

# Thermal Hydrolysis Supporting Systems

Adding dependability, maintenance, and performance to the systems powering thermal hydrolysis

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# Thermal Hydrolysis Supporting Systems

- Thermal Hydrolysis has great digestive, neutralizing and normalizing properties.
- Thermal Hydrolysis increases sludge and digestion efficiency.
- Lets talk steam.
  - Changes to making High-Pressure steam
  - Controlling steam
  - Changes to piping
  - Optimizing energy efficiency

# Thermal Hydrolysis Benefits

- Thermal Hydrolysis gives you great sludge.
  - Energy rich sludge.
  - Enhances Volatile matter removal
  - Better Dewatering
  - Low Viscosity – better pumping
  - Better digestion of sludge
  - Very minor amounts of water added

# Lets talk Steam

- Steam is Hot stuff.
  - Steam does not need pumping.
  - Steam can produce a vacuum just by cooling
  - Steam is inert (water)
  - Lots of power in steam
  - Very low electrical cost
  - Made with lots of fuel

# Lets talk Steam

- Steam Systems Hate.
  - Large percentage swings in load over short time periods (inertia).
  - Make up water (Steam losses and consumption).
  - Being too small.
  - Long Piping Systems, especially outdoors.
- Sizing Steam Systems
  - Steam systems are sized off all system parameters.
    - Maximum rate of BTU's or Pounds per hour
    - System Volume
    - Conveying Velocity
    - Pressure Drop

# Steam Systems verse Thermo Hydrolysis

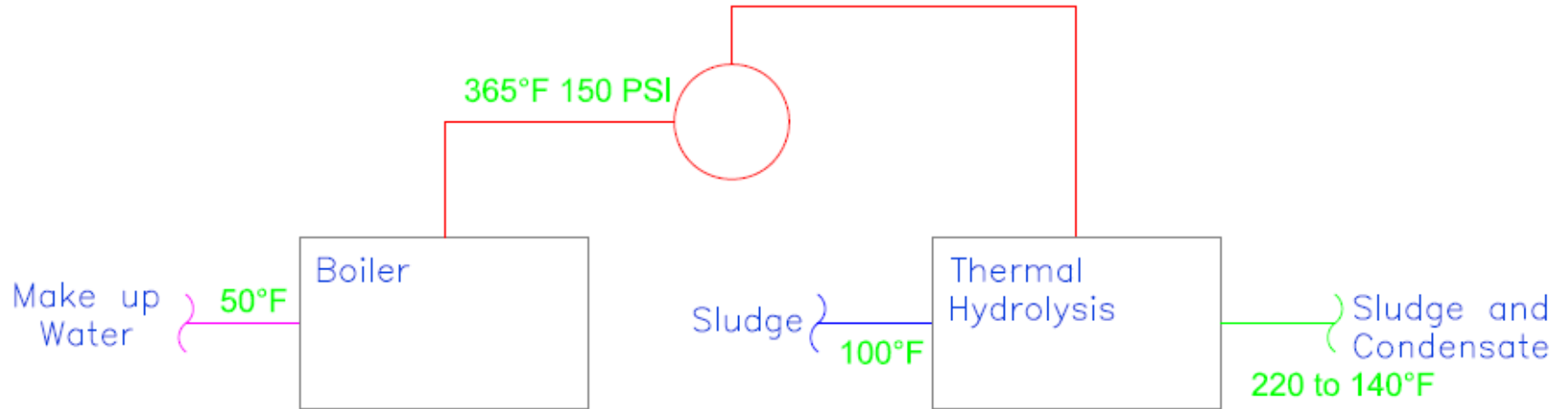
## Thermo Hydrolysis

- Once through steam  
= No Return
- Large Load changes
  - Batching
- High pressure requirements

