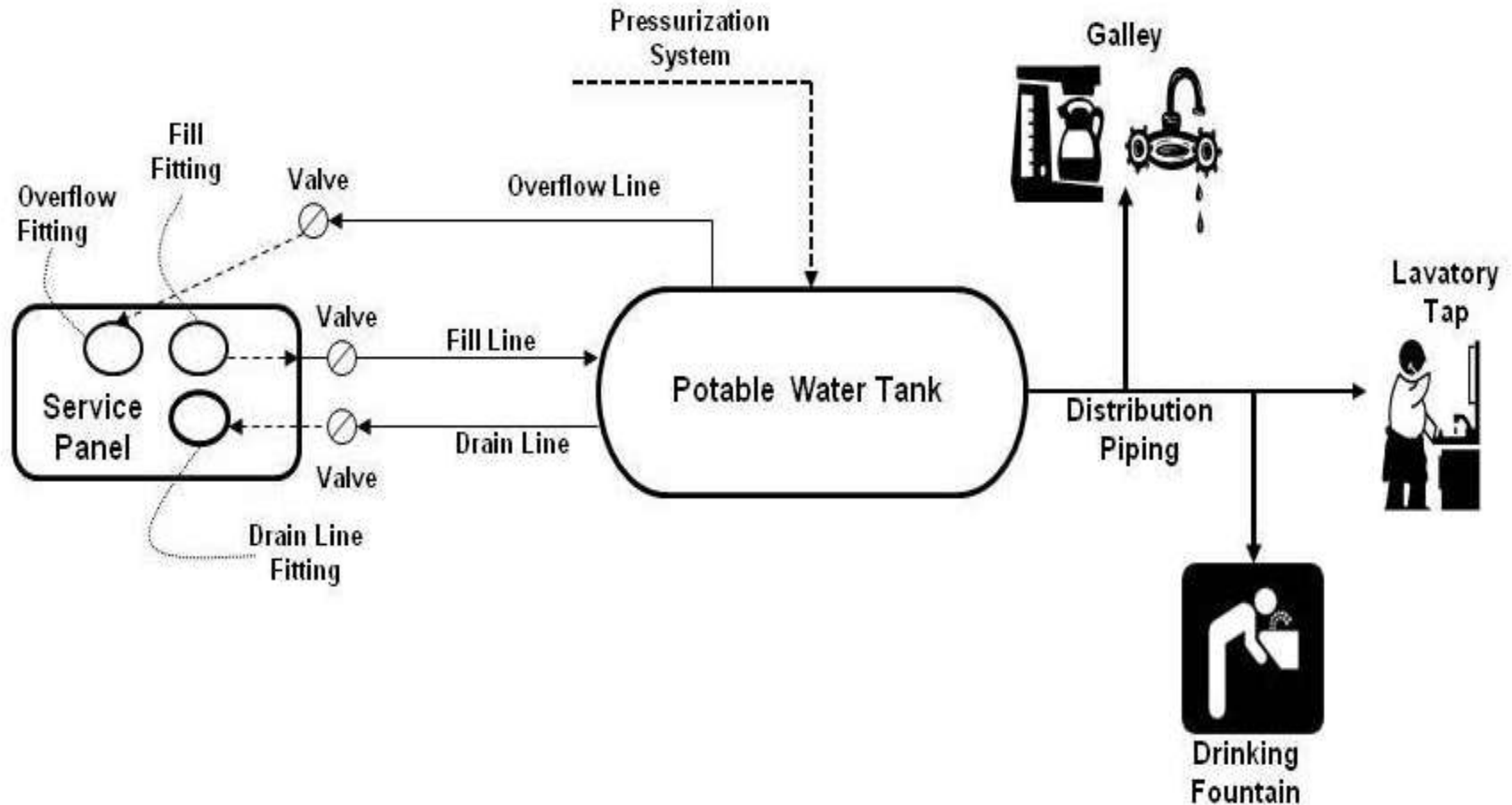
- **Self inspection** means an onsite review of the aircraft water system, including the water service panel, the filler neck of the aircraft finished water storage tank; all finished water storage tanks, piping, treatment equipment, and plumbing fixtures; and a review of the aircraft operations, maintenance, 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 a facility where finished water is transferred from a water supply to the aircraft. These facilities may include water trucks, carts, cabinets, and hoses.

Water System Defined

“Traditional Water System”



Example of an Aircraft Water System



Applicability: Who Does It Capture?

- Must meet the definition of a public water system:
 - Serving, or the potential to serve, 25 or more persons at least 60 days out of the year.
 - Provide piped water for human consumption
 - Regularly serve at an average of 25 or more individuals daily for at least 60 days out of the year
 - Board only finished water (if less than finished water, must meet surface water treatment rule requirements)

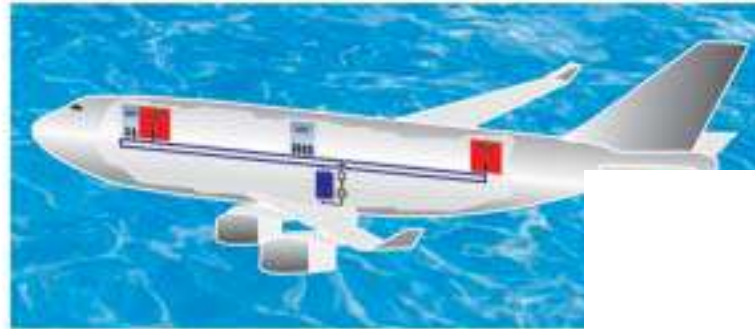
Aircraft in the following categories are not subject to the ADWR because they do not meet the definition of a PWS, are not under EPA's jurisdiction, or are excluded from regulatory requirements under SDWA section 1411²:

- **Aircraft that do not serve 25 or more people for at least 60 days per year**
- **Aircraft without a qualifying lavatory or galley**
- **Aircraft solely used for cargo purposes**
- **Aircraft that fly international routes serving only one U.S. city**
- **Aircraft owned and operated by the U.S. military if used solely for military purposes, not conveying passengers in interstate commerce, and meet all of the other exclusion criteria under SDWA section 1411**

ADWR Applicability and Scope

- Aircraft within U.S. jurisdiction
 - Must transport passengers between 2 US destinations
- This includes an industry of >60 air carriers and >7,000 aircraft

Aircraft Water Systems

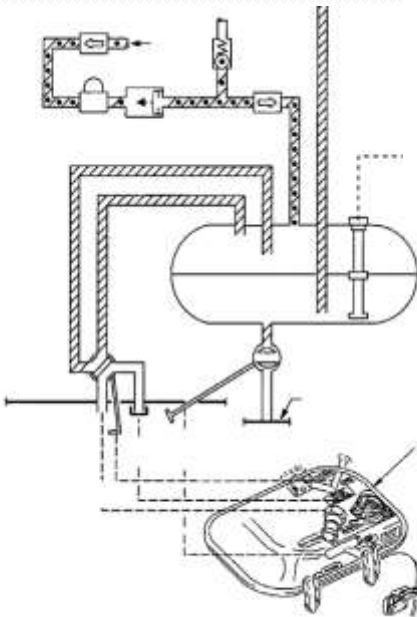
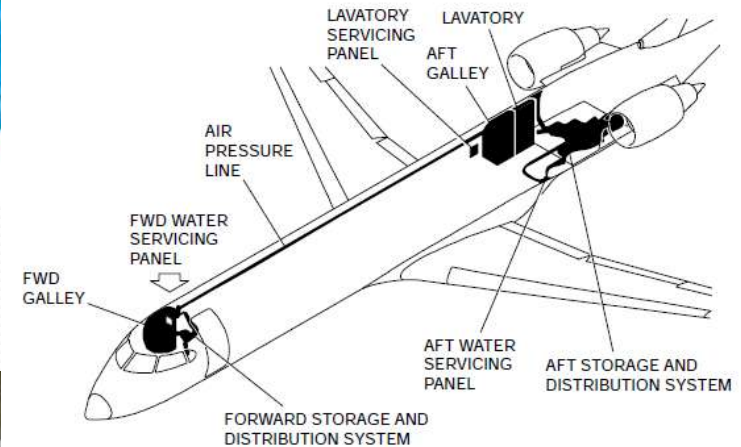


LEGEND:

PWS TANK

PWS PRESS. FLOW PUMP

BNG PWS STABILIZER



Aircraft water systems are defined in 40 CFR 141.801 as follows:

“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.

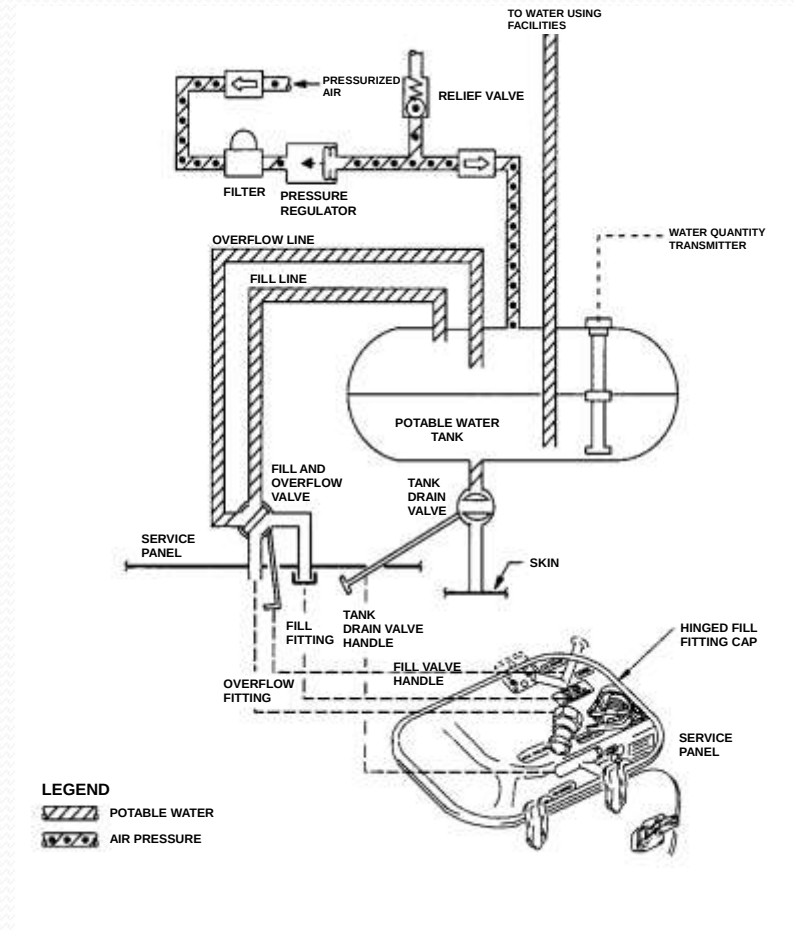
The components of an aircraft water system include:

- Water service panel
- 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.”

Onboard Aircraft Water System

The components can include:

- service panel
- storage tanks
- pipes and valves
- treatment devices
- and plumbing fixtures within the aircraft that supply water to passengers or crew.



Classification of Aircraft Public Water Systems

- Transient non-Community Water Systems (TNC)
- Serves at least 25 of the same persons over sixty days out of the year



When Asked Online:

Aircraft Drinking Water: Is it Safe to Drink?

