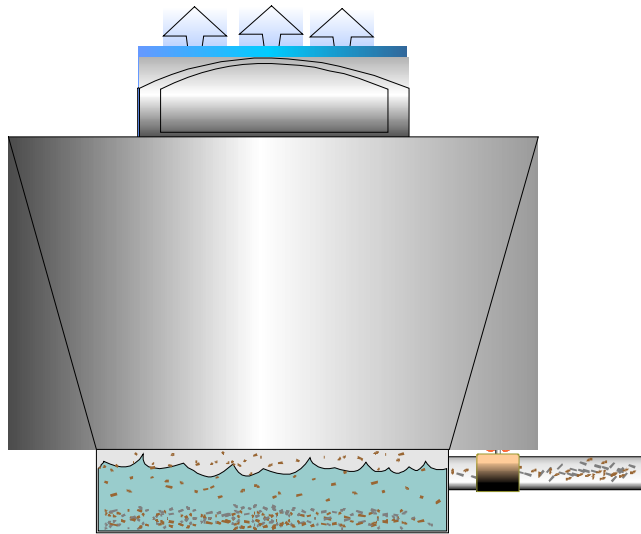


Filtration for Cooling Tower Water

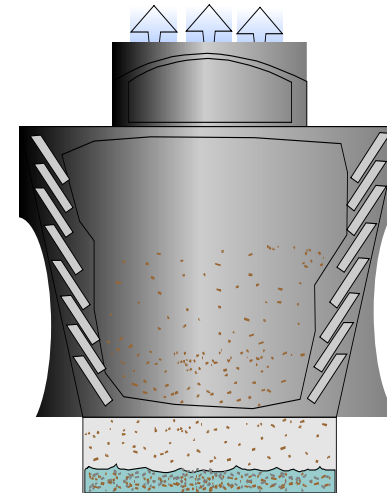
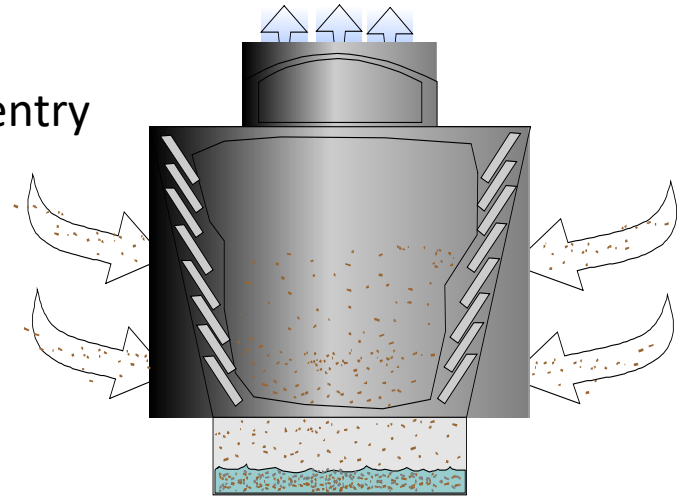


