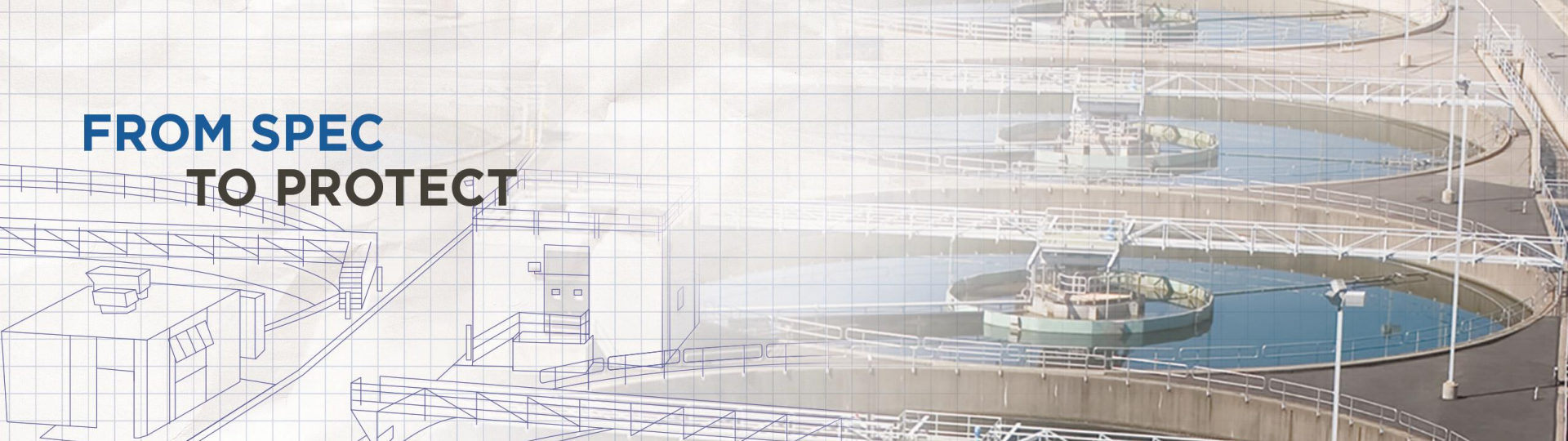




**FROM SPEC
TO PROTECT**

HOW COATING OPTIONS TO PREVENT CORROSION IN OUR WATER INFRASTRUCTURE HELP IN SUSTAINABILITY EFFORTS

Sean Meracle – Project Development, Engineering Services
Kevin Zei – Business Development - Water Infrastructure

October 28, 2025

SHERWIN-WILLIAMS.

Discussion Topics

- **Coatings in the Water Industry**
- **Changes in Regulation & Governance**
- **Defining Sustainability**
- **Governmental & Organizational Drivers**
- **Manufacturing Initiatives**
- **Sustainable Technologies**
- **Project Design Methods**
- **Cost Implications?**



Coatings in the Water Industry

**Protective Coatings provide Asset Protection
& Extended Service Life to Water Infrastructure**

- **Corrosion Protection**
- **Chemical Resistance**
- **Abrasion Resistance**
- **UV Resistance**
- **Tank Linings**
- **Secondary Containment**
- **Marking / Labeling**
- **Design Elements**