Short answer is 'no'. but you can go deeper, what airline, which destinations what water sterilization processes do they use etc...but personally, just don't drink it; and if used in a galley make sure it is boiled, not just 'heated'

- *Technical Services & Planning
Manager at H.M.Sultans Flight*

I think the greatest analogy to airline water is that the bacteria in the water resembles the bar scene out of Star Wars

- *Washington, DC- Z and
Associates; Consultant Owner*

Water Quality

Dependant on Several Factors:

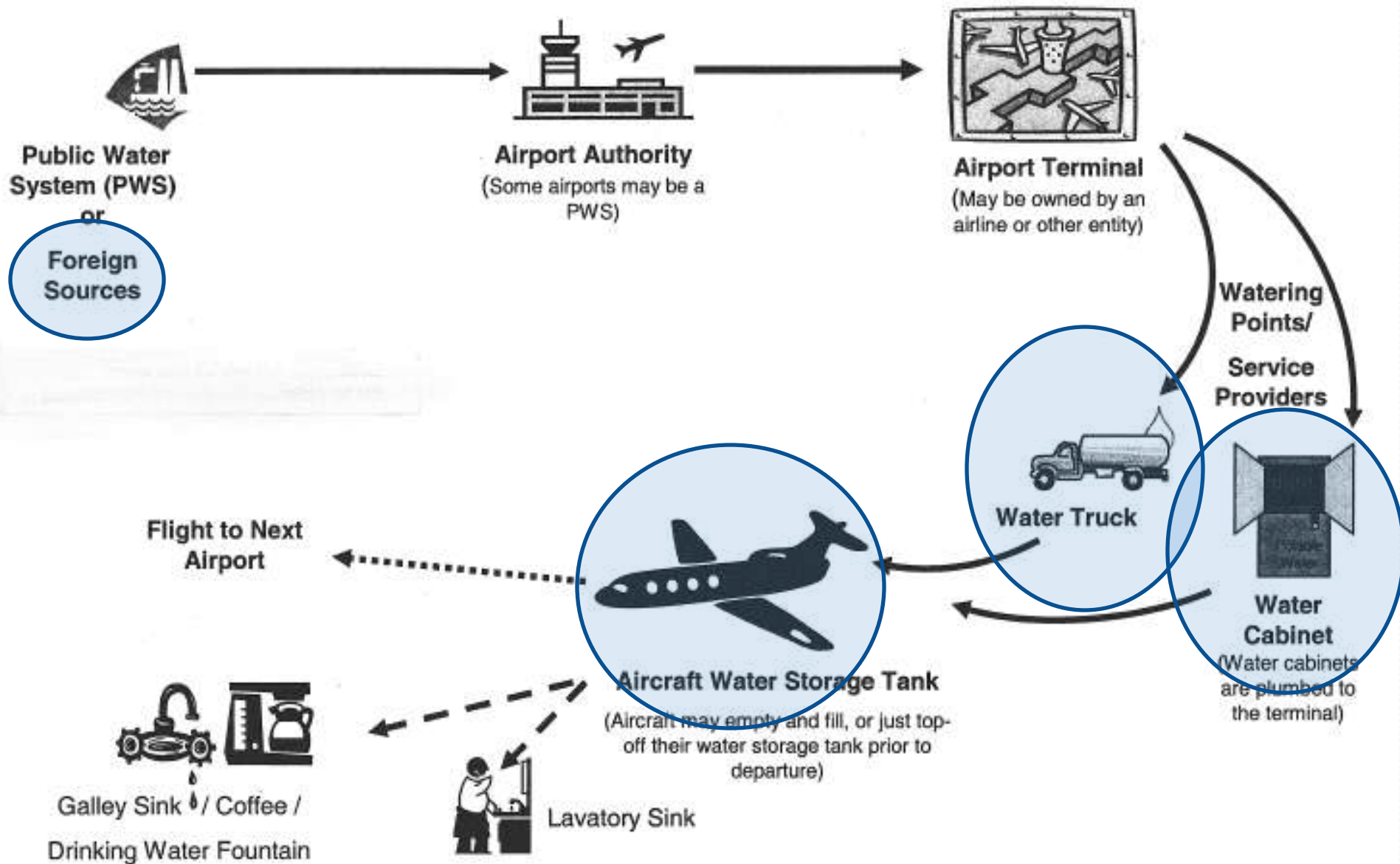
- Following Proper O&M Procedures for Water Boarding
- Source Water Quality at the Airports (water trucks, hoses, etc)
- Overall Aircraft Water System Equipment Condition and Sanitary Quality



Water Supply & Transfer



Locate the top 4 sources of potential contamination



Types of Water Cabinets

- Hooked directly to airport water supply
- Hose reels, connectors, and caps
- Connection to aircraft



Water Trucks

- Water supplied from airport cabinet or other airport source
- Can service many gates/aircraft
- Same connection



Water Carts

- Vary greatly in size and design
- Used to serve a few gates
- Usually not self propelled
- Same supply and connection



Water Carts (cont.)



Other

- Some regional jets have tanks that are removed to fill
- Dedicated to galley or lavatory



Removable Tanks (cont.)



Who is Responsible for the Performance of Services??

- Airline
- Other Airline
- Ground service provider or fixed base operator
- Airport or airport contractor

- The EPA RULE does not specify who will be in violation aside from the owner. However, it is implied that the operator may also take a hit.

Factors for Method Selection in Water Boarding and Sampling

- Aircraft type
- Size and type of operation
 - Number of flights
 - Number and type of gates
- Manpower/Vendor availability
- FDA Approved Watering points

Factors for Method Selection (cont.)

- Airport infrastructure and restrictions
 - Gate/parking configuration
 - Airport supplied equipment
- Equipment availability
- Other considerations

What Does the ADWR Require of me?

- Inventory Reported
- Samples Collected
- O&M Plans Completed:
 - F&D frequencies
 - Sampling frequencies
 - Sampling Plan (locations)
 - Training program
 - Personnel associated with the water system (positions)
 - PN procedures
 - How samples are to analyzed
 - Point of contact
 - Reporting Frequency and method used
- ALL personnel trained:
 - Mechanics, ground crews, flight attendants, managers, sample collectors and anyone else dealing with the water system appurtances or this programs implementation
- Reporting Framework initiated

What Drives The ADWR?

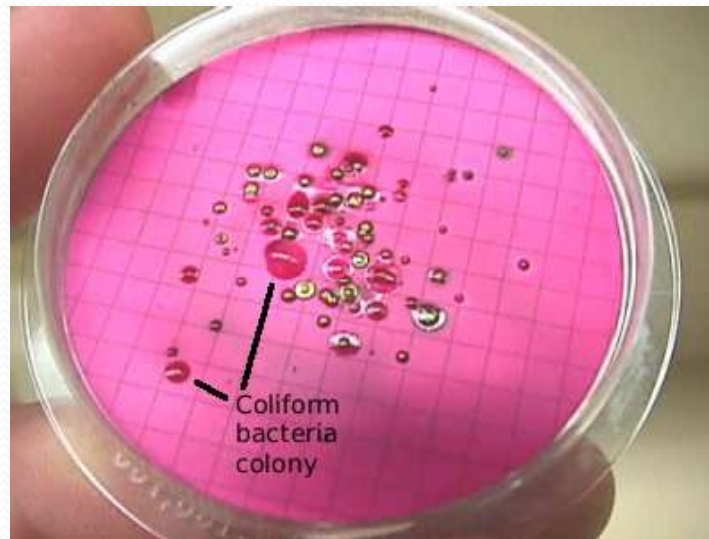


Coliform Sampling Frequencies

Minimum Routine Disinfection and Flushing Frequency	Minimum Routine Coliform Sampling Frequency
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)

Microbiological Testing Standard Approved by EPA for Drinking Water

- Total coliform
 - Not a health threat
 - An Indicator of potential gastroenteric pathogens in the water
 - If total coliform is positive, need to test for *E.coli*



Sources of contamination on aircraft

- Water is already contaminated from the supplying resource
 - Cross contamination during handling and transportation (truck and hoses)
 - Breaking/leaking of water line
 - Biofilm build-up
 - Backflow prevention device failure
 - Improperly maintained portable water carts
 - Cross contamination of surfaces due to hand contact, splash-back, cleaning rags, aerosols
-

3 Types of Sampling

- Routine
- Repeat
- Follow-Up



Routine

- Collected per scheduled frequency
 - Based on frequency of routine D&F
 - Reported to EPA
 - Documented in O&M Plan
- Can be taken at anytime EXCEPT within 72hrs after Scheduled Disinfecting and Flushing occurs

Any ideas as to why?

Routine

- Collect two 100mL samples- typically one from galley and one from lavatory taps
 - If only one tap- collect 2 from single tap
 - If more than 2 taps it is acceptable to rotate sample locations
 - If only one tap and uses a removable or portable container drained everyday of passenger service then only ONE 100mL sample is required

Repeat Samples

- Optional if one or more routine samples are TC+/EC-
- Must be collected within 24hrs of positive results
- Requires three 100mL samples
 - One at positive tap, one galley, one lav
 - If <3 taps, collect 3 samples from available taps

Follow-Up Samples

- Collected after corrective D&F when:
 - TC+ and/or EC+
 - Failure to perform routine D&F
 - Failure to conduct routine monitoring
 - Failure to collect repeat or follow-up samples
 - Failure to board water from an acceptable source
- Requires the same number and location as routine samples
- Must be collected prior to returning the water back on for public access

Replacement Samples & Invalidation

- Replacement Samples
 - Required when a sample has been invalidated by EPA or the Lab
 - Collected within the same monitoring period
 - Same location
- Invalidation Reasons
 - Lab states error in analysis
 - EPA determines it was not related to the system but instead to a domestic or other non plumbing problems
 - EPA determines it was due to non water quality grounds

Coliform Sampling Plans

Includes:

Sample Collection Procedures

Sample Tap Locations

Frequency and number of routine samples

Frequency of routine D&F

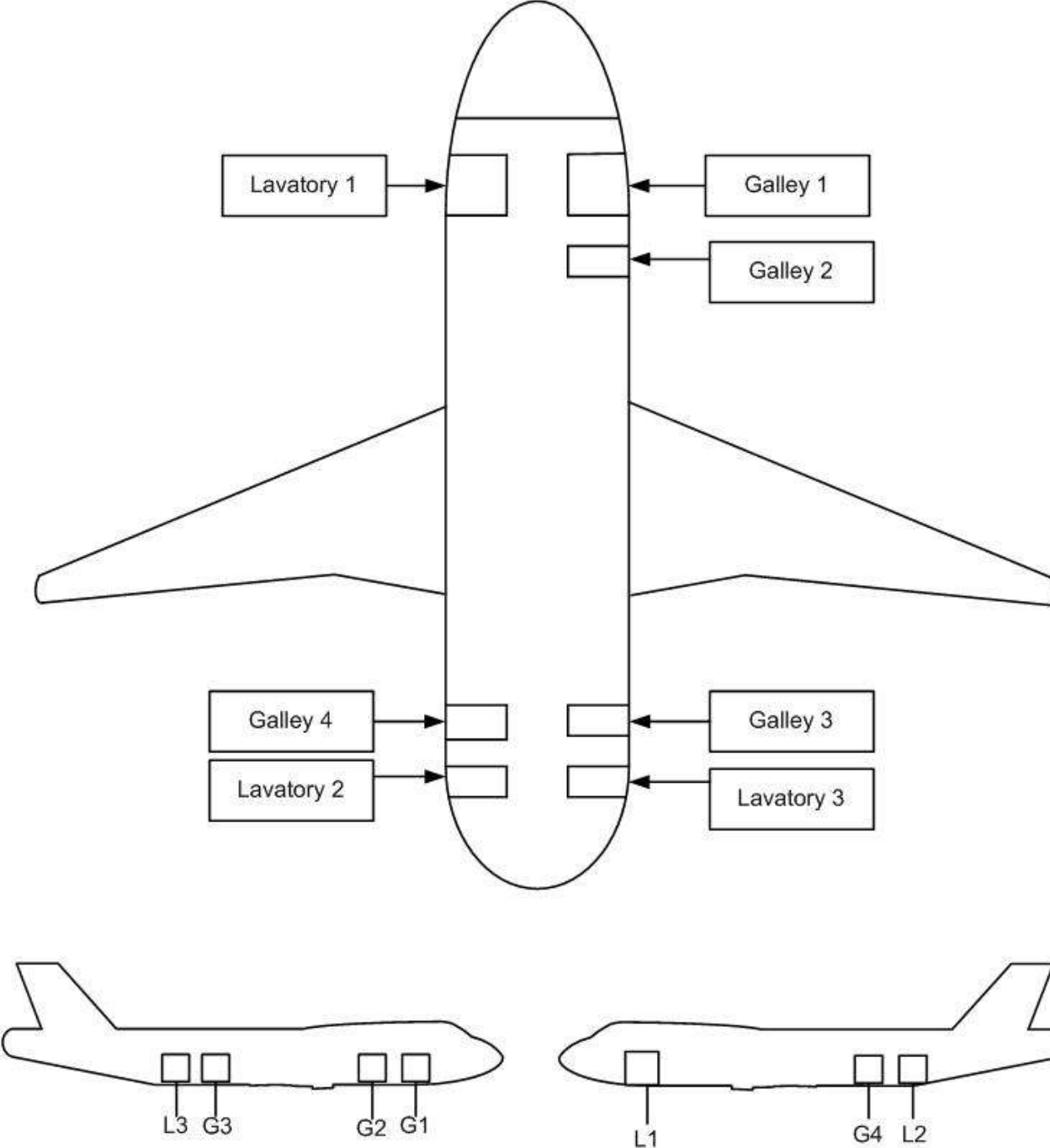
Procedures for Communicating Sample Results

Coliform Sampling Plans

- Proper Coliform Sample Collection ensures:
 - Samples are representative of the actual water available
 - Samples bottles do not become contaminated
 - Faucets and other fixtures will not contribute to contamination
- Sample Tap Locations
 - One galley, one lav unless exception applies
 - Cold Water Taps preferred but not mandatory. More likely to have a positive if heated water is sampled.

