



# UST Inspector Training Webinar Series

Emerging Fuels

8/26/2019

Moderated by James Plummer  
Environmental Analyst, NEIWPCC  
[jplummer@neiwpcc.org](mailto:jplummer@neiwpcc.org)



# Today's Speakers

## **Ryan Haerer**

Program Analyst, U.S. EPA, Office of Underground Storage Tanks

## **Doug Hansen**

UST Compliance Manager, Utah Department of Environmental Quality

## **Ted Unkles**

UST Program Coordinator, Vermont Department of Environmental Conservation

## **Chris Marks, Ph.D.**

Associate Environmental Scientist, Arizona Department of Environmental Quality  
- UST Program

## **Tara Rosie**

Principal Scientist, Arizona Department of Environmental Quality - UST Program



# Emerging Fuels

UST Inspector Training Webinar

Presented by:

The New England Water Pollution Control Commission, and

The ASTSWMO Emerging Fuels Task Force



**ASTSWMO, Providing Pathways to Our  
Nation's Environmental Stewardship Since 1974**

# Renewable Fuel Standard

- Signed into law by president Bush as part of the Energy Act of 2005
- Required 4 billion gallons of renewable fuel be added to our fuel supply in 2006, ramping up to 9 billion gallons in 2008, and 36 billion gallons in 2022.



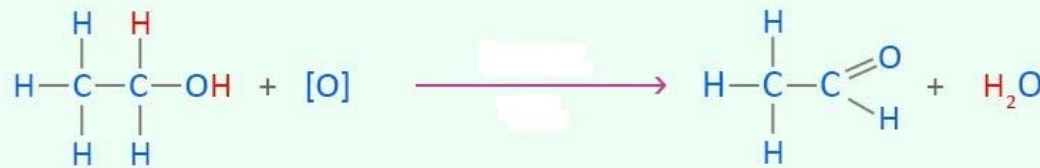
## What's an "Emerging Fuel"?

- Any conventional fuel that has been blended with a renewable fuel (e.g. gasoline-ethanol mixtures & biodiesel blends)
- Any conventional fuel that has had its formulation significantly changed recently (e.g. ultra-low sulfur diesel).



## Problems with new fuel formulations

- Ethanol reacts with oxygen to form acetic acid (same reaction that turns wine into vinegar)
- ULSD – severe corrosion in the ullage portion of tanks
- Biodiesel – oxidizes readily creating aldehydes, alcohols, and organic acids.
- MIC – Microbially-induced corrosion



## Diesel – corrosion

- Impacts UST functionality of equipment
- Could lead to releases through direct corrosion
- Impact engine functionality (vehicles and emergency generators)





# Ethanol corrosion

- sump corrosion in E-10 gasoline





# Compatibility

- EPA and state UST Regs require that all UST components be compatible with the fuels they store.
- But they **do not** require compatibility with the decomposition products.
  - Organic acids are causing severe corrosion with steel and brass components
  - Filters in dispensers have been clogged with glass fibers from FRP tanks – what is causing the fiberglass resins to break down?



## What's next with emerging fuels?

- As yet, we have not seen major releases stemming from corrosion and system failure caused by these new fuel formulations.
- BUT – the tsunami might be coming, just over the horizon.
- UST regulators, cleanup professionals, tank owners & operators, and UST contractors need to understand how new fuel formulations affect components that were not designed to come in contact with decomposition products from these new fuels.



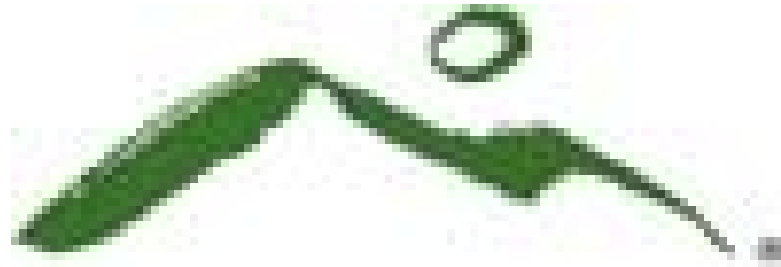
## What's being done?

- We need more and better data on what's going on with these new fuel formulations. The ASTSWMO Emerging Fuels Task Force has constructed some tools for reporting findings, as well as tracking compatibility.
  - Corrosion Observations Tool
  - Compatibility Tool



Thank You

- Ted Unkles
- Vermont Dep't of Environmental Conservation
- UST Program
- [ted.unkles@vermont.gov](mailto:ted.unkles@vermont.gov)
- 802-522-0488



**VERMONT**

# Federal Regulations on Corrosion and Compatibility

**EXTERNAL CORROSION**

soil

ust

**INTERNAL COMPATIBILITY**

# The Changing Fuel Chemistry Landscape

*Renewable Fuel Standard (2005, 2007) mandates increasing annual minimum volumes to attain 36 billion gallons of biofuel annually by 2022.*<sup>1,2</sup>

## Gasoline

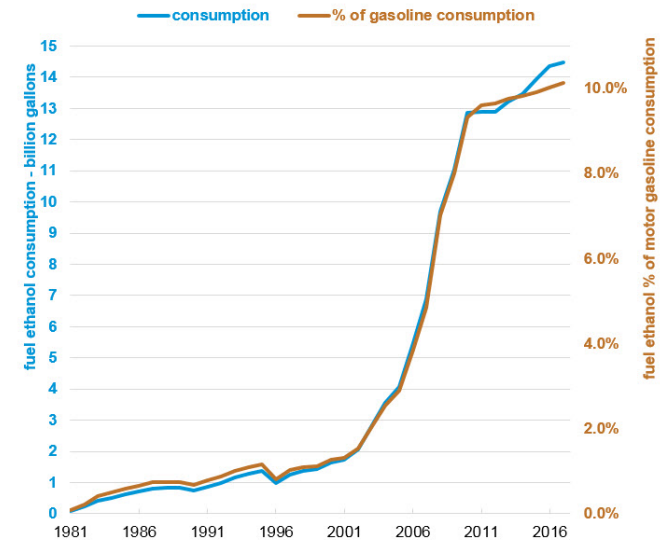
- Ethanol replacement of MTBE as fuel oxygenate (2002)
- Increasing fuel ethanol use
- E10 ethanol blend wall
- E15 allowed for year-round sale by recent EPA regulatory changes

## Diesel

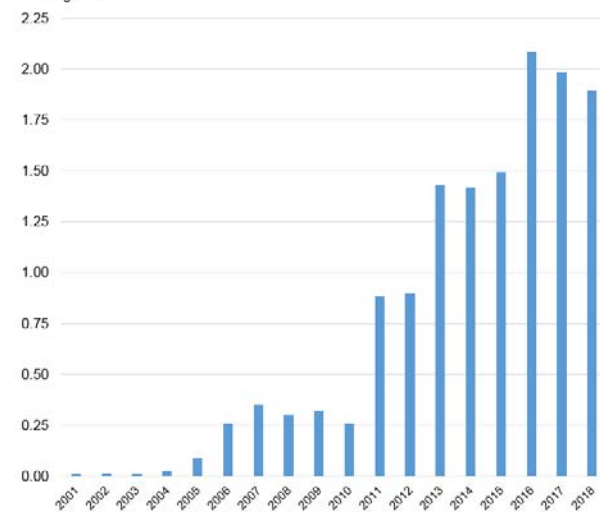
- Ultra-low Sulfur Diesel (15 ppm S) mandated by EPA beginning 2006<sup>3</sup>
- Increased biodiesel blending
- B5 Biodiesel blend wall

*\*\*Slide credit goes to Tara Rosie, Chris Marks of AZ DEQ and the good people of Arizona.*

U.S. fuel ethanol consumption and percent of total U.S. motor gasoline consumption, 1981–2018