Sources of Suspended Solids

Particulate deposits through airborne entry



Particulate deposits through make-up water



Precipitation due to evaporation

Hydronic Filtration Video



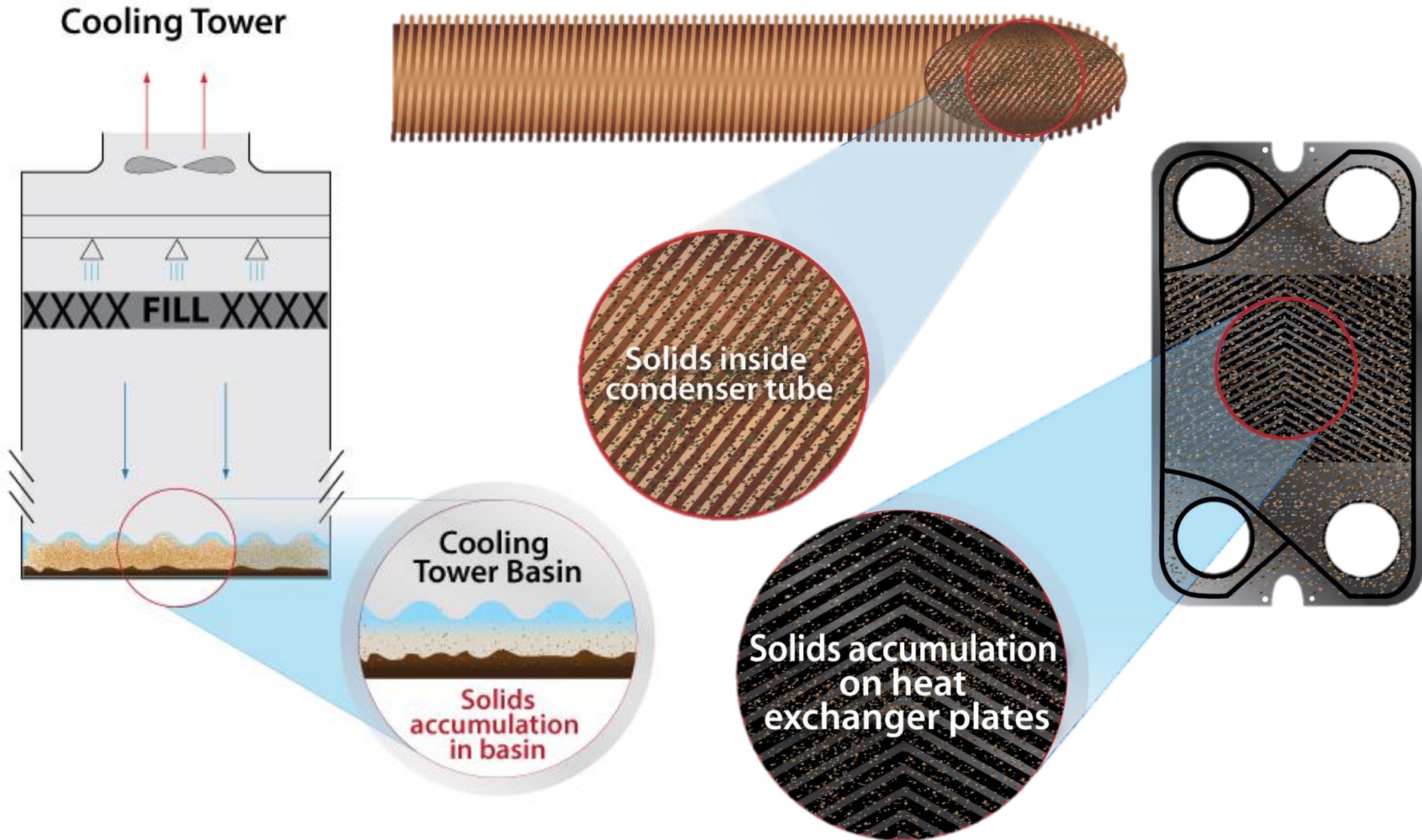
Link to video: <https://youtu.be/hjiMrcC2N0Q>

Sources of Suspended Solids

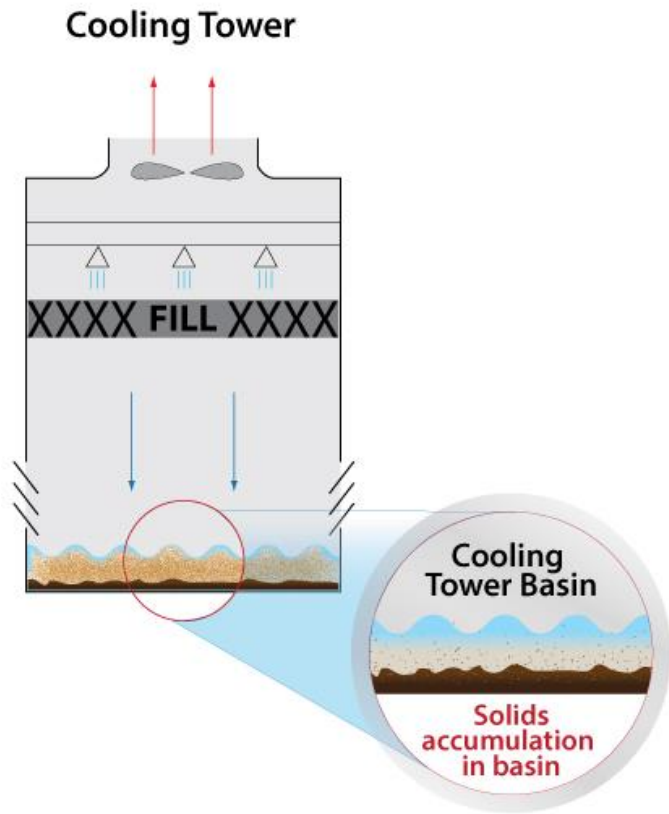
“A typical 200 ton cooling tower operating 1000 hours may assimilate upwards of 600 lbs. of particulate matter from airborne dust and the makeup water supply. Proximity to highways and construction sites, air pollution, and operating hours are all factors in tower soil loading.”

**REF: 2012 ASHRAE Handbook –
HVAC Systems and Equipment. Page: 40.16**

Where Does the Dirt Go?