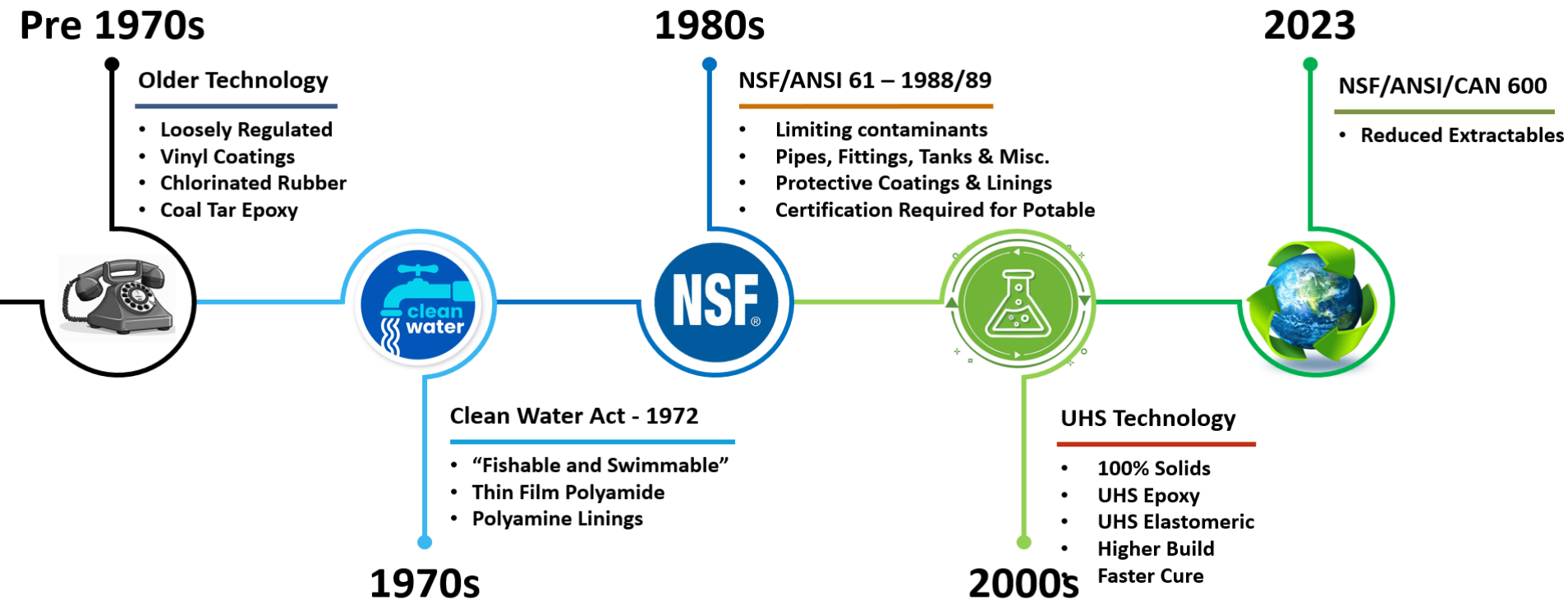


Coatings in the Water Industry

- **Water Storage**
- **Process Tanks**
- **Catwalks / Handrails**
- **Piping & Equipment**
- **Chemical Storage**
- **Resinous Flooring**
- **Pump Stations**



Timeline of Coatings used in Water



What is Sustainability?

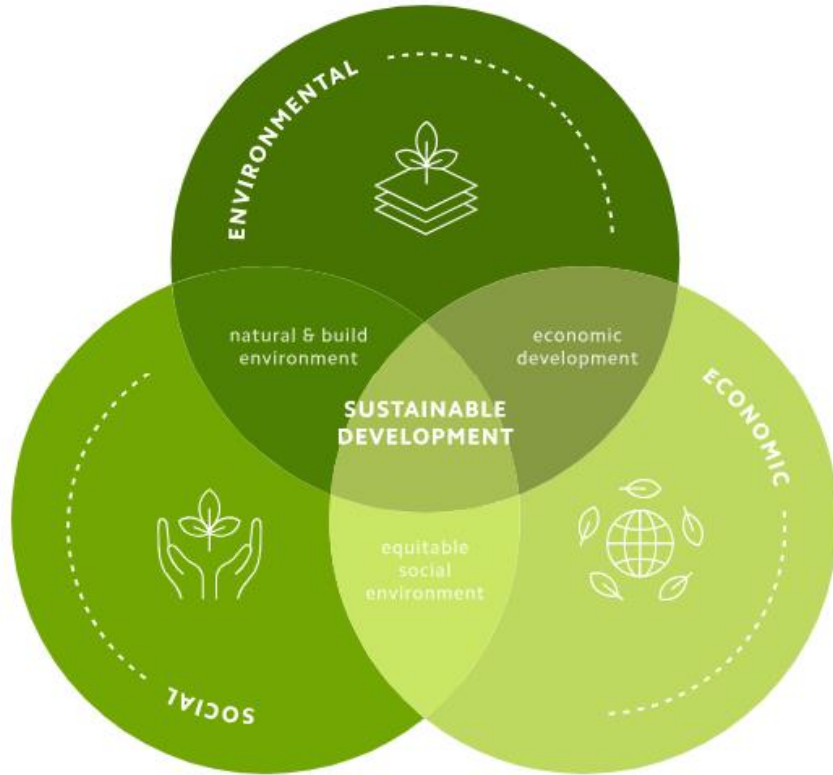
United States Environmental Protection Agency

