

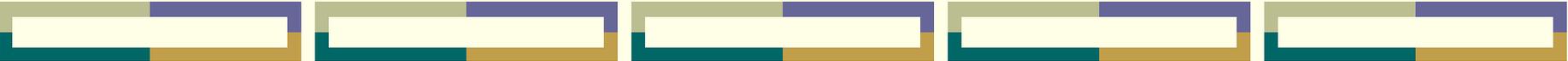
**Division of Clean Water Programs
State Water Resources Control Board**

**Technical Symposium:
Marina Fueling System Design,
Construction, and Operation**



What is a MFF?

- Marina Fueling Facilities (MFFs) are aboveground and underground fuel storage and transfer system(s) located at marinas that dispense fuel on or near the shoreline of a waterway, or over water
 - Currently underground storage tanks (USTs) at MFFs are required to comply with Title 23, California Code of Regulations
 - Aboveground storage tanks (AGTs) are required to comply with Chapter 6.75 of the California Health and Safety Code
- 

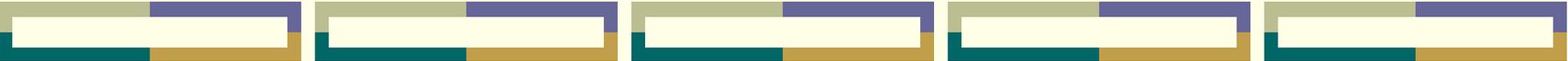


MFF Performance

- Objectives
 - Safety
 - Environmentally Protective
 - Efficient
 - Economical
 - Requirements
 - Fire Safety
 - Environmental Protection
 - Worker Health and Safety
- 

Marina Advisory Panel Report





Advisory Panel

Fuel Storage & Transfer Systems

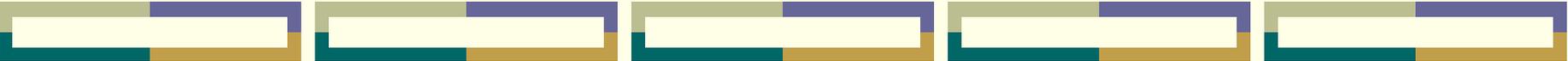
- Issue: Inconsistencies between statutory and regulatory requirements
 - Recommendation: UST and AST requirements for marina product piping should be consistent and specific to marinas
 - Follow-up: Propose amendments to statute requiring MFFs with ASTs meet the same requirements as MFFs with USTs
- 



Advisory Panel

Fuel Storage & Transfer Systems

- Issue: Statutes and regulations related to fuel piping are inconsistent
 - Recommendation: Continue to research statute and regulations
 - Follow-up: Promote code compliance and consistency through the use of a comprehensive marina standard
- 



Advisory Panel

Fuel Storage & Transfer Systems

- Issue: Each marina system is dynamic/unique and therefore needs to be designed using best practices
 - Recommendation: Develop appropriate standards for fuel transfer systems specific to marinas
 - Follow-up: Development of UL standards specific to marina fueling systems
- 



Advisory Panel

Fuel Storage & Transfer Systems

- Issue: New requirements may impose a financial hardship on marina operators/operators
 - Recommendation: Legislature should consider grants or low interest loans
 - Follow-up: Inquiring into grant and loan availability for MFF upgrades
- 



Advisory Panel

Floating Fuel Systems

- Issue: No specific standard for floating fuel systems
 - Recommendation: Develop regulations that provide consistency for floating fuel systems
 - Follow-up: Research on statutes, regulations, code consistency, public safety, and environmental protection is being conducted to help us better evaluate these systems
- 



Advisory Panel

Vessel Fueling

- Issue: Vessel fuel venting systems may result in direct petroleum discharges to water
 - Issue: Watercraft emissions to water
 - Recommendation: Consult with NMMA, USCG, and CARB
 - Follow-up: Promote BMPs
 - Follow-up: CARB evaluating MFF and water craft fugitive emissions
- 

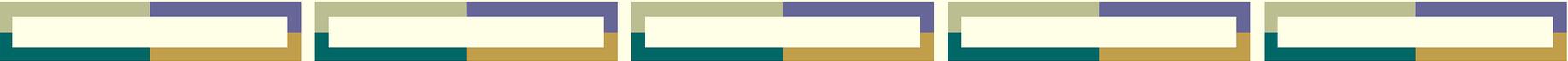
Fuel Releases

Statewide MFF Inspections

MFF Project Activities

Material and Design Standards

Consistent Implementation



Ensuring “California's
vital water supply is
protected now and for
years to come.....with or
without MTBE, is
a top priority.”

Governor Gray Davis, June 2002



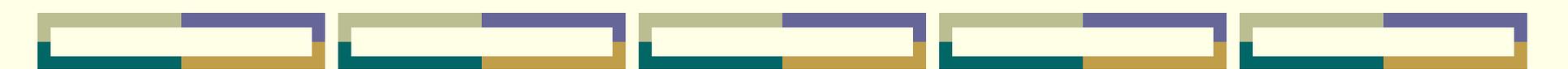
MFF Project Goal

To develop a comprehensive MFF regulatory program that will allow consistent and effective implementation of protective standards, regardless of whether the fuel tank is located above or below ground surface.



Material and Design Standards

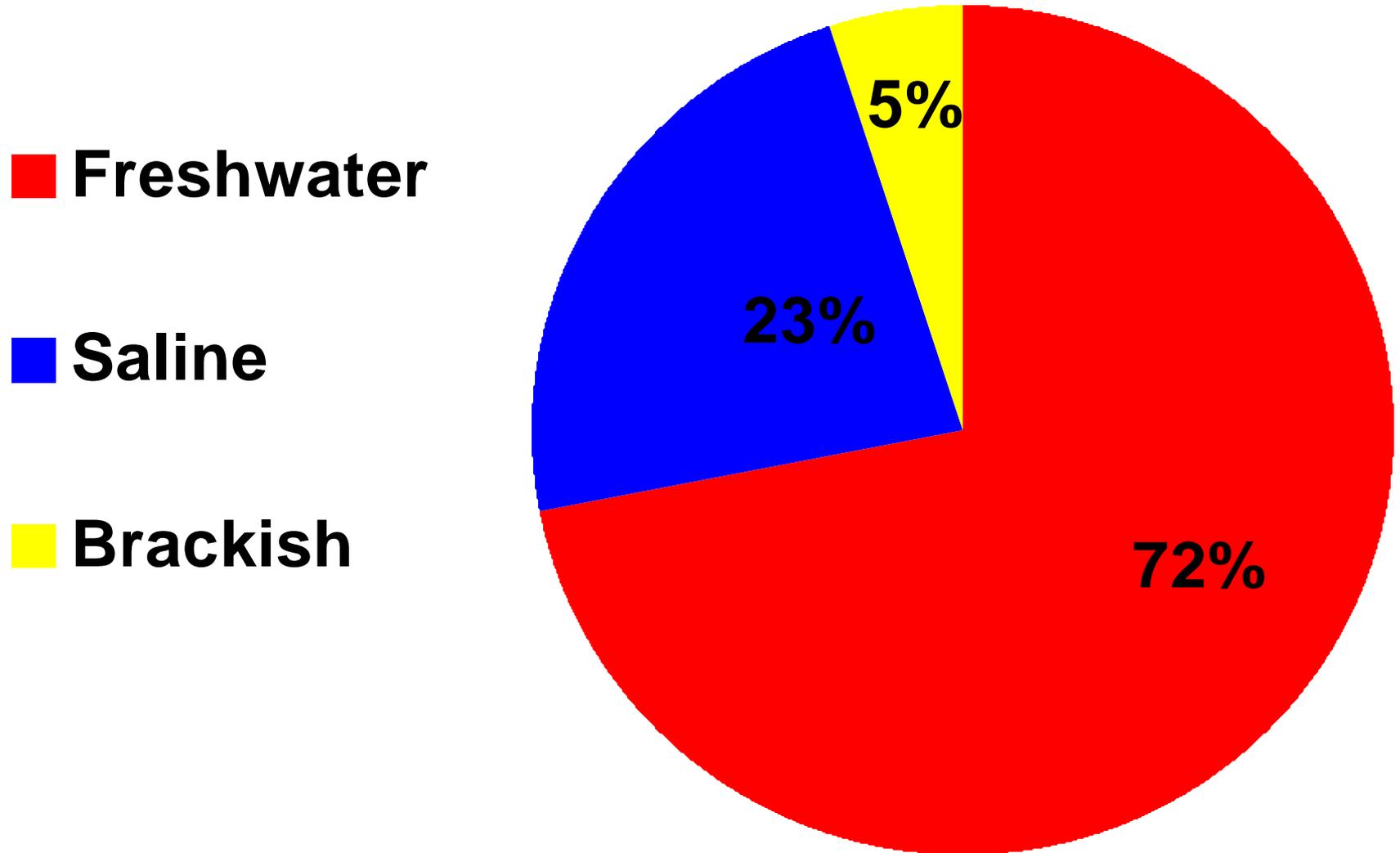
- Standard UL 2248, Marina Fuel Storage, Piping, and Dispensing Systems
 - Standard UL 2405, Aboveground Secondly Contained Piping for Flammable Liquids
 - Standards available for comment now. Comments due to UL by July 22, 2002
 - UL to publish First Edition of both standards by September 2002
- 



Statewide MFF Inspections

- Request for LIA & RB assistance was mailed out October 27, 2000
 - MFF inspections recorded on form developed by SWRCB
 - “Marina Fuel Storage and Piping Inspection Form” due Dec 31, 2001
 - Inspections were conducted at 183 facilities
- 

