

# HPD

## McIlvaine Hot Topic Hour

Nuclear Power Plant Water Treatment

Thursday, July 1, 2010



# Introduction



## Water



## Energy



## Transport



## Environmental Services



**HPD**

HPD is a subsidiary of Veolia Water Solutions & Technologies



# (waste)Water at a Nuclear Station

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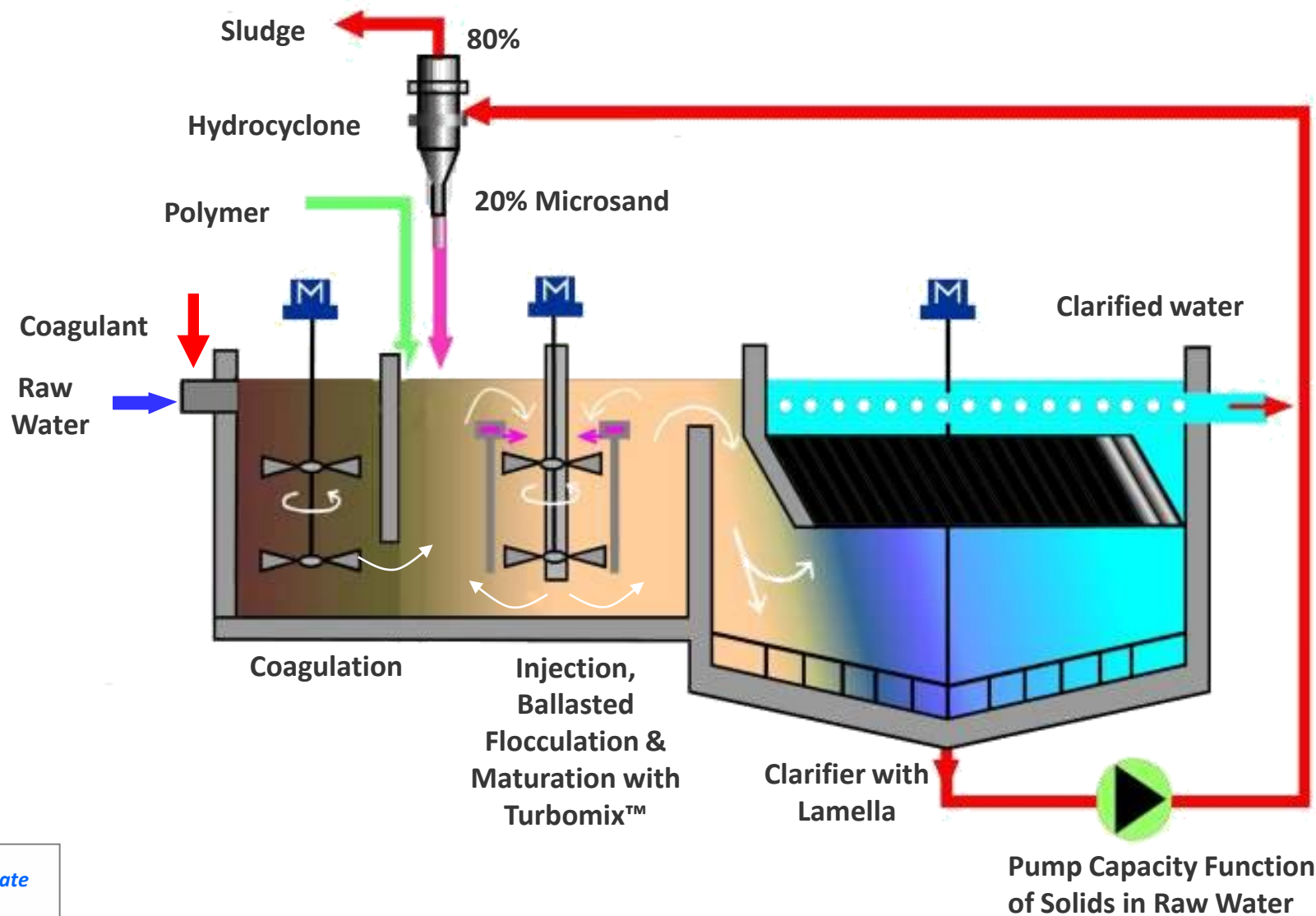
## • “Process Water”