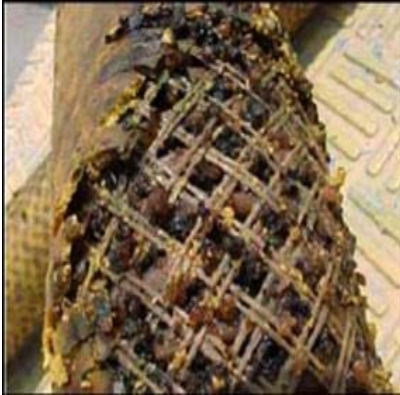


U.S. biodiesel consumption, 2001–2018





# Incompatibility in UST Systems



**Delamination**



**Discoloration**



**Fiberglass Tank Walls**



**Softening**

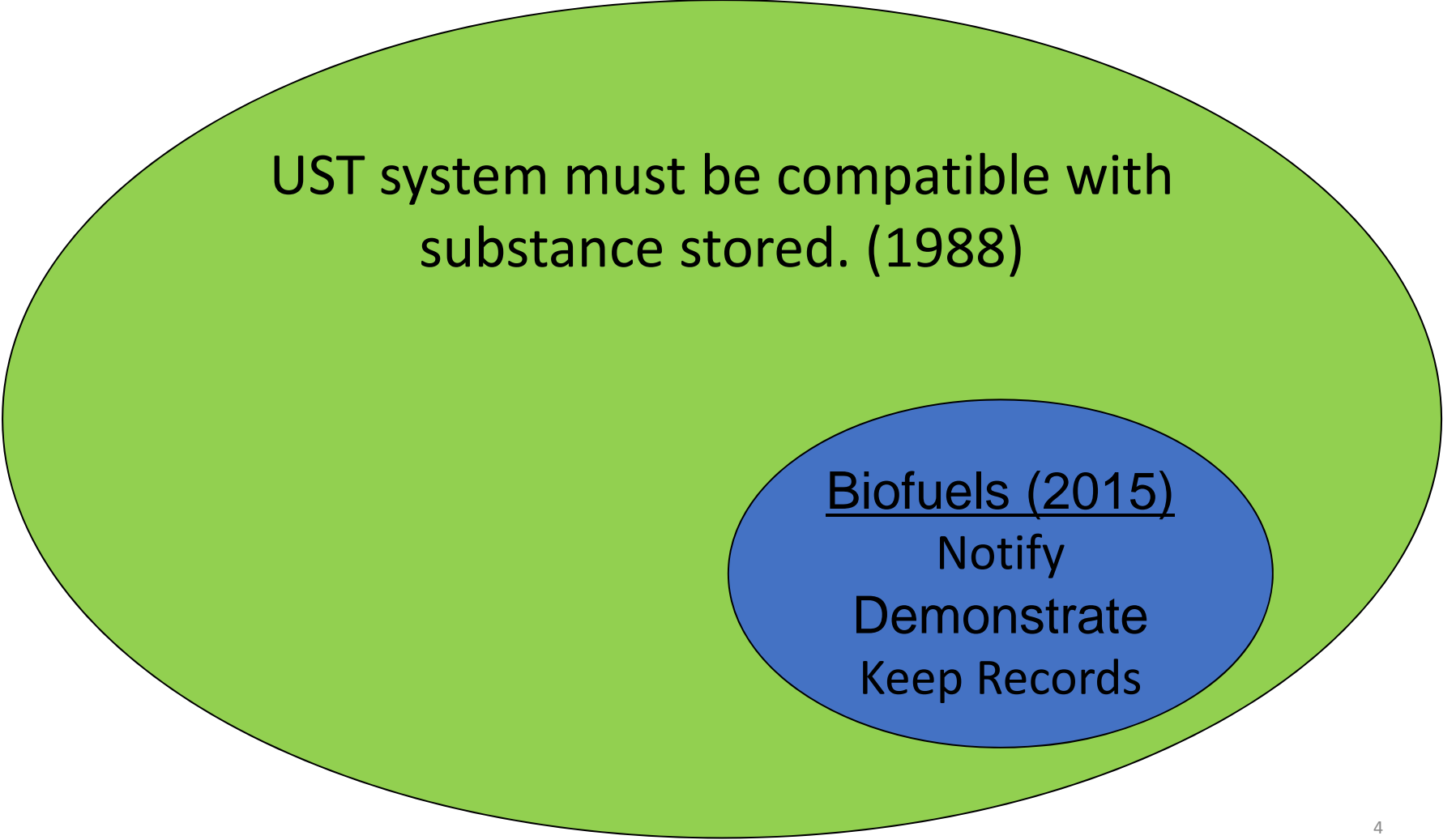


**Swelling**



**Elongation ("creep")**

# Federal Compatibility Requirements



UST system must be compatible with  
substance stored. (1988)

Biofuels (2015)

Notify

Demonstrate

Keep Records

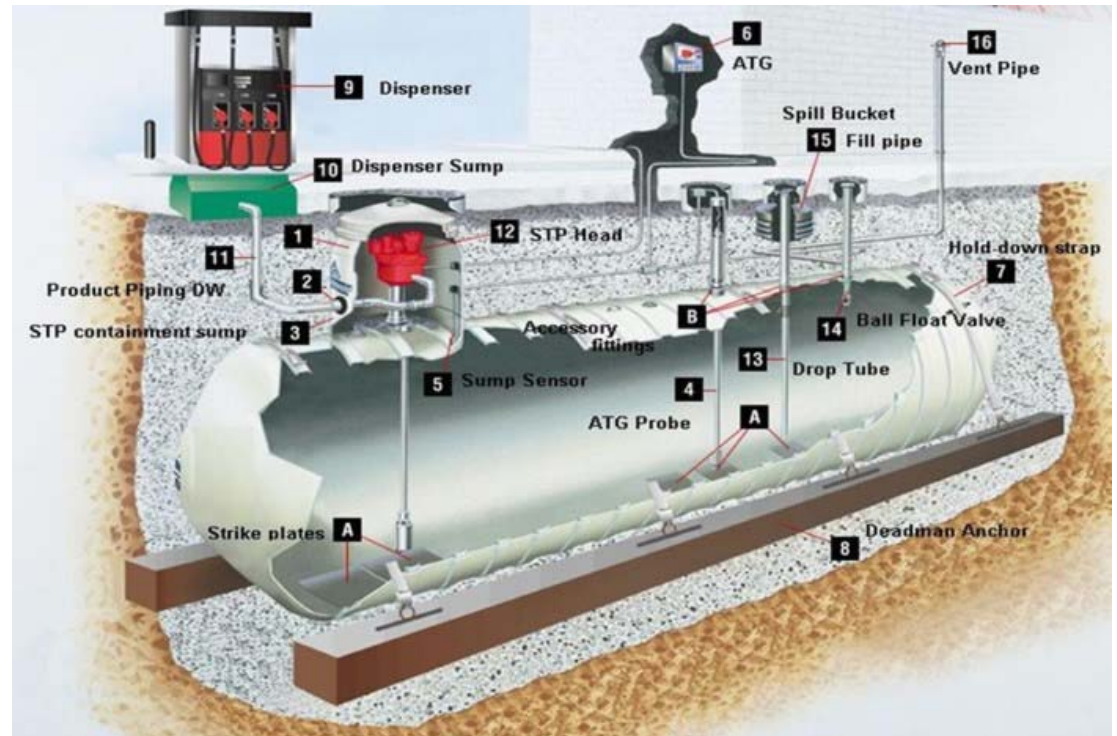
## ***Compatibility and Biofuels –***

### ***When do I need to follow the additional federal regulations?***

- **Notification** - Owners and operators must **notify** the implementing agency at least 30 days before switching to a regulated substance containing greater than 10 percent ethanol, 20 percent biodiesel, or any other regulated substance identified by the implementing agency
- **Demonstration of compatibility** – Owners and operators must
  - **demonstrate** compatibility of the UST system through a nationally recognized testing lab listing or manufacturer approval of UST equipment or components, or
  - **use an alternative option** identified by the implementing agency that is no less protective than demonstrating compatibility of the UST system
- **Recordkeeping** - Owners and operators must **maintain records** for as long as the biofuel blend is stored to demonstrate compliance

## *Biofuels: Demonstrate Compatibility For:*

- Tanks
- Piping
- Containment sumps
- Pumping equipment
- Release detection equipment
- Spill equipment
- Overfill equipment



# Examples for Demonstrating Compatibility

## Independent Laboratory Certification or Listing for Use with the Substance



### Engineering Report

#### Fuel Compatibility of Containment Solutions FRP Tanks with Biodiesel or Biodiesel/Diesel Blends

William A. Schneider  
Revised May 8, 2009

##### Background

Containment Solutions Inc. (CSI) single, double, and triple wall tanks are listed by Underwriters Laboratories Inc., under UL Standard 1316 - Glass-Fiber-Reinforced Plastic Underground Storage Tanks for Petroleum Products, Alcohols, and Alcohol-Gasoline Mixtures. This standard outlines the requirements for fiberglass reinforced tanks for the underground storage of petroleum-based flammable and combustible liquids, alcohols, and alcohol-blended fuels.

To obtain a UL 1316 listing, actual tank laminate was exposed to a number of environments and then tested for property retention to meet UL's minimum specified values. This testing was done by UL and included No. 2 Fuel Oil (Diesel Fuel) and No. 6 Fuel Oil as well as various other fuels including Ethanol and Methanol. However, at this time, there is no recognized representative biodiesel fuel for UL testing of underground tanks.

Currently, there are four ASTM standards that relate to Biodiesel:

1. ASTM D 975-08a Standard Specification for Diesel Fuel Oils. This specification covers seven grades of diesel fuel oils suitable for various types of diesel engines and includes an allowance for up to 5 percent biodiesel for the light middle (D-1) and middle (D-2) grade distillate fuels.
2. ASTM D 7467-08 Standard Specification for Diesel Fuel Oil, Biodiesel Blend (B6 to B20). This specification covers fuel blend grades of 6 to 20 volume percent (%) biodiesel with the remainder being a light middle or middle distillate diesel fuel, collectively designated as B6 to B20. These grades are suitable for various types of diesel engines.
3. ASTM D396-08(b) Standard Specification for Fuel Oils. This specification covers grades of fuel oil intended for use in various types of fuel-oil-burning equipment under various climatic and operating conditions and includes an allowance for up to 5 percent biodiesel for Grades No. 1 or 2 distillate fuels.
4. ASTM D 6751-08 Standard Specification for Biodiesel Fuel Blend Stock (B100) for Middle Distillate Fuels. This specification covers pure biodiesel (B100) for use as a blend component with middle distillate fuels and includes a new requirement that controls minor compounds using a new cold soak filterability test. The U.S. EPA requires that all biodiesel intended for use as a fuel meet D 6751.

Biodiesel is a fuel composed of mono-alkyl esters of long chain fatty acids (typically 16 to 18 carbons long) derived from vegetable oils and animal fats. Some sources of the oils and fats are soy beans, corn, cotton, sunflowers, rapeseeds, and from pork, tallow from beef, etc. Pure biodiesel meeting ASTM D 6751 is referred to as B100. When B100 biodiesel is then mixed with diesel, the resulting

## Affirmative Statement of Compatibility from Manufacturer



MODERN WELDING COMPANY  
BOX 1480 • COWFARROW, KENTUCKY 42300-1450  
PHONE: (270) 685-4400 • FAX: (270) 684-6072

August 4, 2011

Bio Fuels Compatibility

Modern Welding Company, Inc. a trusted and tested steel tank manufacturer for more than three quarters of a century, asserts that this letter shall apply to all makes and models of steel tanks that we have manufactured during any time period including all:

- GLASTEEL™ underground storage tanks
- GLASTEEL II™ underground storage tanks
- single-wall underground storage tanks
- double-wall underground storage tanks
- AG-P3® underground storage tanks
- ACT-100® underground storage tanks
- ACT-100-U® underground storage tanks
- Non-UL® storage vessels

All steel tanks are compatible and suitable for use with all fuel blends meeting ASTM standards, including ethanol blends from E10 to E100. All tanks are also compatible and suitable for use with all blends of biodiesel, from B2 to B100. Testing has been done proving compatibility of steel by several sources including Oak Ridge National Lab sponsored by DOE in collaboration with UL and NREL, SWRI, DNV and STI (through Hatfield). To access test reports and other information on biofuels:

See STI's website for test data and information on biofuel testing and steel compatibility.