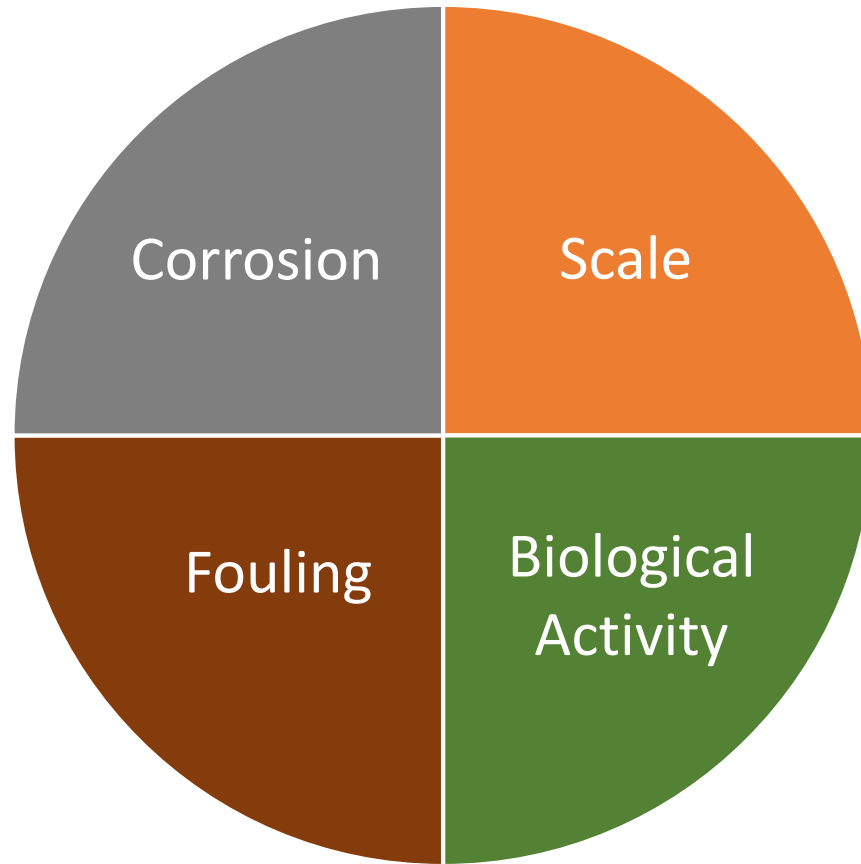
ASHRAE States: Minimum of 5 ppm



In one year:

- 5 ppm, 250 ton, 2000 hours = 5" (13cm)
- 15 ppm, 4,000 ton, 8000 hours = 9.3" (24cm)

What does the dirt do?

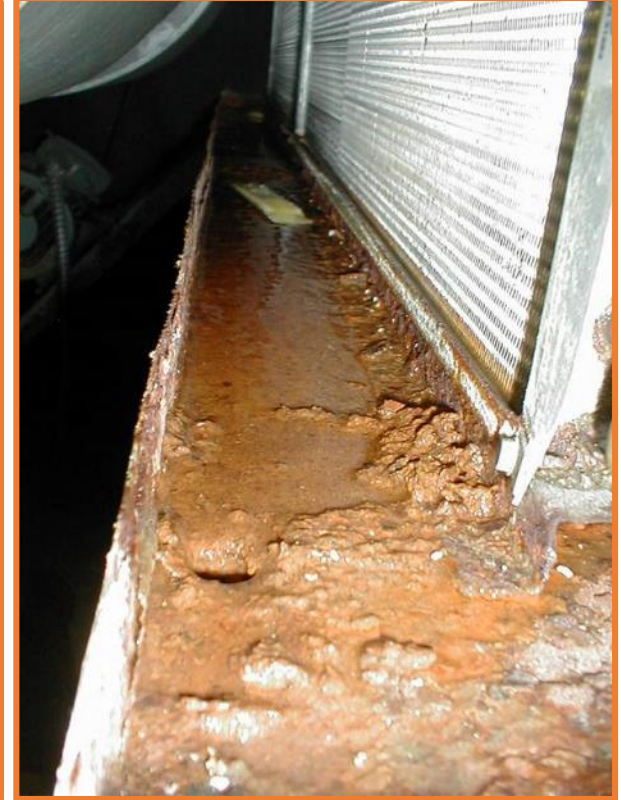


Problems caused by the accumulation of solids...