- Polishing demin regen
- Boron blowdown
- Laundry drains

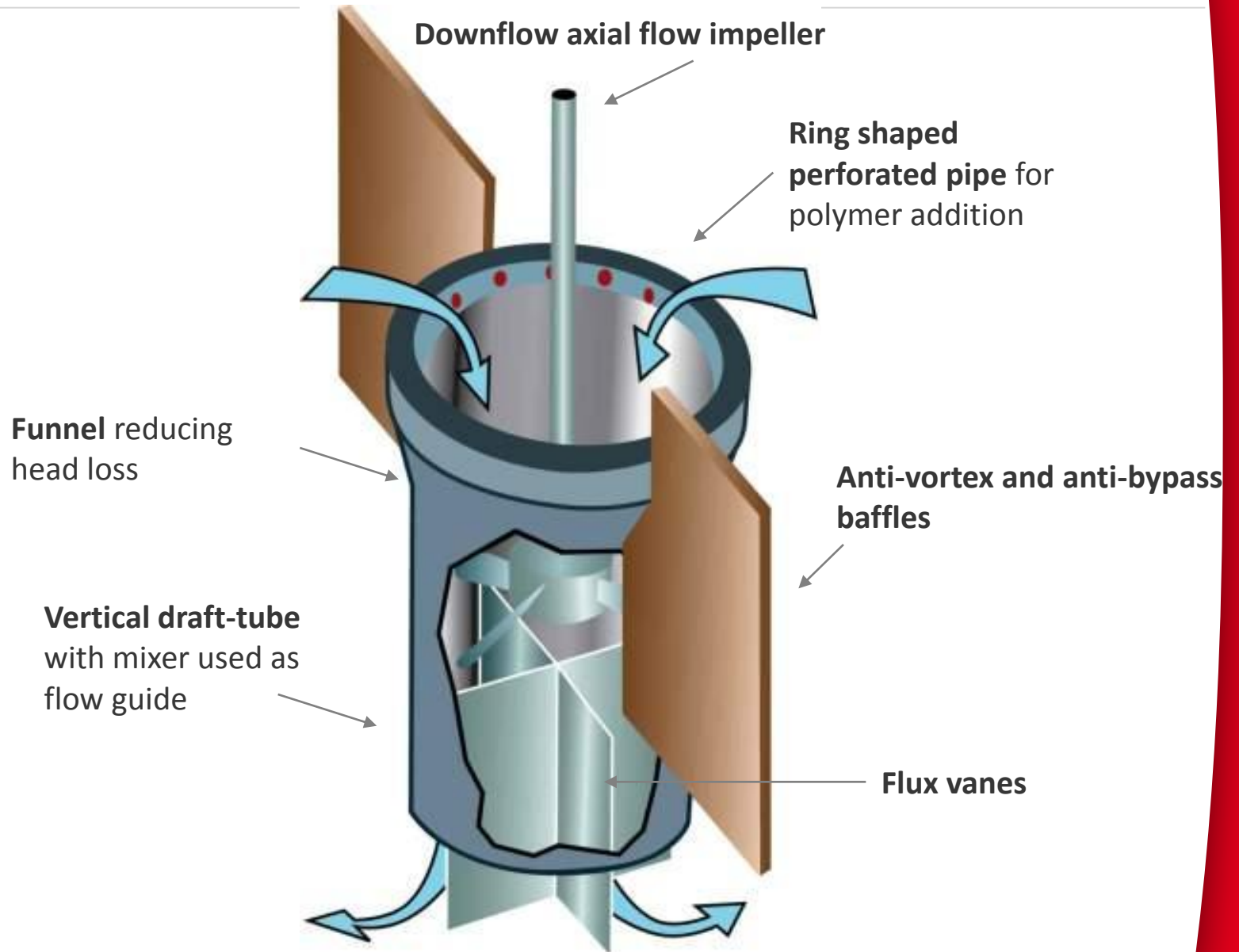
## • Non-Process

- River water
- Reclaim (grey) water
- Cooling tower blowdown

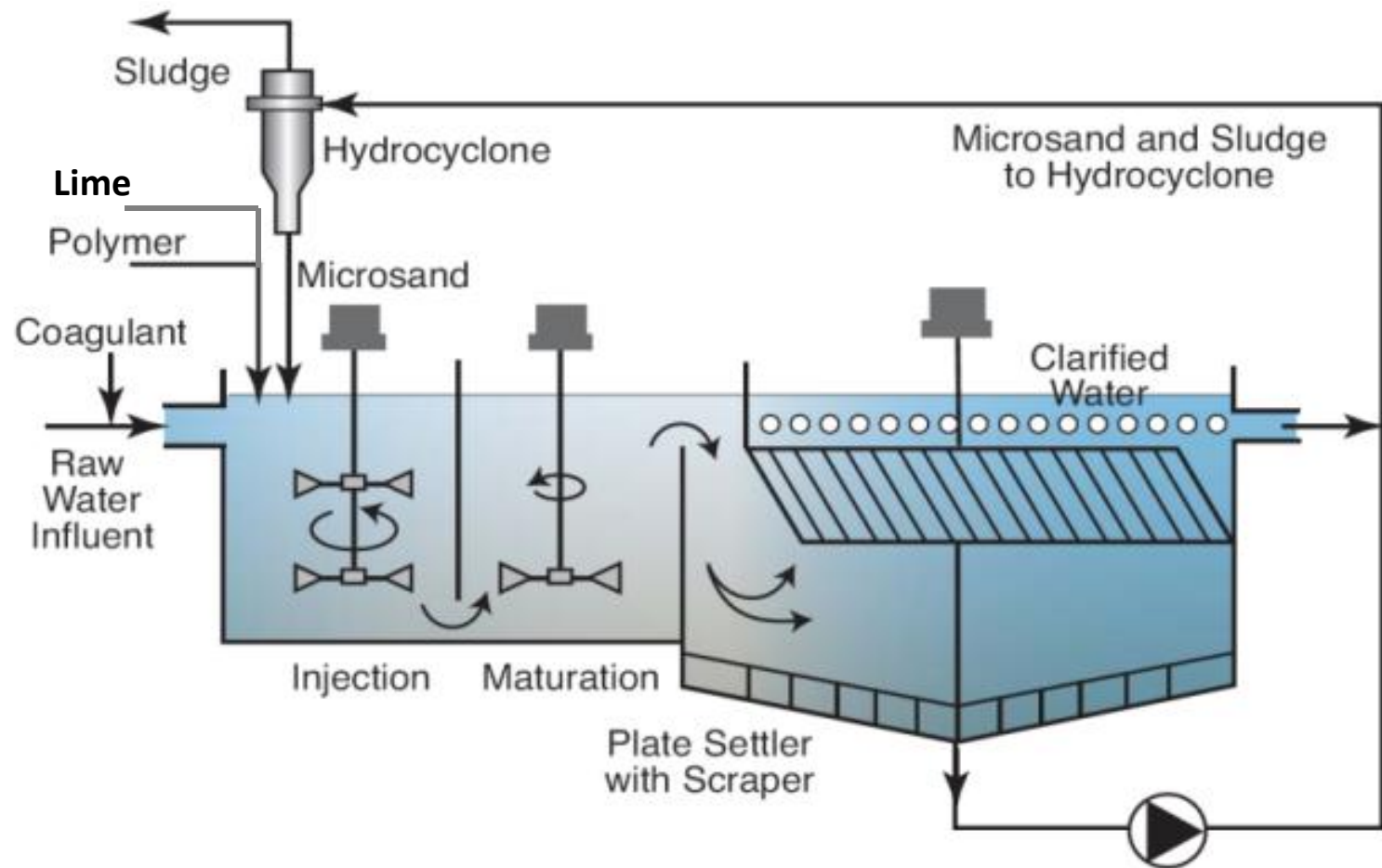
# Actiflo<sup>®</sup> Turbo Clarification



