



# Utilizing AWWA D 102 To Specify Protective Coatings for Water Tank and Treatment Projects

OTCO

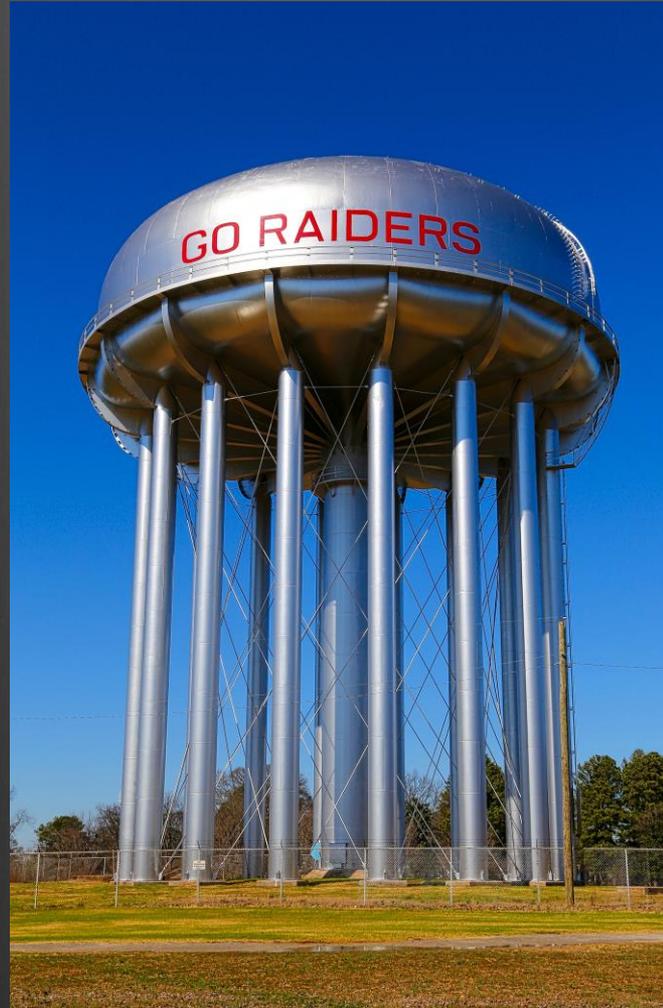
Presented by:  
Jeff Rog

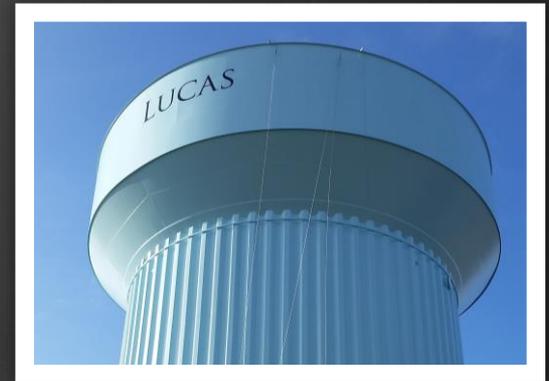
**INDURON**  
PROTECTIVE COATINGS

# OVERVIEW

- TYPES OF STEEL WATER STORAGE TANKS
- STANDARDS AND GUIDES
- SPECIFICATION CONSIDERATIONS
- SURFACE PREPARATION STANDARDS
- INTERIOR COATINGS SYSTEMS
- EXTERIOR COATINGS SYSTEMS
- OVERCOATING EXISTING TANKS