What if there are multiple galleys and lavs?





Monitoring Period #1	Lav 1 & Galery 3
Monitoring Period #2	Lav 2 & Gallery 1
Monitoring Period #3	Lav 1 & Gallery 2
Monitoring Period #4	Lav 1 & Gallery 4

Sampling Plans (con't)

- Frequency and number of routine samples are based upon the frequency of the D&F (monthly, quarterly, or semi-annual, or annually)
- Frequency of ROUTINE D&F
 - Based on Manufacturers Recommendations
 - If none specified, then use quarterly D&F with annual water sample collection

Corrective Action: Fecal and Non-Fecal

- **Non-Fecal Event:**

- Routine Sample TC(+) and EC(-)
- Failure to Collect Routine samples
- Failure to collect repeat or follow-up samples due to TC(+)
- Failure to board water from an approved source
- Not in accordance with FDA Regulations
- Does not meet NPDWRs for TNCs
- Non-compliance with procedures specified in O&M

Action to Take:

- Within 72hrs, D&F and collect follow-up samples **OR**
- Within 72hrs, restrict public access, then D&F, and collect follow-up samples when possible, **OR**
- Within 24hrs, collect repeat samples

Corrective Action: Fecal and Non-Fecal

- **Fecal Event:**

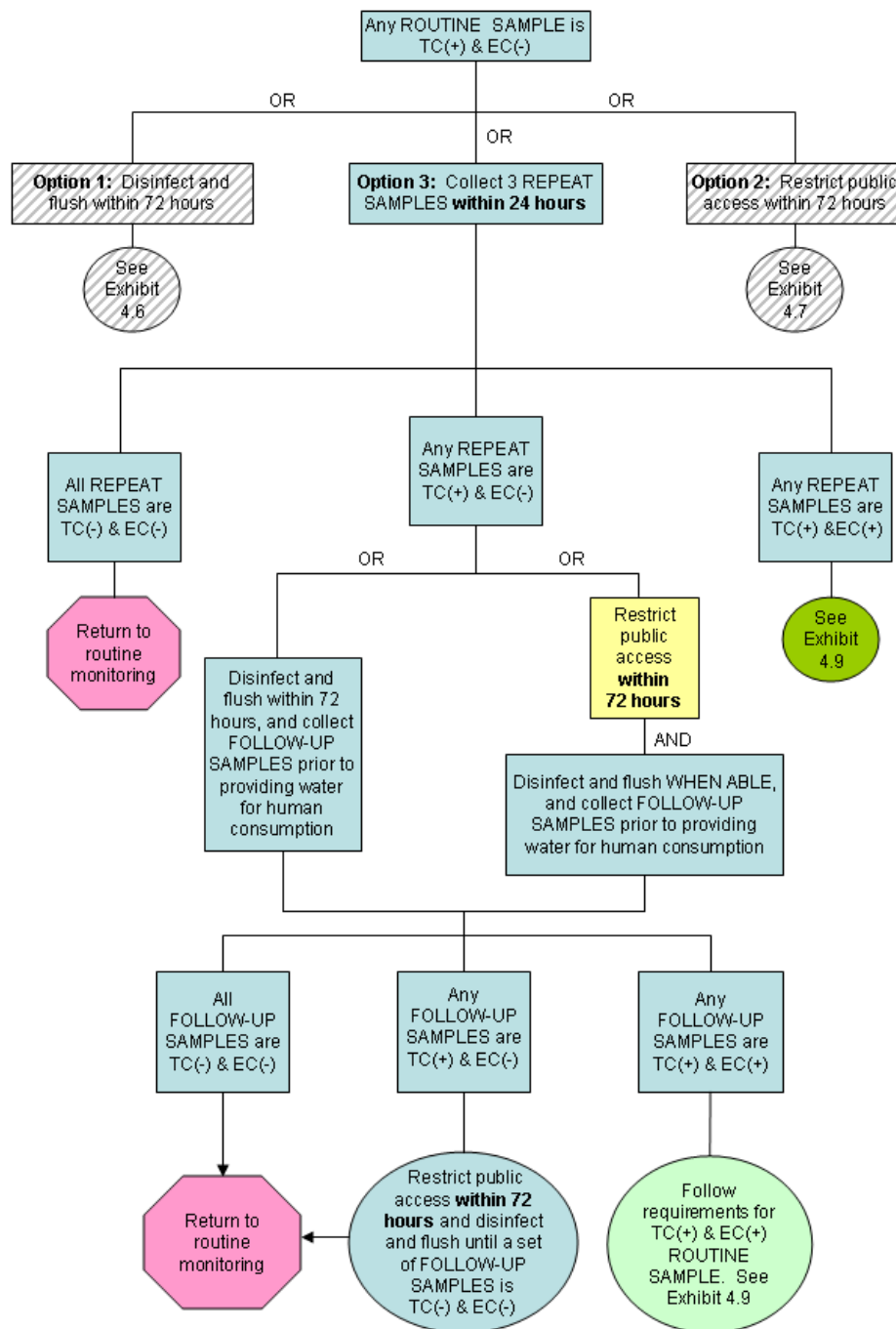
- Routine Sample EC(+)
- Failure to collect repeat or follow-up samples due to EC(+)
- Failure to board water from an approved source w/ know EC+
- Not in accordance with FDA Regulations
- Does not meet NPDWRs for TNCs
- Non-compliance with procedures specified in O&M

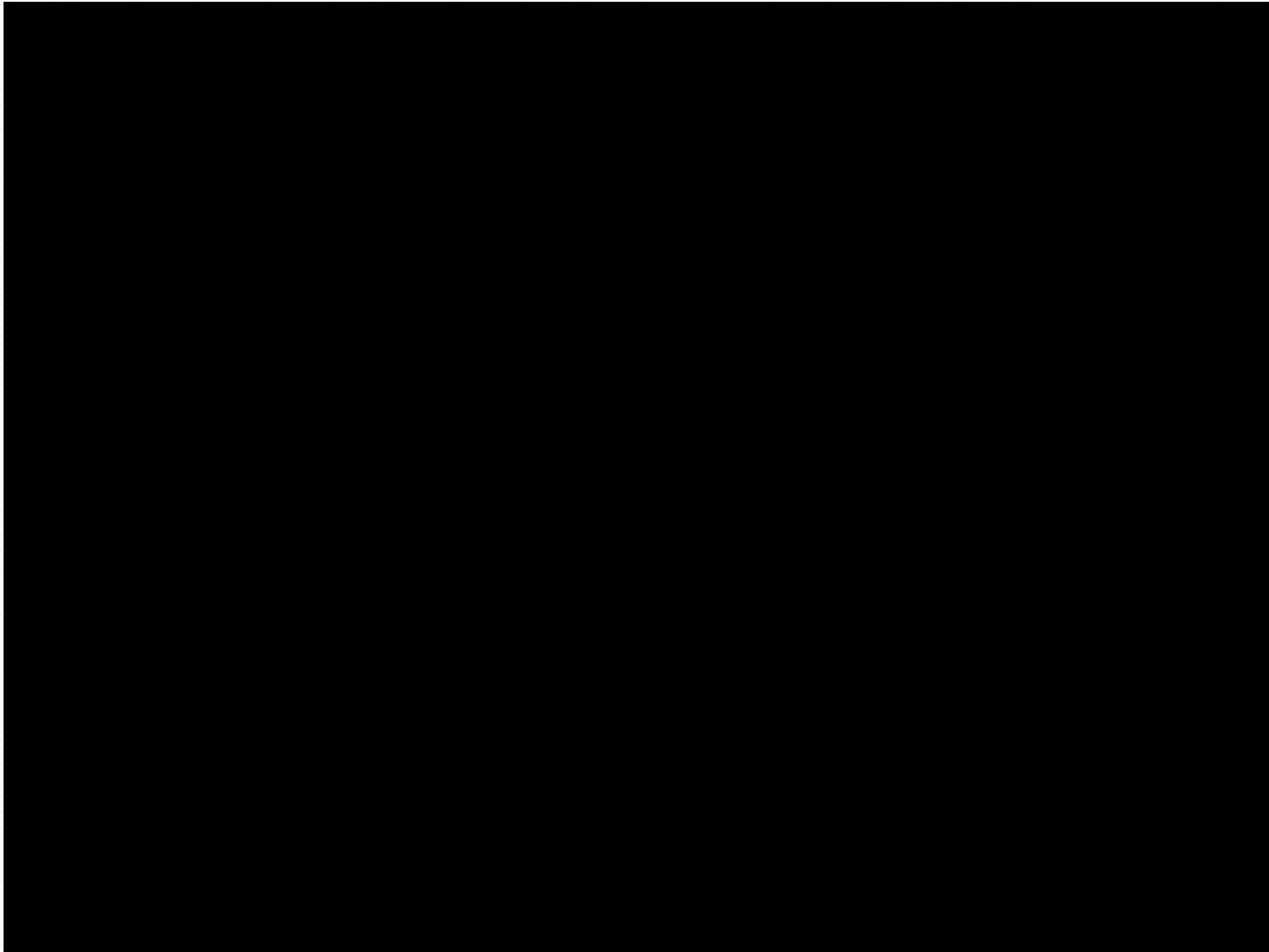
Action to Take:

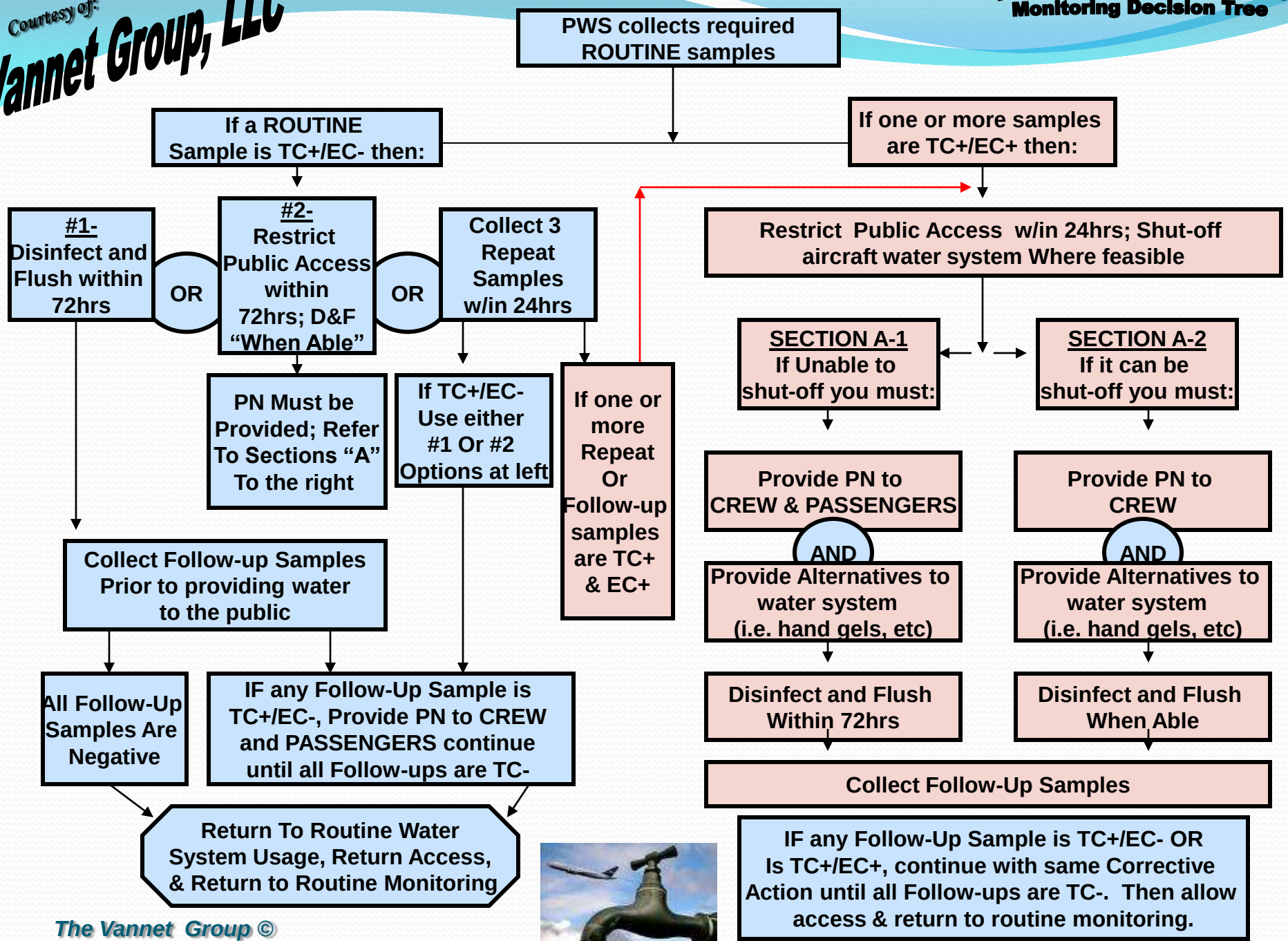
- Within 24hrs, restrict public access, AND
- D&F in 72hrs and collect follow-up samples if system not shut off,
OR
- Disinfect and Flush when able, and collect follow-up samples, if system is shut-off

To Recap:

- If coliform bacteria are detected, air carrier must take Corrective Action
- Actions and timeline depend on sample results:
TC+/EC- or TC+/EC+
- Due to imminent public health risk from an EC+, options and timelines are limited
- Follow-up action may include restricting public access to the aircraft water system







All samples must be TC- before providing water and returning to routine monitoring

**Untested FC
Results Or Failure
to Sample are
Treated as TC+/FC+**

***Restrict Public Access Includes:**
-Physical disconnect/ shut off of water system
-Provision of Public Notification
-Provision of Water Alternatives

Compliance Dates: Sample Plans

- Existing Aircraft
 - Coliform Sampling Plan due April 19th as part of O&M Plan
- New Aircraft
 - Coliform Sampling Plan due by the end of the first calendar quarter
- Changes to monitoring frequencies are to be reported no later than 10 days following the calendar month in which the change occurred.



Total Coliform Rule (TCR) Sampling Procedures

Total Coliform Rule Sampling

The purpose of these slides is to demonstrate recommended sampling techniques. This presentation includes:

- supplies recommended
- sample tap selection
- collection; and
- Shipping tips.

TCR Sampling Supplies

Before you begin sampling, it is important to have all of your supplies on hand. Here is a list of the suggested supplies you may need:



Cooler for shipping and storage of your sample while in transit between collection point and lab.



Bagged Ice for your shipping cooler.



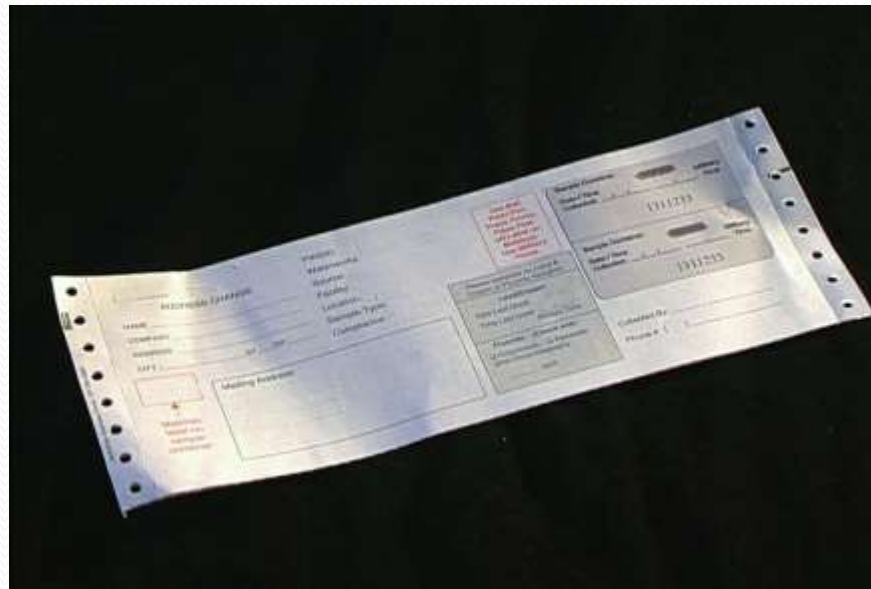
PVC or unsupported Neoprene gloves which are necessary to keep your hands safe from sample container preservative chemicals.



Sample Container



Lab slips, labels, and markers for sample container identification



Additional Recommended Items are:



Paper towels for drying off the outside of your sample container after sampling.

Plastic storage baggies for ice and sample container



Sample preparation instructions

Although different sizes and types of sampling containers may be used for collecting coliform samples, most laboratories supply 100mL sterilized, plastic bottles. A few laboratories may furnish single service, sterilized glass bottles.



Sample preparation instructions

**As a general rule,
proper washing of
hands is highly
recommended for
the sample collector.**



Sample preparation instructions

Also, food, drink, and even 2nd hand cigarette smoke should never come into contact with the sample or its containers. These foreign objects have been suspected of causing false results in samples, so be sure to practice good clean sample collection procedures.



Sample preparation instructions

It is recommended that you not sample with any containers that appear to have been tampered with since this may cause an undesirable sample result.



Sampling Instructions



The laboratory that supplies the sampling containers may provide instruction with the kit for the type of monitoring being performed. Be sure to refer to those instructions when provided.

Sampling Procedures

Important Notice

Follow the laboratory instructions if provided.

If no instructions are provided – the following are general sampling procedures.

Assemble all of the sampling supplies before beginning. Your sample bottle may have Sodium thiosulfate, a small white tablet or powder in the sample container, which is used for chlorinated waters (such as those found in most distribution systems). Handle the containers carefully as they are sterilized. Do not rinse out or dispose of any liquids, powders or tablets inside the containers.

Select an approved sampling location if any have been designated. Normally, the sampling location (s) is specified in the approved sampling plan as reviewed by your state drinking water program. Each representative sampling location is usually located in the distribution system and is usually considered accessible during the day.

Sampling Procedures

Examples include hospitals, city buildings, pump stations, restaurants, and dedicated sampling stations. Sampling sites specified in the sampling plan should be selected carefully throughout the distribution system to represent the varying conditions that occur throughout your system or plumbing.



Sampling Procedures



If possible, remove any aerator, strainer, or hose that is present, as any of these many harbor bacteria and cause a false coliform positive sample result.

OPTIONAL STEPS:

Some sampling practices involve spraying the tap with a chlorine solution, or even flaming the tap. (This step is optional since many people believe this practice does not kill attached bacteria and is not necessary if the sampling tap is selected carefully.) Keep in mind that the average consumer will not perform such practices and could be argued that doing so would not properly represent the water quality at the point where the consumer will use it.



Turn on the cold water and run the water to flush the tap. This typically takes 1-2 minutes.



Sampling Procedures



be sure to completely and accurately fill out the labels, tags, and laboratory forms. Apply the labels to the containers.

Sampling Procedures



Remove the bottle cap. Be careful not to contaminate the sample by touching the inside of the cap or the inside of the sample container with your fingers.

Sampling Procedures



Then position the bottle under the water flow. Hold the bottle in one hand and the cap in the other. **Do not lay the cap down or put it in your pocket!** Water dripping from your hands may also cause contamination of the sample so extra care should be taken when collecting this sample.

Sampling Procedures



Fill the bottle to the shoulder or to about $\frac{1}{4}$ inch from the top. Many bottles have a 100ml fill line.

Sampling Procedures



The sample container should be tightly capped. Blot the sample container with a paper towel to dry it off.

Since Ice is sometimes recommended for use in shipping, it is recommended that it be bagged separately to eliminate any contamination of the sample.

Sampling Procedures



Check that the information on the label is correct (or check the laboratory form and attach it to the bottle with a rubber band).

Complete any additional laboratory forms that came with the sample bottle, including chain-of-custody form (if necessary).



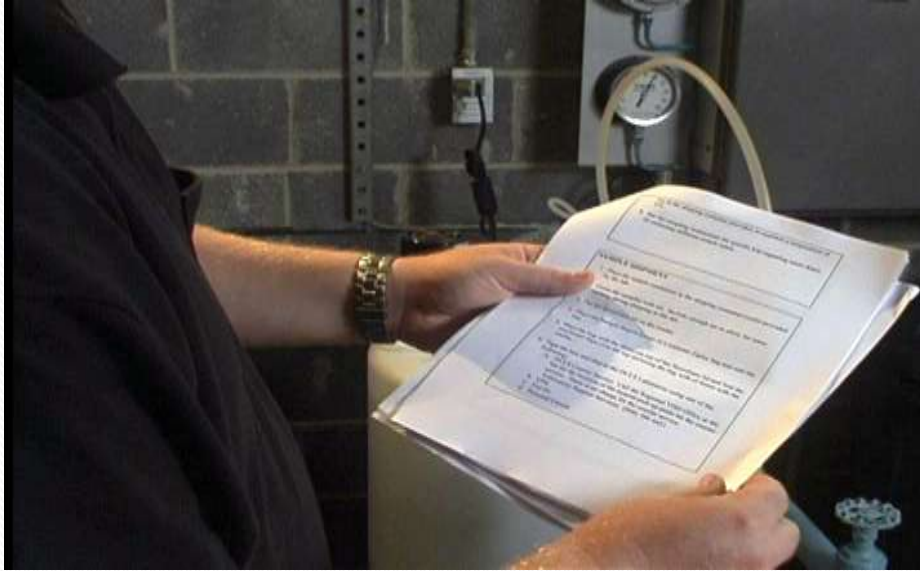
IMPORTANT:

The samples must reach the laboratory and the analysis must begin within 24 hours of collection. It is recommended that all samples be refrigerated or cooled to 4 degrees to 10 degrees Celsius (39 degrees to 50 degrees Fahrenheit). If the laboratory is nearby, refrigerate with ice packs, and deliver the samples there directly. If not send the samples overnight by US mail or by an overnight courier.