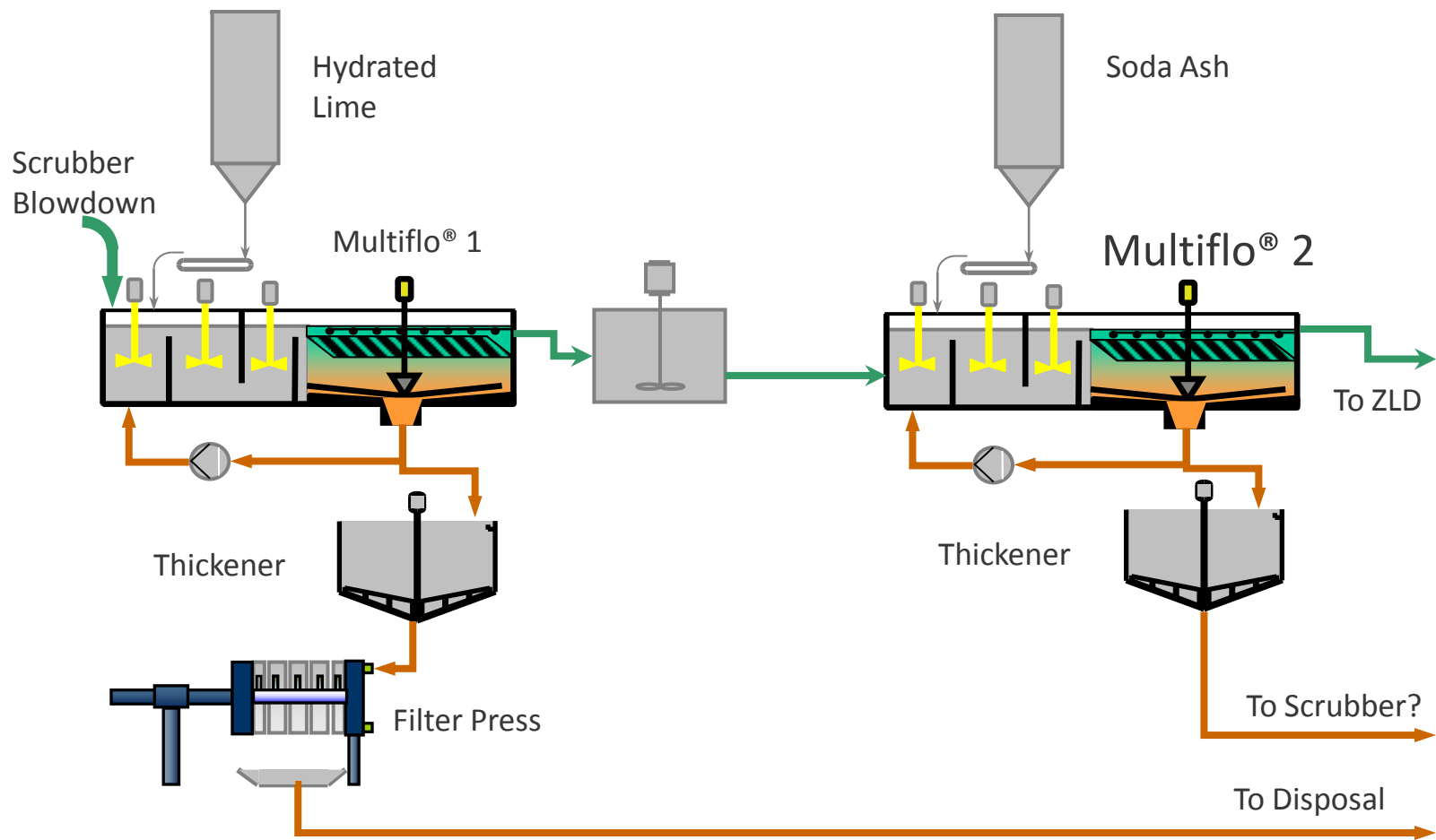
# Turbomix®



# Veolia Actisoft® Cold Lime Settler Design



# Two Stage Softening





# Removal of Suspended Solids: Packaged Actiflo® Clarifier

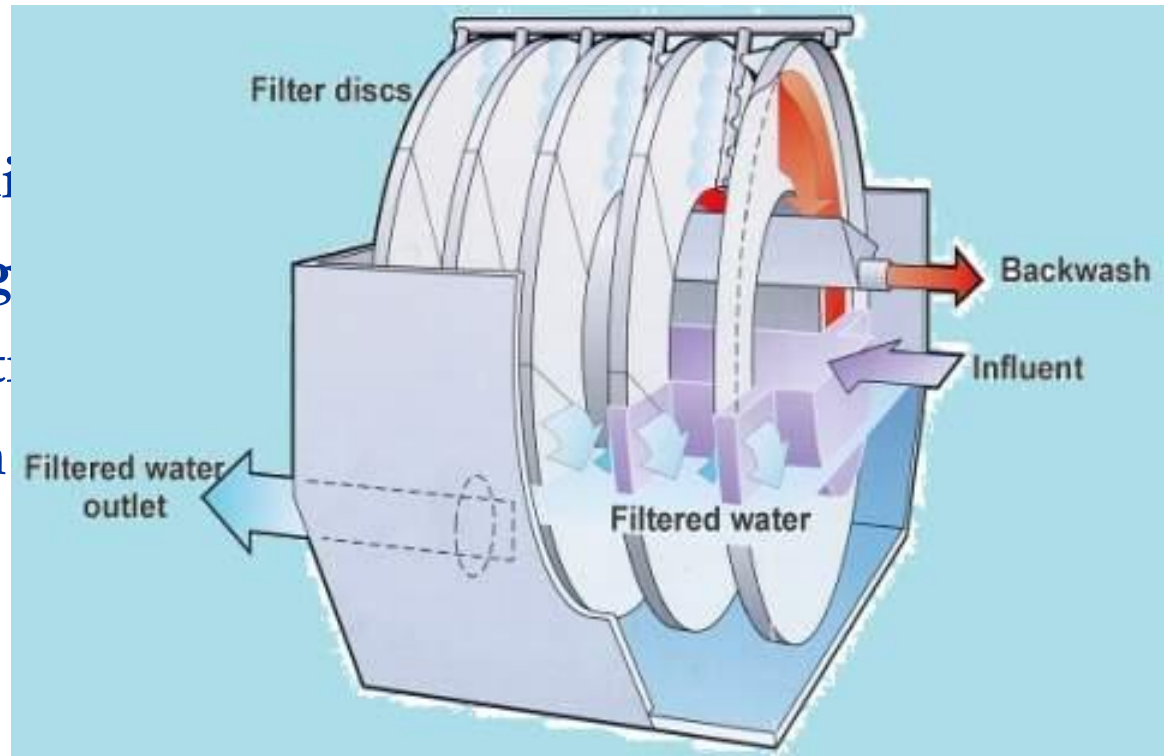




# Discfilter Operation



- Stationary filter discs
- Partially submerged
- Automatic operation
- Gravity operation