MFF Location - Water Type



Type of Tank

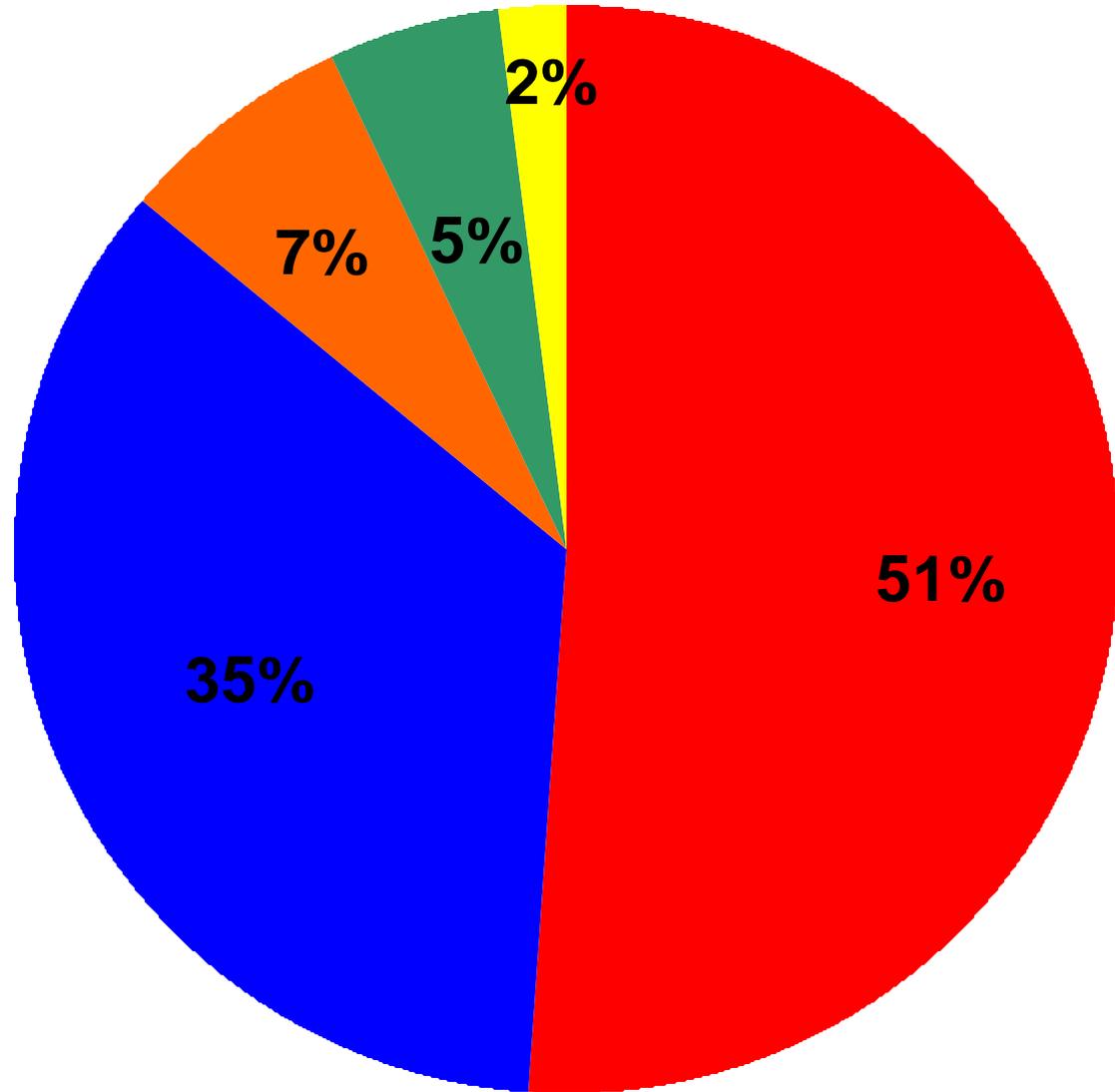
■ Land-based AST

■ Land-based UST

■ Tank at Dock
Abovewater

■ Tank at Dock
Underwater

■ Unidentified



Product Type - All Systems

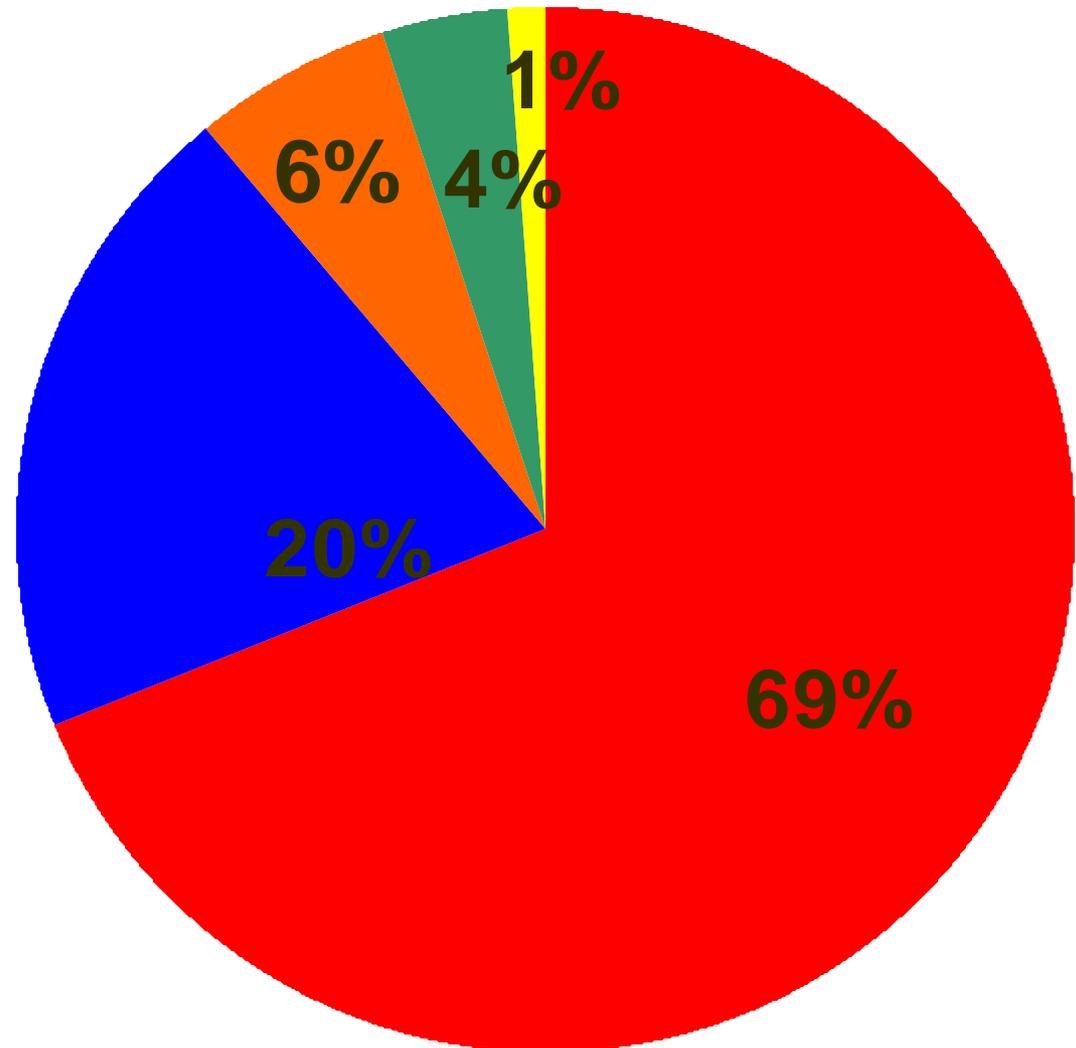
 **Gasoline**

 **Diesel**

 **Premix**

 **Other**

 **Unidentified**



Tank Construction

Land-based ASTs

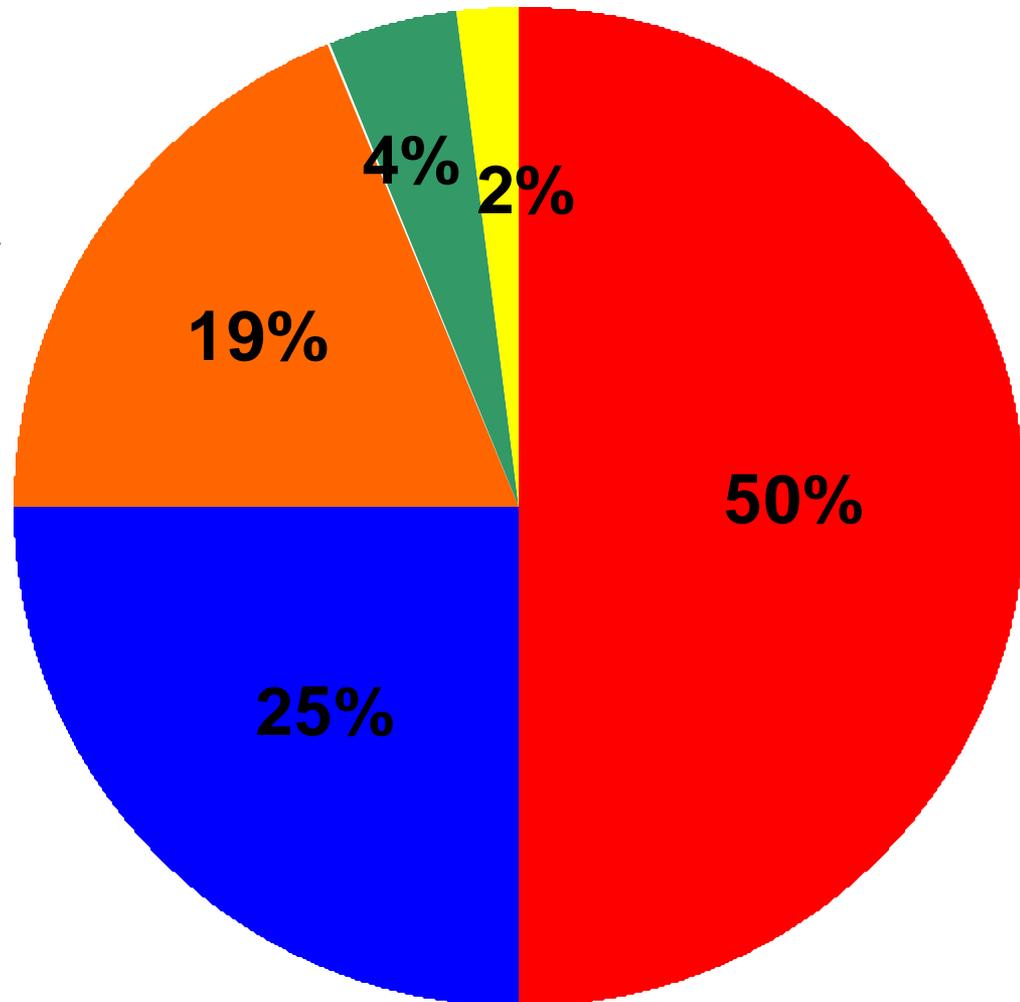
■ Double-walled

■ Single-walled (with other secondary containment)

■ Single-walled

■ Unidentified

■ Other



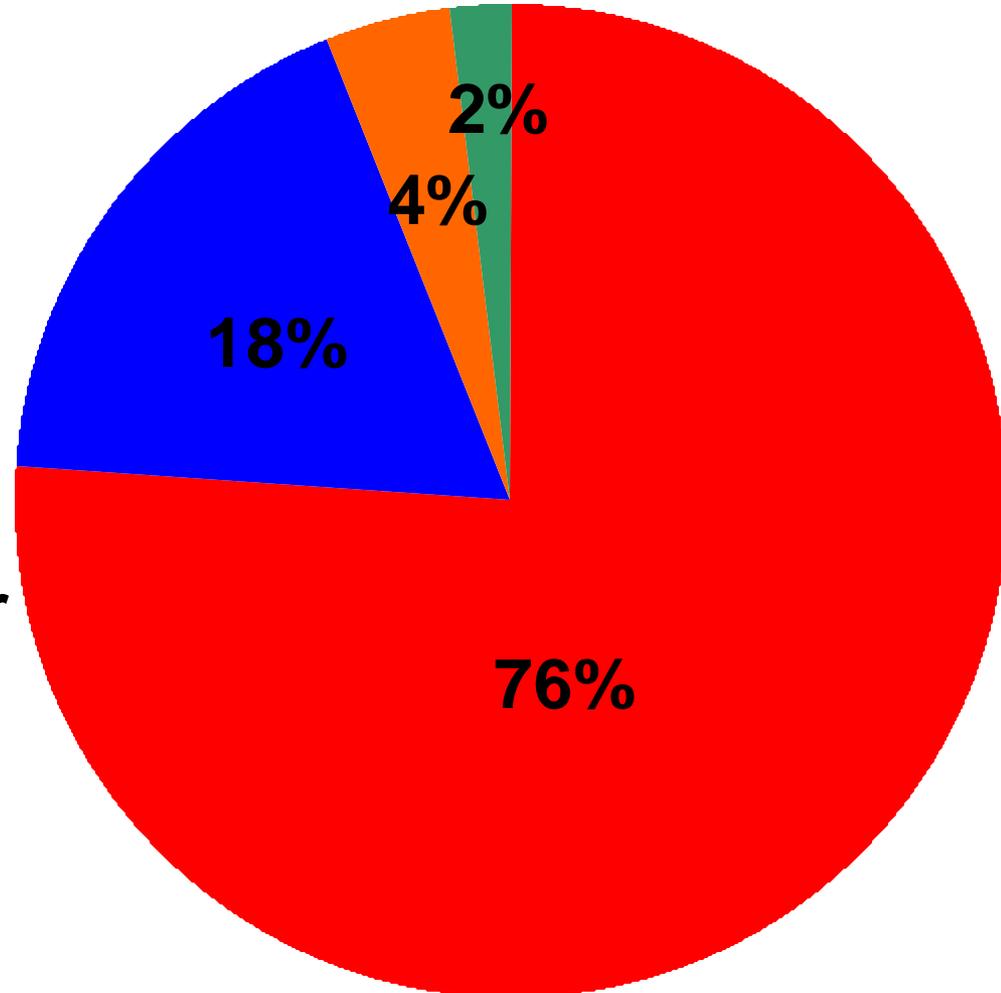
Tank Construction Land-based USTs

■ Double-walled

■ Single-walled

■ Single-walled (with other
secondary containment)