RECOMMENDED:

Taping of the chest prior to shipping is also recommended since the container could be mistakenly opened during shipment.

Also be sure to tape the sample forms and any other sample documentation either inside or the outside of the lid.



If the laboratory has any additional shipping recommendations or requirements, they should be read and followed closely.

- **A PERSON LIVES ON THE TENTH FLOOR OF HIS APARTMENT BUILDING. EVERY MORNING HE LEAVES FOR WORK AND RIDES THE ELEVATOR FROM THE FLOOR TO THE FIRST FLOOR AND WALKS TO WORK. WHEN HE COMES HOME HE GETS ON THE ELEVATOR ON THE FIRST FLOOR AND RIDES IT TO THE SEVENTH FLOOR, THEN WALKS THE REST OF THE WAY UP TO HIS APARTMENT ON THE TENTH FLOOR**

WHY DOESN'T HE RIDE IT TO THE TENTH FLOOR?



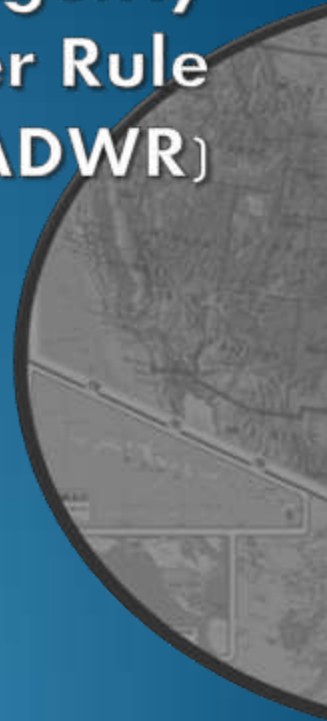
END of Part I: BREAK



**United States
Environmental Protection Agency
Aircraft Drinking Water Rule
[ADWR]**

Rule Overview Part II

- ❖ Coliform Monitoring Plans
- ❖ D&F Frequency = Sampling Frequency
- ❖ O&M Plans
- ❖ Public Notifications
- ❖ Self Inspections
- ❖ Record Keeping & Audits
- ❖ Violations of the Rule
- ❖ Compliance Dates Revisited
- ❖ Recap of the ADWR



Let's look at the rule from a different angle



Photo Copyright © Stephan Tophoven

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Sampling Plan Development

- **Coliform sample collection procedures**
- **Sample tap location(s) representative of the aircraft water system**
- **Frequency and number of routine coliform samples to be collected**
- **Frequency of routine disinfection and flushing as specified in the operation and maintenance plan**
- **Procedures for communicating sample results to ensure any required actions are conducted in a timely manner**

Sampling Frequency

<u>Routine Disinfection and Flushing Frequency</u>	<u>Routine Coliform Sampling Frequency</u>
At least quarterly	Annually
At Least three times per year	Bi-Annually
2x Per Year	Quarterly
At least Once Per Year or Less	Monthly

Certified Labs and Analytical Methods

- EPA Certified Labs

- Labs can be found at <http://www.epa.gov/ogwdw/labs/index.html>
- Must be certified in the analysis of coliform bacteria and *E. coli*.
- Current list of approved analytical methods is provided on EPA's website at <http://www.epa.gov/safewater>

Sample “Invalidation”



- Can only be made by EPA in accordance with 40 CFR 141.21(c)(1)(i), (ii), or (iii) or by the State- or EPA-certified laboratory in accordance with 40 CFR 141.21 (c)(2).

Sample “Invalidation” (con’t)

- EPA may invalidate samples if any of the following applies:
 - The laboratory establishes that improper sample analysis caused the total coliform-positive result.

- EPA, on the basis of the results of repeat samples, determines that the total coliform-positive sample resulted from a non-distribution system plumbing problem.

EPA cannot invalidate a sample on the basis of repeat sample results unless all repeat sample(s) collected at the same tap as the original total coliform-positive sample are also total coliform-positive, and all repeat samples collected at other taps are total coliform-negative

Sample “Invalidation” (con’t)

- EPA has substantial grounds to believe that a total coliform-positive result is due to a circumstance or condition which does not reflect water quality in the aircraft water system. The decision to invalidate, with the rationale for the decision, must be documented in writing and approved and signed by the supervisor of the EPA official who recommended the decision. EPA must make this document available to the public. The written documentation must state the specific cause of the total coliform-positive sample, and what action the system has taken, or will take, to correct this problem. EPA may not invalidate a total coliform-positive sample solely on the grounds that all repeat samples are total coliform-negative.

Sample Results- Reporting

- All sample results must be reported to EPA no later than 10 calendar days following the monitoring period in which the sampling occurred. Remember that the length of the monitoring period depends on the coliform sampling frequency and may be monthly, quarterly, or annual sampling.
- All events requiring notification to passengers and crew and non-routine disinfection and flushing must be reported within 10 days of the event triggering the notification or disinfection and flushing requirement.

Public Notification

PUBLIC NOTICE



Why Pilots Shouldn't Be Water Operators

- [Funny TV ad - Airplane pilots - YouTube.mp4](#)

Purpose

- “Notify Airline Customers to potential health risks from violation of the drinking water standards”

Recipients of Public Notification

- Passengers and crew that are on board the aircraft during the time that PN is required
- Notice to Passengers is NOT required in certain instances
- However, the caveat is that they will ask why the water is shut off, or the flight attendants will notify them, or the notice will be read.

When is PN REQUIRED?

- Whenever Public Access to the water system is restricted as a result of an E.coli positive sample result, etc...
- Two things required along with notification:
 1. Disconnecting/Shutting off the water upon landing
 2. Providing “temporary” alternatives such as bottled water and antiseptic hand gels



Public Notification: Who gets What

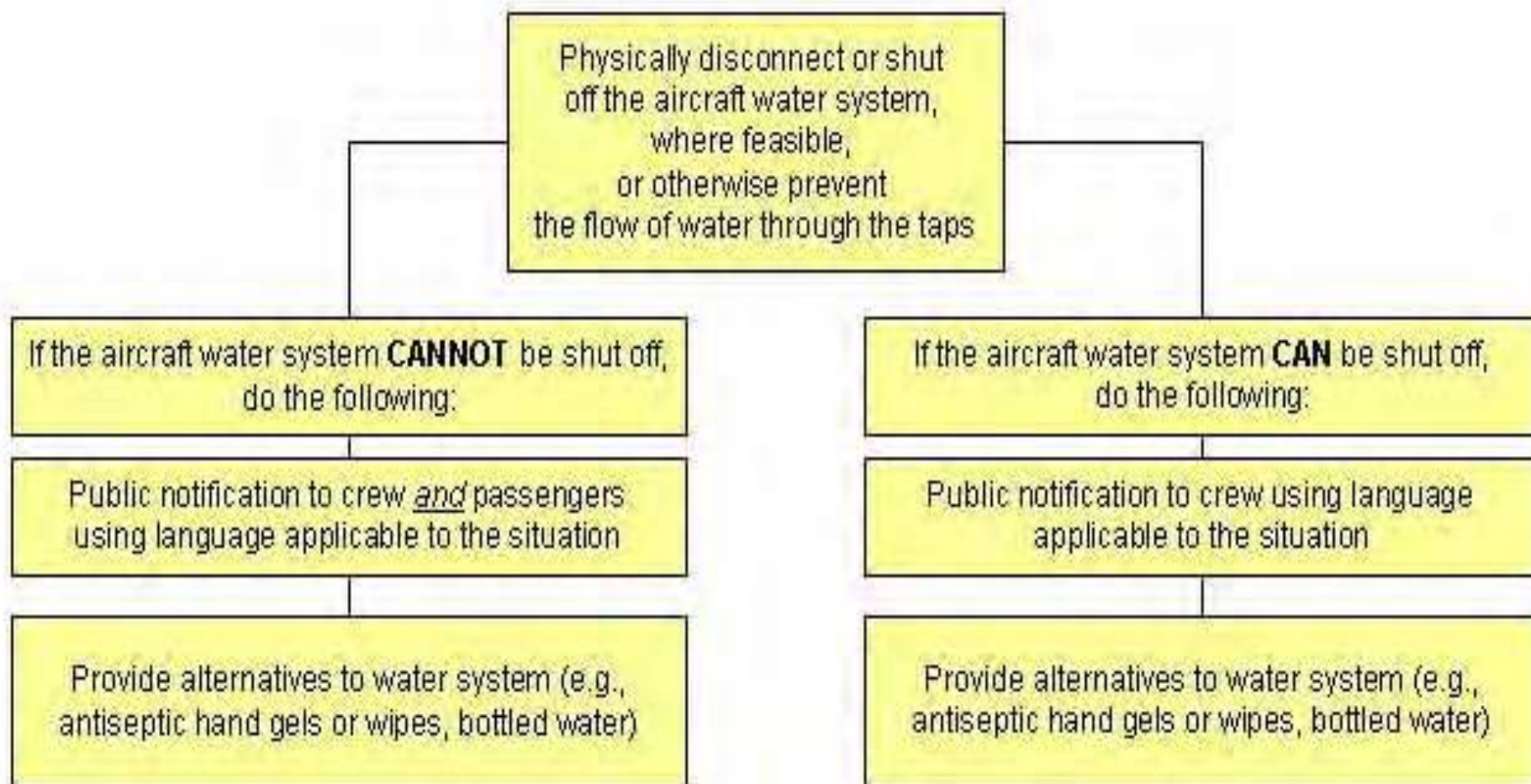
Provide PN to **CREW ONLY** if:

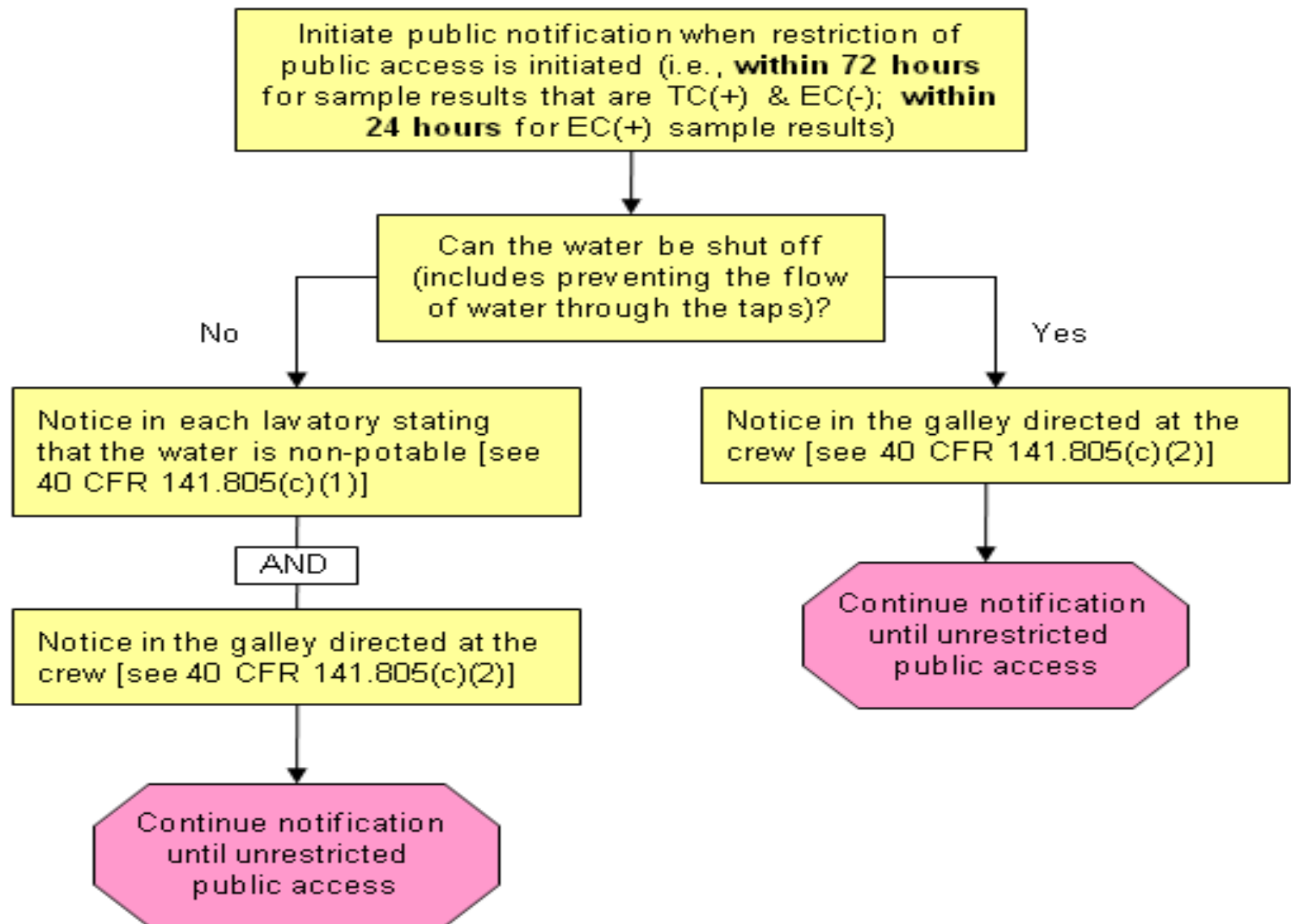
- If water HAS BEEN physically shut off or disconnected