# Discfilter Applications



- **Effluent Filtration**
- **Water Reuse**
- **Title 22 Applications**

- **Process Water Filtration**
- **Process Water Recovery**
- **Aquaculture**



# HPD CeraMem® Product



- Long life
- High temperature –  $> 200^{\circ}\text{C}$ .
- Chemical cleanability – can take pH 2 – 13 cleaning solutions.
- Robust and can take high operating and backpulse pressures
- Absolute TSS barrier



# Degreaser Bath Recovery

- cross-flow system for treatment of alkaline
- Portable systems



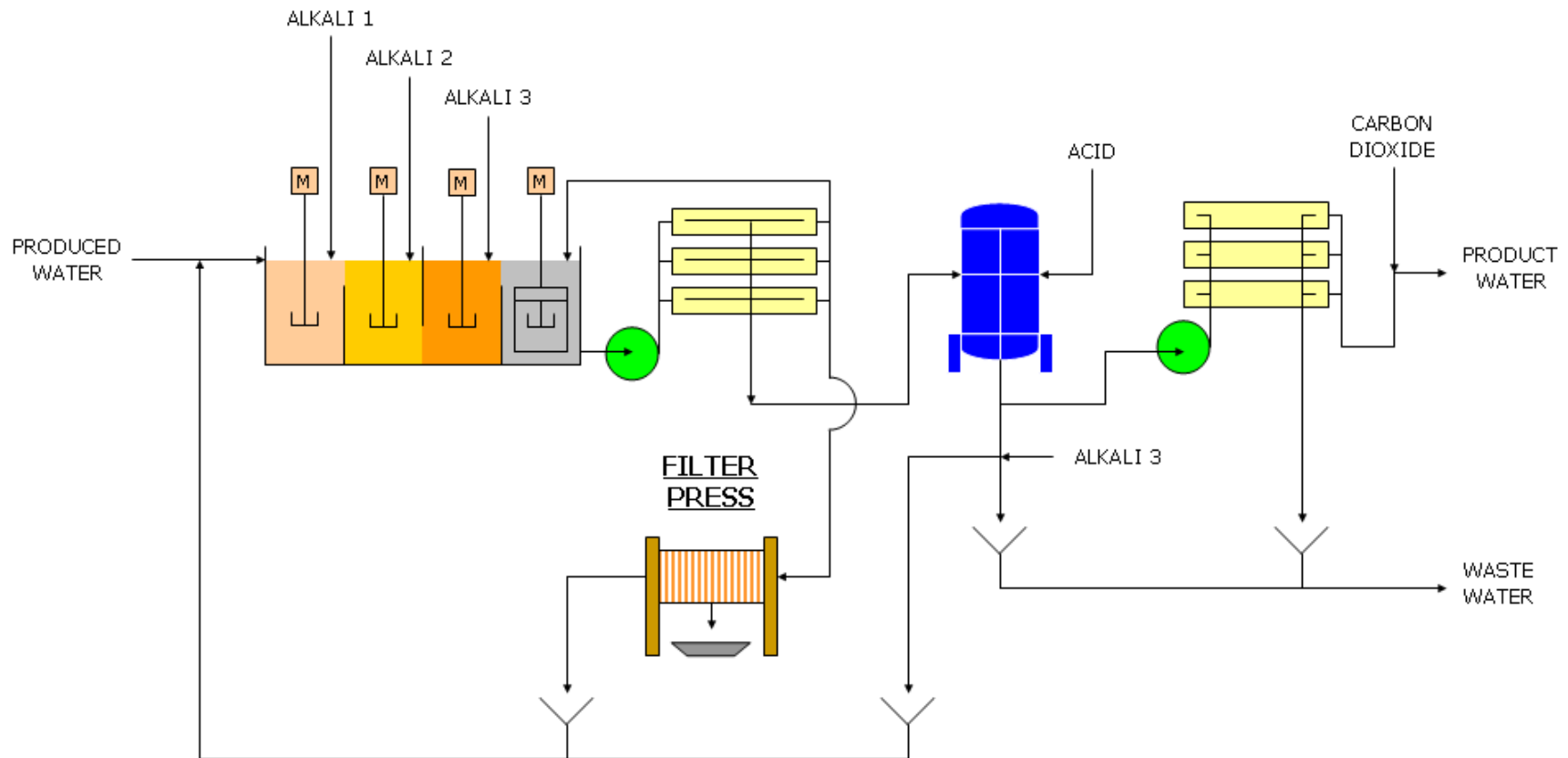
