



# Off-Line Preservation Solutions Boiler and Cooling Water Systems

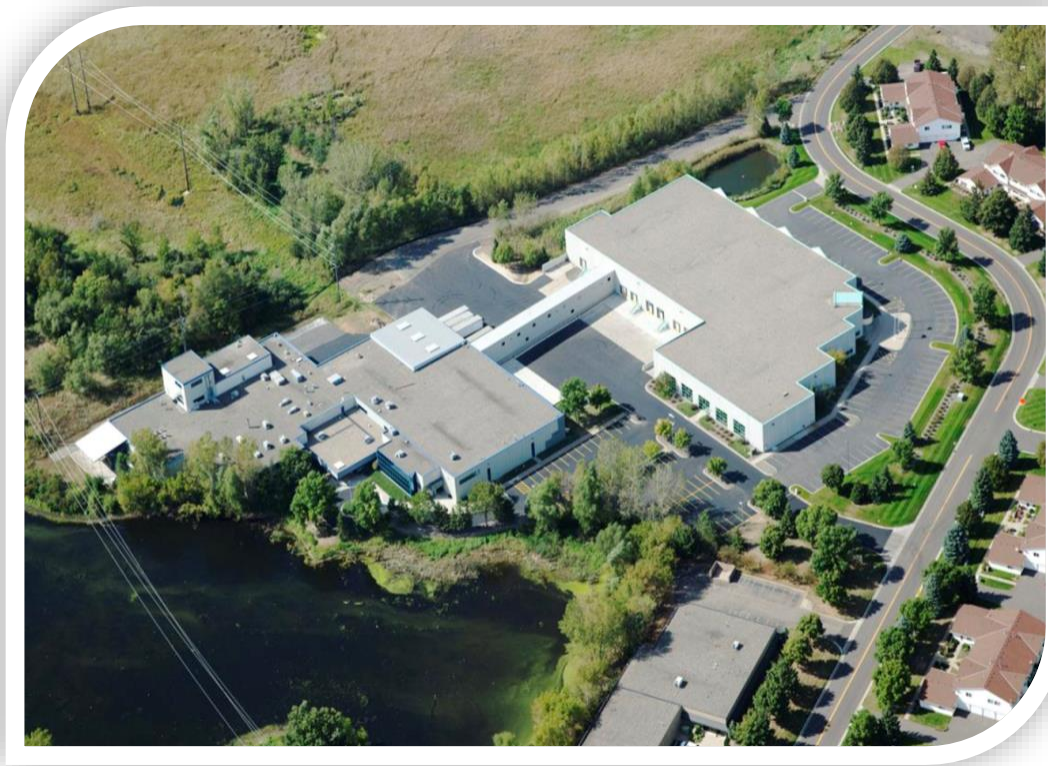
Council of Industrial Boiler Owners  
March 8, 2023

# Agenda

- Introduction to Cortec
  - Cortec's Water Treatment Market
- What is Vapor Phase Corrosion Inhibitor (VpCI)?
- Operational Cycles
  - Types of Layups
  - Shutdowns
  - Need for a Preservation Plan
- VpCI Preservation versus Conventional Layup Methods
- VpCI versus Nitrogen
  - Performance
  - Cost of Applications
- Q & A

# Cortec Corporation

*Headquarters in  
White Bear Lake, MN*



## Headquarters

- Corporate & Administrative Offices
- R & D Laboratory
- Testing Laboratory
- Warehousing