Biological Growth

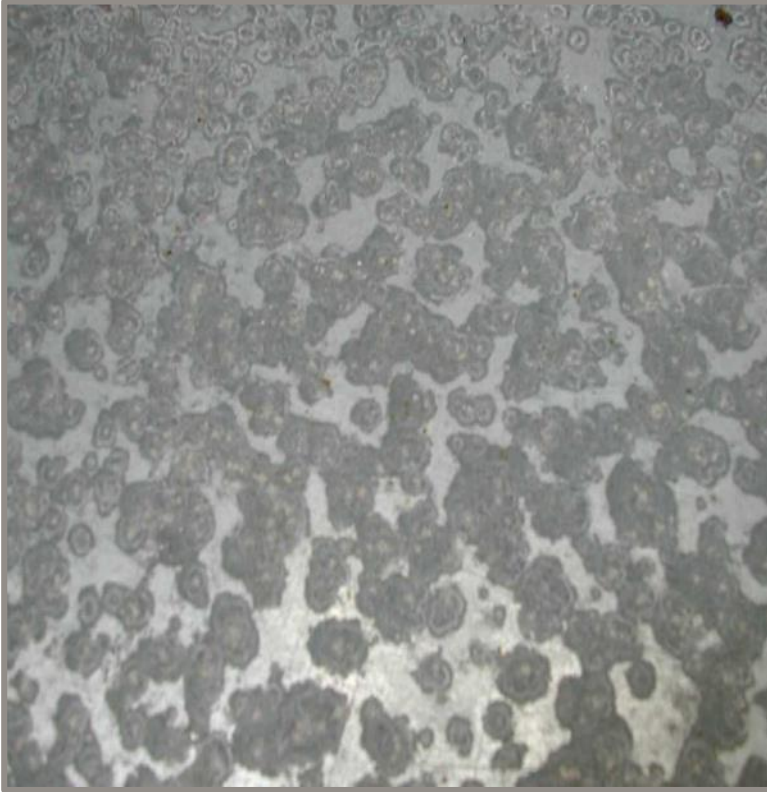


Scale



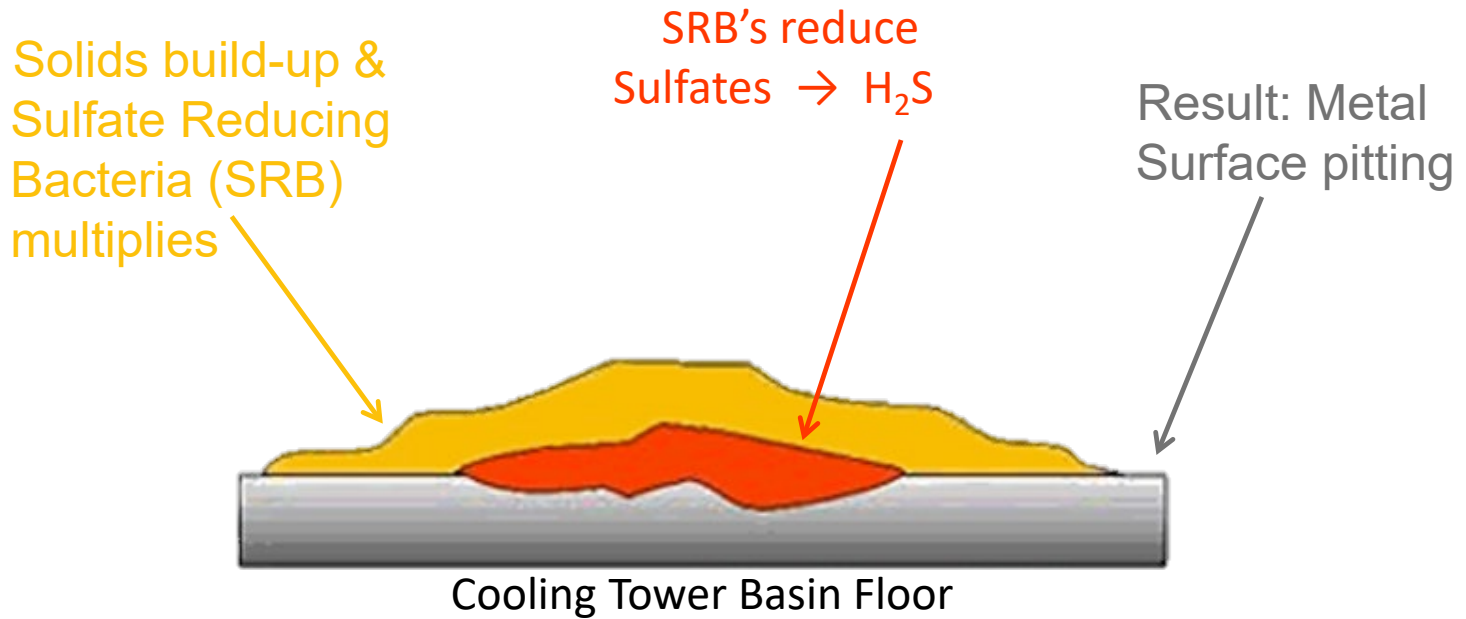
- Plating-out of Calcium Carbonate (CaCO_3)
- Created by precipitation of dissolved minerals