Tank maintenance is a critical component in any fuel storage and dispensing program. With new or different product blends being introduced to the storage tank system, proper cleaning of the tank should be accomplished. This and other pertinent maintenance information may be found in STI Recommended Practice RP R111, "Storage Tank Maintenance".

Questions or comments you may have about our products or about this statement, please contact:

MODERN WELDING COMPANY, INC.  
2880 New Hartford Road  
Owensboro, KY 42303  
270-685-4400

Tony W. Honey  
Vice President - Sales and Marketing

GLP FORM 001-0101  
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| SIGNATURES      |                   |                    |                 |                  |                     |                  |                 |                    |                 |                   |                   |
|-----------------|-------------------|--------------------|-----------------|------------------|---------------------|------------------|-----------------|--------------------|-----------------|-------------------|-------------------|
| Agate<br>(org.) | Talagda<br>(org.) | Lalagana<br>(org.) | Ferns<br>(org.) | Huayan<br>(org.) | Waldovich<br>(org.) | Swartz<br>(org.) | Navas<br>(org.) | Cardenas<br>(org.) | Borja<br>(org.) | Montiel<br>(org.) | Montiel<br>(org.) |

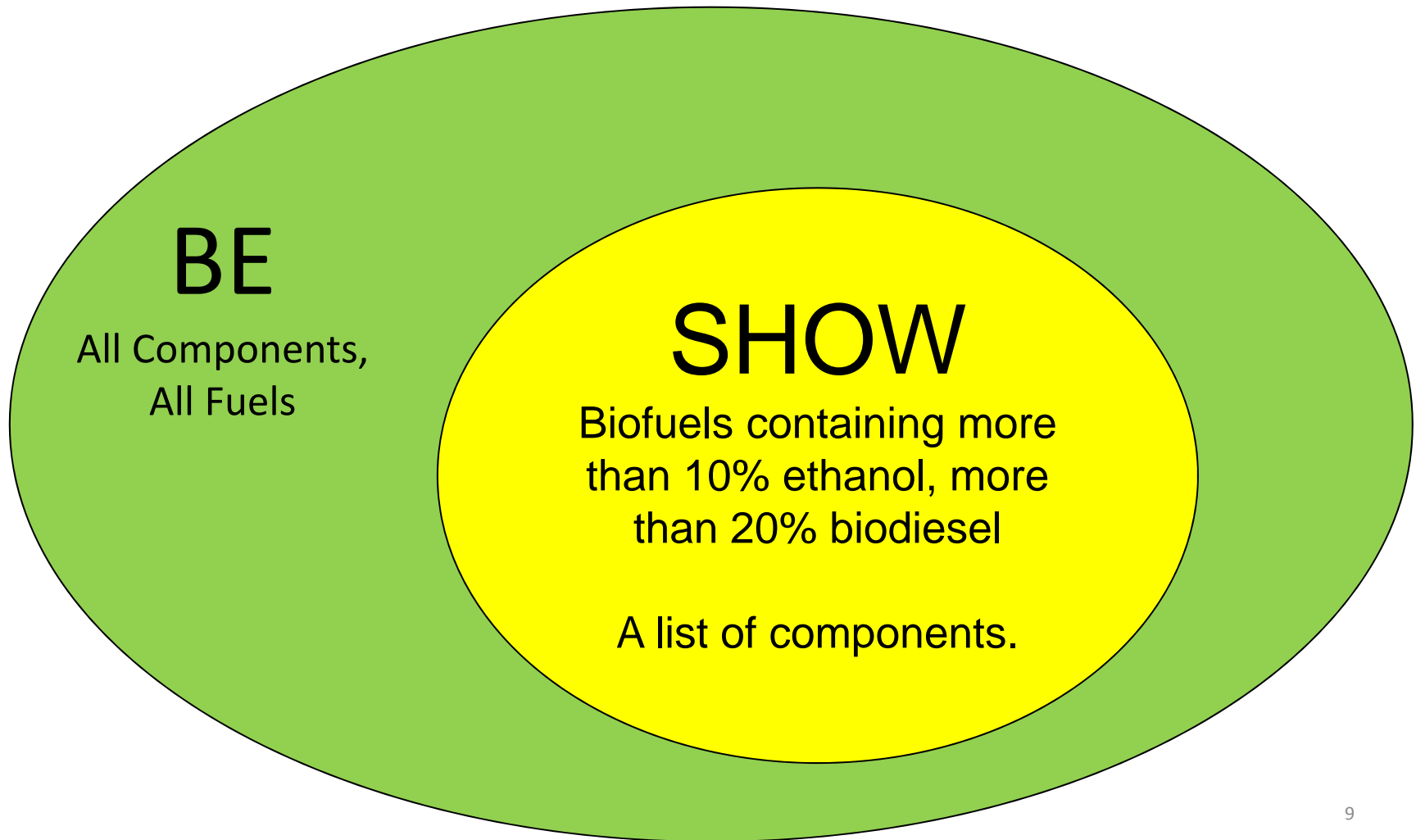
# Demonstrating Compatibility

| <b>Sample Checklist for Determining and Documenting UST System Compatibility</b>   |   |  |                                 |   |
|--|---|--|---------------------------------|---|
| <b>Instructions:</b> Complete all sections. This will help ensure you have the required information to demonstrate compatibility of an UST system with biofuels containing more than 10 percent ethanol or more than 20 percent biodiesel.         |   |  |                                 |   |
| <b>Facility Owner:</b><br><br><b>Facility Name:</b><br><br><b>Facility Number:</b>   |   | <b>Facility's Street Address, City, State, Zip Code:</b> |                                 |   |
| <b>UST System Identifier:</b>  | <b>Type and Blend Of Regulated Substance:</b>                                     |  | <b>UST Capacity In Gallons:</b> |   |
|  |   |  |                                 |   |
| Complete the checklist below, listing compatibility determination, method*, and description. All answers must be Yes and supported with a sufficient description and documentation for your system to be demonstrated compatible with the biofuel. |   |  |                                 |   |
| <b>UST System Components</b>   | <b>Documentation Demonstrating Compatibility With The Substance Listed Above?</b> |  | <b>Method A Or B*</b>           | <b>Description Of Component Type, Model Number, And National Laboratory Certification, Listing Or Manufacturer Approval</b> |
| <b>Tank</b>  | No  | Yes  |                                 |   |
| <b>Piping</b>  | No  | Yes  |                                 |   |
| <b>Containment Sumps</b>   | No  | Yes  |                                 |   |
| <b>Pumping Equipment</b>   | No  | Yes  |                                 |   |

- 1. Determine component:
  - manufacturer
  - model number
  
- 2. Find certification, listing, or manufacturer statement of approval for use with the fuel you wish to store

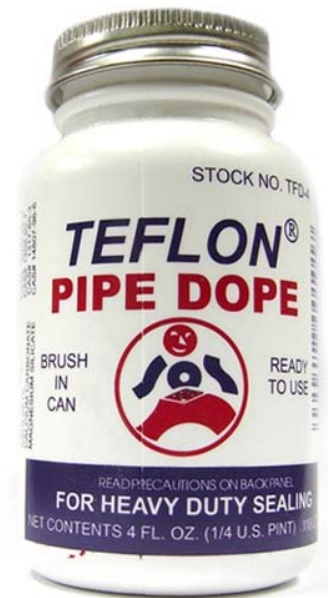


# ***Demonstrating Compatibility with Biofuels***



## *Pipe Dope and Sealants*

- **Must be compatible**
- **Multiple versions available**
- **High ethanol compatible first came out around 2007**
- **Many pipe dope connections underground**