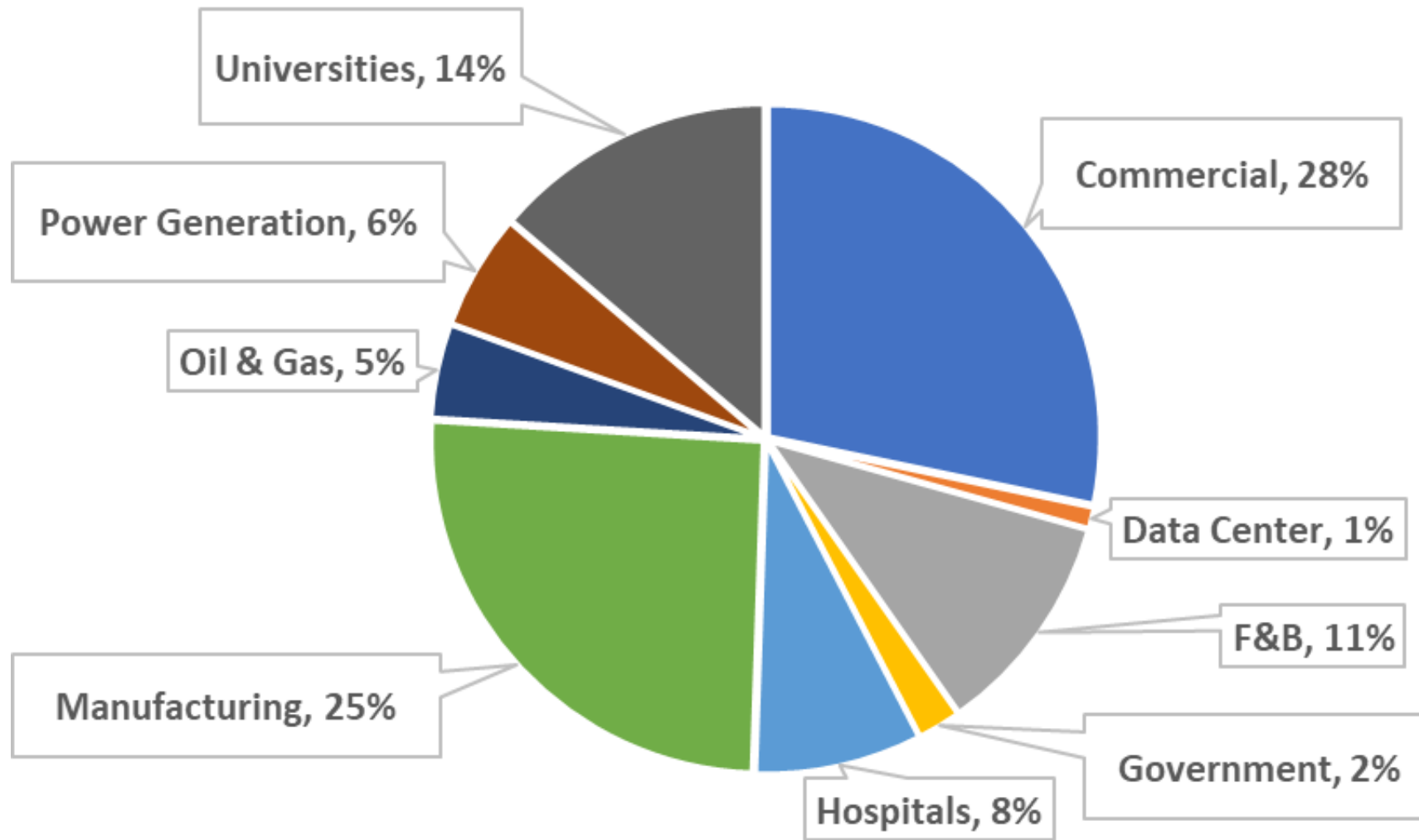
## Production

- Integrated Chemical Manufacturing
- Coatings
- Blending

## Services

- Product Applications
- Corrosion Engineering & Field Services
- Technical Advisors