Provide PN to **CREW AND PASSENGERS** if:

- Water HAS NOT BEEN shut-off or disconnected

Restricting Public Access





Notice Content & Display:

- Passenger Notice
 - Must be prominently displayed in each lav and at any drinking water stations
 - Must include a clear statement that the water is non-potable and should not be used for drinking, food or beverage prep, hand washing, teeth brushing, or any other consumptive use.
- Crew Notice
 - Must be prominently displayed in the galley
 - Content depends on the violation/situation requiring notification

Notice to Passengers- Template 1

WARNING
DO NOT DRINK THE WATER



**The water is non-potable. Do not use it for drinking, food
Or beverage preparation, hand washing, teeth brushing, or
Any other consumptive use.**

Presentation for Public Notifications

- **Must be displayed in a conspicuous manner**
- **Not overly technical or contain small print**
- **Must not be formatted to defeat its purpose**
- **Must make a good faith effort to address non-English speaking population**

ADWR Guidance Appendix D contains templates that meet the content and clarity requirements

PN Content for Crew

- Clear statement that the water is non-potable and should not be used for drinking, food or beverage, etc....
- Description of the violation or situation
- When it occurred
- Potential adverse health effects language
- Population at risk
- What is being done to correct it
- When the air carrier expects to return to unrestricted public access

PN Content for Crew ONLY:

Optional Mandatory Briefing

- Minimum Equipment List cre briefing for crew only
- Notice must be read in its entirety during mandatory pre-flight briefing
- Notice must include all of the required content and be identical to a posted notice elsewhere
- Records of the notice must be maintained and made available to the crew for reference.

Public Notification (con't)

- **When public access to the water must be restricted due to the detection of fecal coliform or E. coli in one or more water samples, or if more than one coliform sample in a monitoring period is total coliform-positive**
- **Failure to conduct routine, repeat, and follow-up monitoring for coliforms**

Public Notification (con't)

- Water has been boarded from a watering point that is not FDA-approved or has not otherwise been determined to be safe.
- **The EPA, the air carrier, or the crew otherwise determine that public notification is necessary to protect public health**



Vannet Group, LLC
Proprietary

Operation & Maintenance Program Development



*Successful O&M practices used by air
carriers*

ADWR requirements related to operation and
maintenance (O&M) of the aircraft water
system.

Operations and Maintenance Plans

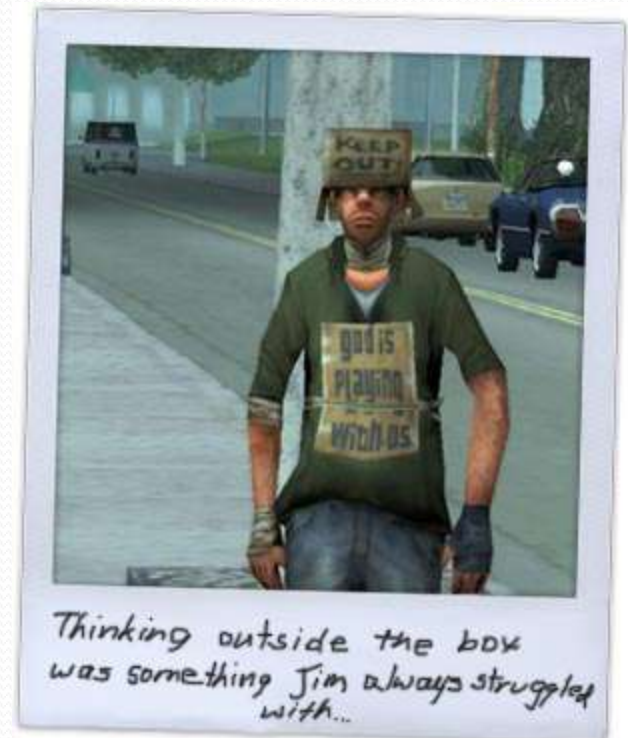
Overview of Requirements and Timeframes

- ✓ Developed for each aircraft in your inventory that meets the definition of a public water system
- ✓ More than one aircraft can be covered by the same O&M Plan
- ✓ An O&M plan must be completed for each aircraft that is a public water system by April 19, 2011
- ✓ New aircraft added to a fleet after April 19, 2011, the aircraft O&M plan must be completed by the end of the first calendar quarter during which the aircraft is placed into operation. EX: New plane model enters fleet in May 2011, you must have it entered into an updated inventory with frequency and O&M Plan submitted in time to report into EPA by July 10th.

Operations and Maintenance Plans

Overview of Requirements and Timeframes

- ✓ Updated aircraft water system operations and maintenance (O&M) plans, which must be incorporated into the air carriers' FAA-approved or accepted O&M program for aircraft. The O&M plans must include a plan for sampling coliform bacteria and performing routine disinfection and flushing, among other requirements.
- ✓ **FORMAT AND CONTENT TO BE DETERMINED BY THE AIR CARRIER NOT BY EPA**



FAA Regulatory Requirements

- **14 CFR Part 43 – Maintenance, Preventive Maintenance, Rebuilding, and Alteration**
- **43.13 (a) says in part – Each person performing maintenance, alteration or preventive maintenance on an aircraft shall use the methods, techniques, and practices prescribed in the current manufacturer's maintenance manual or Instructions for Continued Airworthiness (ICA) prepared by its manufacturer.**
- **43.13 (b) says in part – shall do that work in such a manner and use materials of such a quality, that the the condition of the aircraft worked on will be at least equal to its original or properly altered condition.**

FAA Regulatory Requirements Cont.

- 43.13 (c) says in part - operators holding operations specifications. Unless otherwise notified by the administrator, the methods, techniques, and practices contained in the maintenance manual or the maintenance part of the manual of the holder of an air carrier operating certificate or an operating certificate under Part [121 or 135] and Part 129 operators holding operations specifications (that is required by its operating specifications to provide a continuous airworthiness maintenance and inspection program) constitute acceptable means of compliance with this section.

FAA Regulatory Requirements Cont.

14 CFR Part 121.367 Maintenance, preventive Maintenance, and Alterations Programs

Each certificate holder shall have an inspection program and a program covering other maintenance, preventive maintenance, and alterations that ensures that--

- (a) Maintenance, preventive maintenance, and alterations performed by it, or by other persons, are performed in accordance with the certificate holder's manual;**
- (b) Competent personnel and adequate facilities and equipment are provided for the proper performance of maintenance, preventive maintenance, and alterations; and**
- (c) Each aircraft released to service is airworthy and has been properly maintained for operation under this part.**

FAA Regulatory Requirements Cont.

- **14 CFR Part 25.1529 Appendix H – says in part - The contents of the manual or manuals must be prepared in the English language. The Instructions for Continued Airworthiness must contain the following manuals or sections, as appropriate, and information:**
 - (a) *Airplane maintenance manual or section.***
 - (1) Introduction information that includes an explanation of the airplane's features and data to the extent necessary for maintenance or preventive maintenance.**
 - (2) A description of the airplane and its systems**
 - (4) Servicing information that covers details regarding servicing points, capacities of tanks, reservoirs, types of fluids to be used, pressures applicable to the various systems, location of access panels for inspection and servicing, locations of lubrication points, lubricants to be used, equipment required for servicing, tow instructions and limitations, mooring, jacking, and leveling information.**
 - (b) *Maintenance Instructions.***
 - (1) Scheduling information for each part of the airplane**

Aircraft Maintenance Programs

- **Maintenance Planning Document (MPD) is developed by the Aircraft manufacturer and contains recommended checks , servicing and other scheduled maintenance tasks.**
- **Aircraft Maintenance Manual (AMM) is also developed by the aircraft Manufacturer and contains life and time limited parts, repair, troubleshooting, removal and installation instructions as well as servicing instructions.**
- **Maintenance Review Board Report (MRBR) is developed by the manufacturer in conjunction with Industry and Regulatory Authorities. The MRBR established the initial maintenance intervals and tasks for new aircraft IAW Advisory Circular AC 121.22A.**

FAA Surveillance

- **Air Transportation Oversight System (ATOS)**
(System Safety Approach)
- **National Work Program using the Program Tracking and Reporting System (PTRS)**
(Traditional approach of monitoring compliance, investigating non-compliance and administering sanctions for non-compliance)

Operations and Maintenance Plans

Overview of Requirements and Timeframes

In order to ensure that the appropriate multiple barriers are in place, each aircraft water system O&M plan must include the following components:

- ✓ Watering Point Selection Requirement
- ✓ Procedures for Boarding Water
- ✓ Procedures for Disinfection and Flushing of Aircraft Water System
- ✓ Procedures for Follow-up Sampling
- ✓ Training Program Elements**
- ✓ Self-Inspection Procedures
- ✓ Coliform Sampling Plan

Disinfection and Flushing (D&F)

- Frequency is based on D&F Frequency
 - Quarter, semi-annually, 3x per year, annually, or less
 - Must indicate type of disinfecting agent
 - Must indicate the concentration
 - Disinfectant Contact Time to include flushing volume and times

Operations and Maintenance Plans

Routine and Corrective Disinfection and Flushing

Typical disinfectants and dosage rates are summarized:

Disinfectant		Dosage Rate	Contact Time
Trade Name	Active Ingredient		
Purogene plus citric acid activator	2% chlorine dioxide	100 parts per million (ppm)	1 hour
Ozone	Ozone	1.5 ppm	20 minutes to 1.5 hours
Elsil	3% hydrogen peroxide	400 ppm	1 hour
Herlisil	50% hydrogen peroxide	400 ppm	1 hour
Chlorox, sodium hypochlorite, or calcium hypochlorite	chlorine	100 ppm	1 hour
		50 ppm	4 hours

Operations and Maintenance Plans

Routine and Corrective Disinfection and Flushing

Recommended Disinfection Procedure:

1. Open all taps and completely drain water system.
2. Remove filters and replace filter caps.
3. Make up disinfectant solution (disinfectant type and dose vary, refer to previous table).
4. Fill water system tank with disinfectant solution until full (drains out of tank overflow).
5. Flush galley and lavatory taps until proper disinfectant concentration is measured at all taps.
6. Top off water system tank with disinfectant solution.