Corrosion



- Increases maintenance costs
- Reduces the life of the basin

Corrosion: Cooling Tower Basin



1/16" (1.58mm) thick (US penny height) debris can cause pitting and corrosion

Fouling



- Increases energy costs
- Increases maintenance

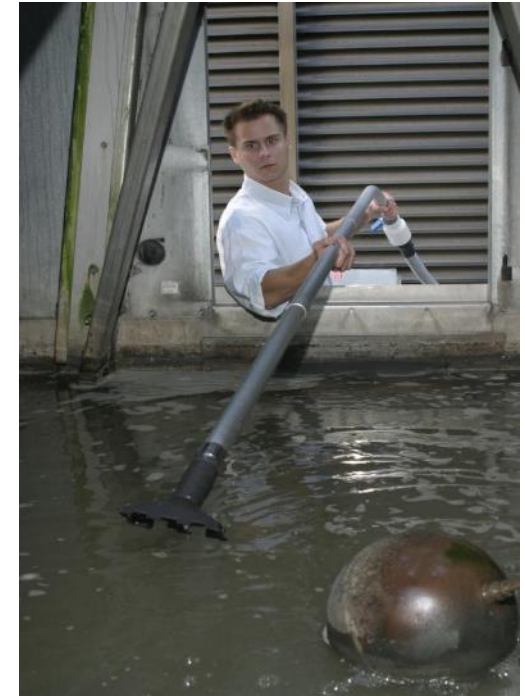
Plate & Frame Fouling



Other Problems with Suspended Solids

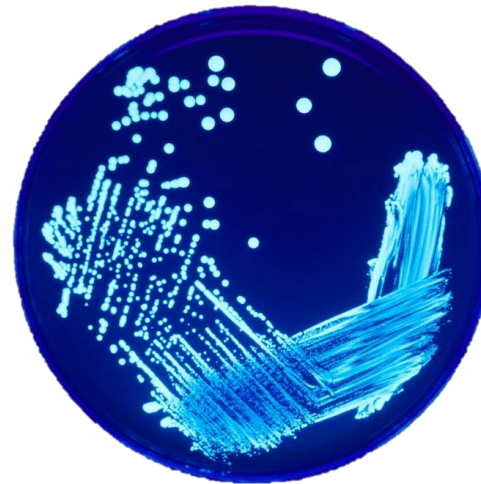