## 2021 Layup Sales - Markets



# What is VpCI<sup>®</sup> Technology?

## Vapor Phase Corrosion Inhibitor

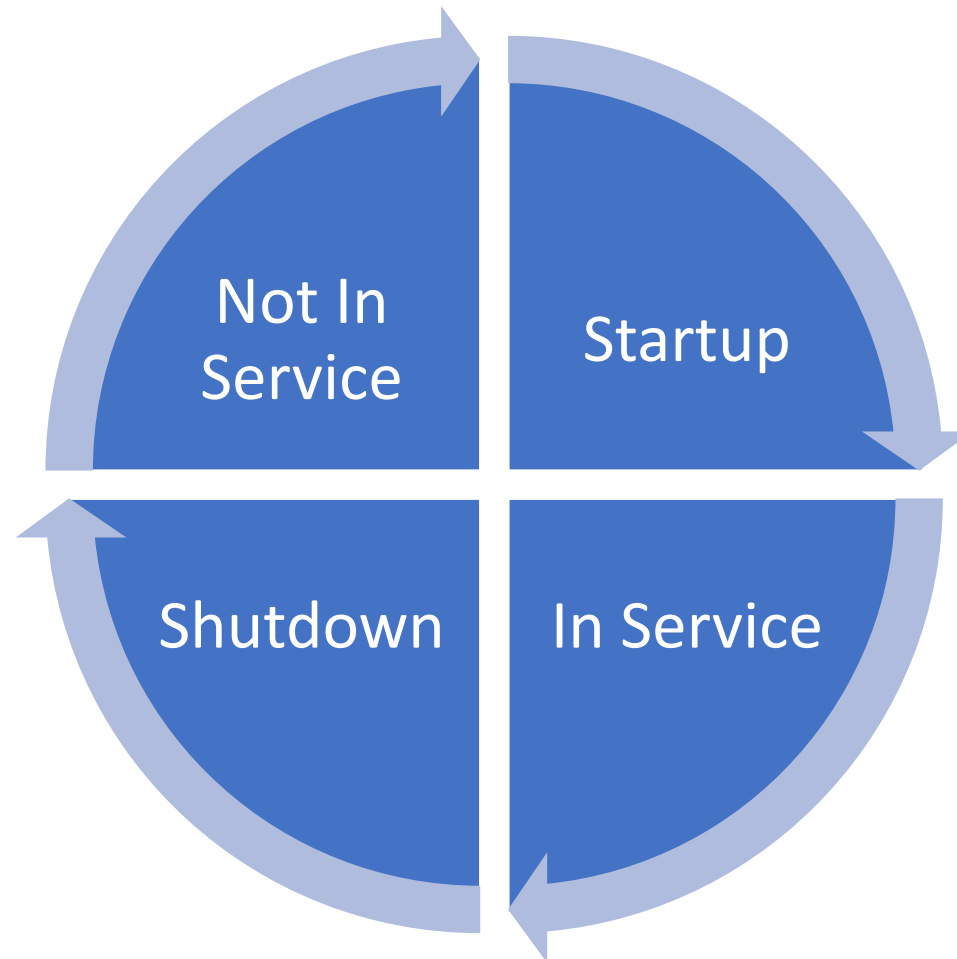
- Evaporation/Sublimation
- Diffusion
- Saturation
- Adsorption



# Operational Cycles of a System

## Not In Service

- Long-Term
  - Mothball
- Short-Term
  - Seasonal Layup
- Standby
- Types of Layup
  - Dry
  - Wet
- Hydrotesting



## In Service

- Boiler Water
- Cooling Water
- Closed Loops

# Shutdowns

## Planned, Unplanned or Extended

- Purpose of Preservation
  - Protect equipment against deterioration caused by corrosion when idled.
  - Prepare equipment for quicker start up and returning to service
- Proper Layup Program Prevents
  - Premature equipment failure
  - Unnecessary and non-budgeted repair/replacement costs
  - Further delays to equipment startups
- Best Approach to Layup/Mothballing is an Active One
  - Lead the conversation