Operations and Maintenance Plans

Routine and Corrective Disinfection and Flushing

Recommended Disinfection Procedure (continued):

7. Hold disinfectant solution in water system for predetermined contact time (varies depending on disinfectant type and dose.
8. Record contact time and initial disinfectant concentration in maintenance records (Aircraft Maintenance Report).
9. Open all taps and completely drain water system.
10. If measured disinfectant concentration was less than required, or actual contact time was less than required, repeat disinfection procedure.
11. If disinfection procedure met requirements for disinfectant concentration and contact time, refill the water system with potable water and allow water to flow from each tap for 2 minutes.
12. Collect water samples for coliform bacteria if follow-up samples are required.
13. Repeat disinfection procedure if coliform samples are coliform-positive, or if water quality is otherwise unsatisfactory.
14. Install new filters.

Operations and Maintenance Plans

Routine and Corrective Disinfection and Flushing

1. If the aircraft will be parked for more than three days, drain the water system. When it is returned to service, perform disinfection procedure, and then fill the lines with potable water.
2. If the aircraft will be stored (i.e., “**inactive**,” taken out of service), conduct the following prior to storage: drain the water system, perform the disinfection procedure, and then drain the water system again so that there is no water in the system while the aircraft is stored. Before the aircraft is returned to service, conduct the following: perform the disinfection procedure, replace charcoal filters if installed, and fill with potable water and flush the lines.

Operations and Maintenance Plans

Training of Personnel

The O&M plan should describe the following elements of the training program:

- ✓ Training topics and typical training schedule, including the frequency training that will be provided and duration of the training
- ✓ Training program for new staff
- ✓ Refresher classes for existing staff- although it may depend entirely on the airlines preferences and available training

Operations and Maintenance Plans

Training of Personnel

Training topics for aircraft water system personnel should include:

- ✓ The public health and safety reasons for the ADWR requirements
- ✓ ADWR requirement details
- ✓ Acute contaminants, contaminant pathways, and control measures
- ✓ General Overview on the sanitary practices associated with procedures for boarding water
- ✓ Collecting water samples for coliform bacteria analysis and transport of samples to the laboratory
- ✓ Dealing with the public
- ✓ Routine disinfection and flushing practices
- ✓ Procedures for taking aircraft out-of-service and returning to service (e.g., draining, disinfection, flushing)
- ✓ Performing self-inspections
- ✓ Draining and cleaning the storage tank
- ✓ Backflow prevention and cross connection control
- ✓ Water treatment equipment maintenance and replacement requirements

Training

- **Training for all personnel involved with the aircraft water system operation and maintenance provisions of this regulation must include, but is not limited to:**
 - (i) Water boarding procedures;
 - (ii) Sample collection procedures;
 - (iii) Disinfection and flushing procedures;
 - (iv) Public health and safety reasons for the requirements of this subpart.

Operations and Maintenance Plans

Training of Personnel

Training REQUIRED for all personnel associated with the operation and maintenance provisions of this Rule.

Ground Crews

Maintenance Crews

Flight Attendants

Pilots

Miscellaneous Contractors (MRO's, etc)

LAB Personnel

May be tailored to individual job descriptions but must cover required topics

Training Frequency

- Not specified
- Was meant to reflect standard 2yr recertification requirements for Operator Licensing
- Is offered by Vannet Group, LLC



SELF-Inspections



Operations and Maintenance Plans

Procedures for Conducting Self-Inspections

The O&M plan must explain how self-inspections of the aircraft water systems will be conducted. The ADWR requires that a self-inspection be completed no less frequently than once every five years. The purpose of the self-inspection is to make sure that the aircraft water system is not compromised or subject to contamination.

Aircraft water systems are generally considered to include the following basic elements: a water service panel, a storage tank, treatment equipment (if any are on the aircraft), the distribution lines (piping and valves), and plumbing fixtures.

A thorough inspection is needed to determine:

- ✓ Whether the system can provide a safe and adequate supply of drinking water to the passengers and crew
- ✓ The potential for degradation of the water quality or sanitary risks
- ✓ The system's reliability and vulnerability

Operations and Maintenance Plans

Procedures for Conducting Self-Inspections

The self-inspection example checklist is based on the eight essential elements of a public water system sanitary survey, with modifications appropriate for an aircraft water system. The eight elements of a typical sanitary survey include the following:

1. Source
2. Treatment
3. Distribution System
4. Finished Water Storage
5. Pumps, pump facilities, and controls
6. Monitoring, reporting, and data verification
7. System management and operation
8. Operator compliance with State Requirements

Operations and Maintenance Plans

Practices and Procedures for Boarding Water

An example of water boarding practices provided by the National Air Transportation Association (NATA) and Airline Services Council & Associates includes the following:

1. Persons known to have or suspected of having one or more of the following conditions are not allowed to conduct drinking water service for aircraft water systems:
 - a) Carrier of a communicable disease.
 - b) Suffering from a gastrointestinal disease/illness.
 - c) An open lesion or evidence of infection on exposed surfaces of body.
 - d) Personnel engaged in removal or disposal of wastes from aircraft or other airport facilities.
2. Personnel handling drinking water service equipment shall keep hands clean at all times.

Operations and Maintenance Plans

Practices and Procedures for Boarding Water

Continued

3. Water service tanks and connected plumbing, hoses, hose reels, racks, and cabinets must be kept clean at all times.
4. All plumbing and hoses must be water-tight with no leaks.
5. All tank openings except the tank vent must be capped or plugged at all times except when being repaired or serviced or when tank is being filled.
6. The hose end that is connected to the aircraft water system must be carried to and from its storage place and never allowed to touch the ground. When not in use, the hose end must be plugged, capped, or attached to an approved storage fitting.
7. When not in use, hoses must be stored on a hose reel or suitable bracket to prevent kinking, damage, and contamination from dirt, oil, etc.
8. Prior to connecting a service vehicle to the aircraft water system, flush the system by running 5 to 10 gallons of water through it.
9. Thoroughly flush mobile water trucks and carts every 1 to 2 days.

RULE VIOLATIONS



Legal Authority

- EPA is tasked by Congress through the Safe Drinking Water Act as having the legal responsibility of enforcing the law of the SDWA.
- Can impose penalties and fines, especially for negligence
- Imprisonment for severe criminal cases
- Does have flexibility in enforcement proceedings

Violations

Violations of the ADWR are

- Specified in 40 CFR 141.810.
- Most involve failure of the air carrier to perform a specified action. An important exception is that any routine or repeat coliform sample result that is *E. coli-positive* is a violation of the ADWR.

Violation	Required Response for the Violation (including citation)
Failure to perform any requirements in [40CFR 141.803 or 141.804]. This includes failure to: use analytical methods approved in accordance with 141.21(f)(3) and 141.21(f)(6) of the National Primary Drinking Water Regulations; and/or use laboratories certified by EPA or a "State".	There are no rule citations specifying actions in response to these violations. Actions will be determined by EPA. One of the actions could include replacing the sample.
Failure to perform routine disinfection and flushing [40 CFR 141.810(a)]. This includes failure to conduct routine disinfection and flushing as specified in the O&M plan.	The responses specified for this violation under 40 CFR 141.803(c)(3)(ii) are as follows: (1) Restrict public access to aircraft water system within 72 hours which includes: • Physically disconnecting/shutting off aircraft water system, where feasible, or otherwise preventing the flow of water through the tap(s). • Providing public notification to passengers and crew per 40 CFR 141.805. • Providing alternatives to water from the aircraft water system (e.g., bottled water, antiseptic hand gels, etc.). (2) Conduct disinfection and flushing. (3) Collect follow-up samples. Once samples are collected, aircraft water can be provided for human consumption. 40 CFR 141.806(b)(5) requires the violation be reported to EPA within 10 calendar days of discovery of the failure.

Violation	Required Response for the Violation (including citation)
Failure to perform corrective disinfection and flushing [40 CFR 141.810(a)]. This is triggered by sample results or failure to perform required activities.	40 CFR 141.806(b)(5) requires the violation be reported to EPA within 10 calendar days of discovery of the failure. By failing to perform corrective disinfection and flushing, the air carrier also would have failed to collect follow-up samples. Therefore, the air carrier must complete the required responses for failing to collect follow-up samples for an <i>E. coli</i> -positive or a total coliform-positive and <i>E. coli</i> -negative routine or repeat sample, whichever is applicable.
Failure to restrict public access to the aircraft water supply by not physically disconnecting or shutting off the aircraft water system where feasible [40 CFR 141.810(a)]. This is triggered by sample results or failure to perform required activities.	By failing to restrict public access by not physically disconnecting or shutting off the aircraft water system when feasible, the air carrier also would have failed to perform corrective disinfection and flushing in the required timeframe and failed to collect the required follow-up samples. Therefore, the aircraft must complete the required responses for failing to collect follow-up samples for an <i>E. coli</i> -positive or a total coliform-positive and <i>E. coli</i> -negative routine or repeat sample, whichever is applicable.
Failure to restrict public access to the aircraft water supply by not providing public notification [40 CFR 141.810(a)]. This is triggered by sample results or failure to perform required activities.	There are no rule citations specifying actions in response to this violation. Actions will be determined by EPA.
Failure to restrict public access to the aircraft water supply by not providing alternatives to water or other measures [40 CFR 141.810(a)]. This is triggered by sample results or failure to perform required activities.	There are no rule citations specifying actions in response to this violation. Actions will be determined by EPA.

Violation	Required Response for the Violation (including citation)
Failure to provide notification to passengers and crew [40 CFR 141.810(c)]. This includes public notification required for passengers and crew per [40 CFR 141.805] triggered by sample results, failure to perform required activities, or as determined by EPA, the air carrier, or the crew.	There are no rule citations specifying actions in response to this violation. Actions will be determined by EPA.
Failure to collect routine coliform samples [40 CFR 141.810(a)]. This includes failure to collect and analyze the required number of coliform samples in accordance with the coliform monitoring plan.	The responses specified for this violation under 40 CFR 141.803(c)(3)(ii) are as follows: (1) Restrict public access to aircraft water system within 72 hours which includes: • Physically disconnecting/shutting off aircraft water system, where feasible, or otherwise preventing the flow of water through the tap(s). • Providing public notification to passengers and crew per [40 CFR 141.805]. • Providing alternatives to water from the aircraft water system (e.g., bottled water, antiseptic hand gels, etc.). (2) Conduct disinfection and flushing. (3) Collect follow-up samples. Once samples are collected, aircraft water can be provided for human consumption. 40 CFR 141.806(b)(5) requires the violation be reported to EPA within 10 calendar days of discovery of the failure.

Violation	Required Response for the Violation (including citation)
Failure to collect repeat or follow-up samples as a result of a total coliform-positive and <i>E. coli</i>-negative result [40 CFR 141.810(a)]. This includes failure to conduct repeat sampling after routine samples are found to be positive for total coliform, and failure to conduct follow-up monitoring after corrective disinfection and flushing.	The responses specified for this violation under 40 CFR 141.803(c)(3)(ii) are as follows: (1) Restrict public access to aircraft water system within 72 hours which includes: • Physically disconnecting/shutting off aircraft water system, where feasible, or otherwise preventing the flow of water through the tap(s). • Providing public notification to passengers and crew per [40 CFR 141.805]. • Providing alternatives to water from the aircraft water system (e.g., bottled water, antiseptic hand gels, etc.). (2) Conduct disinfection and flushing. (3) Collect follow-up samples. Once samples are collected, aircraft water can be provided for human consumption. 40 CFR 141.806(b)(5) requires the violation be reported to EPA within 10 calendar days of discovery of the failure.