Sustainability is based on a simple principle: Everything that we need for our survival and well-being depends, either directly or indirectly, on our natural environment. To pursue sustainability is to create and maintain the conditions under which humans and nature can exist in productive harmony to support present and future generations.¹

¹ <https://www.epa.gov/sustainability/learn-about-sustainability>



Three Pillars of Sustainability



Environmental

- Reduce Carbon Footprint

Social

- Wellbeing, Health & Safety

Economic

- Economic Responsibility

Organizational Drivers



NRWA™



Coatings Technologies

Manufacturers Commitment to Sustainability

- Responsible coatings manufacturers share a commitment to take care of customers, respect employees and the environment, create value for stakeholders and support their communities.
- Sustainability should be rooted in core values and business ethics, integrating sustainable processes into business operations. Product design, manufacturing, distribution and product application are all areas that can positively impact communities and infrastructure.
- Commitment to a strategy with goals and programs in place to drive progress in these focus areas: Climate and Carbon, Product Stewardship, Life Cycle Assessment, Occupational Health and Safety and Employee Engagement.

Sustainability Commitment



Environmental Footprint

Doing Our Part for the Planet



Product Blueprint

Driving Sustainability Through Innovation



Social Imprint

**Elevating a Culture of Safety, Inclusion and
Community**

Sustainability Commitment

Environmental Footprint – Doing Our Part for the Planet

■ Our 2030 Environmental Footprint Goals (Compared to 2019 baseline)



Reduce absolute Scope 1 and 2 greenhouse gas emissions by **30%**



Increase electricity from renewable sources to **50%** of total electricity usage



Increase operational energy efficiency by **20%**



Reduce waste disposal intensity by **25%**

Sustainability Commitment

Product Blueprint – Driving Sustainability Through Innovation

■ Our 2030 Product Blueprint Goals



Established the Sustainability by Design Stage-Gate Process as a standard part of the product innovation and development processes



Enhanced the supplier engagement component of our Product Blueprint strategy



Refined our definition of “sustainably advantaged products” to be clearer and more verifiable – with the more specific definition being “products that achieve a level of third-party green chemistry, ecolabel or similar recognition”



Enhanced our culture of internal engagement to further embed sustainability into the business and into our products

Social Imprint

Social Imprint – Elevating a Culture of Safety, Inclusion & Community

■ Our Social Imprint Goals and Aspirations



Reduce recordable case rate to **0.8** by 2025



Reduce ergonomic injuries by implementing two ergonomic interventions per year in each manufacturing site



Increase women in management roles to **30%** by 2025, compared with **26%** in 2020



Increase underrepresented racial/ethnic groups in U.S. management roles to **30%** by 2025, compared with **26%** in 2020



Achieve and improve upon a favorable score on the Internally-developed Inclusion Index, based on results of our global employee engagement survey



Foster economic inclusion for underrepresented suppliers

Suppliers Commitment

- A true commitment to “sustainability” in utility construction and maintenance encompasses far more than a calculation to determine how much greenhouse gasses are emitted on a project.
- Materials manufacturers and suppliers should be committed to the “triple bottom line” approach as advocated by AWWA.
- Sustainability partners should be able to communicate their commitment and actions taken to further the movement!