■ Unidentified



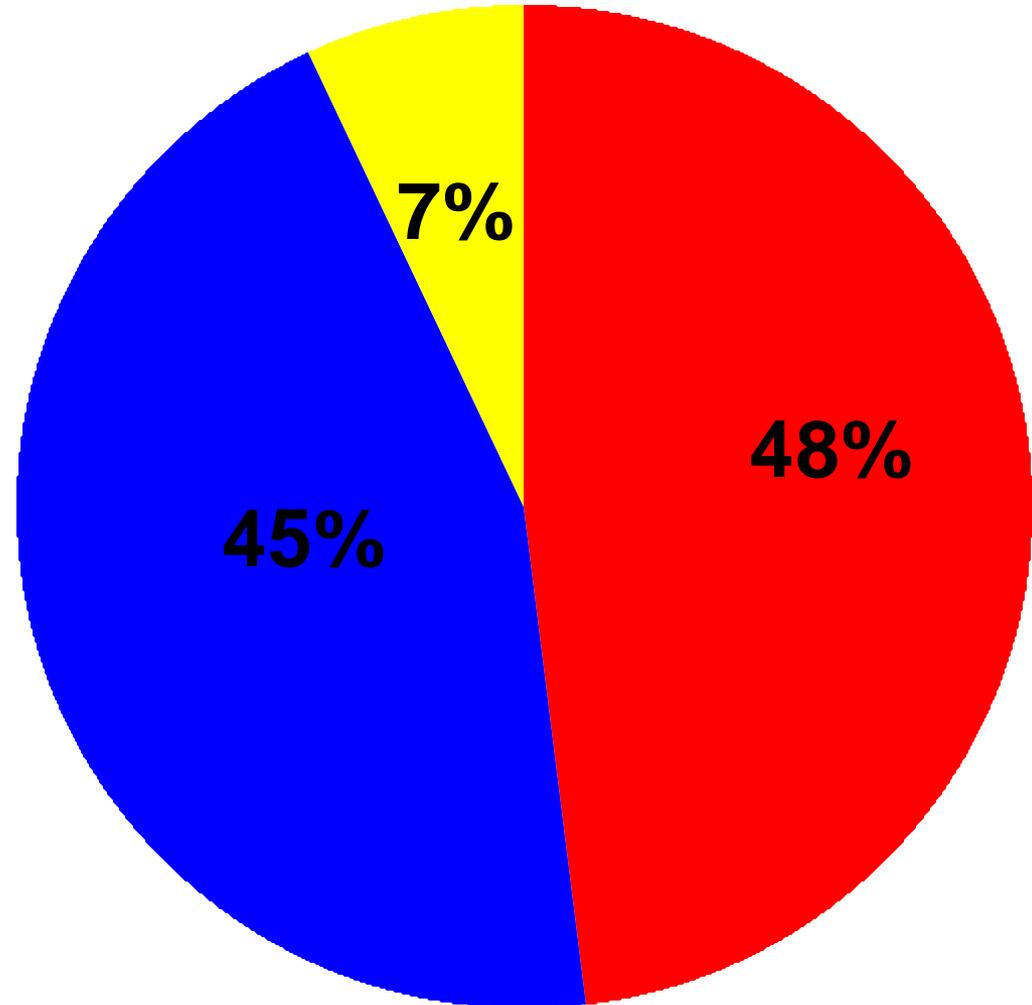
Tank Construction

Tanks at Dock, Abovewater

■ Double-walled

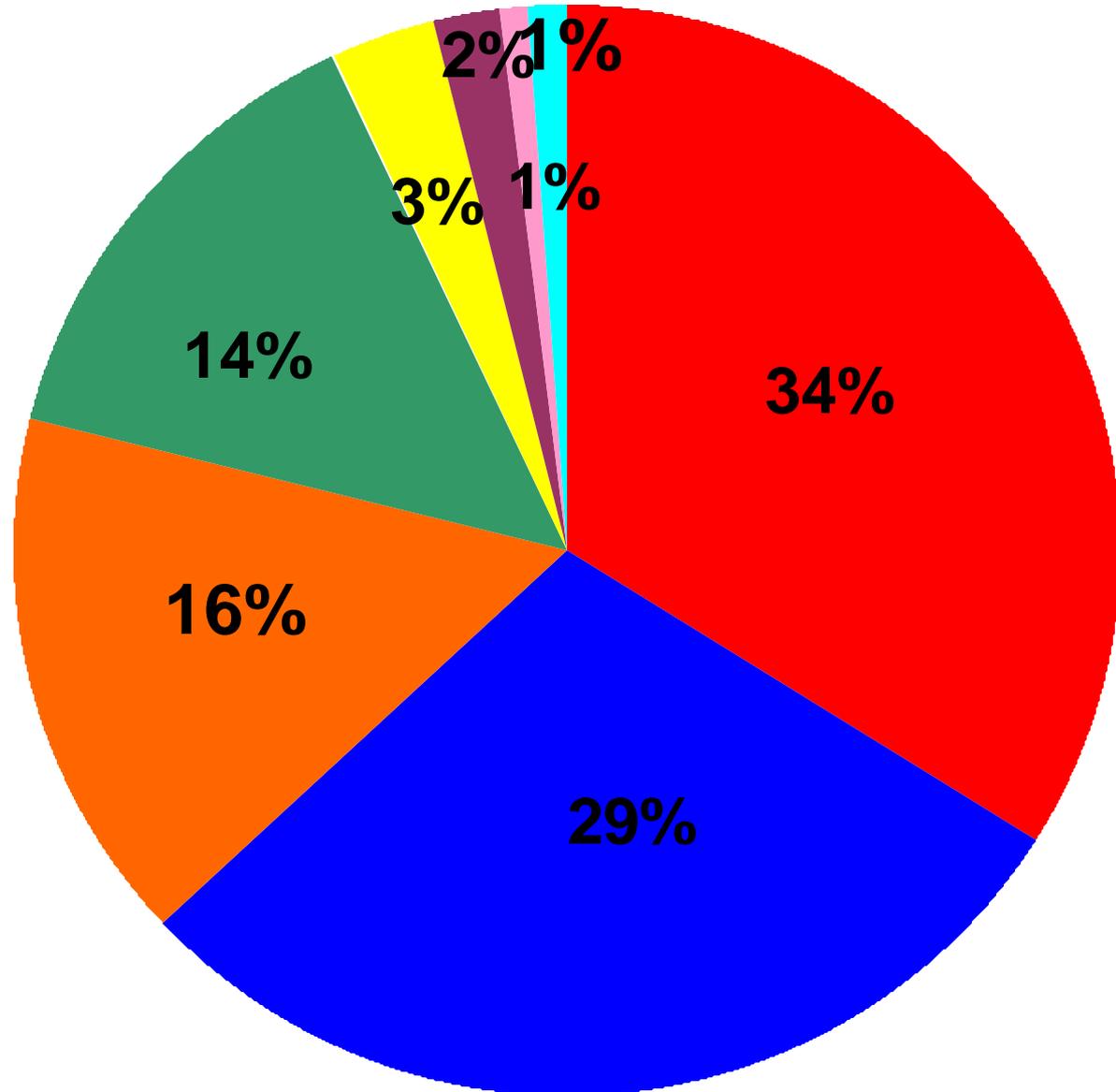
■ Single-walled

■ Single-walled (with other secondary containment)



Placement of Piping

- Under Dock
- Aboveground
- Underground
- Above/Side Dock
- Other
- Underwater
- Floating
- Unidentified

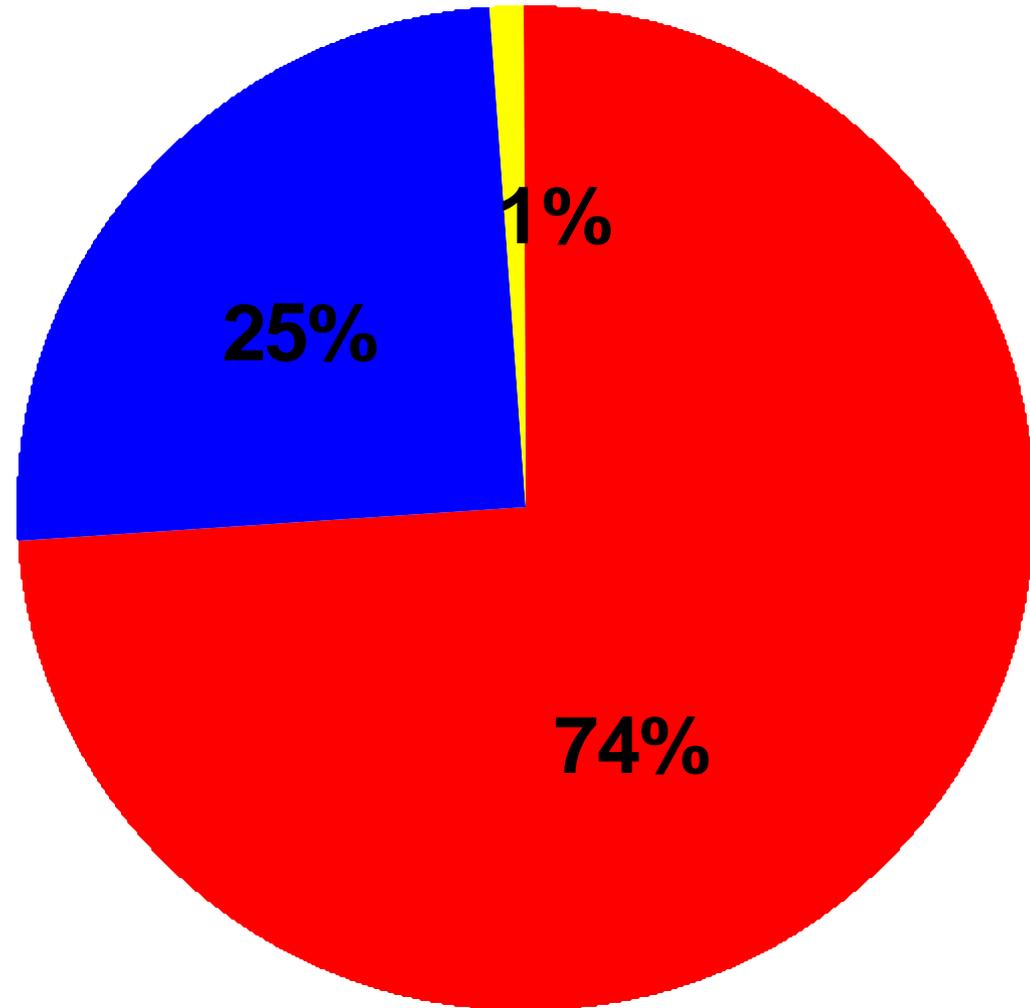


Piping Construction

■ **Single-walled**

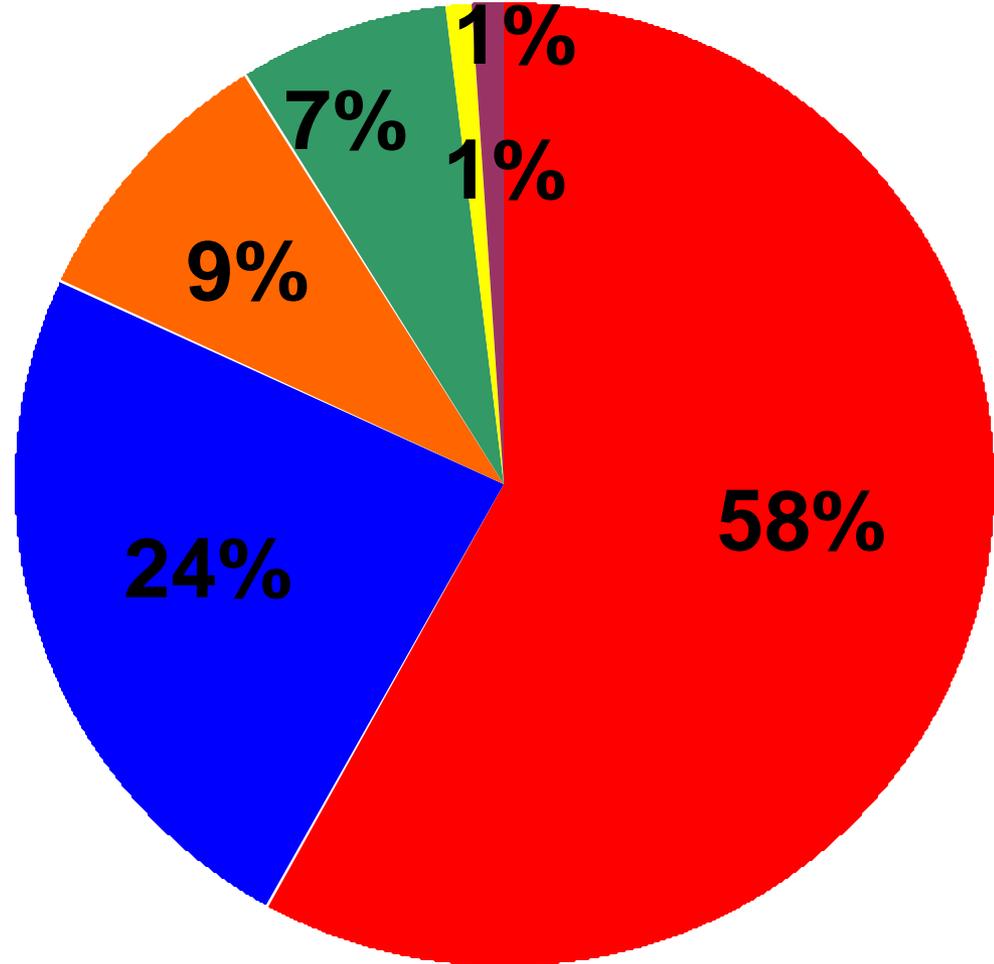
■ **Double-walled**

■ **Unidentified**



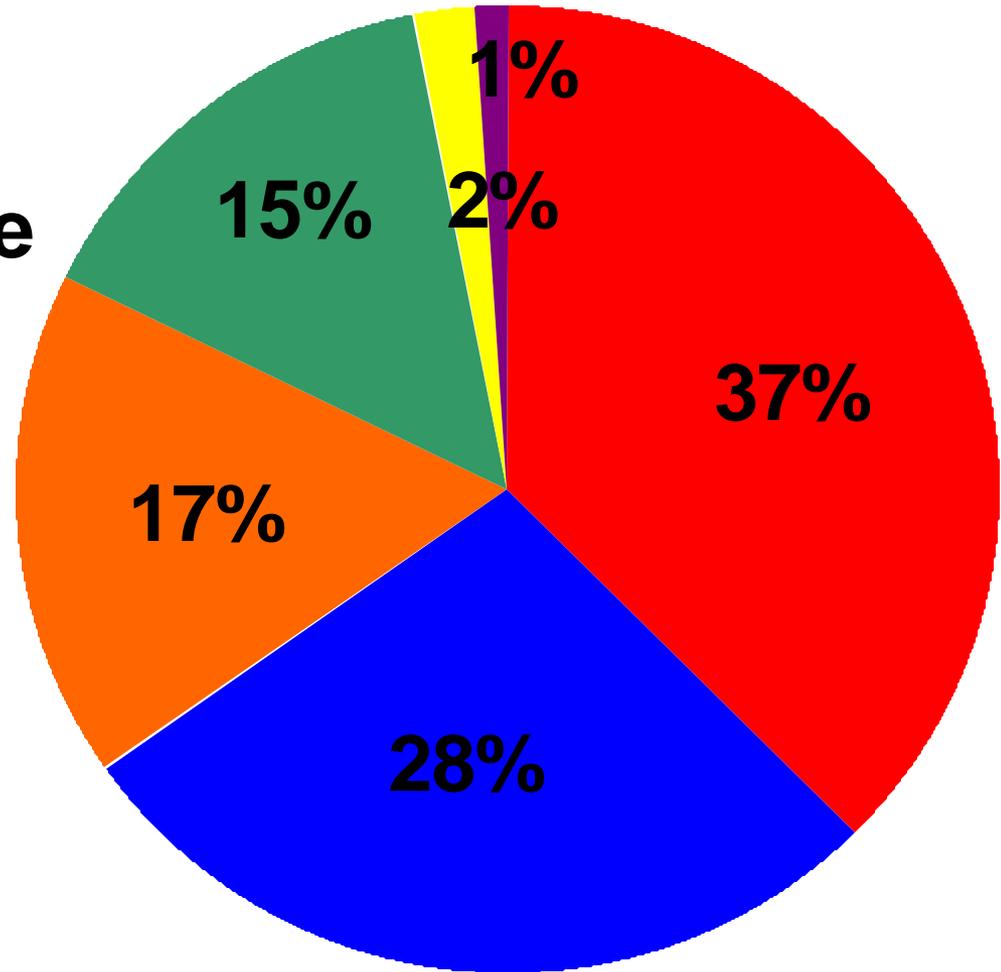
Primary Piping Material

- **Metallic**
- **Rubber Hose**
- **Non-metallic Flexible**
- **Non-metallic Rigid**
- **Other**
- **Unidentified**