**Confined Space and
Down Time**



**Increased
Maintenance
Cost**

Legionella Concerns



How to Counter Suspended Solids: Filtration Applications

Full Stream Filtration

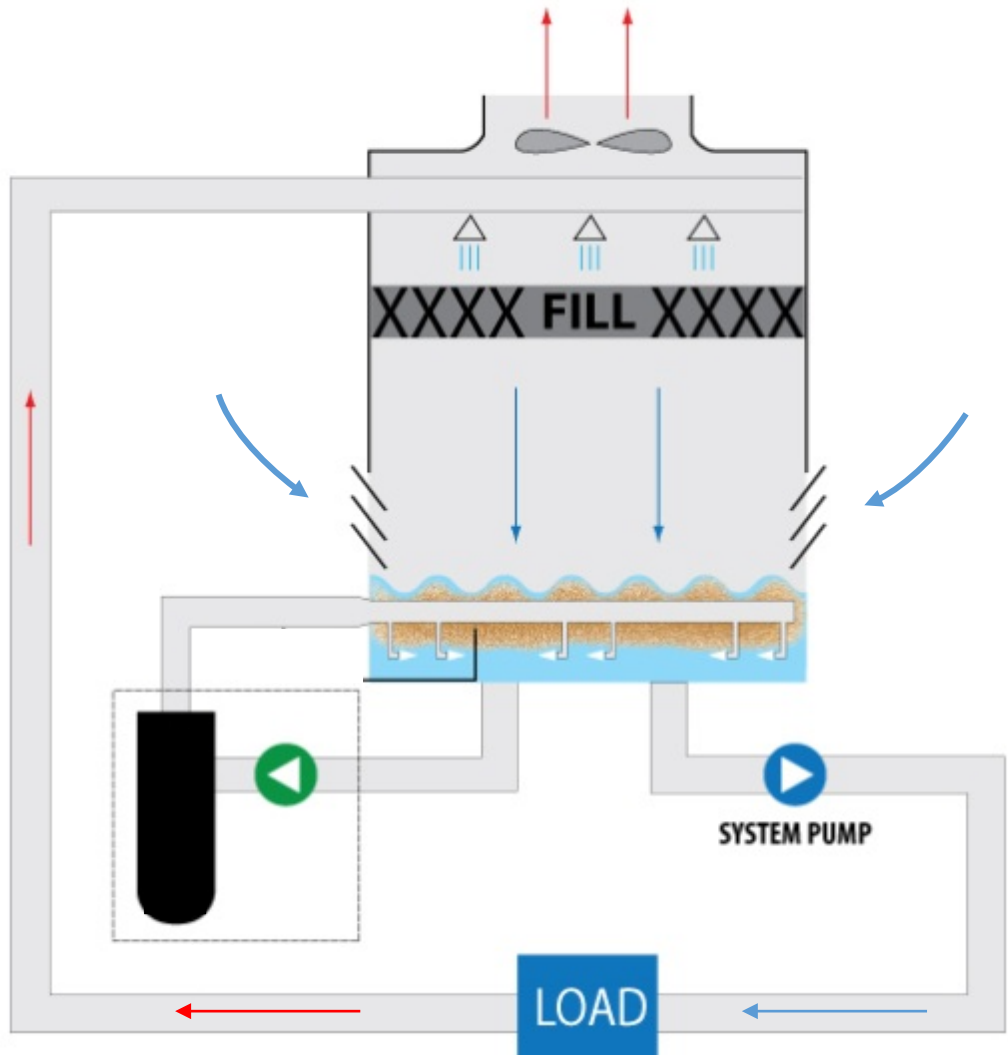
Basin Cleaning Filtration

Side Stream Filtration

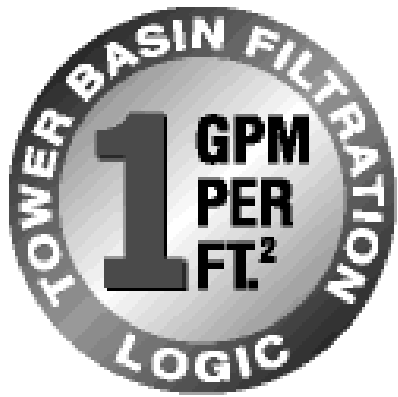
Condenser

Chiller

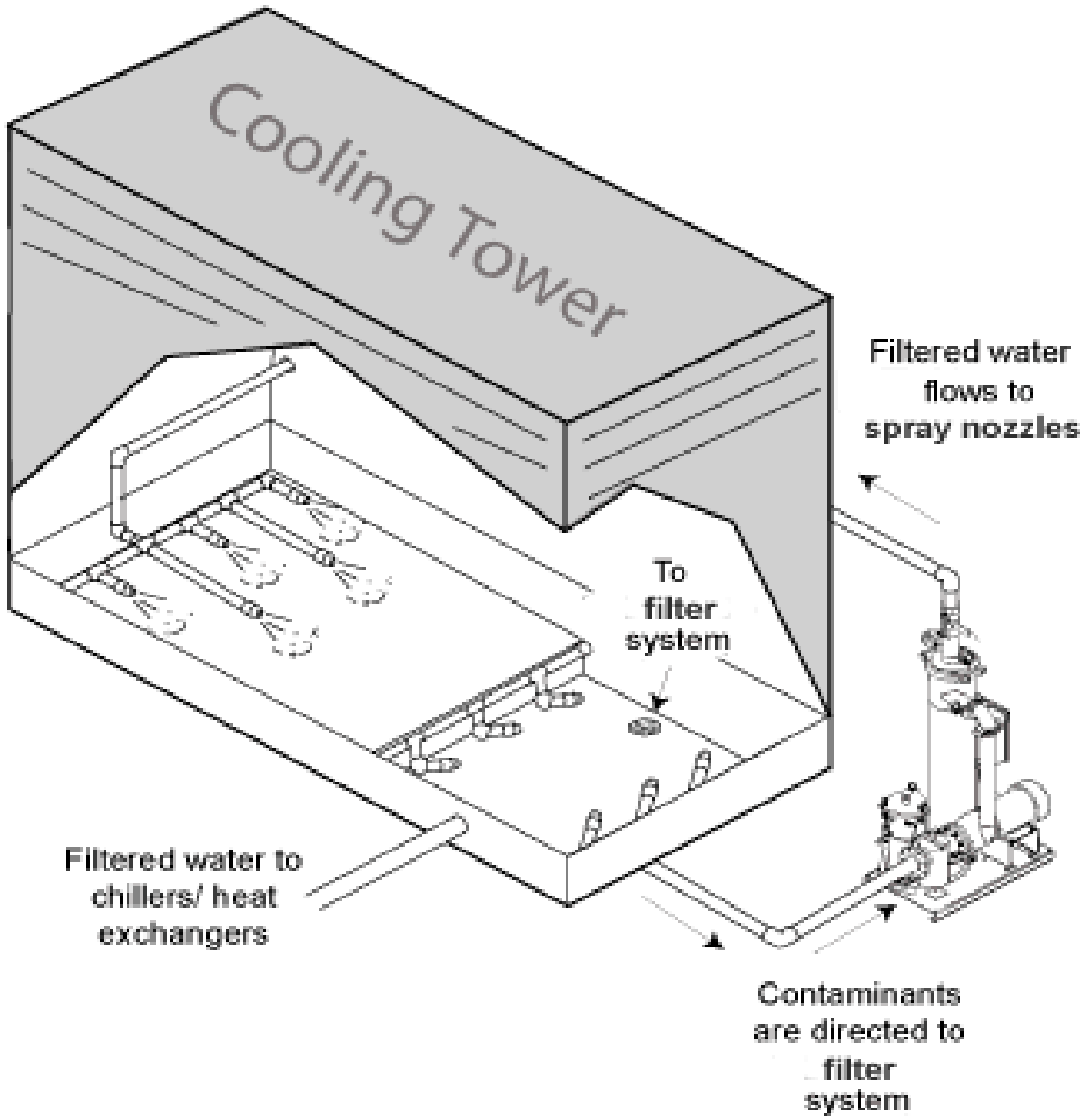
Filtration Applications: Basin Cleaning