# Why a Formal Preservation Plan?

**Preserved**



**Corroded**



**Failure**

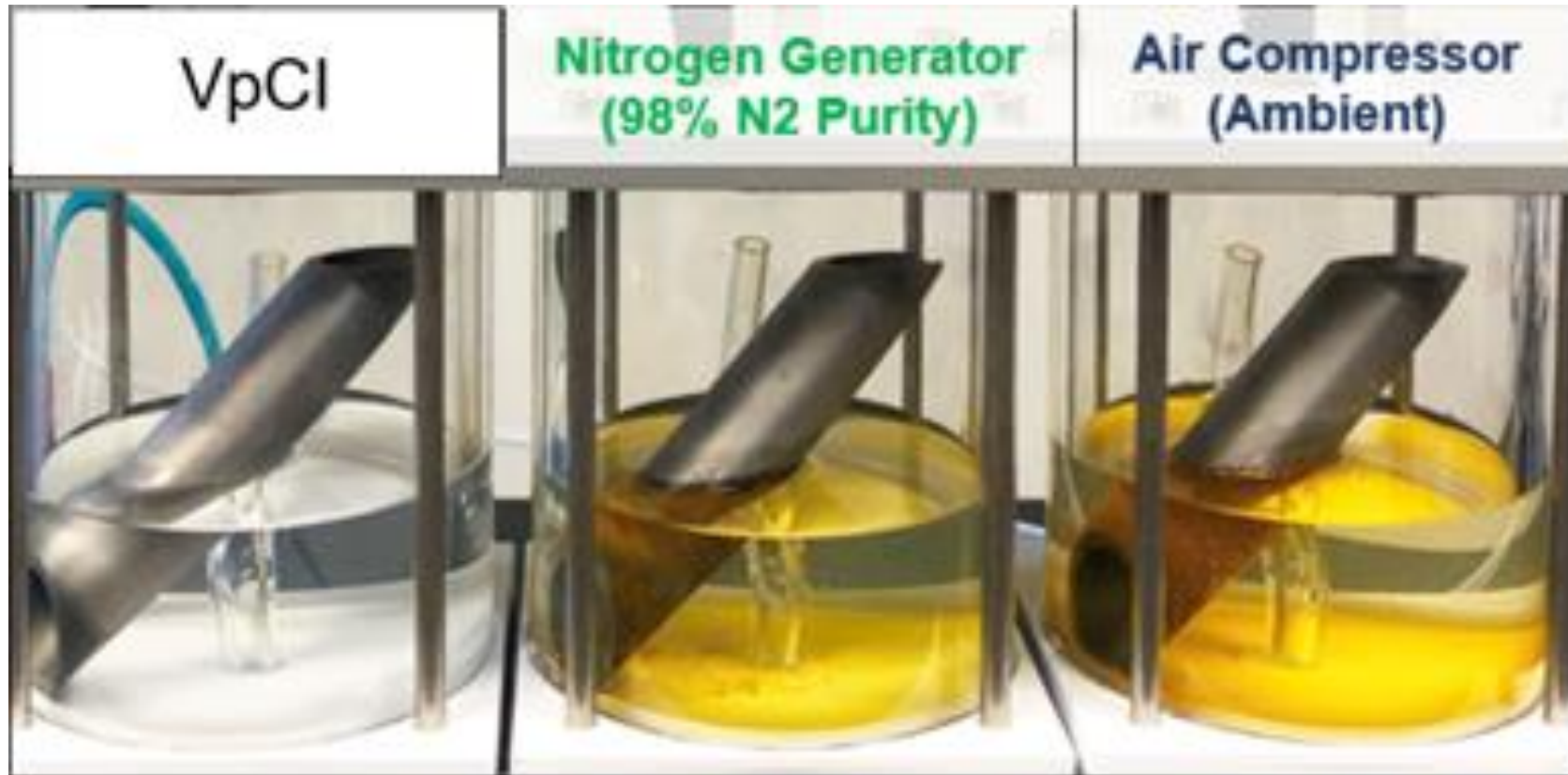




# VpCI vs Conventional Methods

Factors to Consider	Do Nothing	Current Chemistry	Quick Lime	Silica Gel	Positive Dry Air Flow	Nitrogen Blanket	Vapor phase Corrosion Inhibitor
Method of Protection	None	Passivation	Moisture Adsorbing	Moisture Adsorbing	Prevents moisture accumulation	Maintains inert environment	Surface Adsorption
Thorough Drying Required?	N/A	N/A	Yes	Yes	Yes	Yes	No 😊
Maintenance Required?	N/A	Yes	Yes	Yes	Yes	Yes	No 😊
Convenient to Apply?	N/A	No	No	No	No	No	Yes 😊
Easy to Apply?	N/A	No	No	No	No	No	Yes 😊
Subject to Failure?	Yes	Yes	Yes	Yes	Yes	Yes	No 😊
Removal Required?	N/A	N/A	Yes	Yes	Yes	Yes	No 😊
Health & Safety Concerns?	N/A	No 😊	No 😊	No 😊	No 😊	Yes	No 😊

# VpCI vs Nitrogen - Performance



# VpCI vs Nitrogen – Total Cost of Application

## Co-Gen Plant 1 Nitrogen

Initial Cost:	\$2,000
Monthly Costs:	\$2,000
# Months:	48
Total Costs:	\$48,000

## Co-Gen Plant 2 VpCI

Initial Cost:	\$3,000
Monthly Costs:	\$0
# Months:	48
Total Costs:	\$3,000



# Boiler Layup Locations (2020)



# Questions & Answers