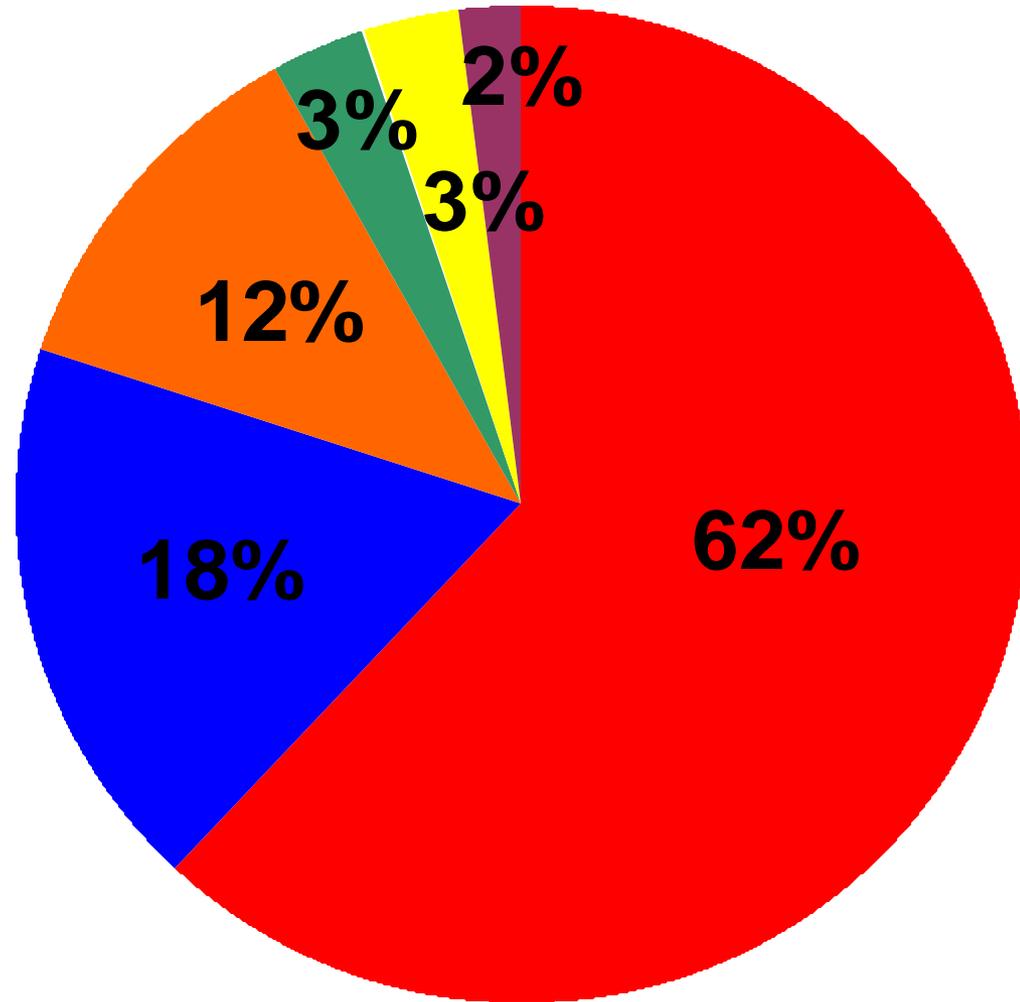
Double-walled Secondary Piping Material

- **Metallic**
- **Non-metallic flexible**
- **Non-metallic rigid**
- **Rubber Hose**
- **Other**
- **Unidentified**



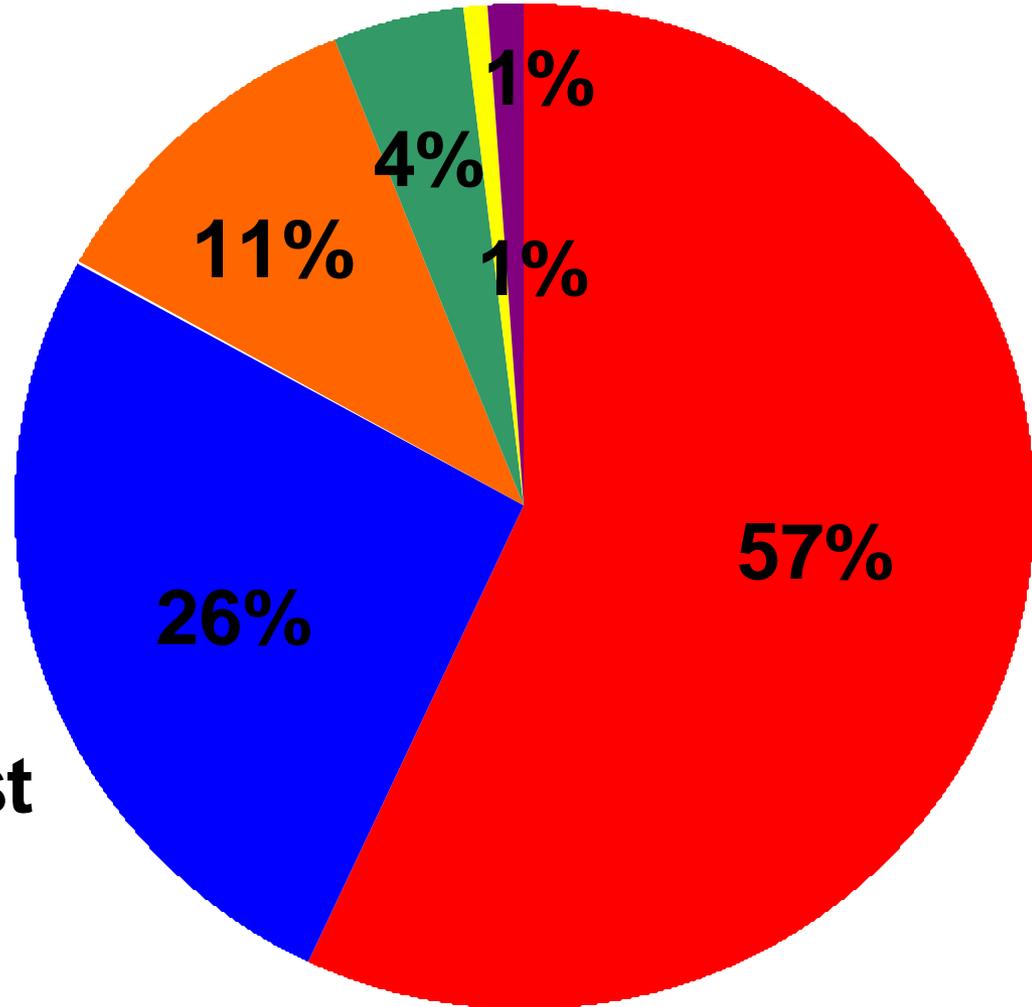
Monitoring of Single-walled Piping

- Visual
- No Monitoring
- Electronic
- Line Tightness Test
- Unidentified
- Mechanical



Monitoring of Double-walled Piping

- Electronic
- Visual
- No Monitoring
- Mechanical
- Line Tightness Test
- Unidentified