Coatings Technology

OIL BASED
EPOXY
NOVOLAC
LATEX



ACRYLIC
POLYSILOXANE
URETHANE
ALKYD

Acrylic Coating Applications

LIGHT
INDUSTRIAL



Int/ Ext Metals



**Concrete
Tank Coating**

Aliphatic Polyurethane Technologies

**HIGH
PERFORMANCE**



Acrylic

- Excellent Color & Sheen Retention
- Improved Abrasion Resistance



WB Acrylic

- Excellent Color & Sheen Retention
- Lower Odor / VOCs
- Water Clean-Up



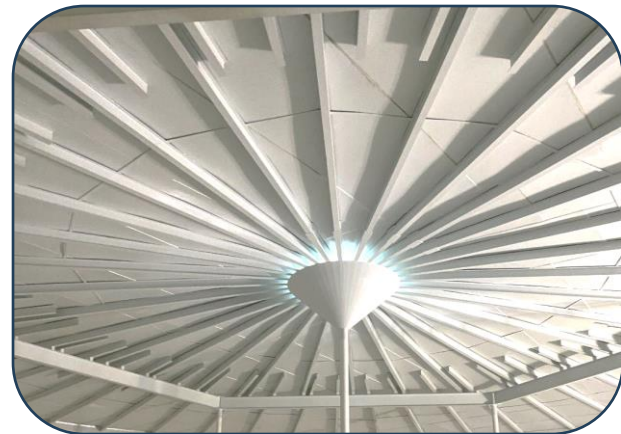
Polyester

- Color & Sheen Retention
- Excellent Abrasion Resistance
- Chemical Resistance

100% Solids Epoxy Linings

**HIGH
PERFORMANCE**

- High Build – 15-250 Mils DFT
- Single-Coat Application
- Potable Water Formulations
- Amine Cured / Chemical Resistant
- Applied Direct to Prepared Steel
- Edge Retention (Mil Spec 23236)
- Excellent Abrasion Resistance
- Longest Service Life
- Fast Return to Service (24 hrs)



Let's do an Exercise

Assumptions

- 500,000-gallon elevated leg tank
- 20,000 square feet exterior
- 10,000 square feet interior
- Crew size 4
- 3 blast nozzles
- 50 hour work weeks

Equipment

- 1-375 CFM compressor
- 1-750 CFM compressor
- 1-20 kW generator
- Ignore miscellaneous equipment, vehicles, and mobilization for now

Duration

- 4 weeks blasting
- 4 weeks painting and finish

Let's do an Exercise

- 375 CFM compressor uses 50 gallons diesel/day
- 750 CFM compressor uses 80 gallons diesel/day
- Generator uses 15 gallons per day on average
- 4 weeks blasting uses 145 gallons per day (all three in use)
- 4 weeks painting and finishing uses 65 gallons per day (750 CFM not used)
- This yields a total of 4200 gallons of diesel fuel

Let's do an Exercise

EPA's GHG Emission Factors Hub was designed to provide organizations with a regularly updated and easy-to-use set of default emission factors for organizational greenhouse gas reporting.