# OPUS - II



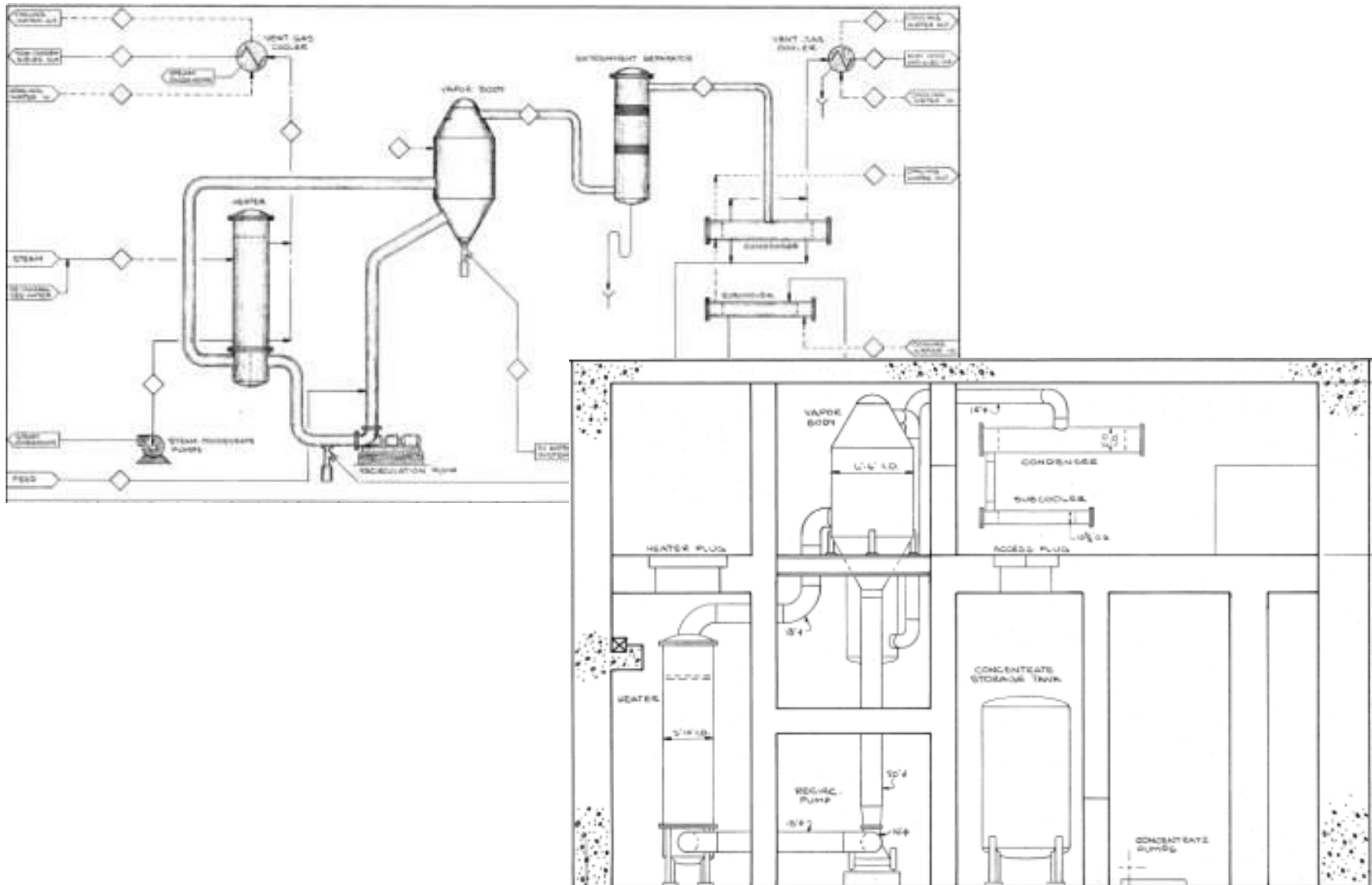
## CERAMEM CERAMIC MEMBRANE SYSTEM

## WAC-NA-IX SOFTENER

## REVERSE OSMOSIS

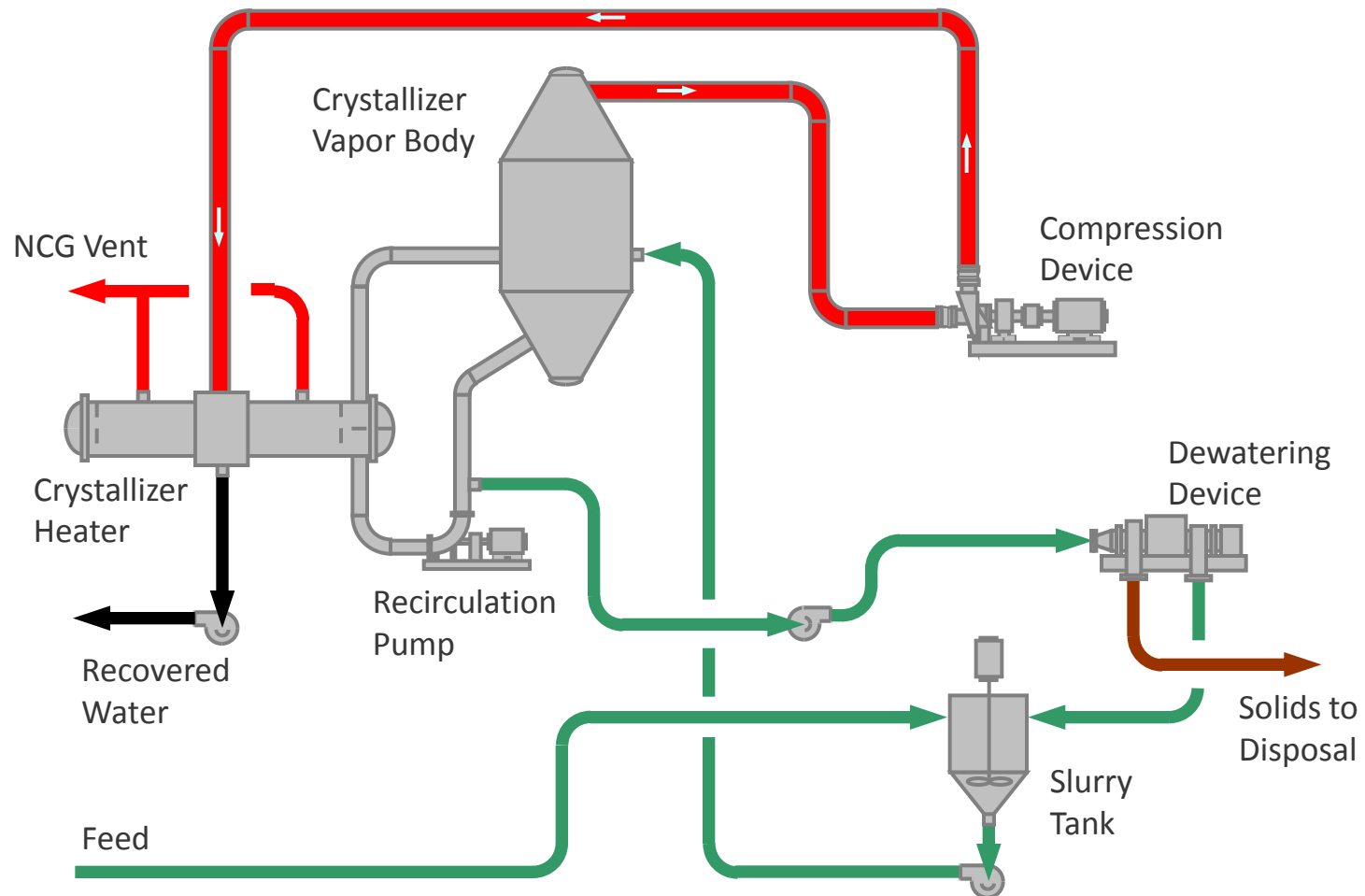


# 40 years of nuclear application

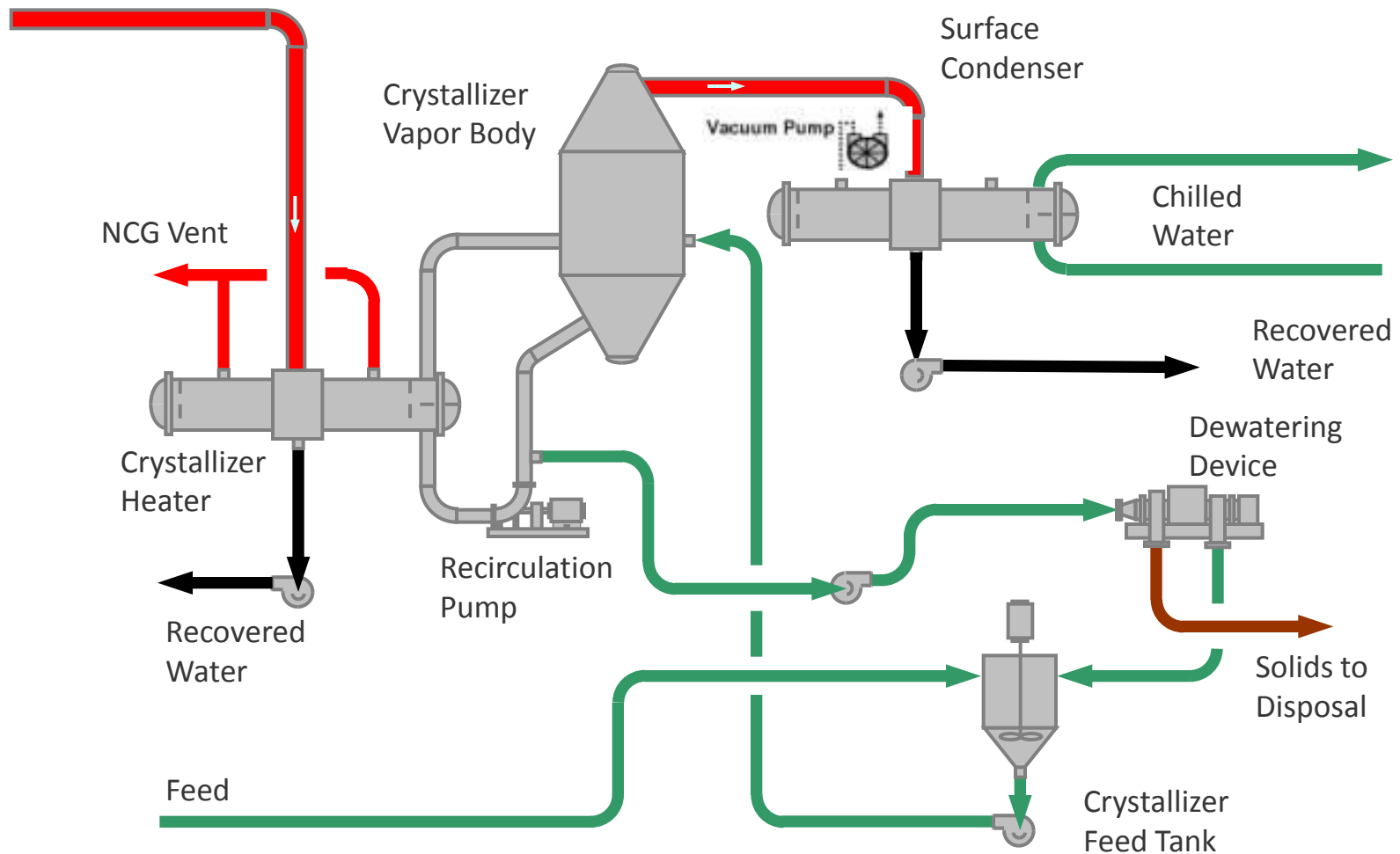




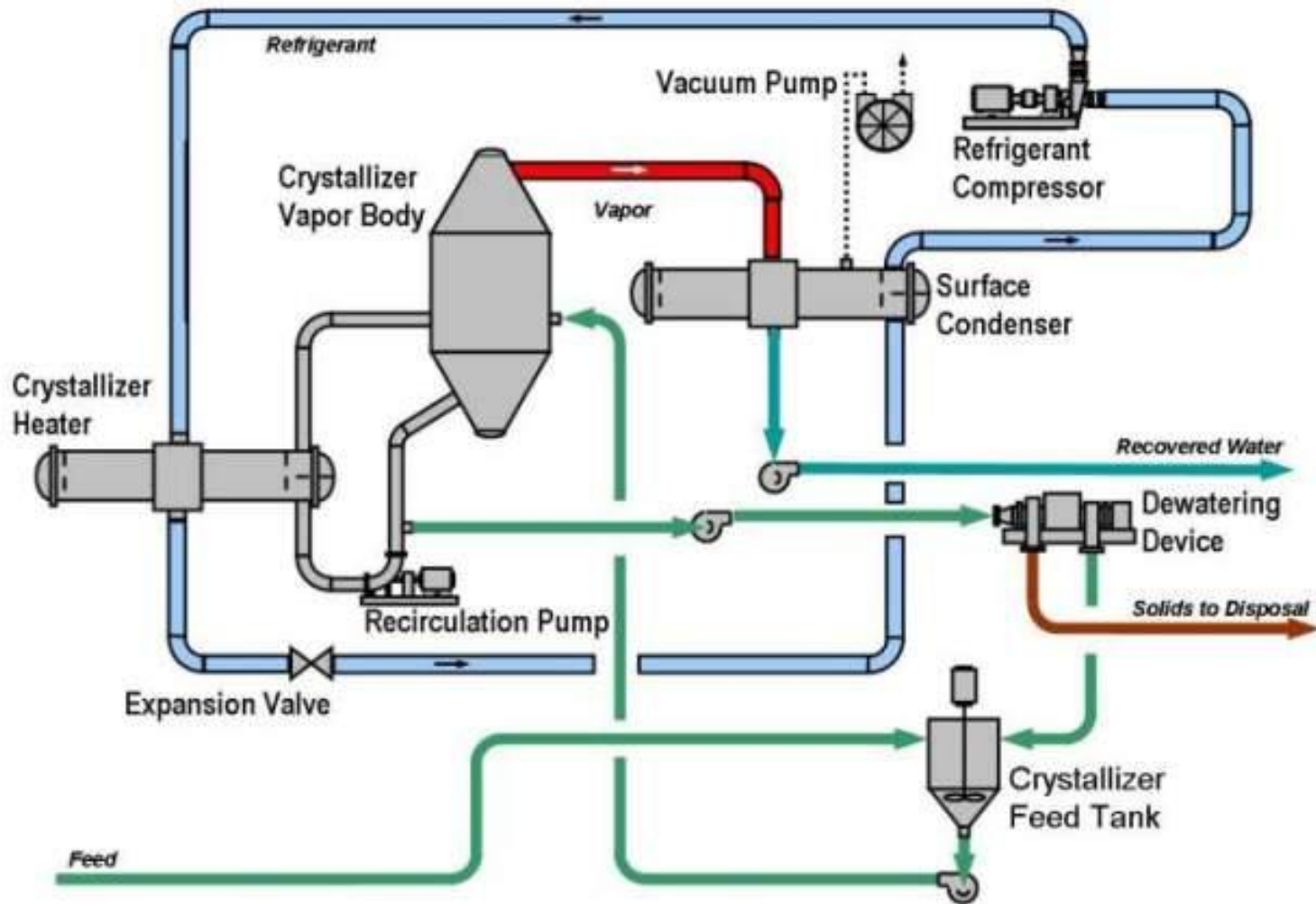