Single-walled Piping Transition Points

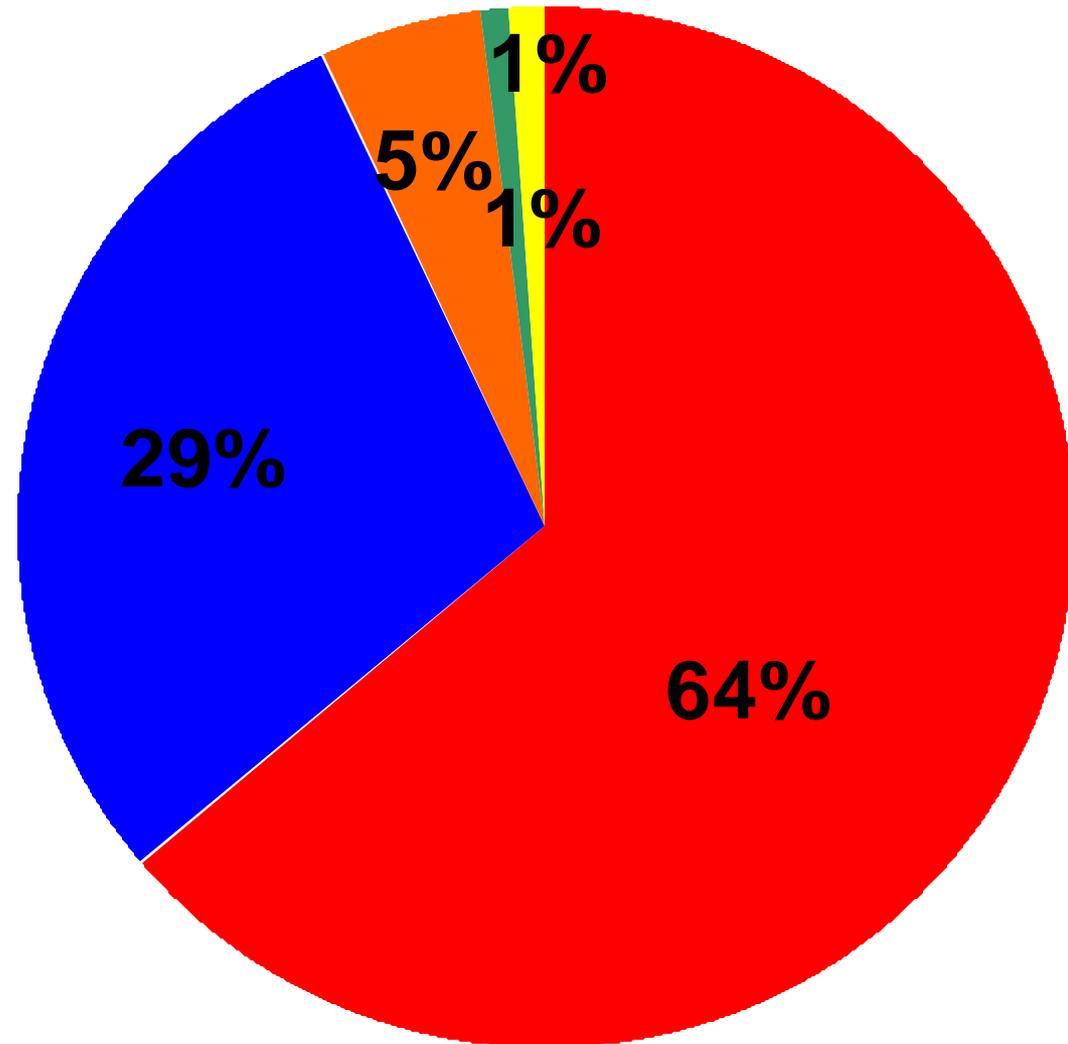
■ Over Water

■ Over Land

■ Unidentified

■ Underground

■ Underwater



Double-walled Piping Transition Points

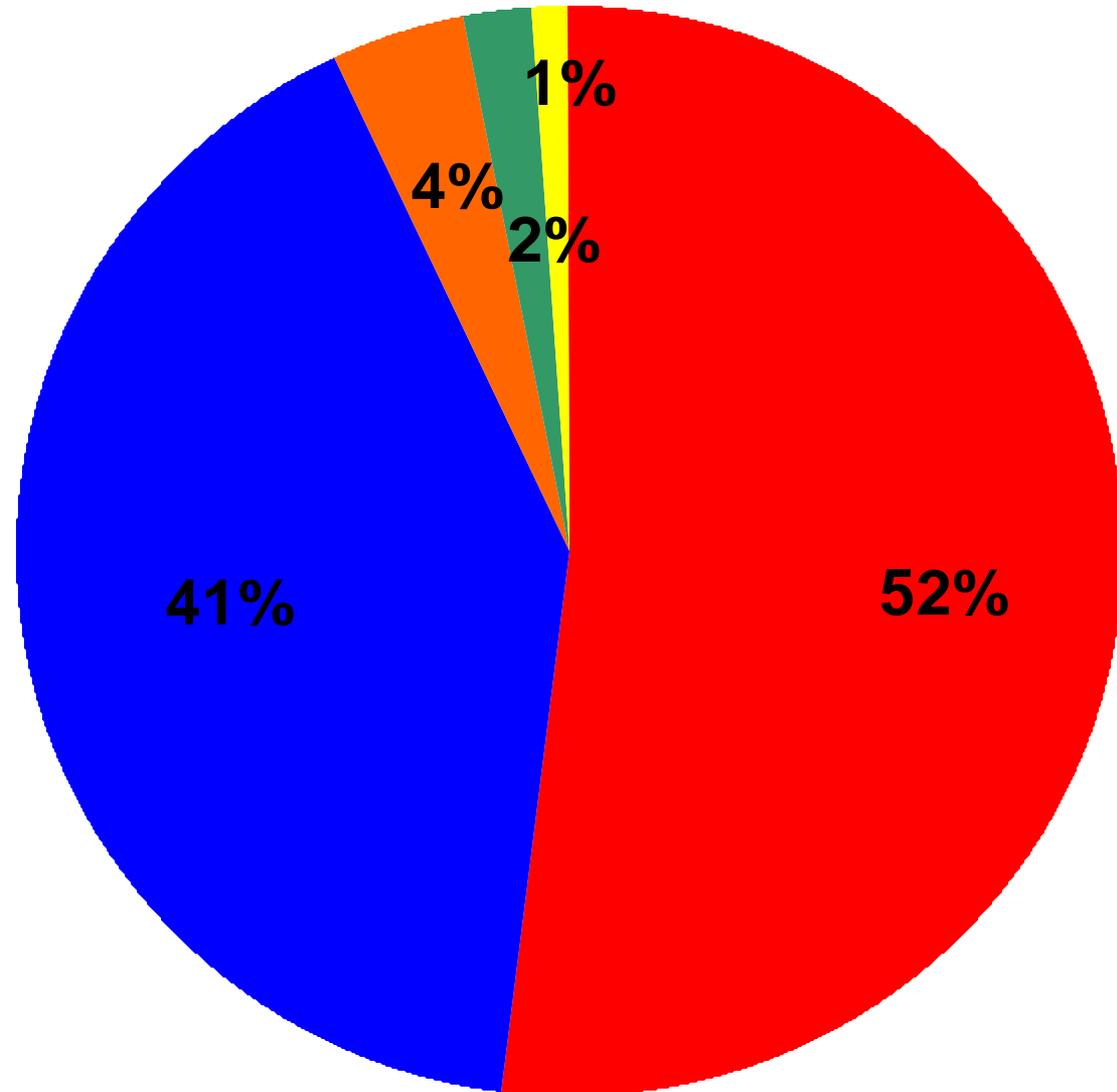
Over Water

Over Land

Unidentified

Underground

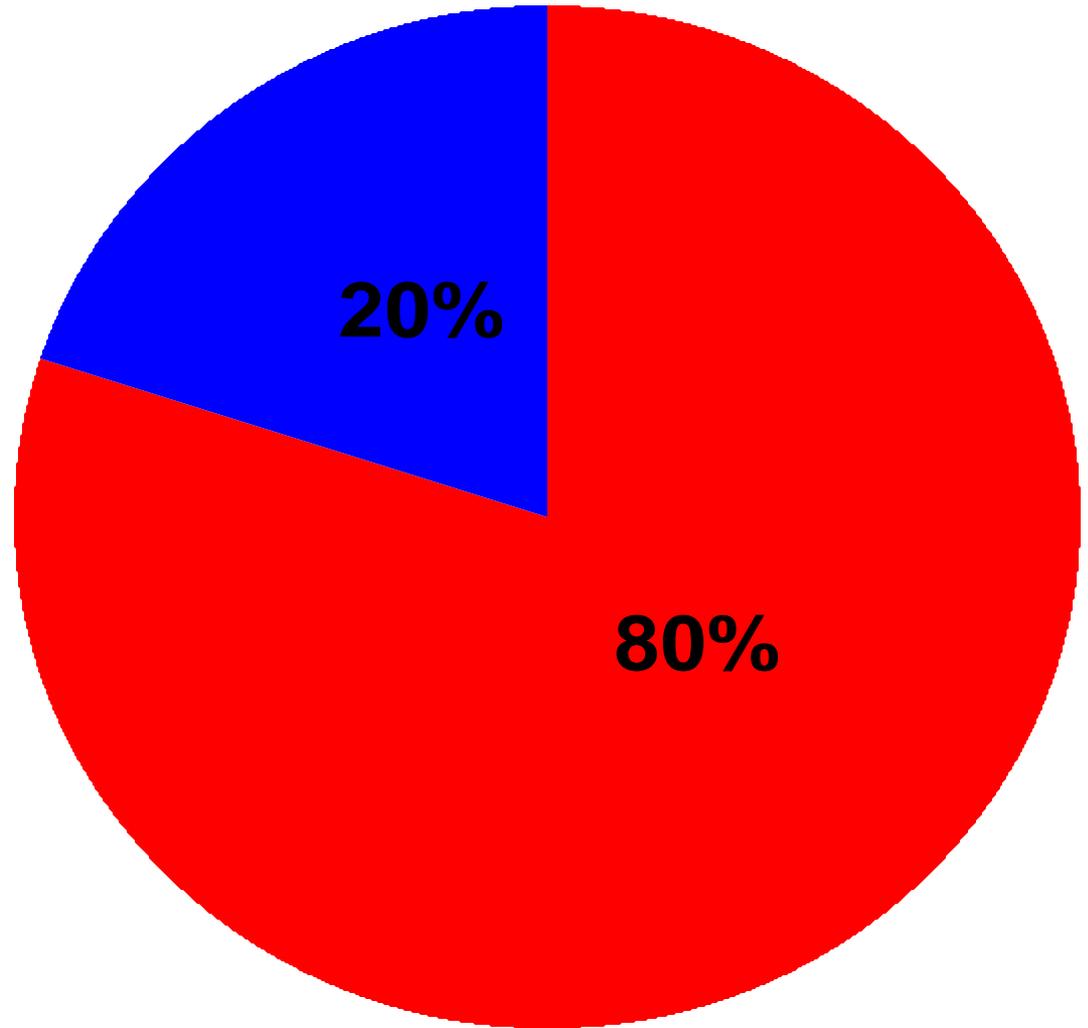
Underwater

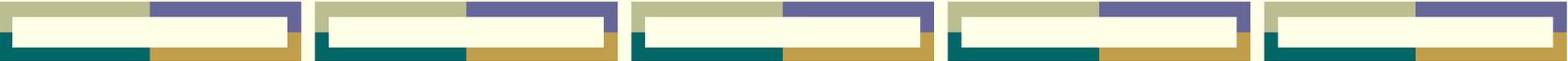


Facilities With Under-Dispenser Containment

 No

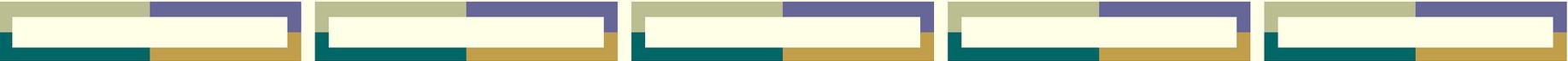
 Yes





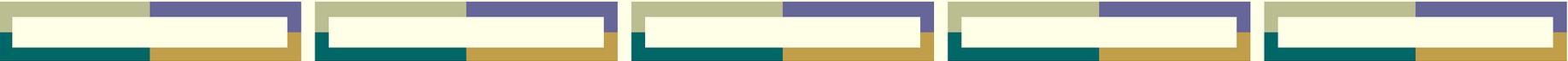
Evaluate MFF Inspection Data

- Variety of system construction and leak detection methods
 - Identify fueling system design flaws and inadequacies
- 



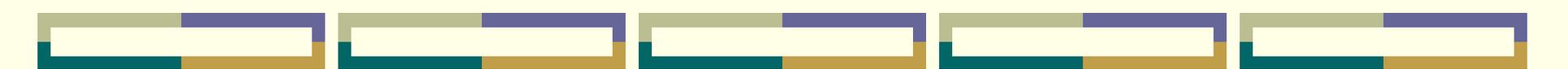
Examples of Design and Construction Inadequacies

- Use of rubber hose
 - Improper use of non-metallic flexible piping
 - Lack of under-dispenser containment (UDC)
 - Single-walled piping components over water/underwater (lack of secondary containment)
- 



Rubber Hose

- Excessive permeation
 - Poor damage resistance
 - Poor life cycle
- 



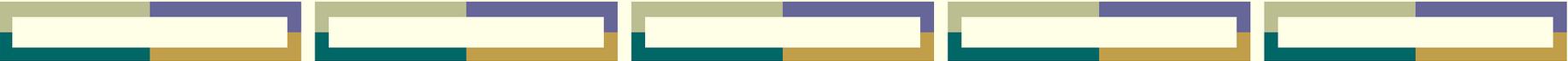
Rubber Hose - Permeation

- Economic and Environmental Impact
 - 2” diameter hose contains approximately .16 gallons of fuel per linear foot
 - A 100 foot length of 2” diameter hose will permeate 200 to 400 gallons every year under normal temperatures, and up to 1,000 gallons if exposed to elevated temperatures



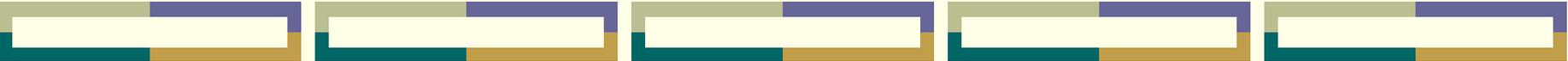
Estimated Permeation Calculation

- 24% of California's primary piping at marinas is rubber hose
 - Estimated length of rubber piping statewide: 14,775 feet
 - At normal temperature with a permeability average of 300 gallons per year 100 per linear foot
 - 44,325 gallons fuel lost per year due to permeation statewide
- 



Coastal and Inland Permeation Scenario

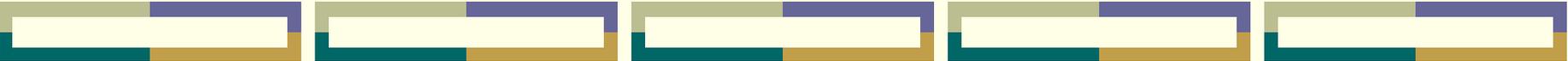
- Facility with 100 feet of rubber hose at normal temperatures (coastal)
 - 300 gallons of fuel lost per year due to permeation
 - Facility with 200 feet of rubber hose at increased temperatures (inland)
 - 1,000 gallons of fuel lost per year due to permeation
- 



So why use rubber hose?

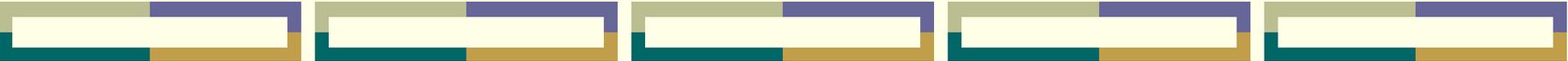
- Until a few years ago it was one of the only effective piping products available to adapt to water level fluctuations
 - Cheaper than newer more effective piping
- 





Use of Non-Metallic Flexible Piping Aboveground

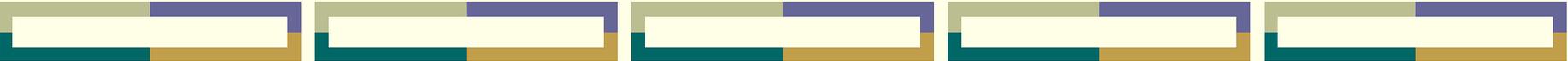
- Use of underground listed piping in aboveground applications at 40 facilities
 - Overall, 69% of underground listed non-metallic flexible piping is used in aboveground applications
- 



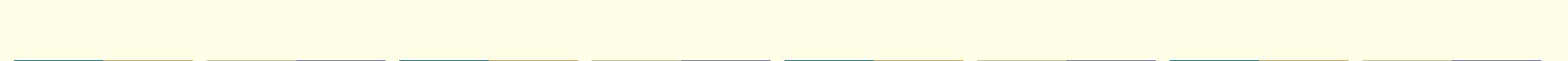
Use of Non-Metallic Flexible Piping Aboveground

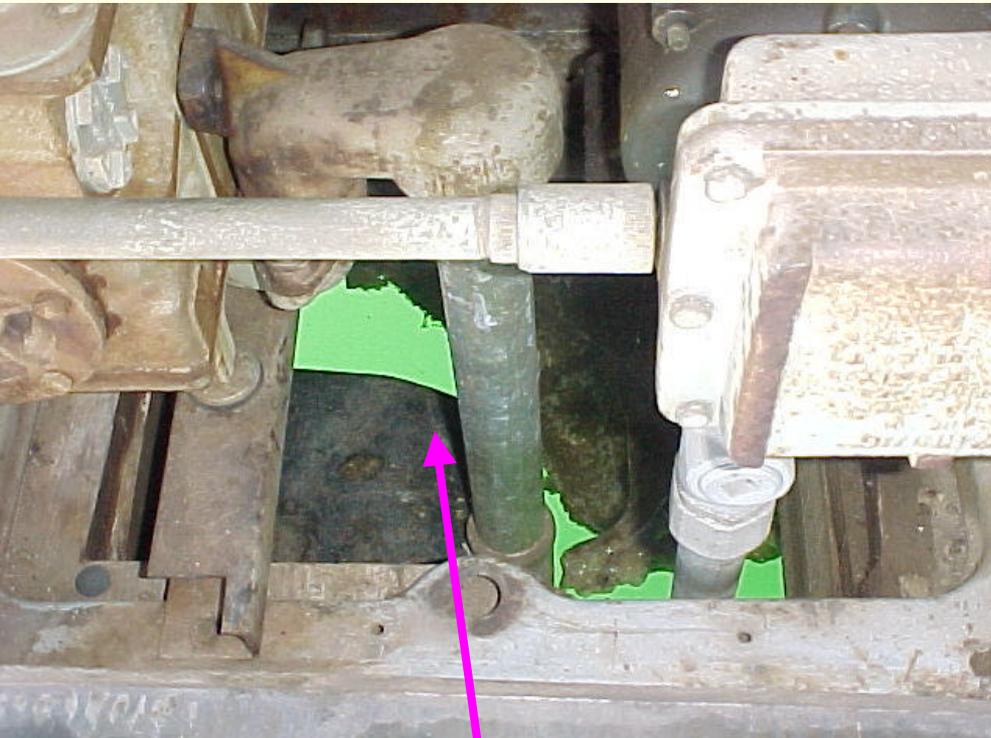
- Not listed, tested, and/or intended for aboveground conditions: excessive cycling, excessive bending, abrasion, UV exposure
 - Aboveground conditions cause fatigue to the piping system resulting in premature failure
- 





Under-dispenser Containment

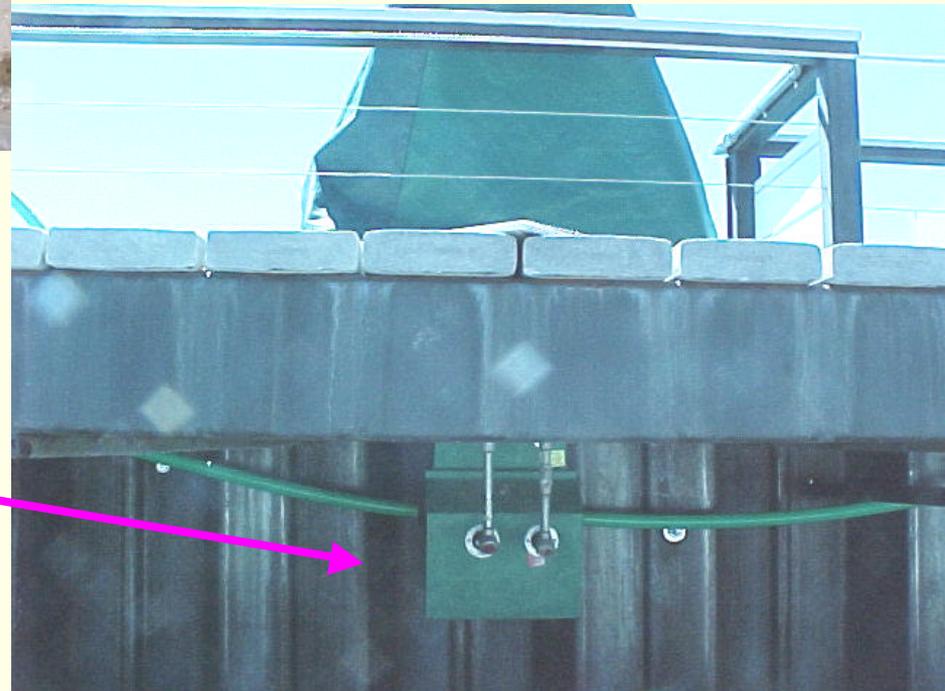
- 145 facilities (80%) do not have UDC
 - Without UDC fuel leaks from inside the dispenser directly enter the water
 - Studies show that releases occur at dispensers
- 