# Water Tanks...





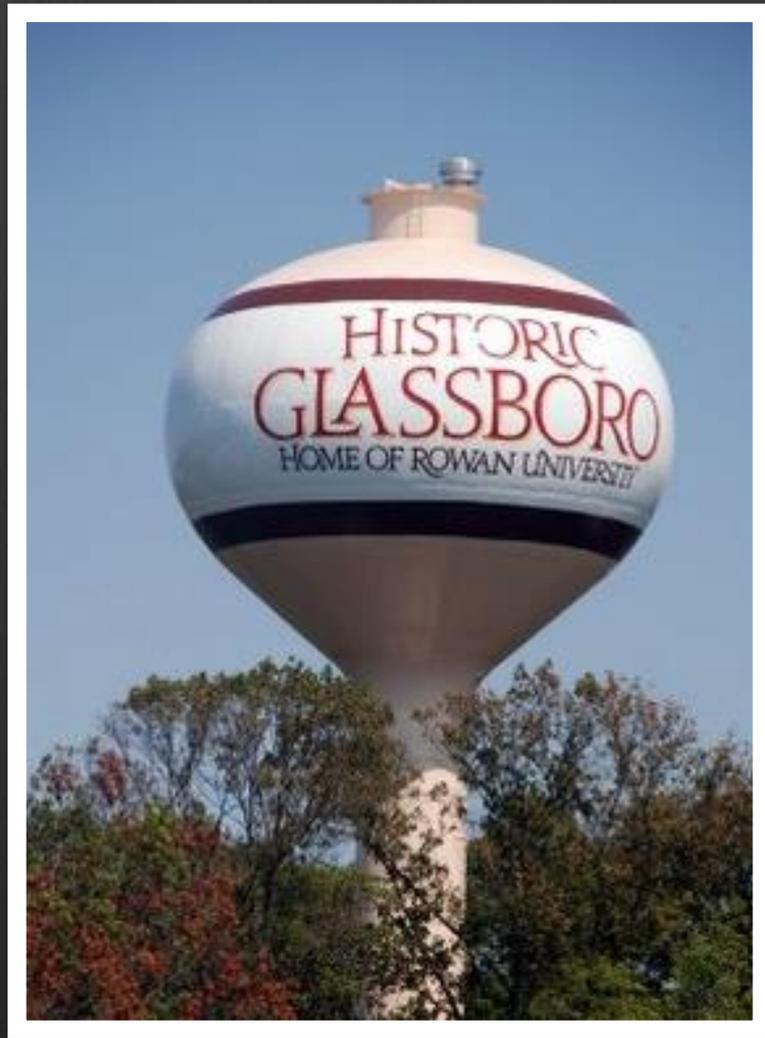
**COME IN ALL SHAPES  
AND SIZES**



**Elevated Leg Tank**



**Standpipe**

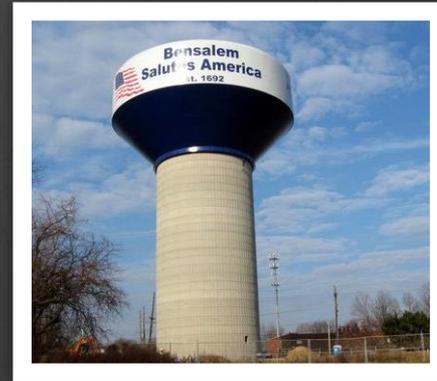
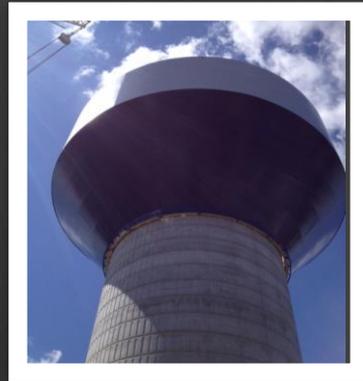


**Spheroid/Pedosphere**



**CET**

**Composite Elevated Tank**



# Construction and Painting of a CET



**Reservoir**



**Single Fluted Column/Hydropillar**

# Water & Wastewater Treatment



# Standards and Guides

- **AWWA D-100-11 – Welded Carbon Steel Tanks for Water Storage**
- **AWWA D-102-17 – Coating Steel Water Storage Tanks**
- **SSPC – The Society for Protective Coatings (Steel Structures Painting Council)**
- **NACE – National Association of Corrosion Engineers**
- **ANSI, NSF, UL, EPA, OSHA, etc.**
- **State and Local Regulations**