**Pipe dope, thread sealant is used with threaded ends to make threaded joints leak proof and pressure tight.**

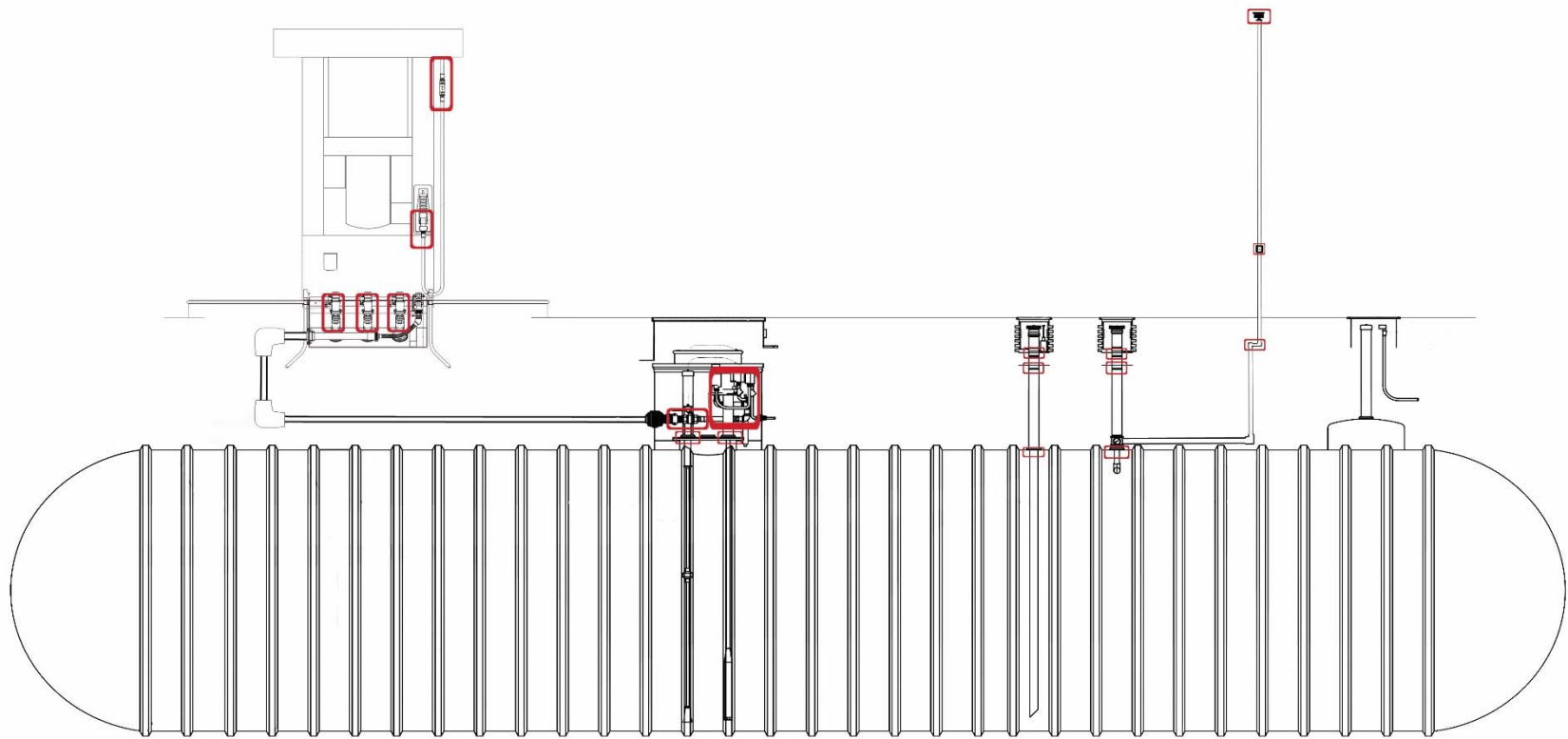


Diagram courtesy of Jeff Dzierzanowki, SOURCE Fueling Equipment Solutions

# ASTSMWO Degradation Reporting Tool

<http://astswmo.org/astswmo-corrosion-observations-tool/>



*Our Mission: to enhance and promote effective State and Territorial programs and to affect relevant national policies for waste and materials management, environmentally sustainable practices, and environmental restoration.*

What equipment was corroded and how severe? Use the example photos below to help with your response.



Tank or tank lining

☐ Low to Moderate Corrosion ☐ Significant Corrosion ☐ Severe Corrosion

Submersible turbine pump area

☐ Low to Moderate Corrosion ☐ Significant Corrosion ☐ Severe Corrosion

Drop tube or overflow prevention device

☐ Low to Moderate Corrosion ☐ Significant Corrosion ☐ Severe Corrosion

Automatic tank gauge components

☐ Low to Moderate Corrosion ☐ Significant Corrosion ☐ Severe Corrosion

Flexible connectors

☐ Low to Moderate Corrosion ☐ Significant Corrosion ☐ Severe Corrosion

Other connection points

☐ Low to Moderate Corrosion ☐ Significant Corrosion ☐ Severe Corrosion

What is the estimated age of the component\*

- ☐ Less than 5 years
- ☐ 5-10 years
- ☐ 11-20 years
- ☐ 21-30 years
- ☐ Greater than 30 years
- ☐ Unknown



# Thank you!

Ryan Haerer  
Release Prevention Division

202-564-0762  
Haerer.ryan@epa.gov

EPA Office of Underground Storage Tanks  
<https://www.epa.gov/ust/emerging-fuels-and-underground-storage-tanks-usts>



# Arizona UST Infrastructure Assessment: Preliminary Findings & Ongoing Studies

Chris Marks Ph.D., Tiffany Yee, and Tara Rosie

Arizona Dept. of Environmental Quality

NEIWPCC UST Inspector Training Webinar Series

August 26, 2019





# Increasing Awareness of UST Internal Corrosion Issues

- 2010: PEI survey documented 42% respondents reporting increased equipment issues relating to ULSD<sup>1</sup>
- 2012: CDFA study identified microbiologically-influenced corrosion (MIC) as primary corrosion mechanism<sup>2</sup>
- 2016: EPA study identified widespread internal corrosion issues in diesel USTs using the CRC corrosion rating system<sup>3</sup>

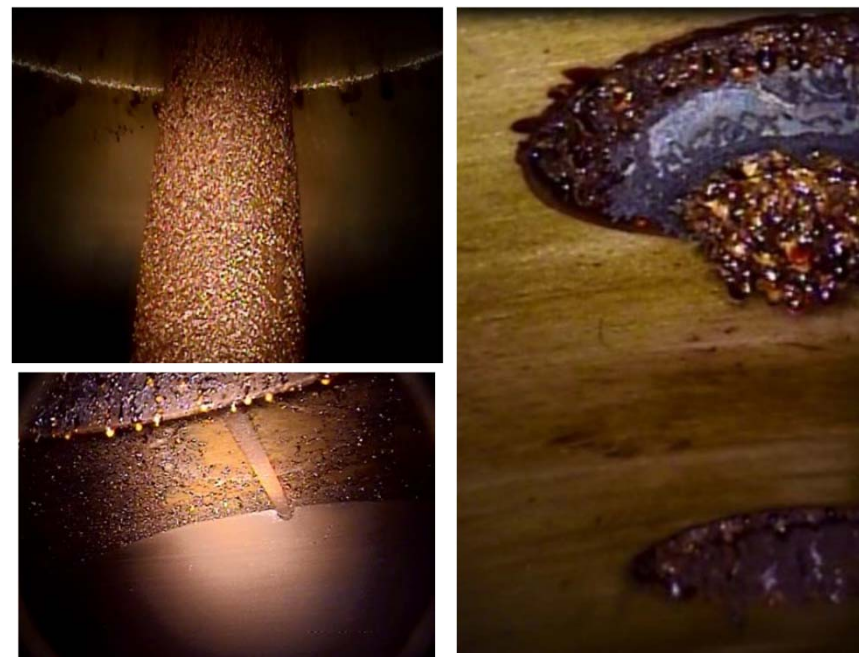
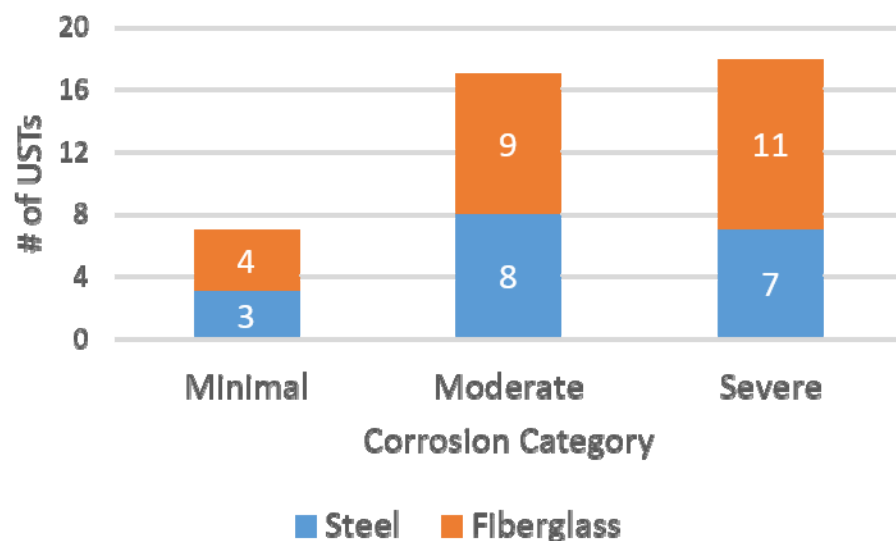


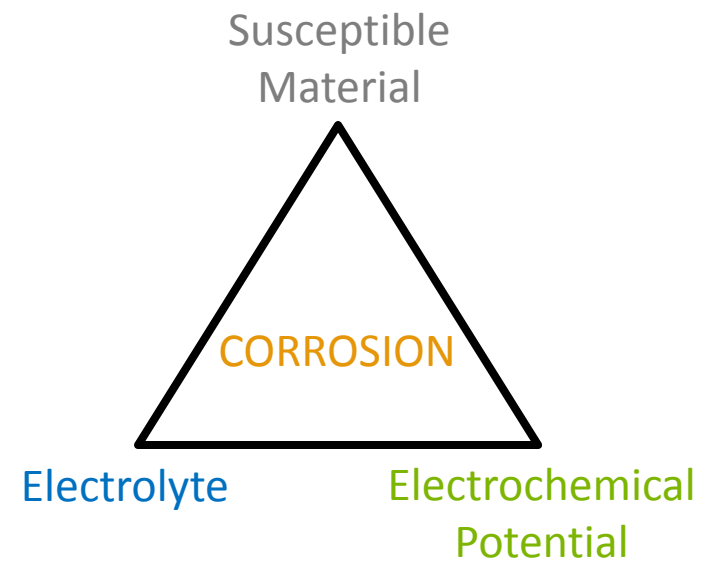
Figure reproduced and photos from EPA 510-R-16-001

# Study Design & Corrosion Rating Systems

| CRC Rating<br>(STP shaft) | Corrosion Coverage Area | ADEQ Rating<br>(Internal Surfaces) |
|---------------------------|-------------------------|------------------------------------|
| Minimal                   | Less than 5%            | A or B                             |
| Moderate                  | 5 – 50%                 | C                                  |
| Severe                    | Greater than 50%        | D                                  |

## ADEQ Study:

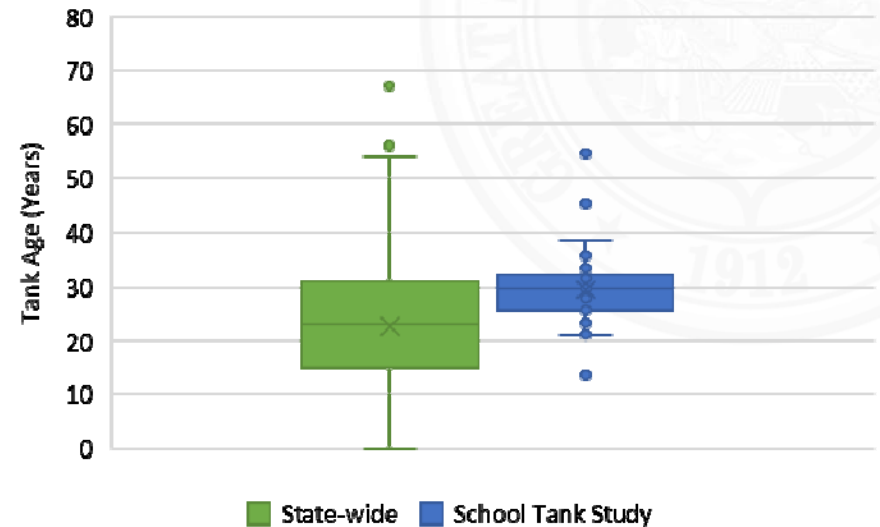
- Evaluating internal corrosion on UST surfaces and internal infrastructure across:
  - Diesel and gasoline storing systems
  - Steel and FRP tanks
- Data Collected
  - Internal visual inspection by video
  - Ullage temperature and % relative humidity
  - Water presence testing
  - Laboratory analyses of water bottoms and fuel samples