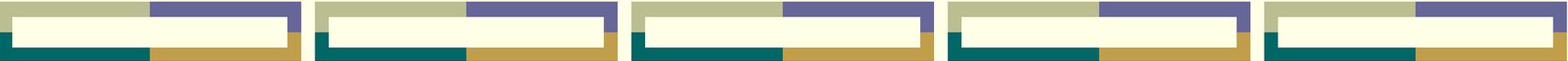


Without UDC

Use of UDC prevents fuel leaks inside the dispenser from reaching the water

With UDC



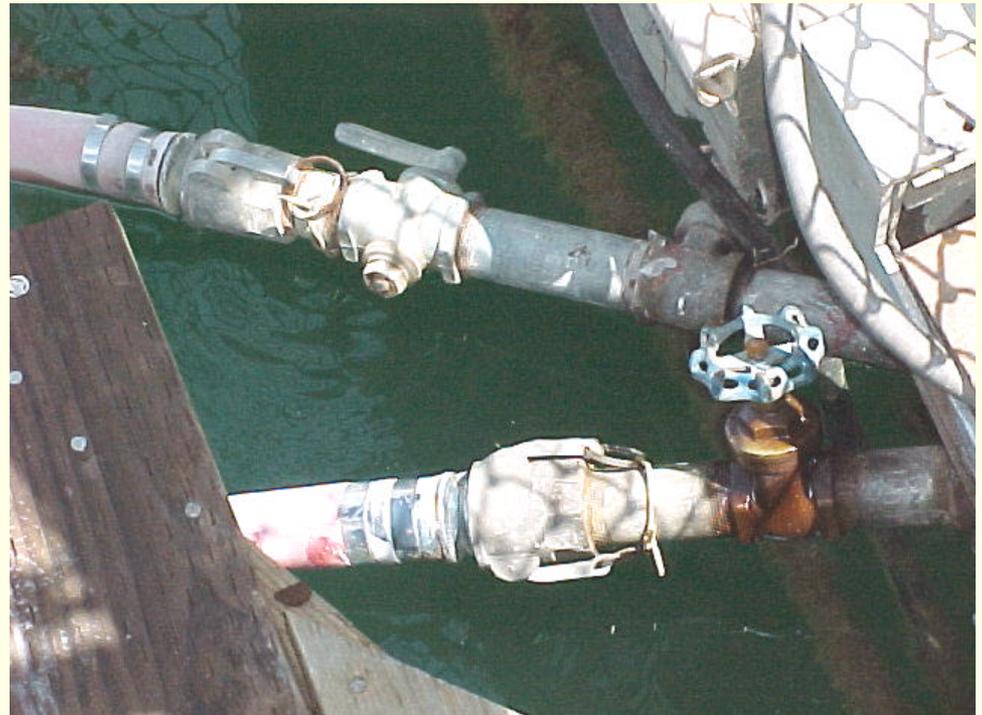


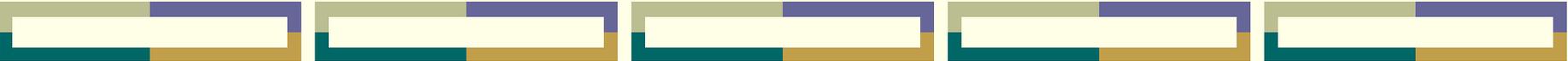
Single-walled Piping Components Over/Underwater

- 838 single-walled piping transitions (piping connection points) over/underwater
 - Overall, 65% of piping transition points are single-walled and over/under water
- 

Single-walled Piping Components Over/Underwater

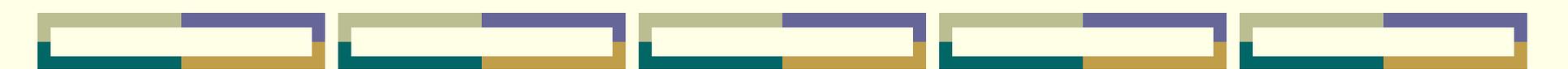
Use of
secondary
containment
prevents fuel
from reaching
the water





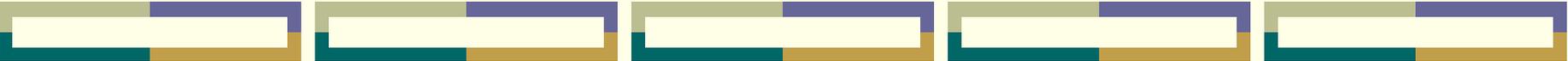
MFF - Spills/Releases

- Release data from spills (at marinas) reported to the Office of Emergency Services from 1997 - 1999:
 - 65 releases during bulk transfers or operations at marine terminal facilities
 - 37 releases from dispensing operations
 - 13 fueling system failures
 - 23 miscellaneous
 - 84 other



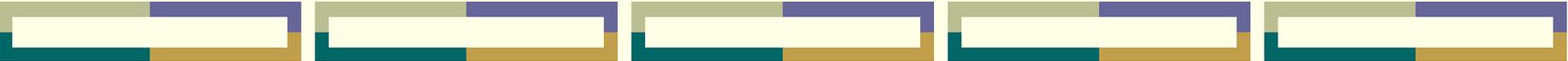
MFF - Spills/Releases

- Release data from spills (at marinas) reported to the Office of Emergency Services from 1997 - 1999:
 - 222 spills reported at marinas
 - 195 of those were to California waterways



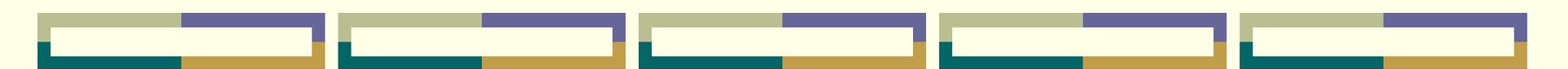
MFF - Spills/Releases

- Release data from the SWRCB Leaking Underground Storage Tank Database:
 - 142 unauthorized releases from USTs at marinas between 1989 and 2000



Petroleum Release Reporting

- Any petroleum spill onto the navigable waters of the United States sufficient to cause a sheen on the water is a violation of Section 311 of the Clean Water Act and must be reported
- 



Consistent & Effective Implementation

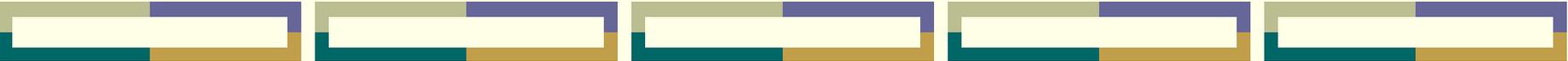
- Evaluate implementation of new MFF requirements
- Evaluate impact on existing MFFs





Authority

- Senate Bill 2198; which became effective January 1, 1999, exempts UST piping at marinas until such time as the SWRCB adopts regulations specific to the design, construction, upgrade, and monitoring of MFFs
 - ***Current authority is limited to revision of UST regulations***
 - We intend to draft regulations for MFFs that operate USTs, and anticipate publishing a draft of these regulations late 2002
- 



We recognize that marina fueling services are an essential part of recreational boating in California. Our goal is to develop a proposal for implementation of MFF upgrades that will minimize economic impact and service disruptions to facilities that may be subject to upgrades.





Contact Information

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www.swrcb.ca.gov/cwphome/ust/usthmpg.htm