Filtration Applications: Basin Cleaning

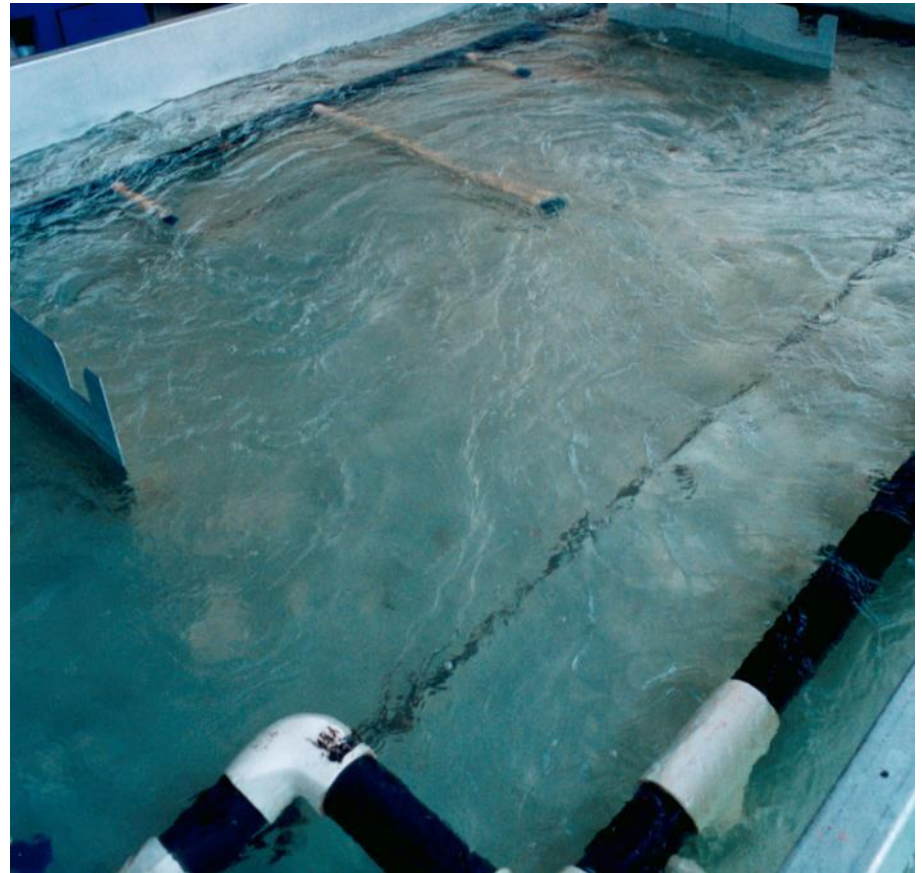


Sizing based on basin area and type of solids

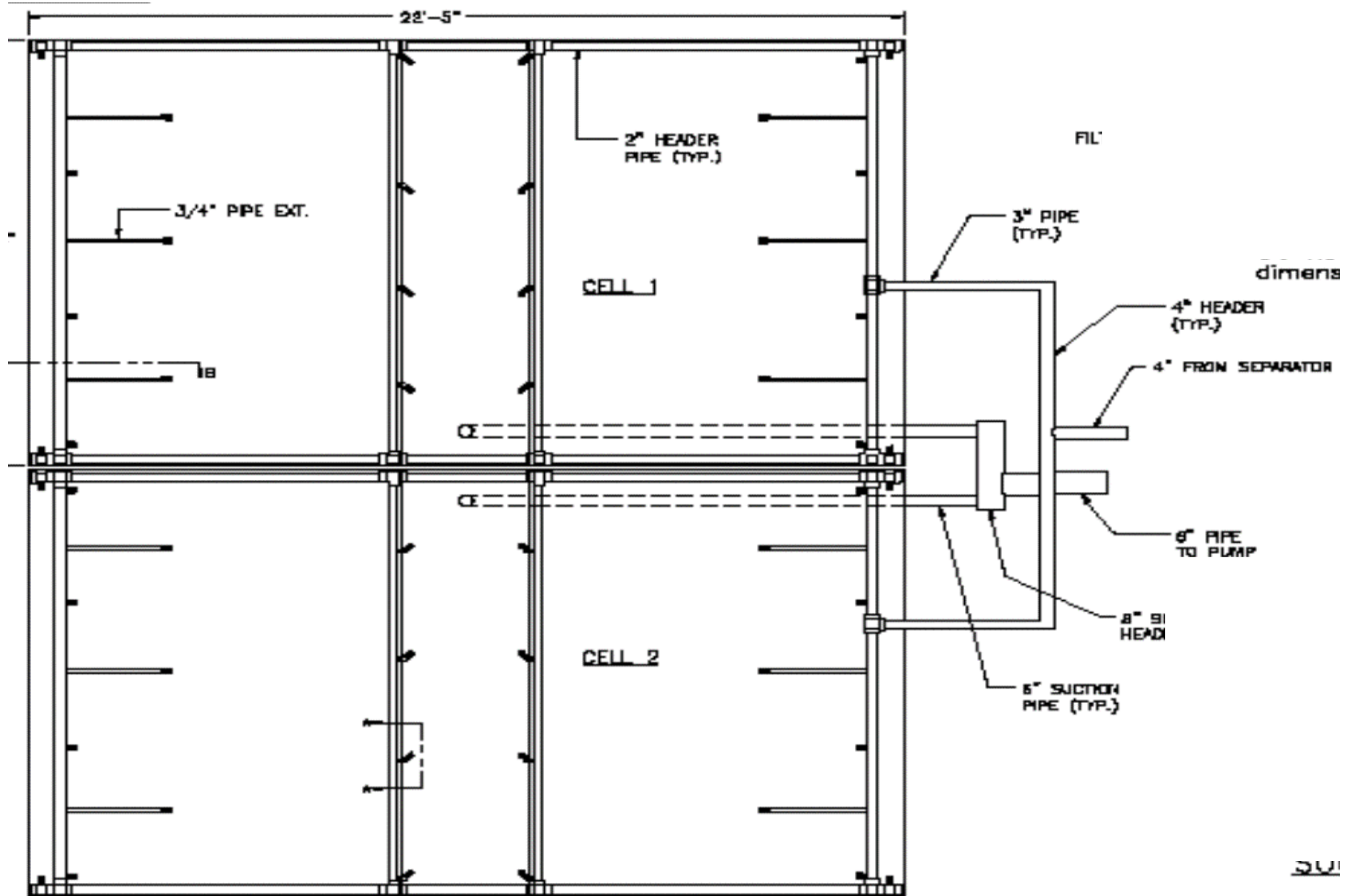


Basin Cleaning: Benefits

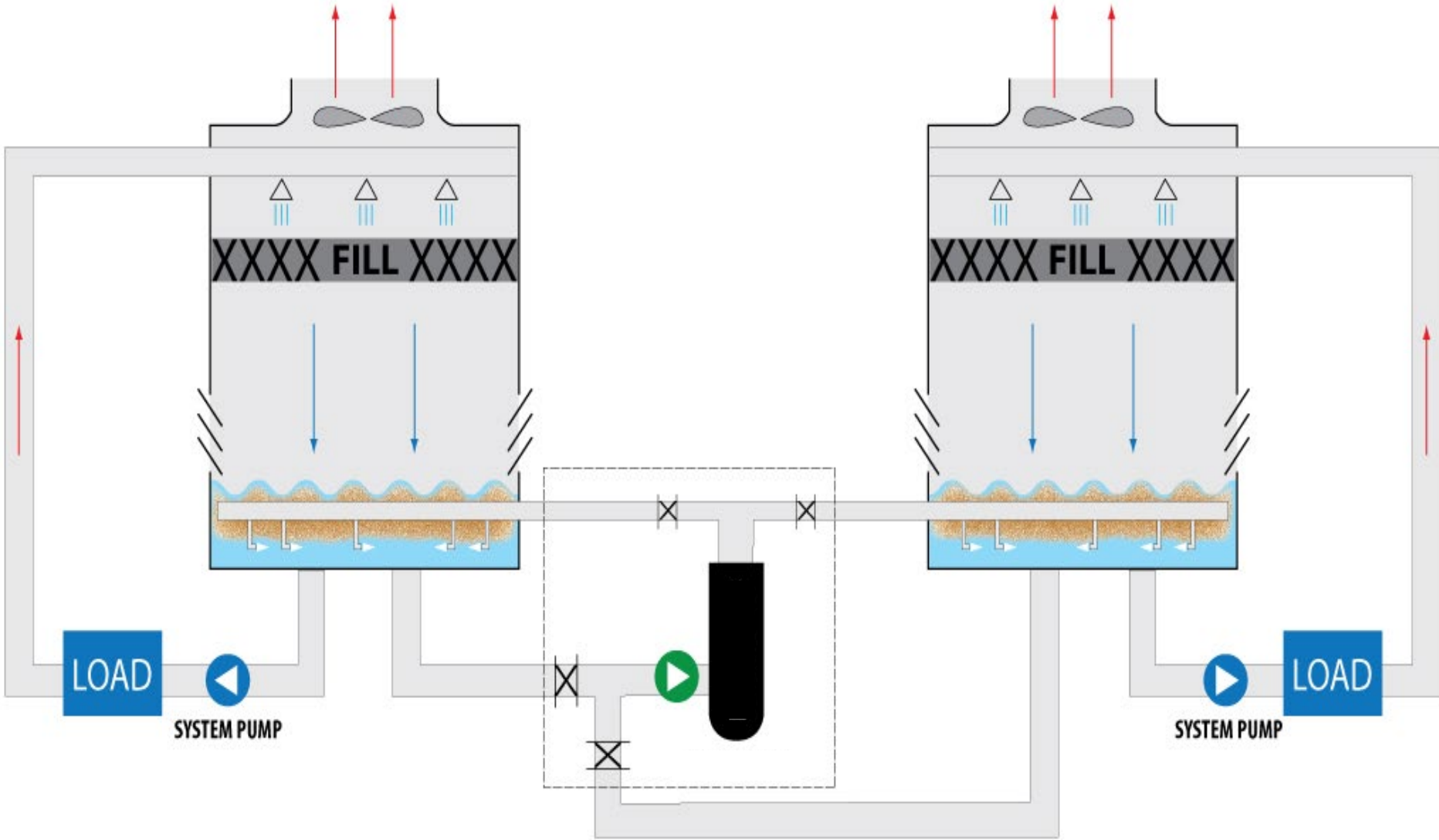
- Reduce fouling in the condenser
- Remove solids at source
- Maintain cooling tower approach temps
- Reduce maintenance and downtime
- Sizing: One gpm per square foot



Best Practices: Basin Cleaning



Budget Practice: Basin Cleaning



Benefits of Filtration

- Maintain design efficiencies on the condenser and cooling tower, resulting in energy savings
- Extended equipment life
- Reduced maintenance and shutdown, resulting in productivity improvement



Greg Johnson,
MPSW Phoenix, AZ

- Will briefly discuss aftermarket strategies.