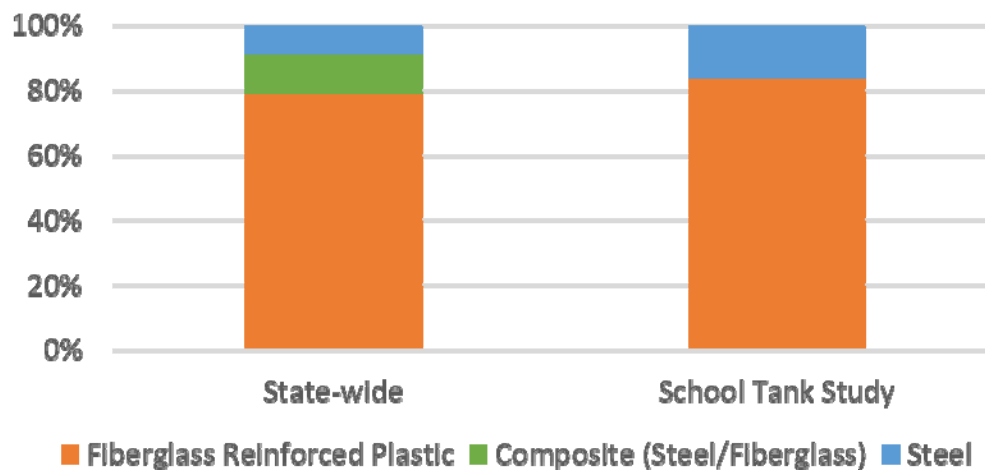
# Arizona Open UST Universe & School Tanks Project

- Currently 5,736 open USTs in AZ
- 78 school tanks studied/rated to date
- Geographically distributed across the state

## Age Distribution of Open USTs



## Tank Material Type Breakdown



# Tank Rating: A (CRC Rating: Minimal)

**No Issues:** no visual cracking, degradation, deformation, or discoloration.

Tank Age: 22 yrs



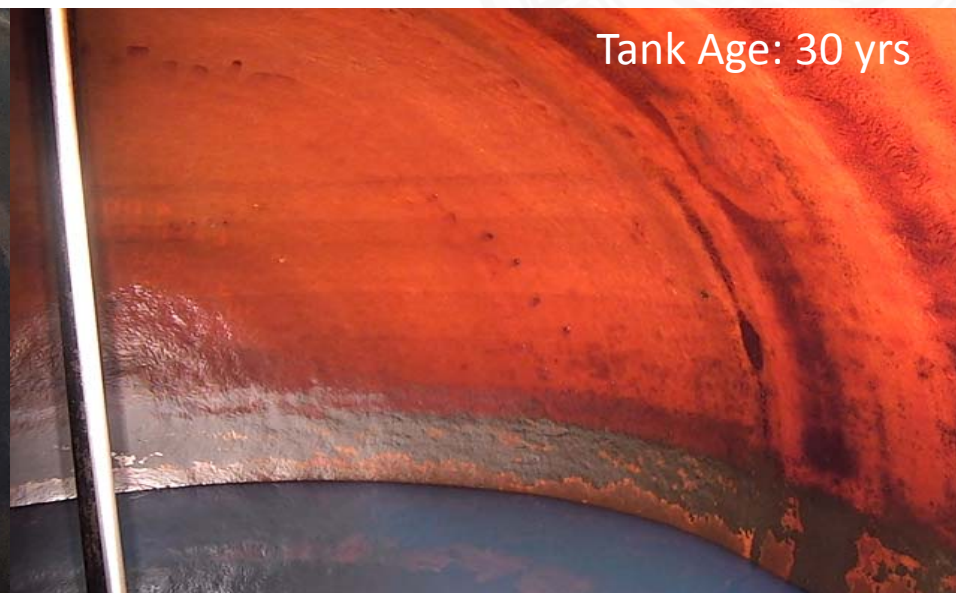


# Tank Rating: B (CRC Rating: Minimal)

**Minimal - Moderate Issues:** minor flaking/blistering, deformation, discoloration, or oxidation. Ideally <5% of the tank surfaces exhibit signs of degradation.



Tank Age: 26 yrs



Tank Age: 30 yrs





# Tank Rating: C (CRC Rating: Moderate)

**Moderate - Major Issues:** heavy flaking, blistering, corrosion, deformation, or minor cracks. Signs of degradation, stress and/or structural integrity has been affected. Ideally <50% of the tank surfaces exhibit signs of degradation. Investigation is warranted.



Tank Age: 39 yrs



Tank Age: 34 yrs

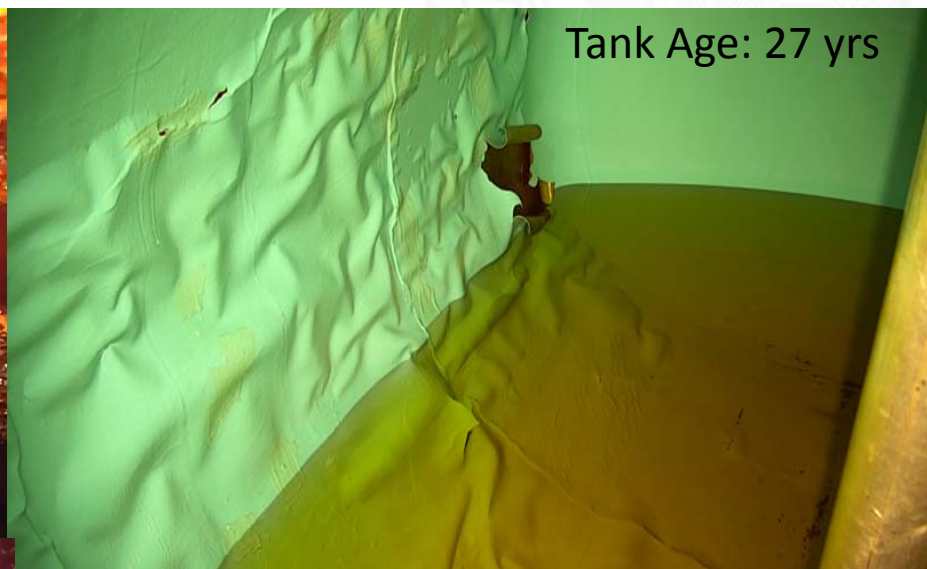


## Tank Rating: D (CRC Rating: Severe)

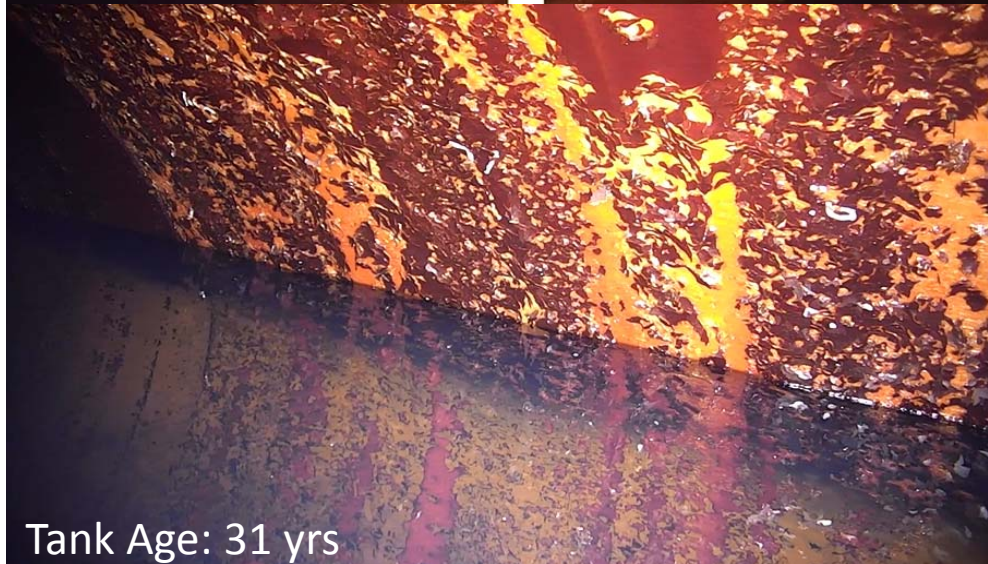
**Severe Issues:** severe cracks or evidence of fuel egress/water ingress, heavy degradation observed >50% of tank surfaces. Timely investigation is warranted.