Additional Information



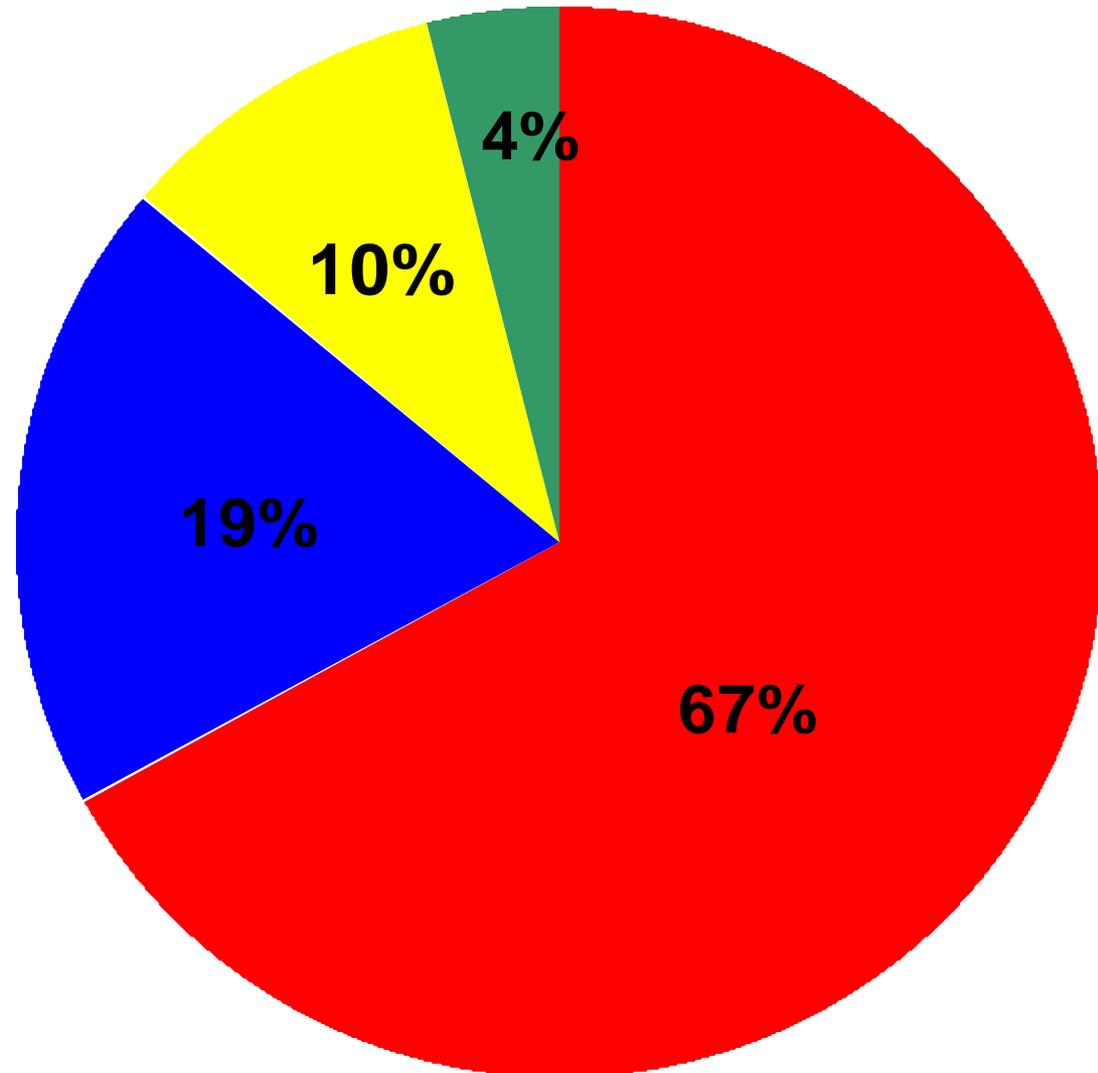
Product Distribution - All Systems

■ Pressurized

■ Suction

■ Gravity

■ Unidentified



Monitoring of Double-walled Land-based ASTs

 Visual

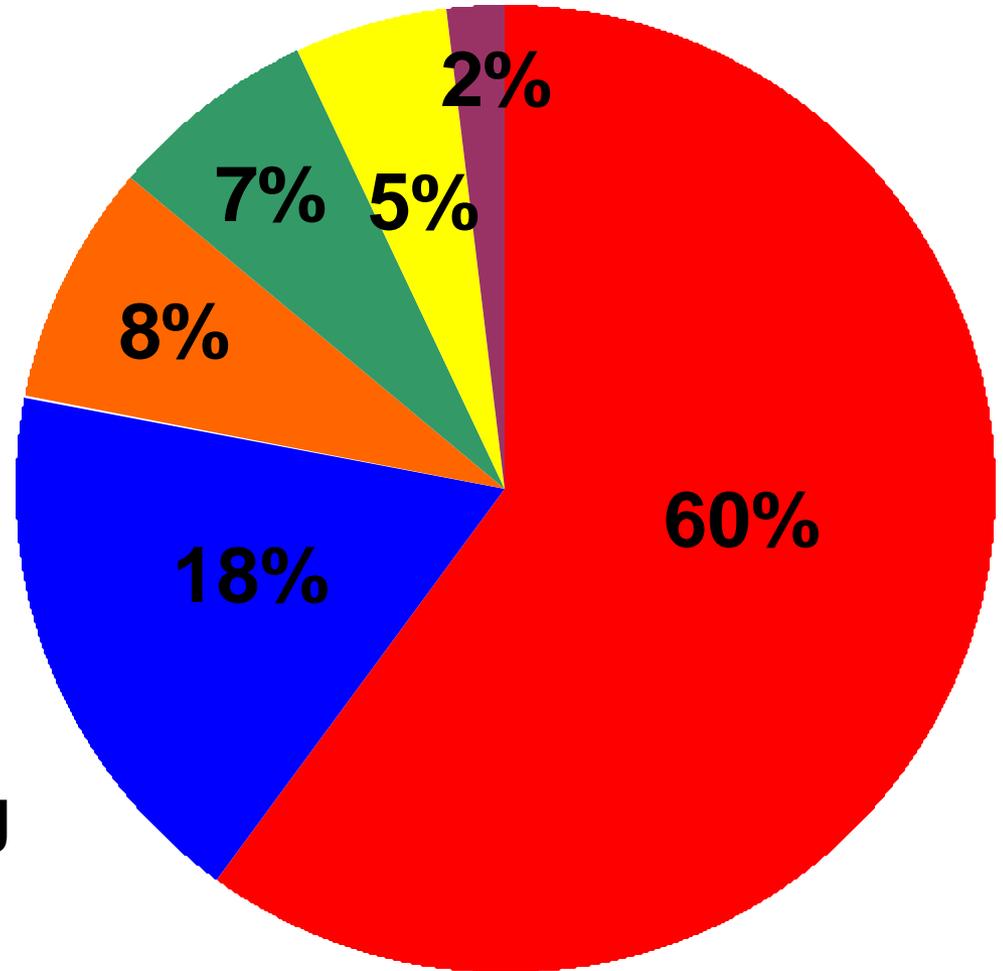
 Electronic

 Unidentified

 Manual Sticking

 Continuous
Interstitial Monitoring

 None

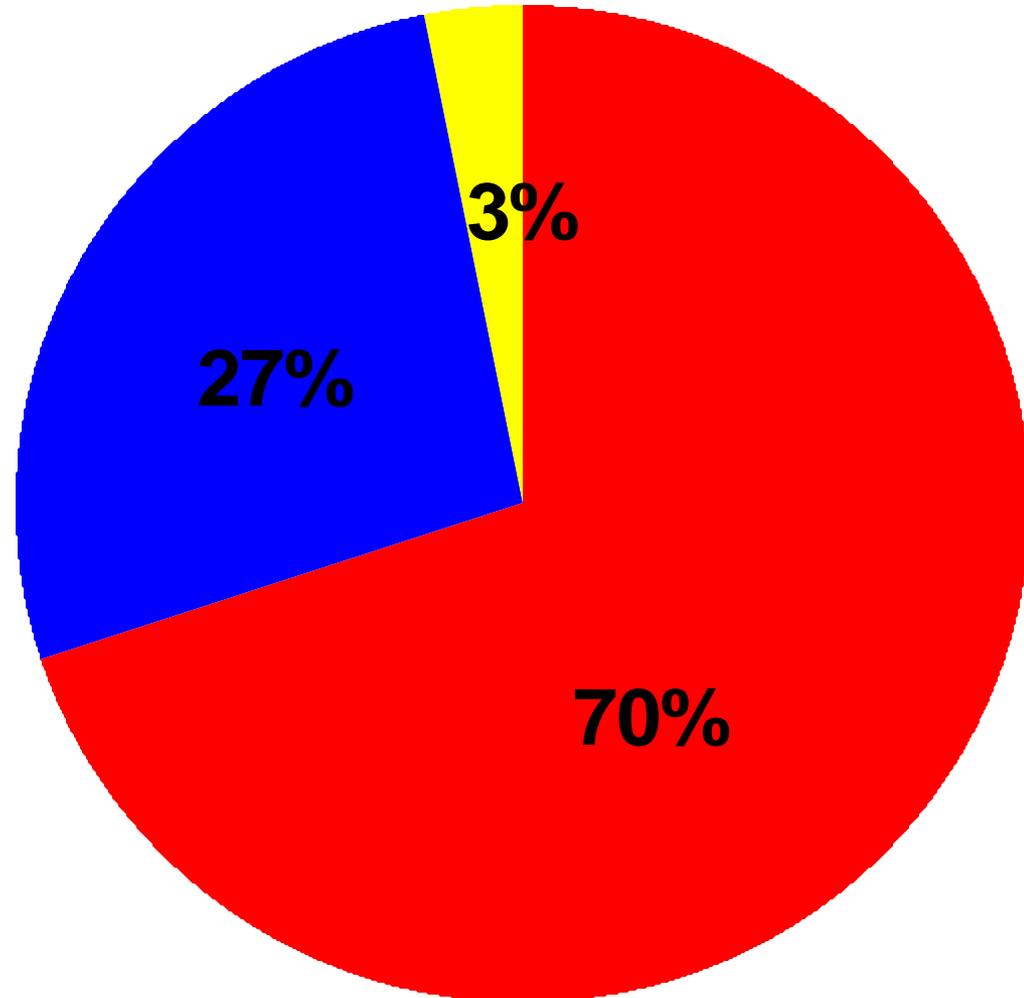


Monitoring of Single-walled Land-based ASTs

Visual Monitoring

None

Unidentified



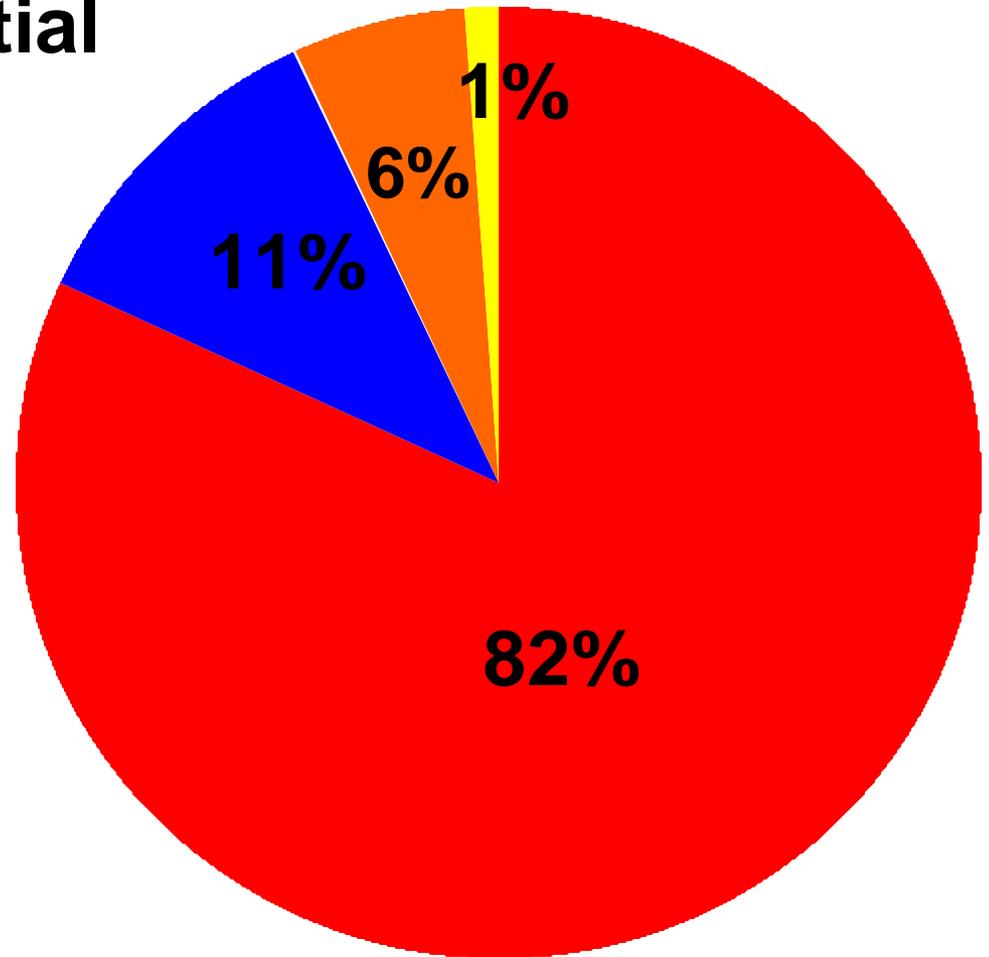
Monitoring of Double-walled Land-based USTs

■ Continuous Interstitial Monitoring

■ Electronic

■ Unidentified

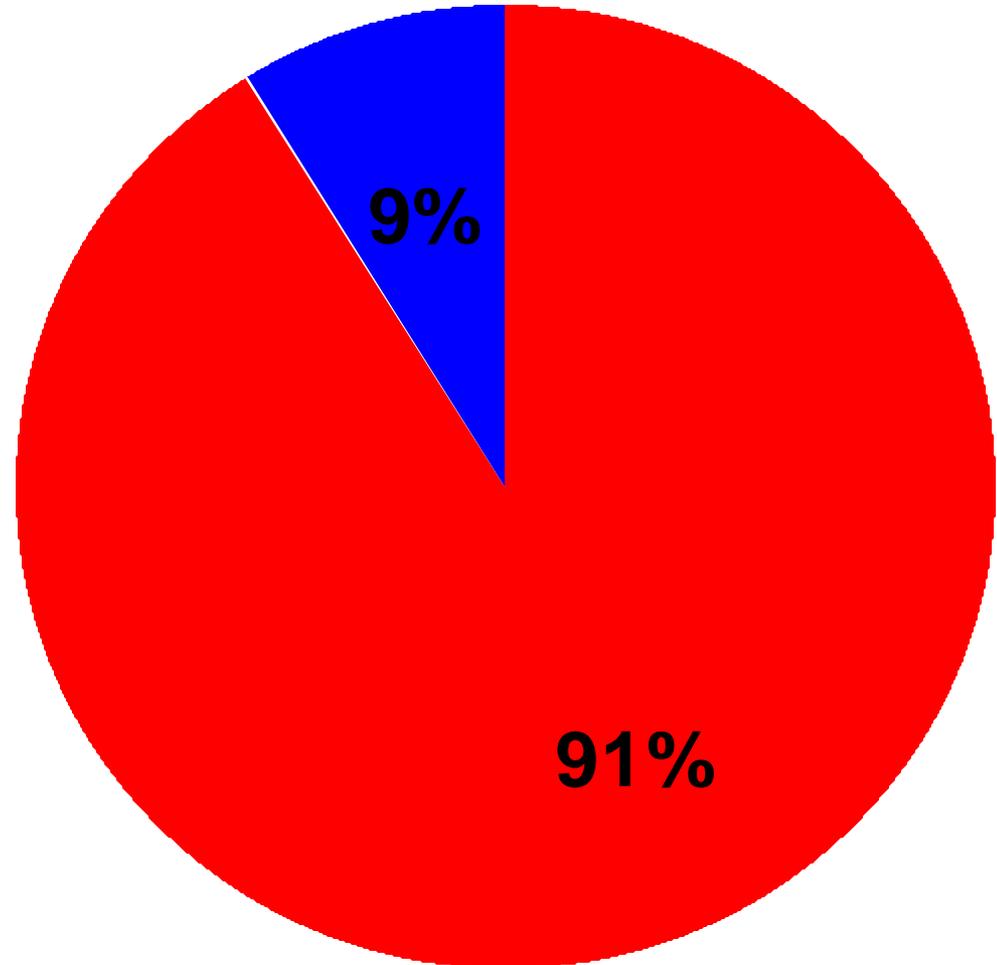
■ Automatic Tank Gauging



Monitoring of Single-walled Land-based USTs

■ Automatic Tank Gauging

■ Electronic



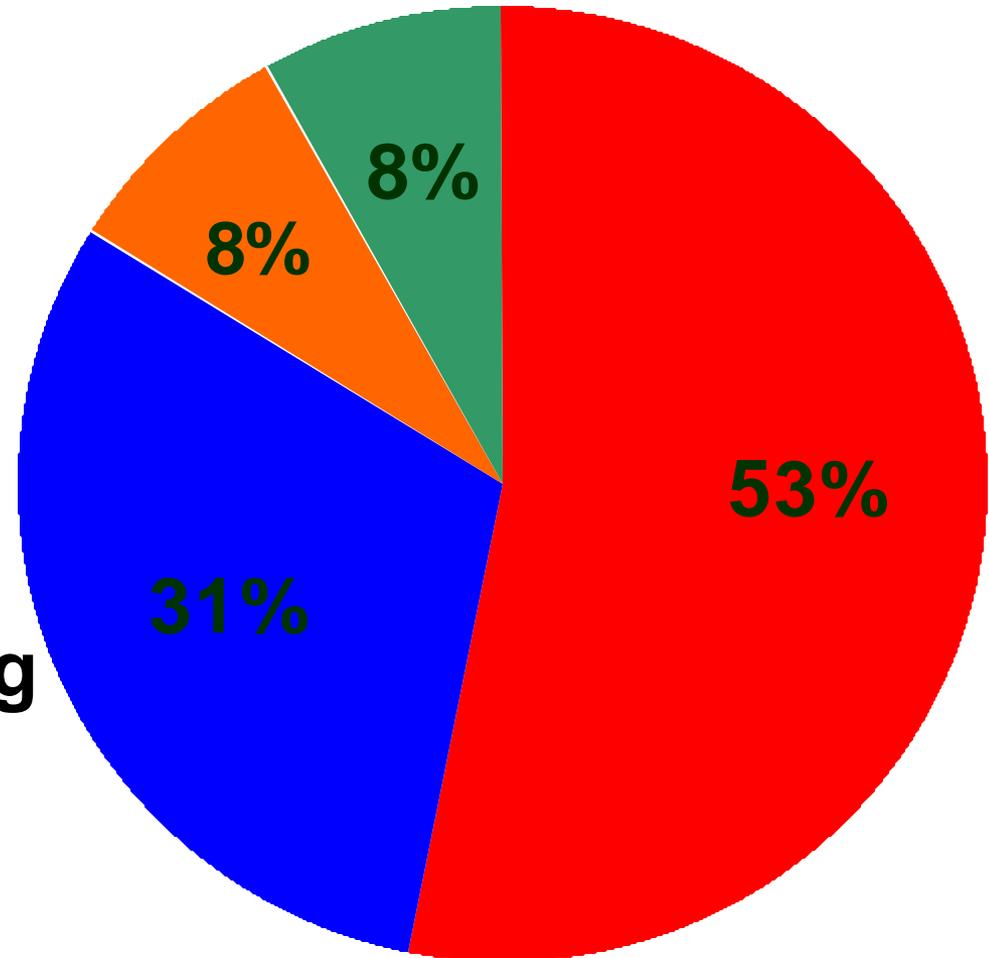
Monitoring of Double-walled Tanks at Dock, Abovewater

■ Visual

■ Electronic

■ Continuous Interstitial Monitoring

■ Unidentified



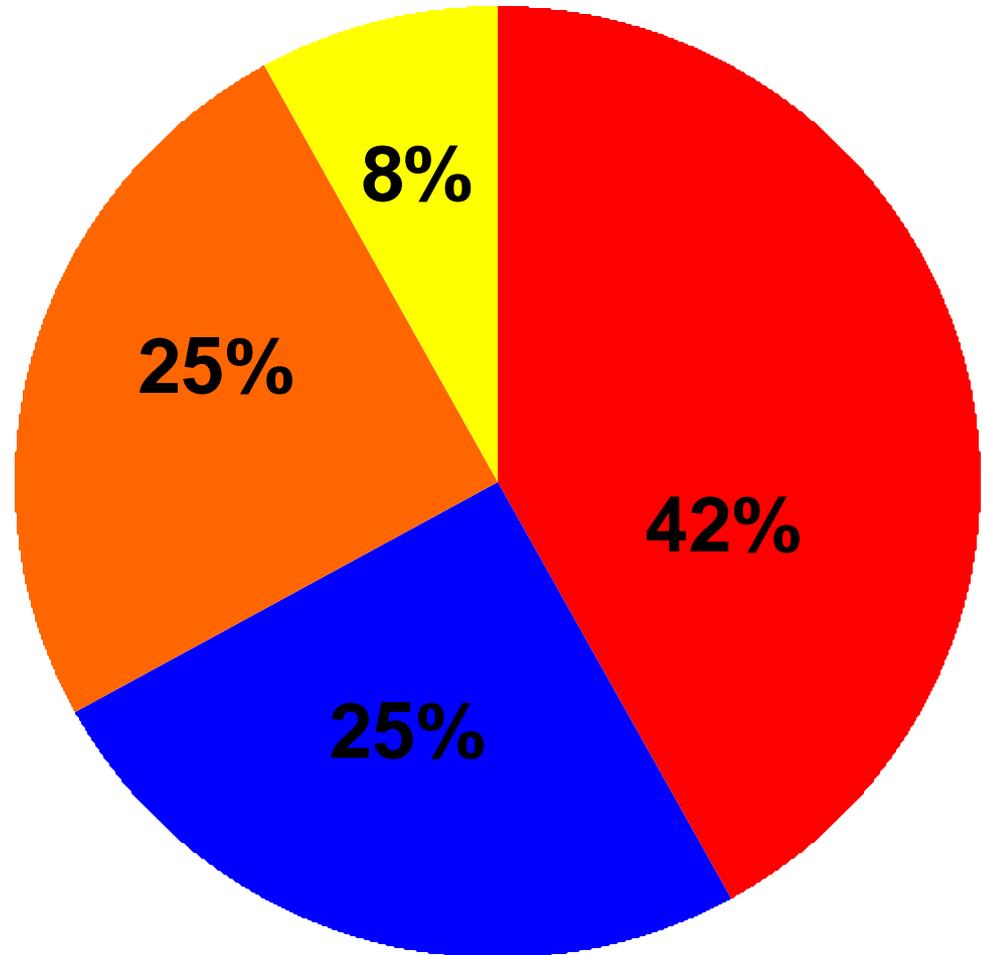
Monitoring of Single-walled Tanks at Dock, Abovewater