# Where to Use Water and Wastewater Coatings



# Where to Use Water and Wastewater Coatings

- Tanks



# Where to Use Water and Wastewater Coatings

- Wetwells
- Headworks



# Where to Use Water and Wastewater Coatings

- Manholes



# Where to Use Water and Wastewater Coatings

- Piping



# Where to Use Water and Wastewater Coatings

- Steel



# Where to Use Water and Wastewater Coatings

- Concrete
- Floors



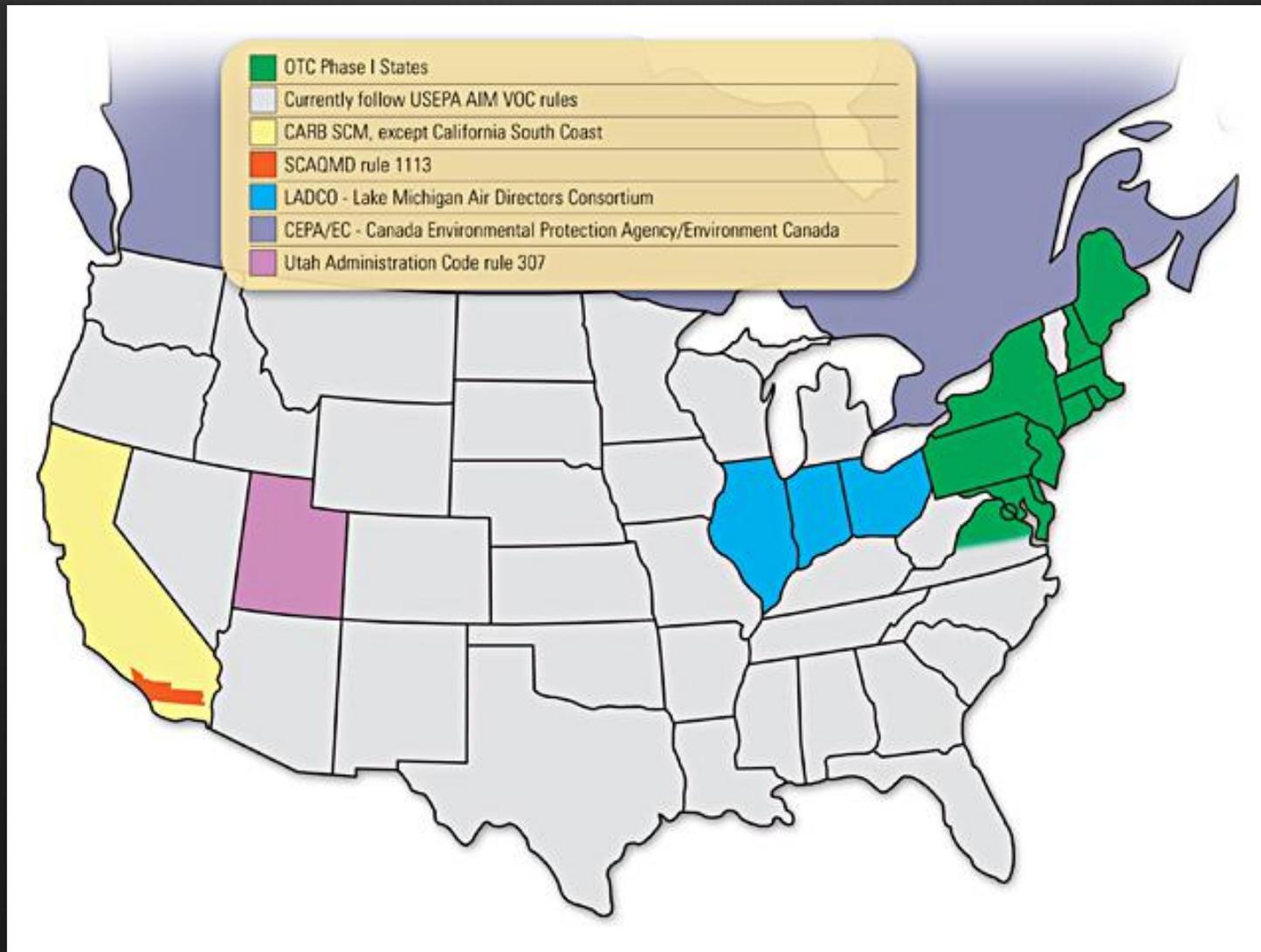
# Where to Use Water and Wastewater Coatings

- Concrete
- Walls



# ENVIRONMENTAL STANDARDS AND REGULATIONS

- VOC's (Volatile Organic Compounds)
- HAP's (Hazardous Air Pollutants)
- NSF/ANSI International Std. 61