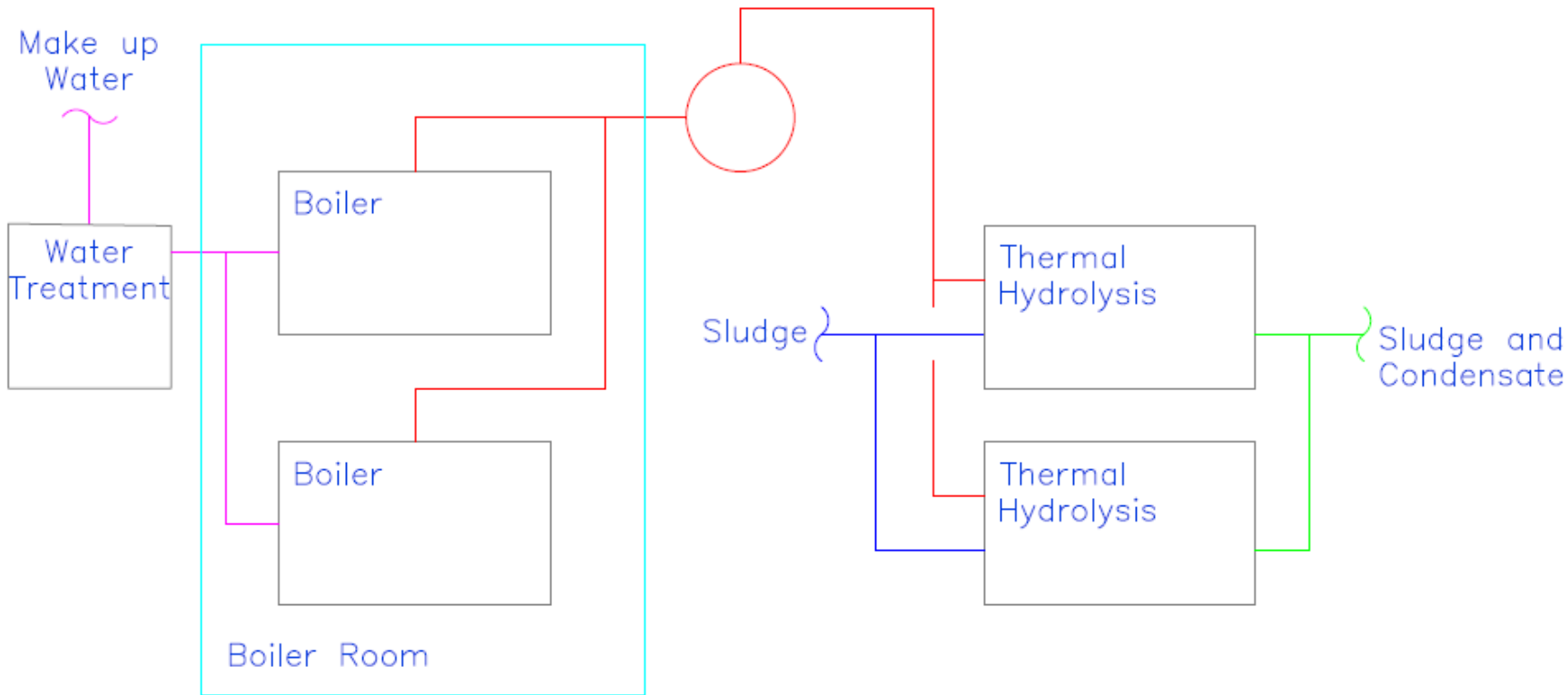
## Steam System

- High Pressures require boiler operator: “C” Blue Seal (3<sup>rd</sup> class engineer’s License or above MUST BE PRESENT AT ALL TIMES BOILERS ON.
- High Pressure Piping 250# rating
- Once through steam requires pretreatment for make-up water(deaeration, softening, reverse osmosis, chemical, mechanical)
- Protect boiler from extreme load changes