Tank Age: 31 yrs



Tank Age: 27 yrs



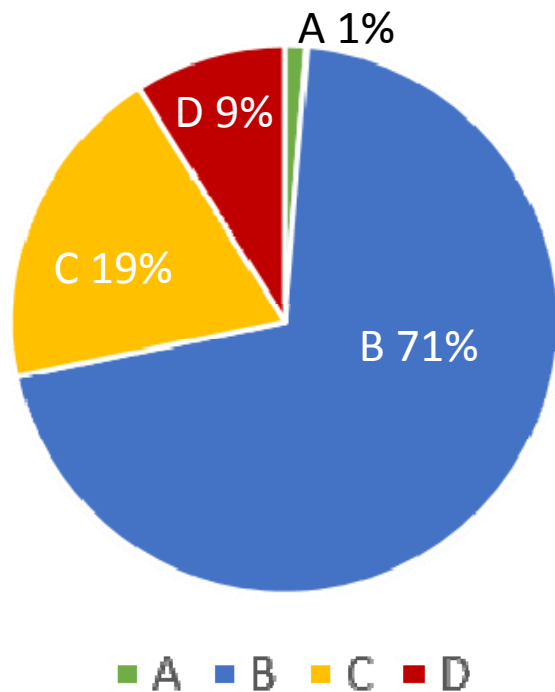
Tank Age: 31 yrs



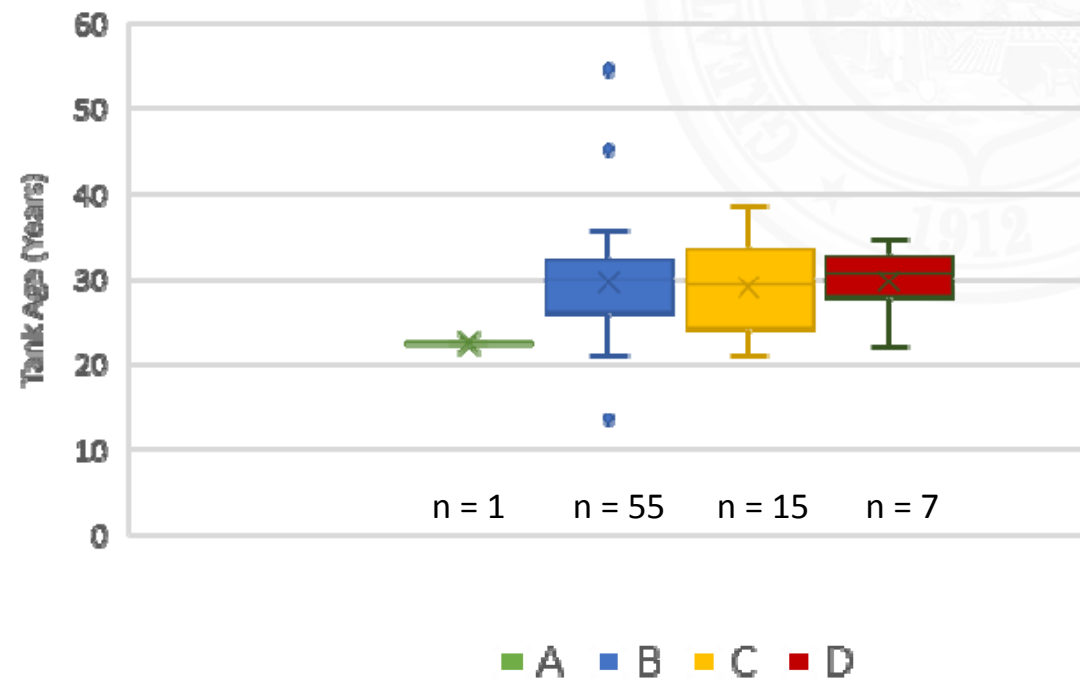
Tank Age: 28 yrs

# Preliminary Results

## School Tank Ratings Breakdown



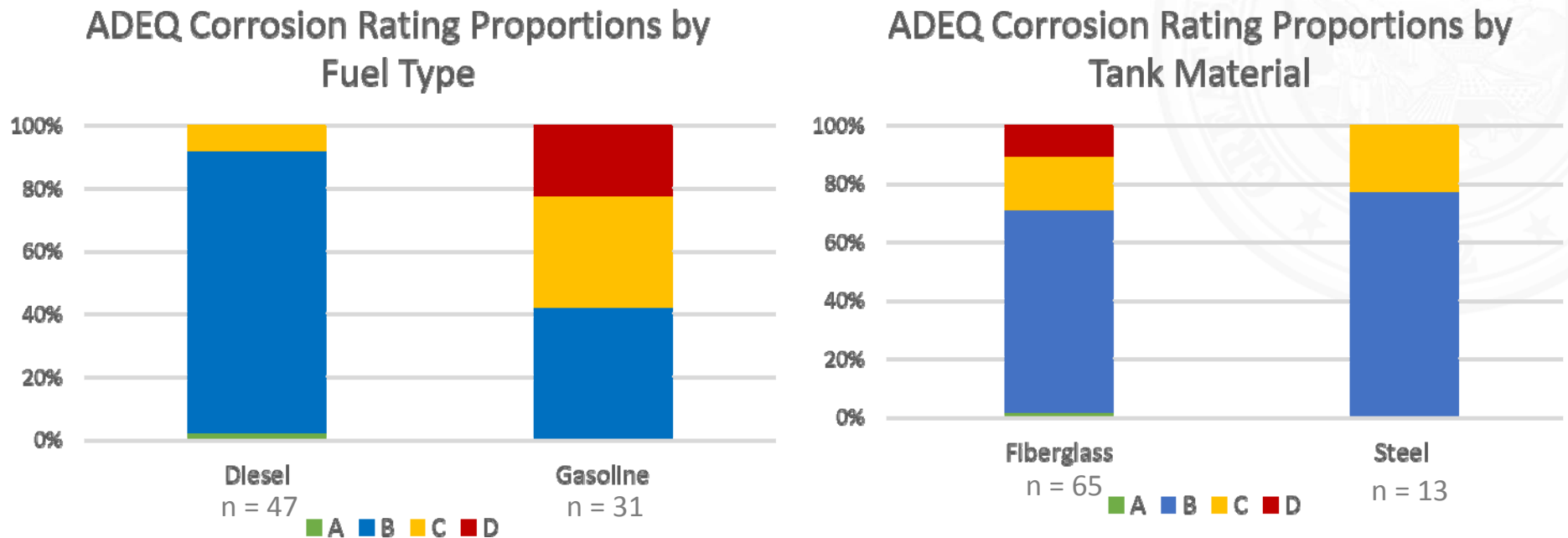
## Tank Age Distribution per Corrosion Rating



### Results:

- ~71% agreement between ADEQ and CRC Corrosion Rating Systems
- Moderate – Severe issues found in ~30% of surveyed tanks (n = 78)
- Tank age is not predictive of corrosion rating

# Preliminary Results

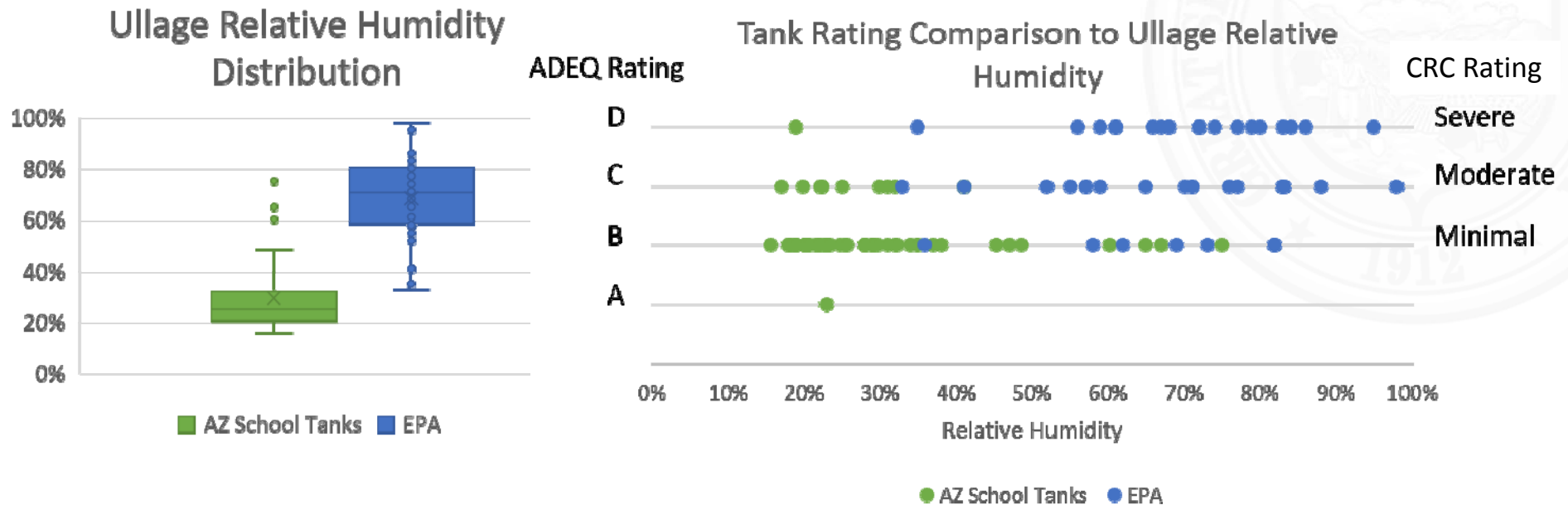


## Results:

- Moderate – Severe issues in both diesel and gasoline storing USTs.
- Internal corrosion issues observed in both of the major tank material categories.
- Study ongoing to increase sample size within categories. Currently data density insufficient to draw definitive trend distinctions between tank ratings and fuel type or UST material categories.



# Preliminary Results



## Results:

- Ambient relative humidity has a strong influence on tank ullage relative humidity. EPA study surveyed geographically-diverse sites across US.
- Relative humidity in the tank ullage shows no or only a weak positive correlation with tank corrosion rating (Spearman's Rho: ADEQ -0.07, EPA 0.13).
- Tank relative humidity cannot be used as predictive for internal tank corrosion status.

# Key Preliminary Findings

- **Corrosion of UST internal infrastructure is widespread and common:**
  - 99% of tanks studied exhibited some evidence of degradation with ~30% classified as moderate to severe
  - Observed in both diesel and gasoline systems
  - Steel and fiberglass tanks are susceptible to severe deterioration.
  - Expands upon EPA & CDFA findings to show corrosion/degradation on tank walls in addition to internal infrastructure (e.g. floats, bungs, risers, etc.)
- **Microbiologically-influenced Corrosion (MIC) is a complex process**
  - Median tank age is not significantly different between corrosion ratings, but within group sample sizes are still too small for definitive statement.
  - No single variable has been identified as statistically predictive of tank corrosion status, in agreement with EPA study of 28 potential predictor variables.
- **ADEQ study is ongoing and similar investigations are recommended for other tank community members**

# Contact Info and References



Christopher Marks, Ph.D.