# United States VOC Regions

# Specification Considerations

## Environmental Conditions

Time of year

Ability to take out of service

## Site Considerations

Coastal

Industrial

Surrounding Properties

## Desired Life Expectancy

Difficulty to Paint

Redundancy

# Surface Preparation Standards

**SSPC-SP1 Solvent Cleaning**

**SSPC-SP2 Hand Tool Cleaning**

**SSPC-SP3 Power Tool Cleaning**

**SSPC-SP11 Power Tool Cleaning to Bare Metal**

**SSPC-SP5/NACE 1 White Metal Blast**

**SSPC-SP10/NACE 2 Near White Metal Blast**

**SSPC-SP6/NACE 3 Commercial Blast**

**SSPC-SP7/NACE 4 Brush-Off Blast**

**SSPC-SP12/NACE 5 Surface Preparation and  
Cleaning of Metals by Waterjetting Prior to  
Recoating**

# Surface Preparation Standards

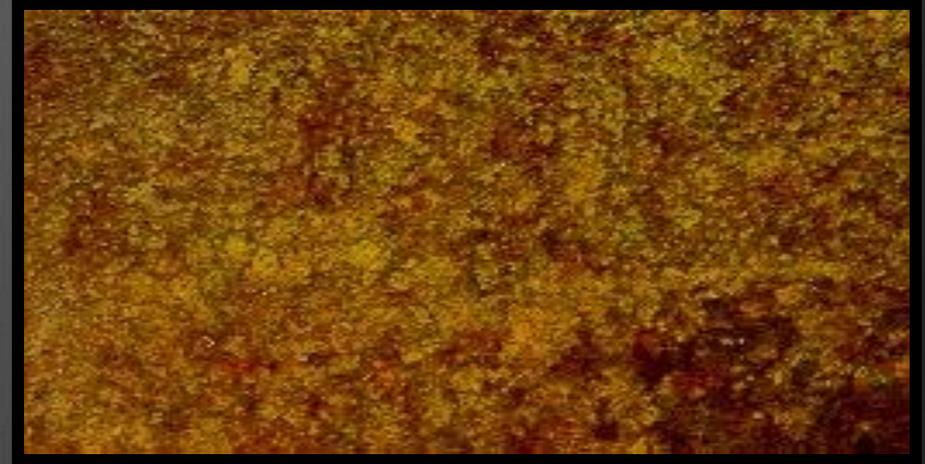
## Most Common Blast Standards

- **SSPC-SP5/NACE 1 White Metal Blast**
  - Removal of everything. 0% Staining allowed
- **SSPC-SP10/NACE 2 Near White Metal Blast**
  - Removal of everything. 10% Staining allowed
- **SSPC-SP6/NACE 3 Commercial Blast**
  - Removal of everything. 33% Staining allowed
- **SSPC-SP7/NACE 4 Brush-Off Blast**
  - Removal of all LOOSE debris, paint, rust, etc.

# SSPC-SP5/NACE 1

## *White Metal Blast Cleaning*

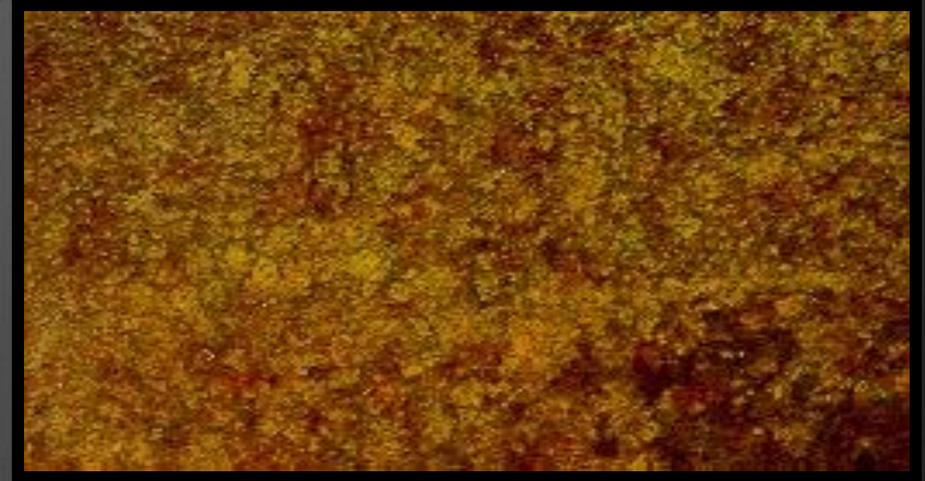
- ⊗ Abrasive Blast cleaning of steel surfaces
- ⊗ Free of all oil, grease, dust, dirt, mill scale, rust, coating, oxides, corrosion products, foreign matter, & stains
- ⊗ Removes all existing coating, mill scale, rust, oxides, corrosion products, stains, & other foreign matter