Visual

Electronic

Manual Sticking

Unidentified

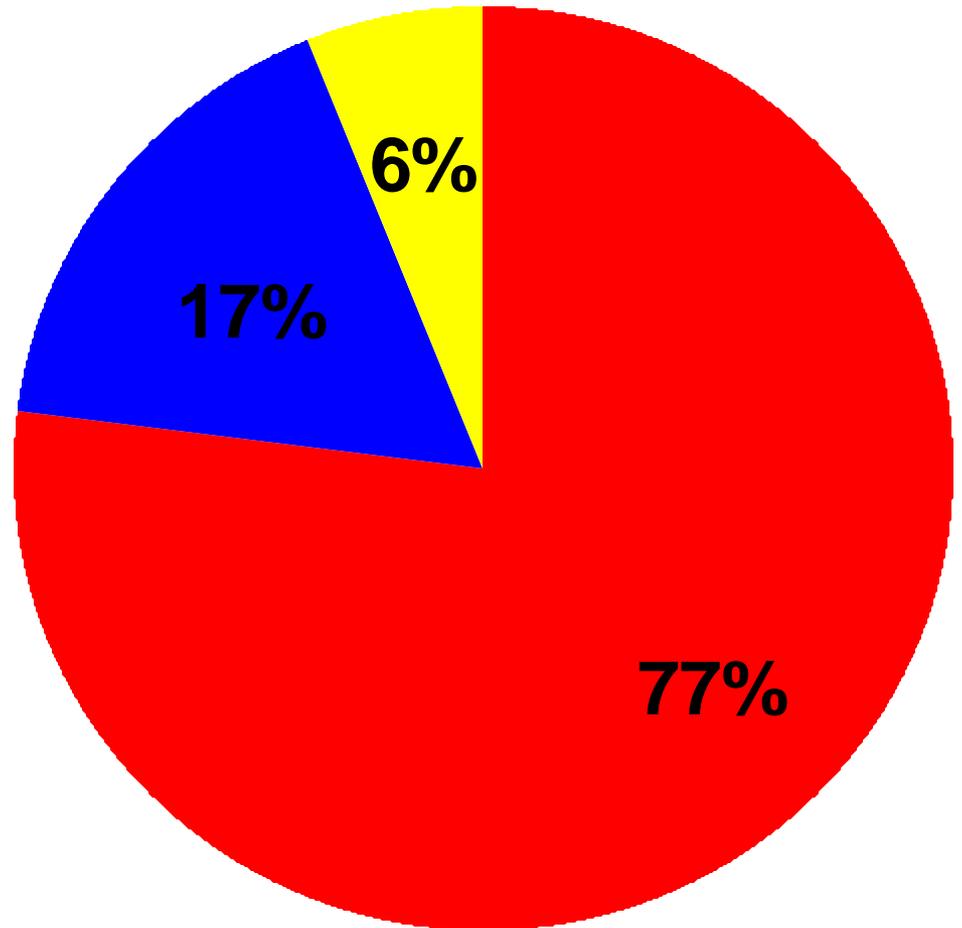


Monitoring of Single-walled Land-based ASTs (with other secondary containment)

■ Visual

■ Unidentified

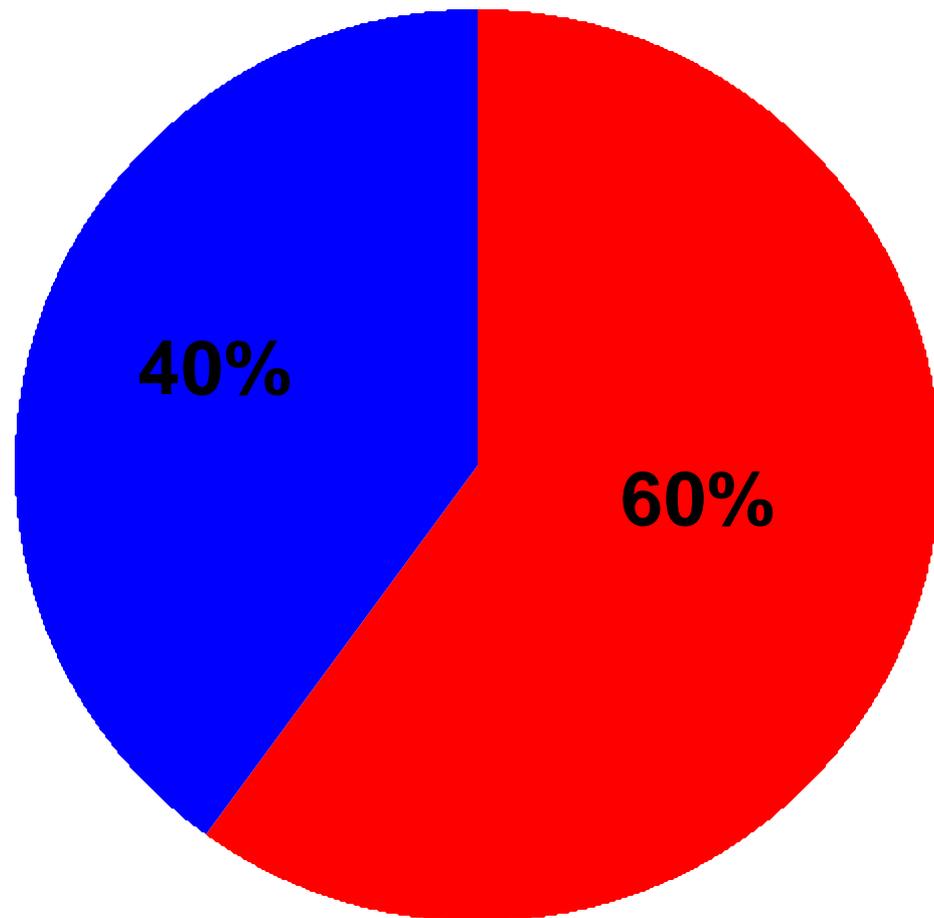
■ None



Monitoring of Single-walled Land-based USTs (with other secondary containment)

■ Unknown

■ Continuous
Interstitial
Monitoring



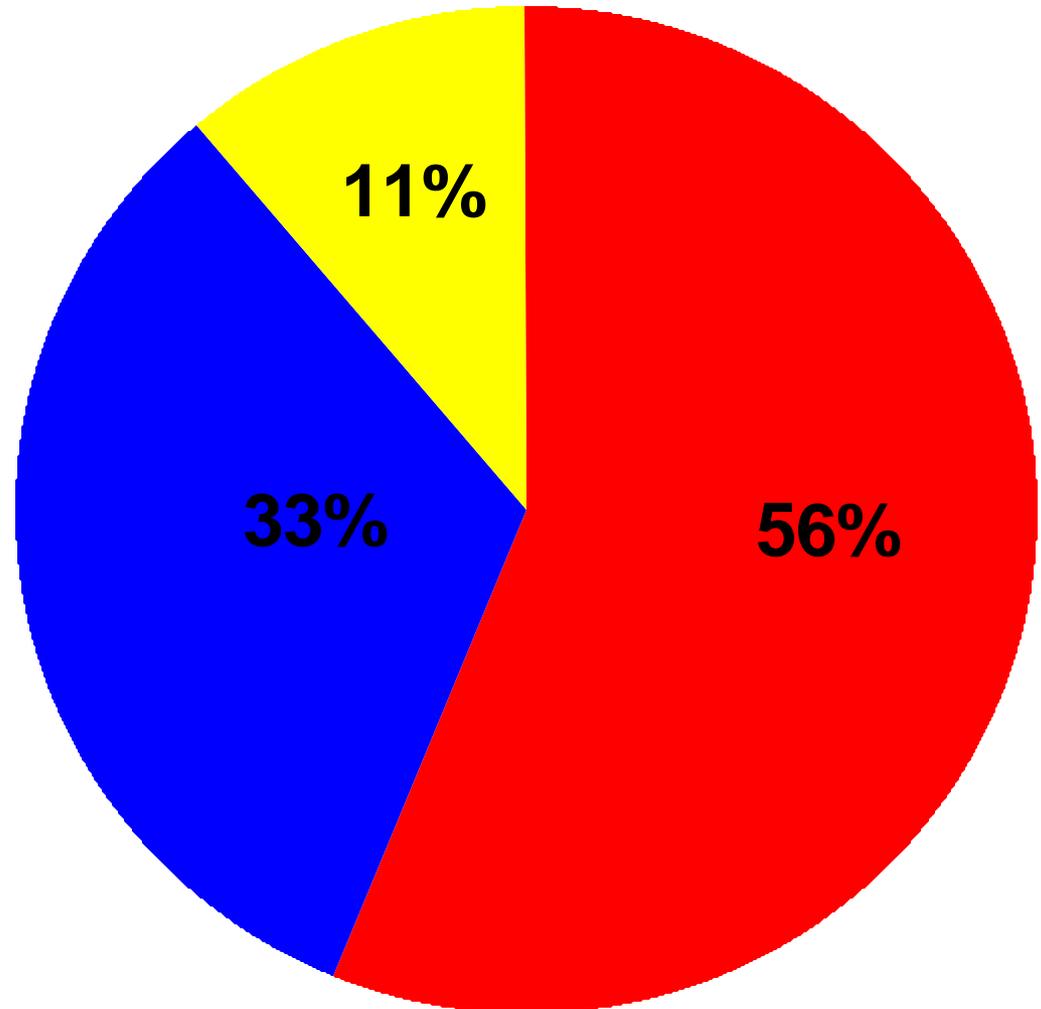
Tank Construction

Tanks at Dock, Underwater

■ Single-walled

■ Double-walled

■ Single-walled
(with other
secondary
containment)

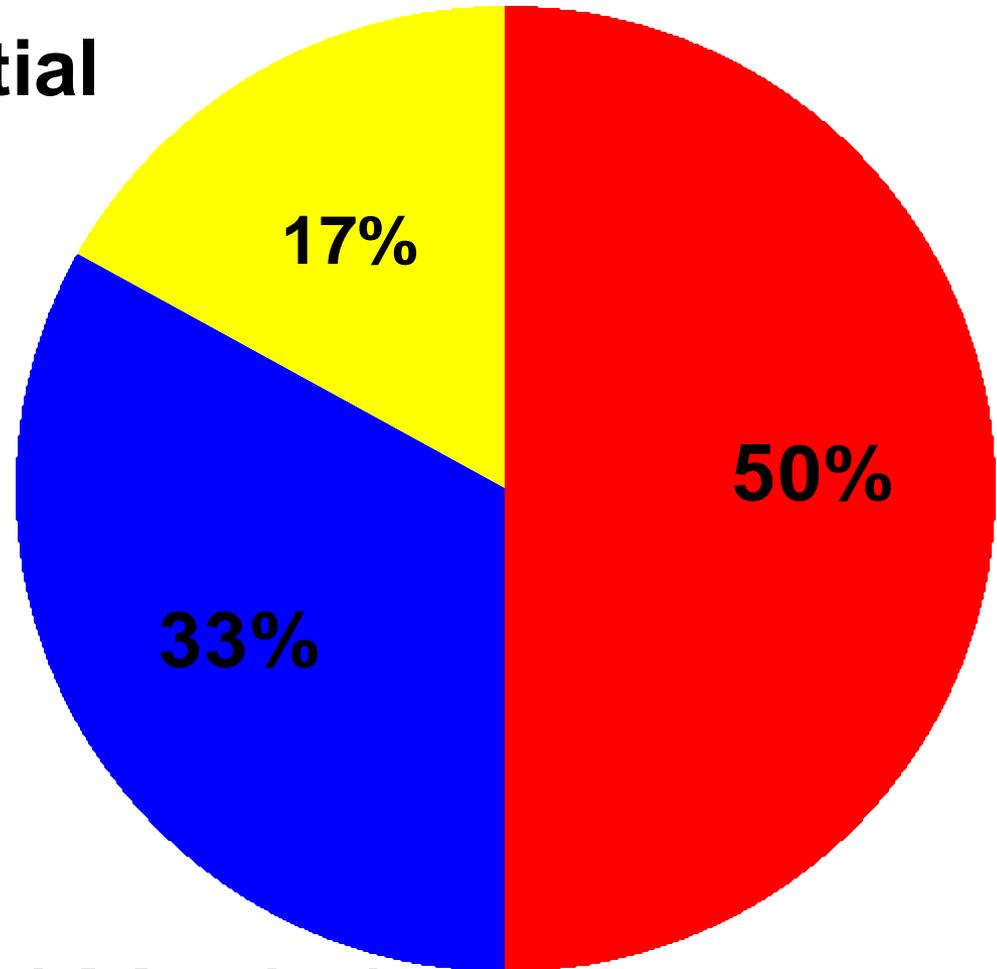


Monitoring of Double-walled Tanks at Dock, Underwater

■ Continuous Interstitial Monitoring

■ Electronic

■ Manual Sticking



100% Visual Monitoring