Fuel Type	kg CO ₂ per unit	Unit
Aviation Gasoline	8.31	gallon
Biodiesel (100%)	9.45	gallon
Compressed Natural Gas (CNG)	0.05444	scf
Diesel Fuel	10.21	gallon
Ethanol (100%)	5.75	gallon
Kerosene-Type Jet Fuel	9.75	gallon
Liquefied Natural Gas (LNG)	4.50	gallon
Liquefied Petroleum Gases (LPG)	5.68	gallon
Motor Gasoline	8.78	gallon
Residual Fuel Oil	11.27	gallon

You can see that the CO₂ factor for diesel is 10.21 kg/gallon or 22.5 lb/gallon

Let's do an Exercise

- 4200 gallons of diesel fuel at 22.5 pounds per gallon equals almost 100,000 pounds of CO₂ from just the compressors and generator on this tank repainting project.
- This does not account for commuting, travel or other gasses such as N₂O.
- It's apparent that reducing maintenance cycles by focusing on service life is the most sustainable option.
- It just so happens that the coatings that yield the longest service life also offer the longest life cycle cost.

Let's do an Exercise

Traditional Solvent Based Epoxy

- Traditional Spray Application Requires
 - 3 gallons per flush X 3 per day = 9 gallons of solvent
 - 70% solids epoxy reduced 10 percent and put on 100 gallons per day = 10 gallons of solvent
 - 19 Gallons of Solvent Used Daily

100% Solids Plural Sprayed Epoxy

- Materials do not need to be thinned, and flush solvent as little as 1 qt per flush.
- Plural Spray Application
 - $\frac{1}{2}$ gallon per flush x 5 per day = 2.5 gallons
 - 100% solids epoxy thinned using heat, spraying 100 gallons a day
 - 2.5 gallons of solvent/VOC's created per day

Coating Selection

Expected Service Life and Cost Considerations for Maintenance and New Construction Protective Coating Work," co-authored by J. L. Helsel and R. Lanterman, which was presented at the AMPP 2022 annual conference

- Industry has been referencing this whitepaper since 1998; updated in 2022
- One of the most referenced documents for conducting comparative lifecycle costing of protective coating systems across various structures and service environments

Coating Selection

Table 4B: Estimated Service Life for Practical Maintenance Coating Systems for Immersion Service (in years before first maintenance painting)¹

Type	Coating Systems for Immersion Service (primer/midcoat/topcoat)	Surface Preparation ² Number of Coats DFT Minimum (mils)			Service Life ^{3,4}		
					Portable Water	Fresh Water Immersion	Salt Water Immersion
Epoxy	Coal Tar Epoxy	Blast	2	16	—	17	14
Epoxy	Epoxy/Epoxy	Blast	2	8	12	9	8
Epoxy	Epoxy/Epoxy (AWWA ICS-1)	Blast	2	6	10	8	6
Epoxy	Epoxy/Epoxy/Epoxy (AWWA ICS-2)	Blast	3	12	15	12	11
Epoxy	Epoxy 100% Solids (AWWA ICS-3)	Blast	1	20	18	16	14
Organic Zinc/Epoxy	Organic Zinc/Epoxy/Epoxy (AWWA ICS-5)	Blast	3	10	16	13	12
Epoxy Phenolic	Epoxy Phenolic/Epoxy Phenolic	Blast	2	12	—	14	12
Metallizing	Metallizing/Epoxy	Blast	2	9	20	17	15
Metallizing	Metallizing/Epoxy/Epoxy	Blast	3	13	24	20	18
Misc.	Polyurethane 100% Solids (AWWA ICS-4)	Blast	1	25	18	16	14
Misc.	Vinyl Ester/Vinyl Ester	Blast	2	20	—	14	12
Misc.	Polyester (composite filled)	Blast	2	25	—	14	12
Misc.	Polyurea	Blast	1	25	18	16	14

Coating Selection

ICS-1	Coat 1	Coat 2	Coat 3	Total	Cost/SF/year
	Prime -	Finish Coat			
	Epoxy	Epoxy	N/A		
Thickness, MIL	3	5			
Material Cost	0.26	0.40			
Application cost	0.60	0.60			
Total Cost per square foot	0.86	1.00		1.86	0.1860