Marks.Christopher@azdeq.gov

(602) 771-0561

<https://azdeq.gov/USTProgram>

## References:

- <sup>1</sup>Petroleum Equipment Institute. "ULSD: From Talk to Action." PEI Journal 2<sup>nd</sup> Qtr (2010): 47-50.
- <sup>2</sup>Battelle Memorial Institute. "Corrosion in Systems Storing and Dispensing Ultra Low Sulfur Diesel (ULSD), Hypotheses Investigation". Clean Diesel Fuel Alliance. 2012.
- <sup>3</sup>USEPA. Investigation of Corrosion-Influencing Factors in Underground Storage Tanks with Diesel Service. EPA 510-R-16-001. 2016.



**ASTSWMO, Providing Pathways to Our  
Nation's Environmental Stewardship Since 1974**

# ASTSWMO Emerging Fuels Tools

Doug Hansen, Utah DEQ



## Emerging Fuels Task Force

- Tanks Subcommittee
- Makeup
  - State and Territory representatives from each EPA Region
- Purpose
  - *"assist the States' and Territories' UST programs by providing resources and information related to managing the storage and releases of new fuels that are in use or in development."*



## Available Tools

- ASTSWMO Corrosion Observations Tool
- ASTSWMO Compatibility Tool
- <http://astswmo.org/emerging-fuels-resources/>





This webpage provides resources developed by the ASTSWMO Emerging Fuels Task Force and others to assist State underground storage tank programs.

ASTSWMO's Emerging Fuels Task Force created this tool for the purpose of submitting information on UST system corrosion observed during inspections and removals in the field. We hope UST regulators, inspectors, contractors, and owners will use this Corrosion Tool to report incidences of corrosion. Our goal is that assembling all this data will help identify trends, and especially we hope this tool will help identify potential problems before they become widespread.



ASTSWMO's Emerging Fuels Task Force created this tool to assist users in identifying UST system components that are compatible with specific motor fuels and biofuel blends containing greater than 10 percent ethanol and diesel containing greater than 20 percent biodiesel. The majority of the information included comes directly from equipment manufacturers and ASTSWMO is not responsible for the accuracy or completeness of any information provided by other parties.

Select Component

Select Component

Underground storage tank or lining

Piping

Flex Connectors



# Corrosion Observations Tool

- Purpose and Uses

- Reporting corrosion incidents observed during inspections
- Providing data to highlight trends and identify possible research opportunities
- Creating a repository of information that can be used for training
- Preventing corrosion related releases from UST systems



<http://astswmo.org/astswmo-corrosion-observations-tool/>

SEARCH

# Sharing Observations

- Your information
  - Name
  - Agency
  - Email



## Sharing Observations (cont.)

- Facility/System Information
  - Location
    - City and State only
  - Affected component and degree of corrosion
    - Tank or tank lining
    - Submersible turbine pump area
    - Drop tube or overflow prevention device
    - Automatic tank gauge components
    - Flex connectors
    - Other connection points





What equipment was corroded and how severe? Use the example photos below to help with your response.

Low to Moderate



Significant



Severe



**Tank or tank lining**

☐ Low to Moderate Corrosion ☐ Significant Corrosion ☐ Severe Corrosion

**Submersible turbine pump area**

☐ Low to Moderate Corrosion ☐ Significant Corrosion ☐ Severe Corrosion

**Drop tube or overfill prevention device**

☐ Low to Moderate Corrosion ☐ Significant Corrosion ☐ Severe Corrosion

**Automatic tank gauge components**

☐ Low to Moderate Corrosion ☐ Significant Corrosion ☐ Severe Corrosion

**Flexible connectors**

☐ Low to Moderate Corrosion ☐ Significant Corrosion ☐ Severe Corrosion

**Other connection Points**

☐ Low to Moderate Corrosion ☐ Significant Corrosion ☐ Severe Corrosion



- Facility/System Information (cont.)
  - Estimated age of component
    - < 5 years, 5-10 years, 11-20 years, 21-30 years, > 30 years, or unknown
  - Was there a release from the component
    - Yes/No
  - Fuel being stored
    - Gasoline up to 10% ethanol (E0 to E10)
    - Gasoline with greater than 10% (eg E15+)
    - Ultra Low Sulfur Diesel (ULSD)
    - Biodiesel or ULSD with more than 5% biodiesel
    - Other (with comment field)



- Facility/System Information (cont.)

- Identify any corrosion protection in place prior to observation
- How was corrosion discovered?
  - Visual Observation
  - Clogged fuel filters
  - Inoperable equipment
  - Other (with comment)



## Photo (or Document) Upload

### *Additional Information*

Narrative Description of Issue, including any findings and resolutions:

Upload any pictures or public file information you would like to share with ASTSWMO. Accepts pdf, jpg, png, and gif formats.

No file chosen

[recaptcha]



# Map of Available Reports

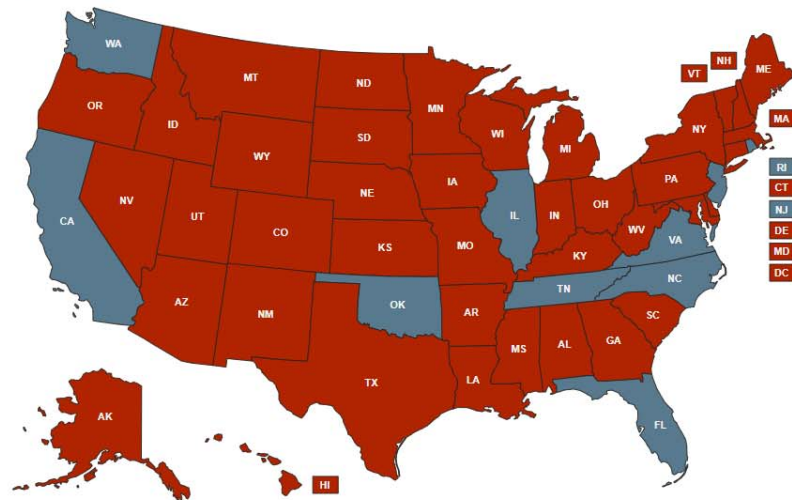
## ASTSWMO Corrosion Observations

ASTSWMO's Emerging Fuels Task Force created the Corrosion Observations Tool for the purpose of submitting information on UST system corrosion observed during inspections and removals in the field. It is well known that some new fuel formulations are associated with accelerated corrosion, clogged filters, and other side effects; however, we do not have a complete understanding of how widespread these issues are, nor do we know if these issues are leading to increases in releases from UST systems.

We encourage UST regulators, inspectors, contractors, and owners to use the Corrosion Observations Tool to report incidences of corrosion. Our goal is that assembling all this data will help identify trends, and especially we hope this toolkit will help identify potential problems before they become widespread.

[Click here to access the Corrosion Observations Tool](#)

The map below provides corrosion observation reports that have been submitted to ASTSWMO using the tool.



## How to use

Simply click any blue state to read corrosion observation reports that have been submitted to ASTSWMO. Red states have no reports available yet. If you'd like to contribute to this tool please click on the link to the Tool above or contact the ASTSWMO staff.

## Report Map- State Selected

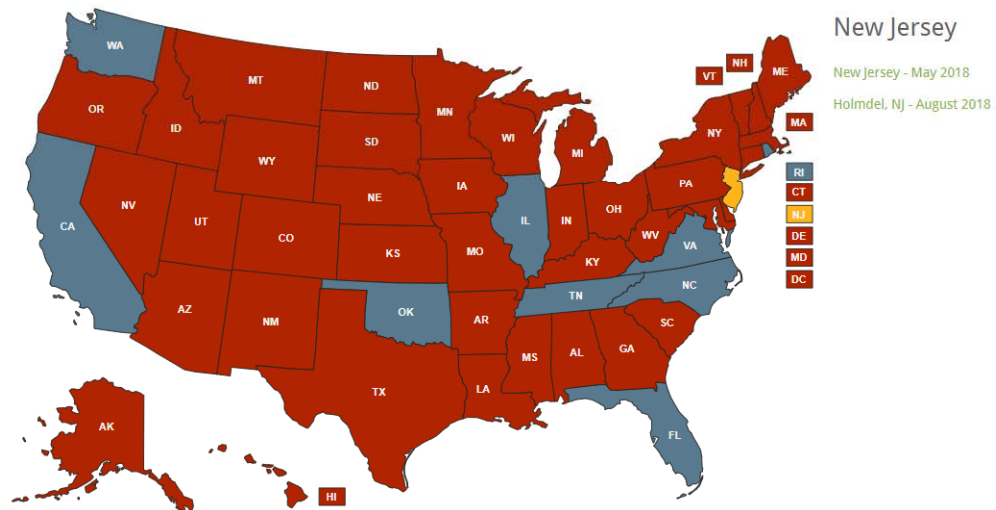
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[Click here to access the Corrosion Observations Tool](#)

The map below provides corrosion observation reports that have been submitted to ASTSWMO using the tool.



# Example Report

From: Michael Hollis  
Organization: NJDEP

Corrosion Location: Holmdel, NJ

Corroded Equipment:  
Tank or tank lining:  
Submersible turbine pump area: Severe Corrosion  
Drop tube or overflow prevention device:  
Automatic tank gauge components:  
Flexible connectors:  
Other connection points:

Component age: 21-30 years

Was there a release: No

Fuel Type: Gasoline with up to 10% ethanol (E0 to E10)  
Fuel Type Other:

Corrosion Protection: No  
Protection Description:

Corrosion Discovered By: Visual Observation  
Other Method:

Additional Information:

PHOTO:






# Compatibility Tool

- Compatibility Requirements
  - 40CFR 280.32 (b): notify when switching to a *"regulated substance containing greater than 10 percent ethanol, greater than 20 percent biodiesel, or any other regulated substance identified by the implementing agency."*
  - 40CFR 280.32 (b)(1): Demonstrate compatibility
    - Certification or listing by independent test lab
    - Written manufacturer approval
    - Implementing agency approval



<http://astswmo.org/ust-compatibility-tool/>



### ASTSWMO Compatibility Tool

**About this Tool**

This tool assists users in identifying UST system components that are compatible with specific motor fuels and biofuel blends containing greater than 10 percent ethanol and diesel containing greater than 20 percent biodiesel. The majority of the information included comes directly from equipment manufacturers and ASTSWMO is not responsible for the accuracy or completeness of any information provided by other parties.