# SSPC-SP10/NACE 2

## *Near-White Metal Blast Cleaning*

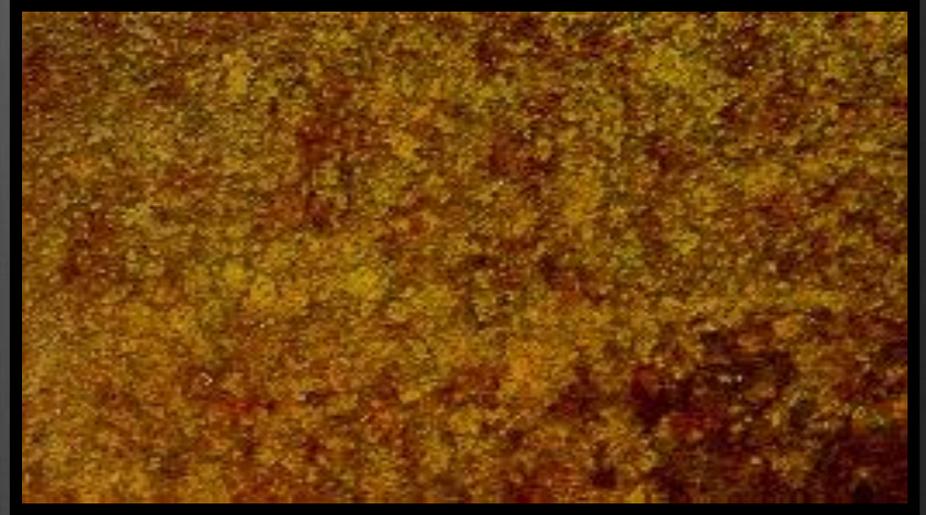
- ⊗ Abrasive Blast cleaning of steel surfaces
- ⊗ Free of all oil, grease, dust, dirt, mill scale, rust, coating, oxides, corrosion products, foreign matter
- ⊗ Random staining up to 5% from rust, mill scale or previously applied coatings



# SSPC-SP6/NACE 3

## *Commercial Blast Cleaning*

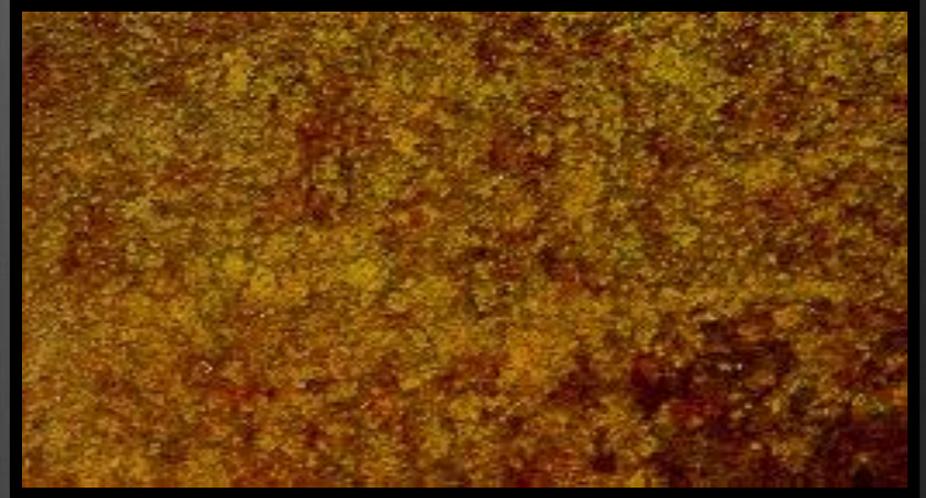
- ⦿ Abrasive Blast cleaning of steel surfaces
- ⦿ Free of all oil, grease, dust, dirt, mill scale, rust, coating, oxides, corrosion products, foreign matter
- ⦿ Random staining up to 33% from rust, mill scale or previously applied coatings



# SSPC-SP7/NACE 4

## *Brush-Off Blast Cleaning*

- ⊗ Abrasive Blast cleaning of steel surfaces
- ⊗ Free of all oil, grease, dust, dirt, & *loose* mill scale, *loose* rust, & *loose* coating
- ⊗ Mill scale, rust, and coating considered adherent if cannot be lifted by putty knife



# FULL FIELD SURFACE PREPARATION

- Imparts angular vs. peened surface profile
- Eliminate oils, greases, mud and other contaminants on the surface from fabrication, transportation and job site staging prior to coating
- Eliminates carbon deposits left from blasting with steel abrasive
- Prime coats becoming hardened and chalked due to extended exposure to UV

# Shop Blasted and Primed Tank



# **AWWA D-102**

## **Coating Steel Water Storage Tanks**

- **Contains proven systems**
- **Meant as a guide**
- **Represents a snapshot of current technology**
- **May be modified**