Annualized Cost per Square Foot for ICS #1

ICS-2	Coat 1	Coat 2	Coat 3	Total	Cost/SF/year
	Prime -	Intermediate	Finish Coat		
	Epoxy	Epoxy	Epoxy		
Thickness, MIL	3	4	5		
Material Cost	0.26	0.32	0.40		
Labor, Equipment Costs x Multiplier	0.60	0.60	0.60		
Application cost	0.86	0.92	1.00	2.78	0.1853

Annualized Cost per Square Foot for ICS #2

Coating Selection

ICS-3 Plural	Coat 1		Coat 2		Coat 3		Total	Cost/SF/year
	Prime -		Finish					
	Zinc Rich Organic		100% Solids epoxy					
Thickness, MIL	2.50		20.00		N/A			
Material Cost	0.43		1.95					
Application cost	0.70		1.50					
Total Cost per square foot	1.13		3.45				4.58	0.2544

Annualized Cost per Square Foot for ICS #3 Plural

ICS-3 Single Leg	Coat 1		Coat 2		Coat 3		Total	Cost/SF/year
	Prime -		Finish					
	Zinc Rich Organic		100% Solids epoxy					
Thickness, MIL	2.50		20.00		N/A			
Material Cost	0.43		1.95					
Application cost	0.70		0.60					
Total Cost per square foot	1.13		2.55				3.68	0.2044

Annualized Cost per Square Foot for ICS #3 Single Leg

Summary

Key sustainability issues:

- There is more to sustainability than pollution.
- Verifying suppliers' commitment to sustainability is a big part of being more "green".
- The construction process creates far more pollution and greenhouse gasses than the actual coating material. Reducing maintenance cycles is the most sustainable action we can take.
- The longest lifecycle options are the most sustainable AND least costly over the long term.

Thank You!

**SHERWIN
WILLIAMS®**

Questions?

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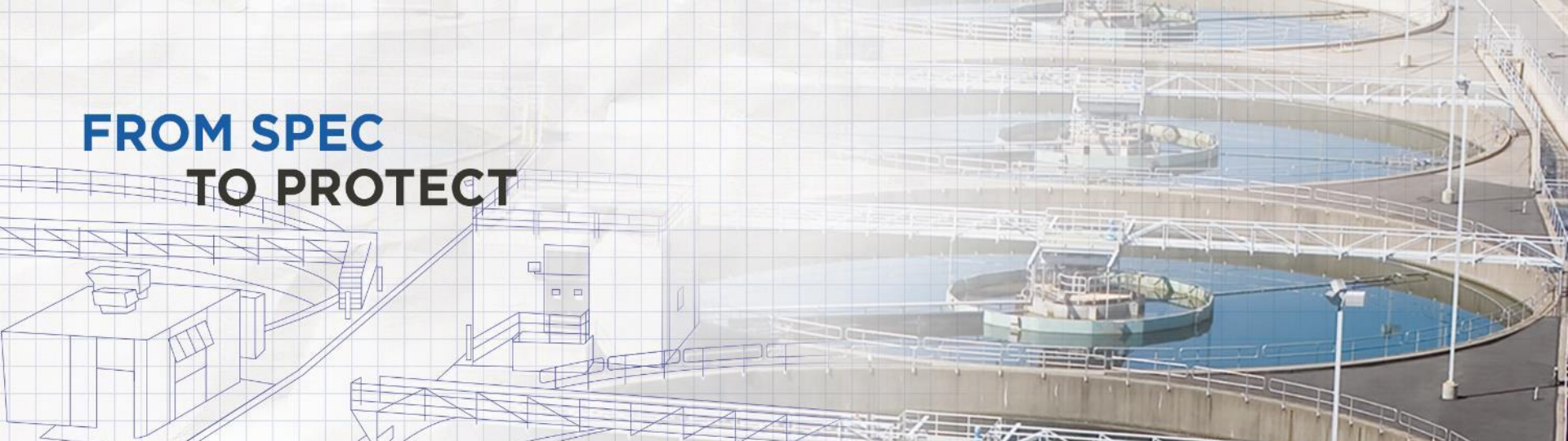
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THANK YOU

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