# MVR Crystallizer



# Steam Driven Crystallizer



# Heat Pump Crystallizer



# Evaporator Demineralizer Waste

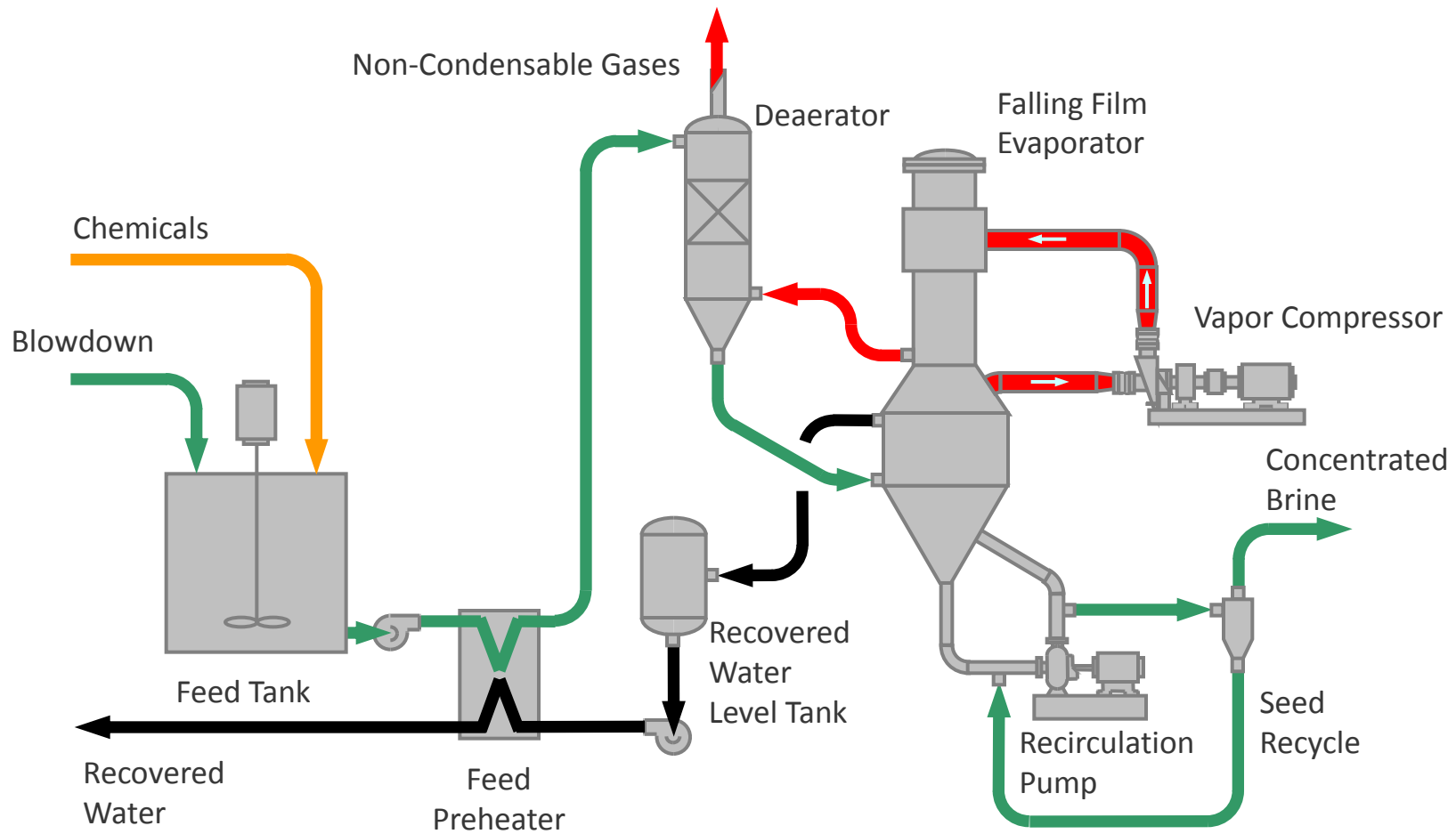


# MVR Crystallizers



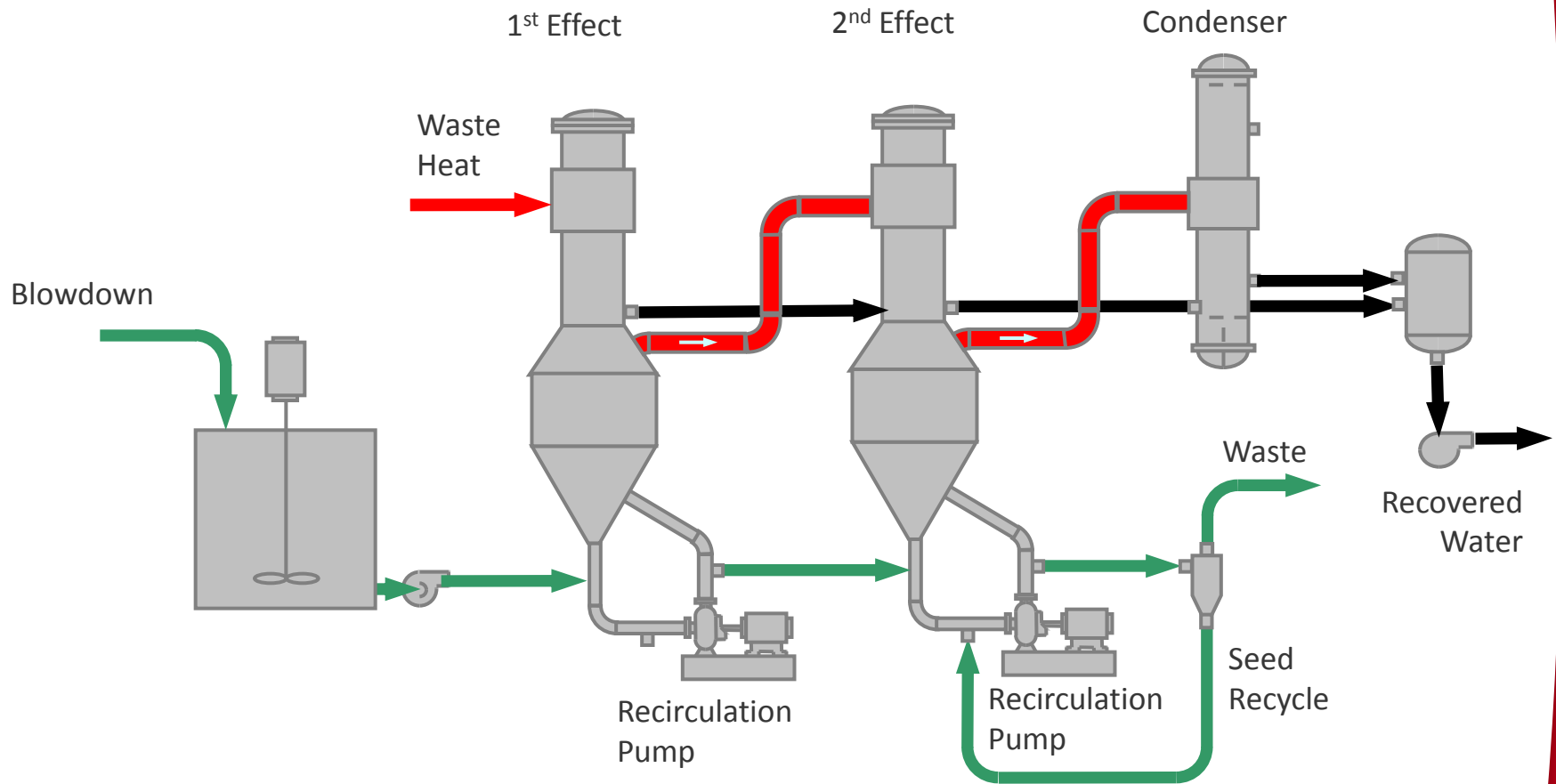


# Brine Evaporator - MVR

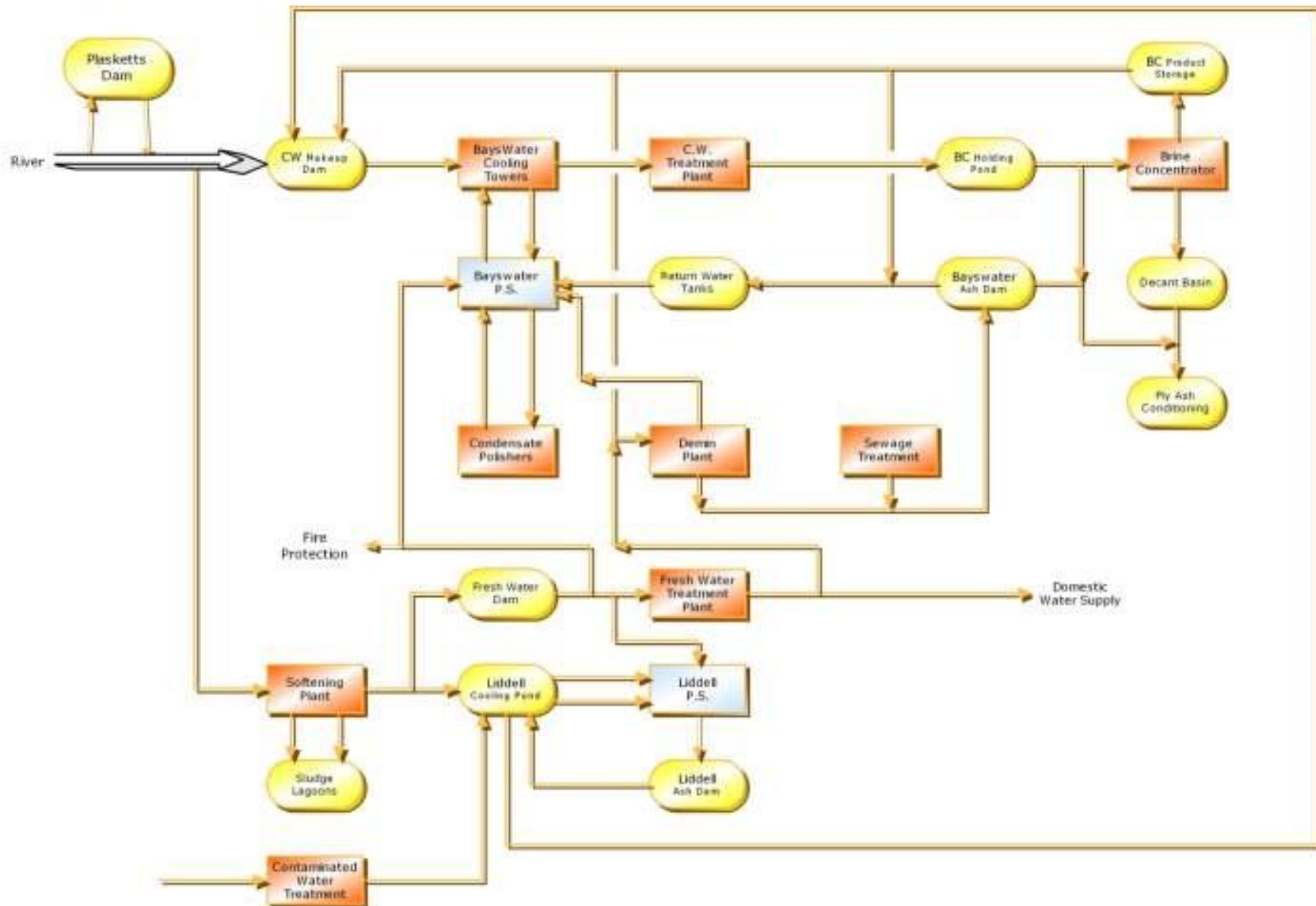




# Brine Evaporator - MEE



# Cooling Water Management



# Zero Liquid Discharge



# Water Reclamation

- Biological treatment
- UF, RO
- 3 – 1,060 GPM MVR Evaporators
- 3 – 30 GPM Crystallizers





# Waste Heat not for Waste Treatment





**HPD**  
**Thank You!**