# AWWA D-102

## Interior Coating Systems

### ICS-1 Epoxy/Epoxy

Minimum DFT                      8.0 mils

Pluses:                      Proven system, Ease of application

Minuses:                      Relatively low film build (no longer the case)

# AWWA D-102

## Interior Coating Systems

### ICS-2 Epoxy/Epoxy/Epoxy

Minimum DFT                      12.0 mils

Pluses:                      Proven system, Ease of application

Minuses:                      Relatively low film build (no longer the case)

# AWWA D-102

## Interior Coating Systems

### ICS-3 100% Solids Epoxy

Minimum DFT                      20.0 mils

Pluses:                      High film build, prevents edge corrosion, quick return to service and elimination of the most common modes of failure

Minuses:                      Limits contractor pool (specialized equipment), more expensive, sometimes needs humidity control or a holding primer

# AWWA D-102

## Interior Coating Systems

### ICS-4 Polyurethane or Polyurea

Minimum DFT                      25.0 mils

Pluses:                      Very high film build, prevents edge corrosion, quick return to service and elimination of the most common modes of failure

Minuses:                      Limits contractor pool (specialized equipment, certified applicators), most expensive, almost ALWAYS needs humidity control or a holding primer





**SEAM TREATMENT**

# AWWA D-102

## Exterior Coating Systems

### OCS-1 Alkyd/Alkyd/Alkyd

Minimum DFT                      6.0 mils

Pluses:                      Inexpensive, Ease of application

Minuses:                      Non V.O.C. compliant in many parts of the country, high HAPS, comparatively short life span, very susceptible to condensation

# AWWA D-102

## Exterior Coating Systems

### OCS-1A or 1B Alkyd/Alkyd/Alkyd

Minimum DFT                      6.0 mils

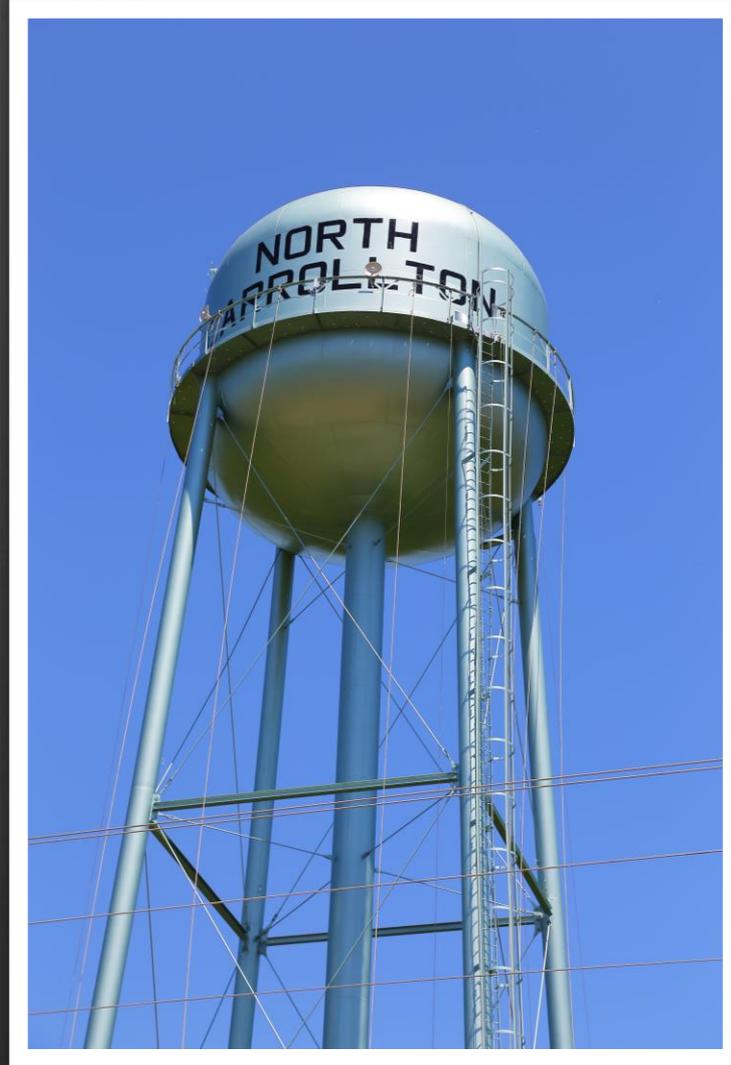
Pluses:                      Inexpensive, Ease of application, VOC compliant because of different standard for metallic pigmented coatings, ability to be over-coated infinitely when maintained