Violation	Required Response for the Violation (including citation)
Failure to collect follow-up samples as a result of an <i>E. coli</i>-positive result [40 CFR 141.810(a)]. This includes failure to conduct follow-up monitoring after corrective disinfection and flushing when a routine sample is <i>E. coli</i>-positive.	The responses specified for this violation under 40 CFR 141.803(c)(2)(i), (ii), and (iii) are as follows: (1) Restrict public access to aircraft water system within 24 hours which includes: • Physically disconnecting/shutting off aircraft water system, where feasible, or otherwise preventing the flow of water through the tap(s). • Providing public notification to passengers and crew per [40 CFR 141.805]. • Providing alternatives to water from the aircraft water system (e.g., bottled water, antiseptic hand gels, etc.). (2) Conduct disinfection and flushing prior to resumption of unrestricted public access to the aircraft water system, or no later than 72 hours if the aircraft water system cannot be physically disconnected/shut off to the crew and passengers. (3) Collect follow-up samples. Follow-up samples results must be total coliform-negative before aircraft water can be provided for human consumption. 40 CFR 141.806(b)(5) requires the violation be reported to EPA within 10 calendar days of discovery of the failure.

Violation	Required Response for the Violation (including citation)
Failure to board water from a safe watering point (non-<i>E. coli</i>-positive event) [40 CFR 141.810(a)]. When an air carrier becomes aware of a non-<i>E. coli</i>-positive event resulting from water that has been boarded from a watering point not in accordance with FDA regulations, does not meet EPA standards for transient non-community water systems, or has been determined unsafe due to noncompliance with procedures for boarding water specified in the O&M plan.	The responses specified for this violation under 40 CFR 141.803(c)(3)(ii) are as follows: (1) Restrict public access to aircraft water system within 72 hours which includes: • Physically disconnecting/shutting off aircraft water system, where feasible, or otherwise preventing the flow of water through the tap(s). • Providing public notification to passengers and crew per [40 CFR 141.805]. • Providing alternatives to water from the aircraft water system (e.g., bottled water, antiseptic hand gels, etc.). (2) Conduct disinfection and flushing. (3) Collect follow-up samples. Once samples are collected, aircraft water can be provided for human consumption. 40 CFR 141.806(b)(4) requires the violation be reported to EPA within 10 calendar days of the event.

Violation	Required Response for the Violation (including citation)
Failure to board water from a safe watering point (<i>E. coli</i>-positive event) [40 CFR 141.810(a)]. When an air carrier becomes aware of an <i>E. coli</i>-positive event resulting from water that has been boarded from a watering point not in accordance with FDA regulations, does not meet EPA standards for transient non-community water systems, or has been determined unsafe due to noncompliance with procedures for boarding water specified in the O&M plan.	The responses specified for this violation under 40 CFR 141.803(c)(2)(i), (ii), and (iii) are as follows: (1) Restrict public access to aircraft water system within 24 hours which includes: • Physically disconnecting/shutting off aircraft water system, where feasible, or otherwise preventing the flow of water through the tap(s). • Providing public notification to passengers and crew per [40 CFR 141.805]. • Providing alternatives to water from the aircraft water system (e.g., bottled water, antiseptic hand gels, etc.). (2) Conduct disinfection and flushing prior to resumption of unrestricted public access to the aircraft water system, or no later than 72 hours if the aircraft water system cannot be physically disconnected/shut off to the crew and passengers. (3) Collect follow-up samples. Follow-up samples results must be total coliform-negative before aircraft water can be provided for human consumption. 40 CFR 141.806(b)(4) requires the violation be reported to EPA within 10 calendar days of the event.

Violation	Required Response for the Violation (including citation)
Any <i>E. coli</i>-positive sample in any monitoring period [40 CFR 141.810(b)] (routine and repeat samples are used in this determination).	The responses specified for this violation under 40 CFR 141.803(c)(2)(i), (ii), and (iii) are as follows: (1) Restrict public access to aircraft water system within 24 hours which includes: - Physically disconnecting/shutting off aircraft water system, where feasible, or otherwise preventing the flow of water through the tap(s). - Providing public notification to passengers and crew per [40 CFR 141.805]. - Providing alternatives to water from the aircraft water system (e.g., bottled water, antiseptic hand gels, etc.). (2) Conduct disinfection and flushing prior to resumption of unrestricted public access to the aircraft water system, or no later than 72 hours if the aircraft water system cannot be physically disconnected/shut off to the crew and passengers. (3) Collect follow-up samples. Follow-up samples results must be total coliform-negative before aircraft water can be provided for human consumption. 40 CFR 141.806(b)(4) requires the violation be reported to EPA within 10 calendar days of the event.
Failure to comply with the reporting and recordkeeping requirements [40 CFR 141.810(d)]. This includes failure to report required information, results, or actions to EPA; and failure to retain records for the required time period or failure to retain the required information.	There are no rule citations specifying actions in response to this violation. Actions will be determined by EPA.

Violation	Required Response for the Violation (including citation)
Failure to conduct a self-inspection or address a deficiency in accordance with the O&M plan [40 CFR 141.810(e)]. Self-inspections are required every 5 years. Deficiencies noted during self-inspections or compliance audits must be addressed 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.	There are no rule citations specifying actions in response to this violation. Actions will be determined by EPA.
Failure to develop a coliform sampling plan [40 CFR 141.810(f)]. Coliform sampling plans must be developed by April 19, 2011, for existing aircraft, or within the first calendar quarter of initial operation for new aircraft.	There are no rule citations specifying actions in response to this violation. Actions will be determined by EPA. One of the actions would include developing the plan.
Failure to develop and follow operations and maintenance plan [40 CFR 141.810(f)]. Operations and maintenance plans must be developed by April 19, 2011, for existing aircraft, or within the first calendar quarter of initial operation for new aircraft.	There are no rule citations specifying actions in response to this violation. Actions will be determined by EPA. One of the actions would include developing the plan.

ADWR Costs

- Total estimated annualized cost to air carrier industry is expected to be approx \$12 million
 - Primarily due to monitoring and corrective action requirements of the ADWR
- Costs passed on to passengers was estimated to be an increase in ticket prices of less than two cents per year
- Estimated at \$600-\$1000 per aircraft

Public Notification, Recordkeeping & Reporting



Reporting Requirements

- All Air Carriers are to report:
 - Frequency of Monitoring
 - Frequency of Flush/Disinfect
- Required of all new and previously serviced aircraft
- Sample Results
- Inventory of all aircraft to include on-board treatment, faucets, lavs, galleys, and on-board storage.

Reporting Requirements

Overview of Requirements and Timeframes

- ✓ Air Carriers Inventory
- ✓ Coliform Monitoring And Sampling Plan Results
- ✓ O&M Plan
- ✓ Corrective Actions
- ✓ Public Notification
- ✓ Self Inspections and Deficiencies
- ✓ Compliance Audits

Required Format for Reporting

- ✓ Electronically: EPA's ADWR Reporting and Compliance System (ARCS)
 - ✓ Performs logic checks
 - ✓ Reduces reporting errors
 - ✓ Allows for batch loading of data
 - ✓ Automatic upload with spreadsheets that EPA will provide formats
 - ✓ Online access granted to air carriers primary contact person(s)

Reporting Timeline

Current Fleet ● ● ●

April 19th

New Aircraft ● ● ●

No later than 10 days following the end of the calendar month.

Inventory Changes ● ●

No later than 10 days following the end of the calendar month.

Coliform Sample Reporting

All Sample Results
(Includes Routine,
Repeats, and Follow-up)

No later than 10 calendar
days following the
monitoring period in which
the sampling occurred

Any sample TC+ &/or EC+
(Any of the 3)

Within 10 calendar days of
receiving sample results

REPORTING REQUIREMENTS FOR "DISINFECTION & FLUSHING" AND "COLIFORM SAMPLING"

<i>Routine Frequency</i>	<i>Quarterly D&F</i>	<i>Every 4 Months D&F</i>	<i>Semi-Annual D&F</i>	<i>Annual or Longer between D&F's</i>
Report Deadlines	Q1 due April 10 Q2 due July 10 Q3 due by October 10 Q4 due January 10	May 10th September 10th January 10th	July 10th January 10th	January 10th, starting in January 2013
				
Sampling Frequency Reporting Deadlines	Report to EPA by January 10th each year on annual sampling	July 10th or January 10th	Q1 due April 10 Q2 due July 10 Q3 due by October 10 Q4 due January 10	Must be reported by the 10th of each following month

ADDITIONAL REPORTING TRIGGERS

*For Total Coliform
Negative Positive
results:*

Monthly



"...non-routine sampling, within 10 days of the event"

This is satisfied by the positive sample result reported to EPA by the lab using ARCS

*Changes to D&F
Intervals*

Monthly



Failure to Sample

Monthly



Corrective Actions

Monthly



Failure to Comply

Monthly



*Changes in
Inventory*

Quarterly



Report no later than the 10th of the month following the change

Report by the 10th of the month following the quarter

Inventory Reporting:

- Air carriers are required to submit to EPA an inventory identifying all aircraft public water systems in their fleet and to update the inventory as fleet changes occur [40 CFR 141.806(b)].
- The reporting requirements for inventory are effective April 19, 2011.

Active vs. Inactive Status



Active Means:

Active status refers to time periods during which an aircraft water system is in normal operation flying routes in the US.

IN-Active Means:

- The aircraft water system must be identified in the ADWR Reporting and Compliance system as inactive by the end of the compliance period in which the monitoring or disinfection and flushing requirement is due to be performed;
- 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; and
- The missed requirement(s) must be performed prior to the aircraft water system serving water to the public.

How to Report to EPA?

EPA Aircraft Reporting and Compliance System (ARCS)

Username

Password

[Forgot Password?](#)



If you do not already have an account with the Aircraft Reporting and Compliance System, click [Request User Account](#)

ARCS

- Web Based/ Password Protected
- Only Air-Carriers and their Representatives
- Used by EPA as Regulatory Oversight
- Captures all required reporting data and analyzes to determine compliance.

EPA to Role out ARCS in 2 phases

- Phase 1: April 19, 2011
 - Complete Aircraft Inventory
 - Sampling Plan Developed
 - O&M Plan Developed
 - D&F Frequency
- Phase 2: October 19, 2011
 - Begin conducting D&F and Routine Sampling
 - Incorporate Sampling Plan into O&M
 - Incorporate O&M into FAA accepted O&M program
 - Begin Report Cycle

RULE RECAP

Let's
Recap

Any aircraft that transports 25 or more passengers within the United States at least 60 days out of the year, and has public water provided onboard, is an individual public water system by definition.



Rule Summary: Coliform Sampling and Operations and Maintenance Plans

- Each aircraft must have a coliform sampling plan and an aircraft PWS operation and maintenance plan
- Plans must be included in a FAA-accepted aircraft operations and maintenance program
- The frequency for routine coliform sampling and notification that the operation and maintenance plan has been updated or developed must be reported to EPA
 - April 19, 2011
 - October 19, 2011

Coliform Sampling

- Two samples, per aircraft, per monitoring period
 - One from a lavatory and one from a galley
 - Sampling frequency is tied to the frequency of disinfection and flushing of the aircraft's onboard water system as recommended by the manufacturer:

<u>Routine Disinfection and Flushing Frequency</u>	<u>Routine Coliform Sampling Frequency</u>
At least quarterly	Annually
At Least three times per year	Bi-Annually
2x Per Year	Quarterly
At least Once Per Year or Less	Monthly

Inspections and Audits

- **Each aircraft PWS must have a self-inspection of their water system no less than once every 5 calendar years**
- **Compliance audits may be conducted by the USEPA as deemed necessary**
- **Air carrier must address deficiencies found within 90 days of deficiency identification**

Rule Summary:

Data Collection and Management

- ARCS
- An air carrier may request an alternate format if it or its lab does not have the capability to report electronically

Training Requirements

- Training IS required for all personnel involved with the aircraft water system operation and maintenance.



Record Keeping

- Can be electronic and/or hard copy
- Records of Self-Inspections must be kept for 10 years
- Bacteriological analyses and D&F data are required at 5yrs
- Public Notifications must be kept for 3 years
- O&M and Sampling Plans must be current



Any Questions???



BREAK for Lunch.....