

# Water Treatment Paying For Itself

Spotlight on the Chill Loop  
and the Perils of Lost  
Water



# Quick Overview of Systems and Preventing Their Inefficiencies

- Inefficiency Culprits in Condenser Loops
- Inefficiency Culprits in Steam/Power Boilers
- Inefficiency Culprits in Closed Loops

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# Inefficiency Culprits in Condenser Loops

- Hot deck diffusers



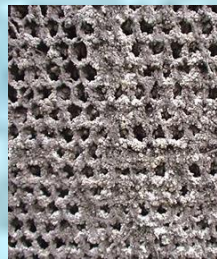
- Air Flow/Fill



- Micro Bio Fouling



- Scale



- Overflowing

# Inefficiency Culprits in Steam/Power Boilers

- Improper Insulation
- Steam Leaks
- Poor Condensate Recovery
- Corrosion/Pitting
- Scale

# Inefficiency Culprits in Closed Loops

- Improper insulation
- Micro Bio Growth
- Corrosion
- Leaks



# Today's Focus – Chill Loop Water Loss

- How Your Chill Loop Is Losing Water
- Problems Inherent to A Leaking Chill Loop
- Indicators of a Chill Loop Leak
- Cost of a Chill Loop Leak
- Corrective Actions

# How Your Chill Loop Is Losing Water

- A true closed loop is defined as one that loses less than 1% of the fluid it holds in a month
  - Maintenance
    - Get the water treatment professionals to address this immediately
      - This takes communication
  - Leaking at pump seals
    - Typically caused by high iron levels in the chill water
  - Leaking at the expansion tank
  - Leaking at Coils
    - High iron levels and the turbulence in a coil will degrade coil walls

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# Problems Inherent to A Leaking Chill Loop

- New Raw Water
  - Higher Temperature
  - Introduction of new organisms
  - Dilution of biocide
  - Dilution of inhibitor
- Expect Higher Corrosion Rates
- Expect Greater Microbiological Growth

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# Major Indicators of a Chill Loop Leak

- Diminished color from dye
- Significant drop In System Conductivity
- Loss of inhibitor

# Cost of a Chill Loop Leak

- Cost in water
  - City of Houston price of water \$6.67/1,000 gallons (as of 11/20)
- Cost in biocide
  - \$47/gallon
- Cost in inhibitor
  - \$24/gallon
- Cost in energy
  - \$0.40/gallon from 70 to 40 degrees
    - <https://www.lairdthermal.com/thermal-wizard/thermal-wizard-liquid-cooling-calculator>

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# A Real-World Example Of A Chill Loop Leak

- A small campus with a 1,000-gallon chill loop
- Service Reports indicate chill loop inhibitor concentrations of:
  - The 1<sup>st</sup> QTR - 600 ppm
  - The 2<sup>nd</sup> QTR – 200 ppm
- Using the dilution formula:  $C_1V_1 = C_2V_2$ 
  - Concentration(start) x Volume(start) = Concentration(final) x Volume(final)
- The result: 600 ppm x 1,000 gallons = 200 ppm x 3,000 gallons
  - A 2,000 gallon water loss over a three month period
  - In dollars, this adds up to a cost of....

# A Real-World Example Of A Chill Loop Leak

- Cost in water

- Water \$6.67/1,000 gallons      2,000 gallons    \$13.34

- Cost in biocide

- \$47/gallon      0.25 gallons    \$11.25

- Cost in inhibitor

- \$24/gallon      1.5 gallons    \$36.00

- Cost in Energy

- \$0.40/gallon 70 to 40 degrees

- 

- 2,000 gallons    \$800.00

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- \$860.59

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# Corrective Actions

- Recognize the Deficiencies of Previous Scope of Work
- Ideal Water Treatment Reporting
- Investigate Possible Leaks Aggressively
- Arrange for “in-house” spot checks

# Recognize the Deficiencies of Previous Scope of Work

- To win a project a contractor often submits unrealistic cost estimates.
- A project won with an unrealistic cost estimate is destined to be “short changed”.
- Without the ability to “double check” a contractor’s work the customer, and their assets, are at the providers mercy.
- Closed Loops are the most likely candidate for neglect when an unrealistic cost estimate is applied to the actual work.

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# Ideal Water Treatment Reporting

- A Chill Loop Report from Water Treatment Providers
  - Reports an “initial” inhibitor level and a “dosed” inhibitor level

| Date    |               | Cond                                   | Nitrite |  | pH  | Fe | Cu |  |
|---------|---------------|--|---------|--|-----|----|----|--|
| 5/19/21 | Final:        | 2206                                   | 600     |  | 9   |    |    |  |
|         | Initial:      | 740                                    | 200     |  | 8.1 |    |    |  |
|         | Action Taken: | Run iron and copper tests next quarter |         |  |     |    |    |  |

- Basic subtraction should reveal a possible leak
- A loop-by-loop report of inhibitor added
- A loop by loop estimate of possible leak volumes

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# Investigate Possible Leaks Aggressively

- Circulating pumps
- Expansion tank
- Condensate drain pans for fan coils units
- Automatic air vents



# Arrange For “in-house” Spot Checks

- Have contractor provide nitrite test kits (inhibitor)
- Have district personnel “spot check” closed loops on a regular basis
- Compare results of recent tests to reported tests
- Possibly catch leaks early

# In The End

- The customer is NOT paying to have a technician visit sites on a regular basis
- The customer is paying to have their assets protected
  - They're paying to have their towers NOT scale up
  - They're paying to have their tower NOT turn green
  - They're paying to have their equipment NOT corrode away
  - They're paying to have the most efficiently run systems practicable

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