Minuses:                      Color limitations, temperature limitations



**OCS – 1A**  
**Aluminum Alkyd**





**OCS – 1B**

**Colored Aluminum Alkyd**

# AWWA D-102

## Exterior Coating Systems

OCS-2 3 coats of moisture cured urethane

Minimum DFT 6.5 mils

Pluses: Cold weather application, moisture tolerant

Minuses: Color limitations, application limitation

# AWWA D-102

## Exterior Coating Systems

### OCS-3 Zinc/Acrylic/Acrylic

Minimum DFT                      6.0 mils

Pluses:                      Ease of application, ease of over coating,  
inexpensive, dry fall application, better corrosion  
resistance than traditional alkyds

Minuses:                      Temperature limitations



**OCS - 3**

**Zinc/Acrylic/Acrylic**

# AWWA D-102

## Exterior Coating Systems

### OCS-4 Zinc/Polyurethane/Fluorourethane

Minimum DFT                      6.5 mils

Pluses:                      Outstanding corrosion resistance, outstanding gloss and color retention, outstanding service life

Minuses:                      Most expensive initial cost



**OCS - 4**

**Zinc/Polyurethane/Fluorourethane**

# AWWA D-102

## Exterior Coating Systems

### OCS-5 Epoxy/Epoxy/Polyurethane

Minimum DFT                      6.5 mils

Pluses:                      Proven system, good corrosion resistance, good service life, easy to apply, relatively economical

Minuses:                      ???