The tool has multiple features:

1. Users can review compatible UST system components by fuel type. This information is based on manufacturer compliance letters.
2. Users can review compatible UST system components by manufacturer. (Under Construction)
3. Users can submit data to ASTSWMO on compatible UST system components for inclusion in this tool.

---

**Review Compatible UST System Components by Fuel Type**

**Fuel Type (Select 1)**

☐ Diesel Blends (>B20)  
☐ Ethanol Blends (>E10)

**Component (Select 1)**

Select Component ▾

**Results:**



## Purpose of Tool

- Provide access to compatibility documentation to meet requirements
  - UST operators
  - Inspectors
- Provide manufacturers an avenue to share information



## Searching by Fuel Type

- Select Diesel blends >B20 or Ethanol blends >E10
- Select component
  - UST or lining
  - Piping
  - Flex connectors
  - Line leak detectors
  - STPs and components
  - Containment
  - Spill/Overfill prevention
  - Drop tubes
  - Fill and riser caps
  - Floats, sensors, probes
  - Sealants
  - Shear Valves
  - Hanging hardware
  - Dispensers

### Review Compatible UST System Components by Fuel Type

#### Fuel Type (Select 1)

- ☒ Diesel Blends (>B20)  
☐ Ethanol Blends (>E10)

#### Component (Select 1)

Line Leak Detectors ▼

#### Results:

[KPS](#)

[VMI](#)





Kungsör, Sweden 2011-09-28

#### Bio-fuel compatibility statement

This letter is to confirm the compatibility of KPS Petrol Pipe System™ products with alternative fuels such as Alcohol blended fuels and Biodiesel.

KPS Petrol Pipe System™ manufactures the following products:

*Double wall conductive plastic pipes*  
*Single wall conductive plastic pipes*  
*Flexible connectors*  
*Plastic fittings, gaskets, couplings and entry boots*  
*Containment sumps*  
*Leak detectors units for filling and refuelling*

All of the above products are suitable for use with all fuel blends meeting ASTM standards, including ethanol blends from E5 to E100, methanol blends from M5 to M100 and biodiesel blends from B2 to B100. Testing has been done proving compatibility of materials by ERA Technology Ltd and Underwriters Laboratories Inc., as well as by our own in house testing facility.

Please visit [www.kpsystem.com](http://www.kpsystem.com) for all information on bio-fuels, testing, training and production of a fully bio-fuel compatible system.

For all questions and information please contact:

Mr Mats Sundberg  
KPS Petrol Pipe System™  
Kungsörs Plast AB  
Box 70, Fabriksgatan 3  
SE-736 36 Kungsör  
Sweden  
Tel: +46 (0)227 422 00

Mats Sundberg  
Technical Director

**Kungsörs Plast AB**  
Box 70 SE-736 22 Kungsör · Sweden  
**Telephone** +46 (0) 227 422 00  
**Telefax** +46 (0) 227 422 01  
**Internet** [www.kpsystem.com](http://www.kpsystem.com)  
**E-mail** [info@kpsystem.com](mailto:info@kpsystem.com)



## Search by Manufacturer

- Select manufacturer from the dropdown and submit

### Review Compatible UST System Components by Manufacturer (Under Construction)

Manufacturer (Select 1)

Bravo Systems ▼ Submit

Results:

[Bravo Systems: Fittings](#)

[Bravo Systems: Sumps](#)







S. Bravo Systems, Inc.  
2929 Vail Avenue  
Commerce, CA 90040  
1-800-AT-BRAVO  
www.sbravo.com

Tuesday - August 30 - 2011

R3 10.21.13

**RE: Bravo Fiberglass Entry Fittings and Alternative fuels**

This letter is to certify the compatibility of Bravo (S. Bravo Systems, Inc.) Single and Double Wall Fiberglass Sump Entry Fittings with Alternative Fuels such as Biodiesel and Ethanol blended fuels. It also addresses compatibility with DEF Diesel Exhaust Fluid.

Bravo Fiberglass Fittings are engineered with the same UL Listed materials used in the manufacture and certification of Fiberglass Tanks, matching the UL Standard 1316. Since our Fiberglass Fittings are Built like a Tank, they can withstand continuous fuel exposure to, or submersion in Biodiesel, Ethanol and Alcohol blends without failure.

All Fiberglass Fittings designed for DoubleWall Sumps are engineered to be fully compliant with the California State Water Resource Control Board Assembly Bill AB-2481 for DoubleWall Sumps and Continuous Monitoring Systems.

The following Single and Double Wall Fiberglass Fittings manufactured by Bravo in Commerce, California are compatible with Biodiesel and Ethanol fuel blends up to B100 and E100, respectively.

- > **F-Series** "Full Body" Fiberglass Fittings.
- > **FF-Series** "Flange" Fiberglass Fittings.
- > **FPE-Series** Fiberglass Fittings for Flexible pipe.
- > **FLX-Series** Fiberglass Split Retrofit Fittings for Flexible pipe.
- > **FR-Series** Fiberglass Split Test Reducers.
- > **F-Series Retrofit-S** & **SD-AB** Fiberglass Split Retrofit Fittings.
- > **F-Series D-BLR-S** & **D-JNR-S** Fiberglass Split Retrofit Fittings.
- > **TBF-Series** Fiberglass Tank Bung Fittings.

Bravo also certifies that these products are compatible with and approved for use in secondarily containing DEF Diesel Exhaust Fluid.

Each respective Series may be UL Listed in addition to being manufactured of UL recognized materials approved for use in the manufacture of Fiberglass UST tanks. Any other relevant documentation will be located in the documents area of each product's respective webpage.

Please feel free to contact us with any questions you may have at 800-AT-BRAVO.

Additionally, you may find further information at [www.sbravo.com](http://www.sbravo.com).

Sincerely,

Jonathan E. Smith  
Director of Brand Management  
S. Bravo Systems, Inc.



# Submit New or Updated Data

## Submit New or Update Current Data in Tool.

Use the form below to provide new documentation for inclusion into this tool, update current information, or if you observed errors.

Your Name

Agency/Organization

Email

Description of your submittal (if new documentation provide manufacturer, UST system component(s), and fuel type(s).)

Upload Document (PDF only)

No file chosen

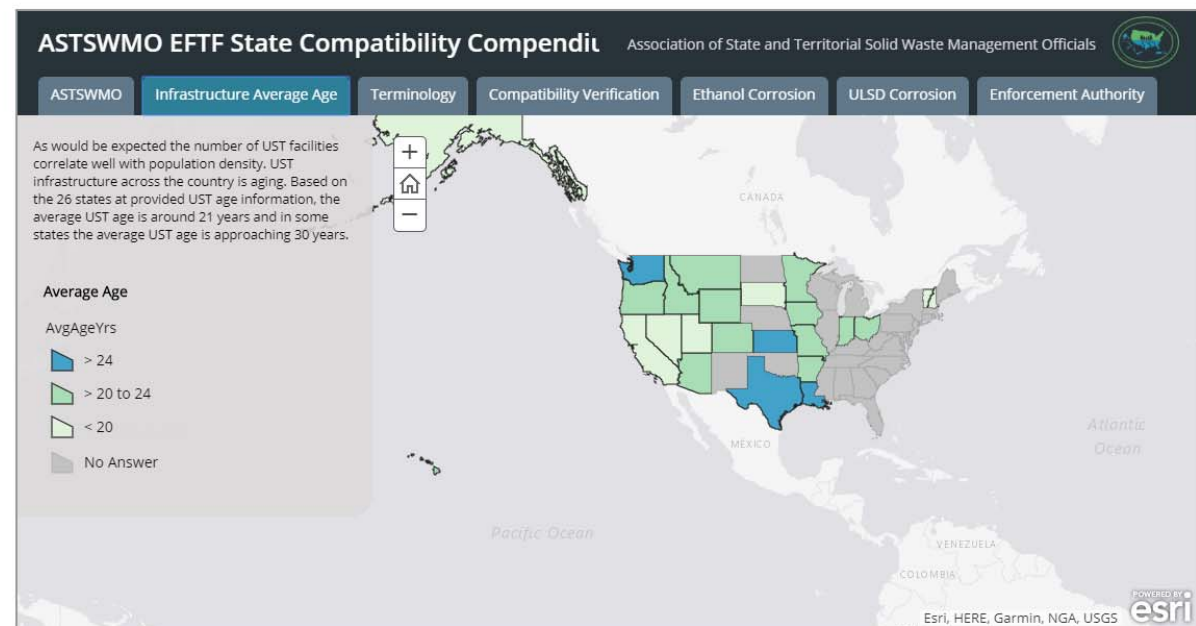


# ASTSWMO 2014 State Compatibility Compendium

## ASTSWMO State Compatibility Compendium

The ASTSWMO Emerging Fuels Task Force developed a survey in 2014 to understand existing UST infrastructure, develop a compendium for State policies and activities specific to biofuels and other emerging fuel types and to help provide a framework for identifying similarities and differences between State programs. If your State has updates to the data in the compendium, please send them to ASTSWMO staff or the Emerging Fuels Task Force representative for your region.

[Click here for a full screen version of the Compendium](#)



## Final Thoughts

- Update Compatibility Compendium
- Please submit corrosion observations
- Share the Compatibility Tool with stakeholders
- Provide feedback to ASTSWMO on both tools
- Be part of the dialogue



# Thank You, Speakers!

**Ryan Haerer**

[haerer.ryan@epa.gov](mailto:haerer.ryan@epa.gov)

**Ted Unkles**

[ted.unkles@vermont.gov](mailto:ted.unkles@vermont.gov)

**Doug Hansen**

[djhansen@utah.gov](mailto:djhansen@utah.gov)

**Chris Marks, Ph.D.**

[marks.christopher@azdeq.gov](mailto:marks.christopher@azdeq.gov)

**Tara Rosie**

[rosie.tara@azdeq.gov](mailto:rosie.tara@azdeq.gov)