**OCS - 5**

**Epoxy/Epoxy/Polyurethane**

# AWWA D-102

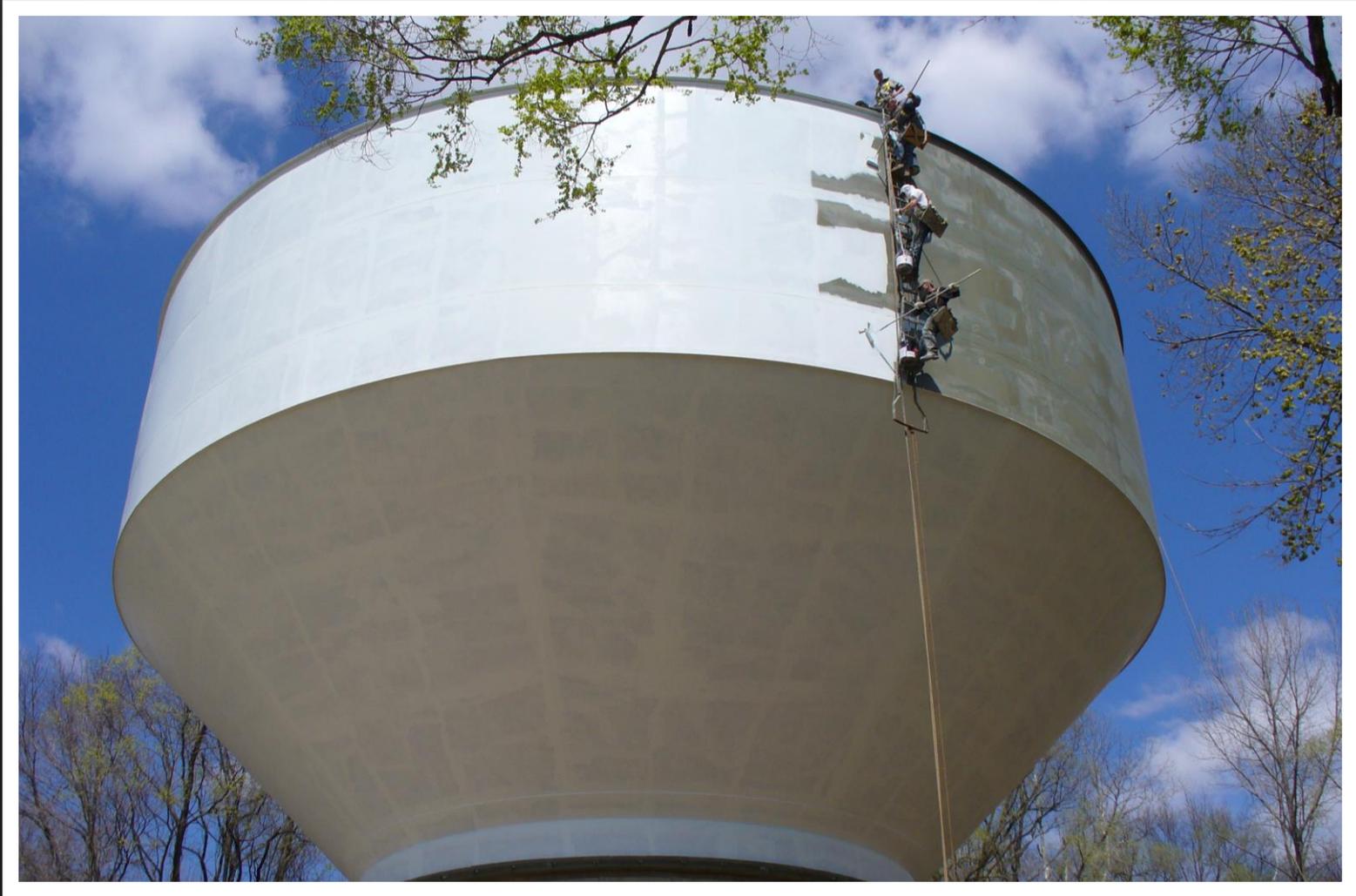
## Exterior Coating Systems

### OCS-6 Zinc/Epoxy/Polyurethane

Minimum DFT                      6.5 mils

Pluses:                      Outstanding Corrosion Resistance, better service life, easy to apply

Minuses:                      ???



**OCS - 6**

**Zinc/Epoxy/Polyurethane**



# **NON-AWWA SYSTEM**

**Interior Coating System: 100% Solids Epoxy, Single Coat**  
**Outside Coating System: 100% Solids Epoxy, Polyurethane Finish**

# OVERCOATING EXISTING TANKS



# To Blast or Not to Blast

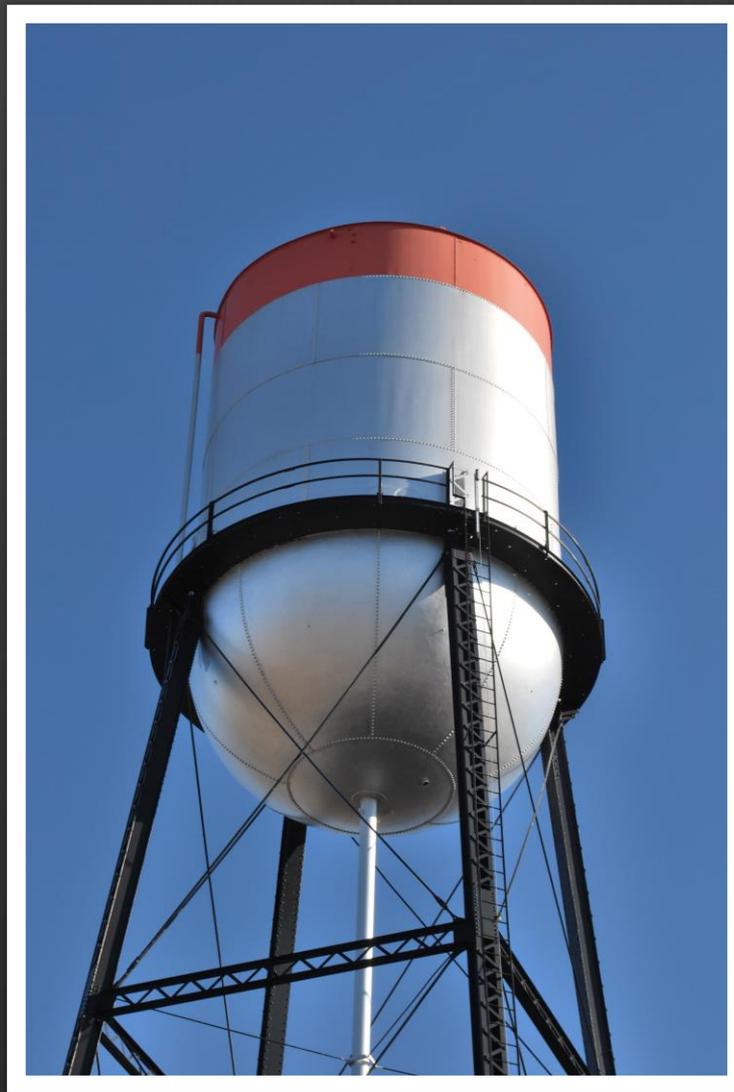


**Routine Tank Inspections are  
critical and should include  
evaluation of existing coatings**

**ADHESION**

**FILM THICKNESS**

**% OF DETERIORATION**



# Century Tank

Greenwood, MS

QUESTIONS???

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