# The typical system

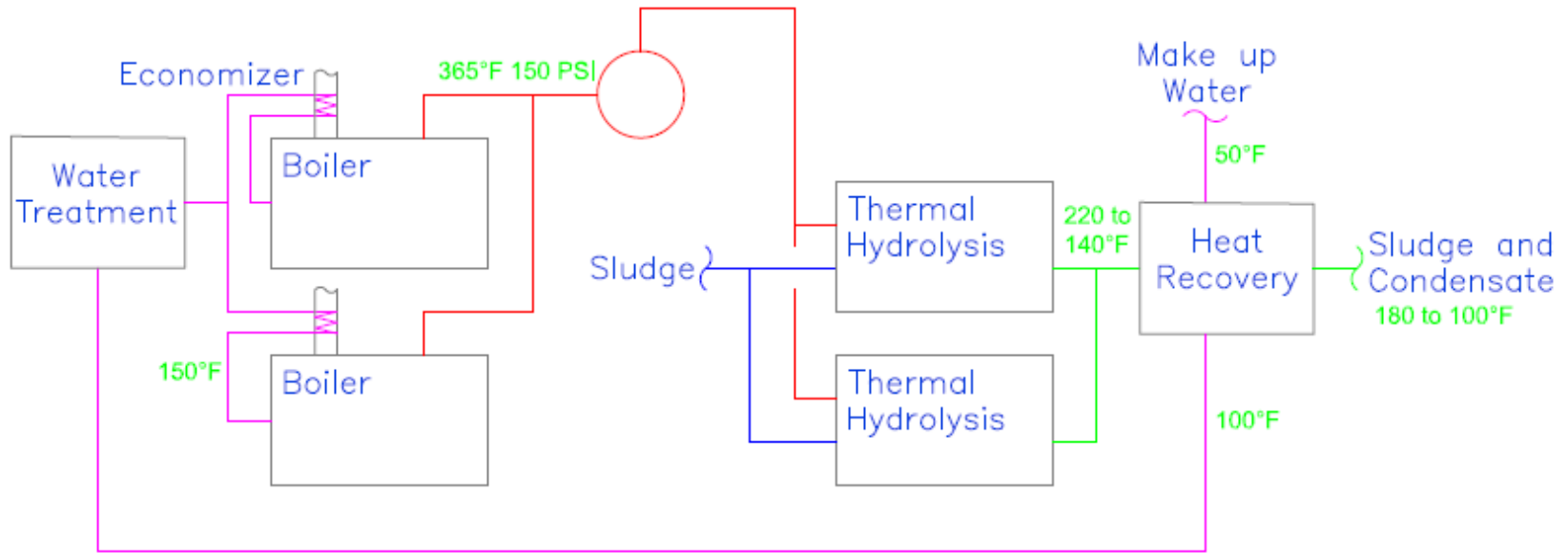


# The Physical Layout





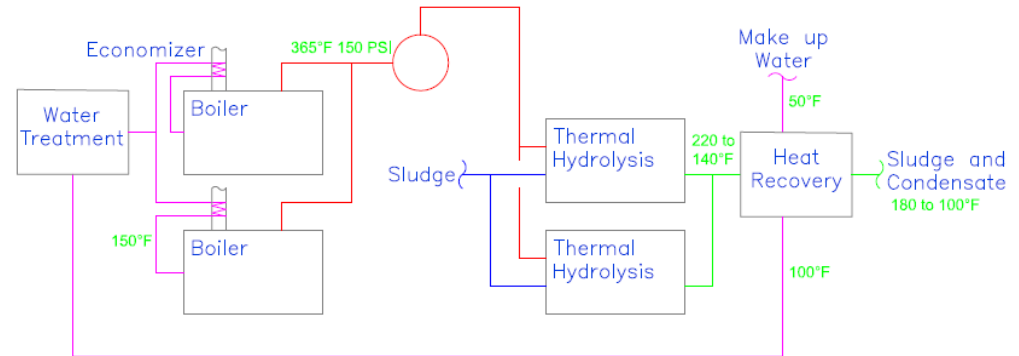
# Adding Heat Recovery



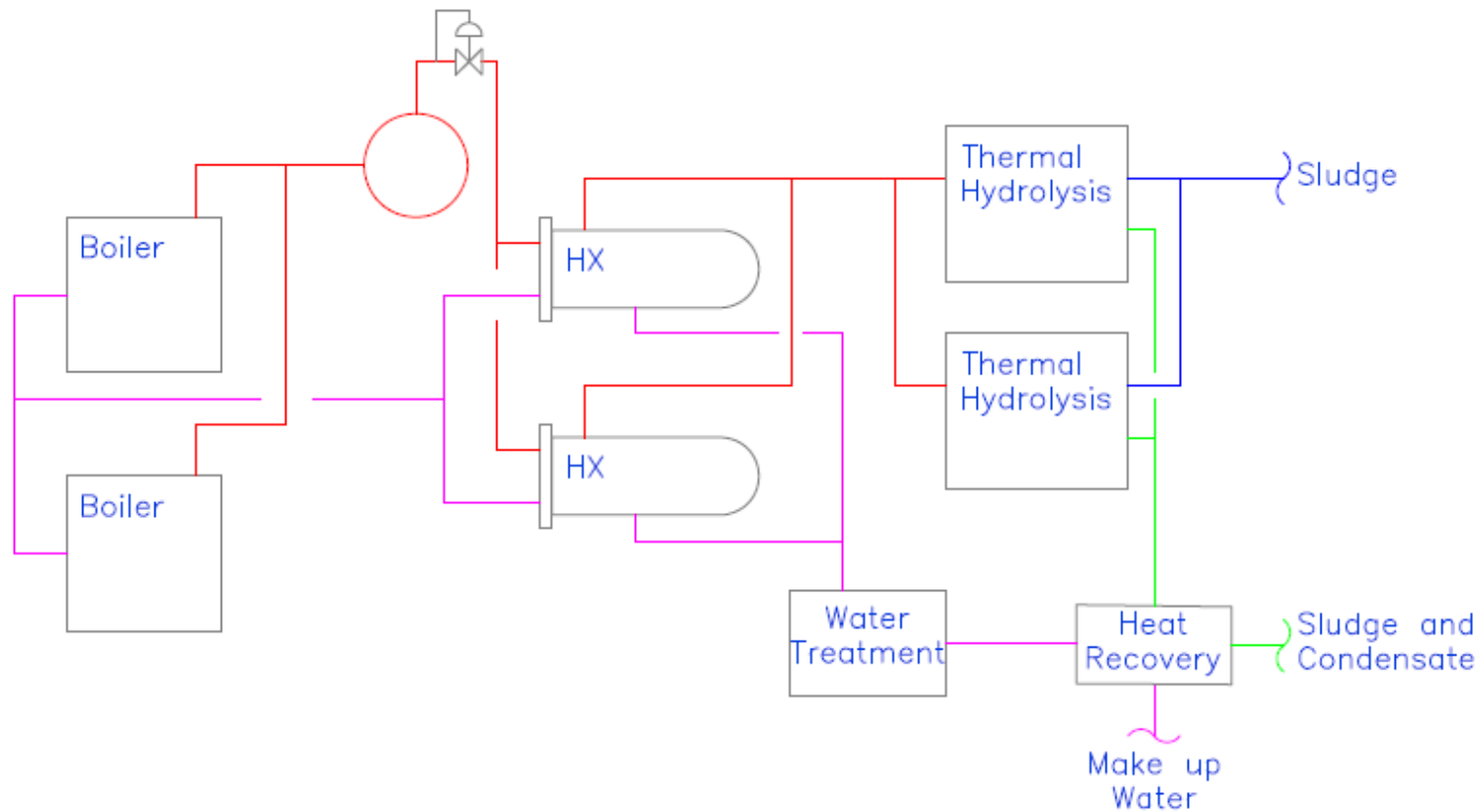
# Adding Energy and Heat Recovery

- For heat recovery use the lowest grade (temp) first
- Return condensate before the reactor (Pipe Losses)
- Lots of physical travel of make up water
- Where to perform water treatment
- Softening and Reverse

Osmosis: backwash  
and waste

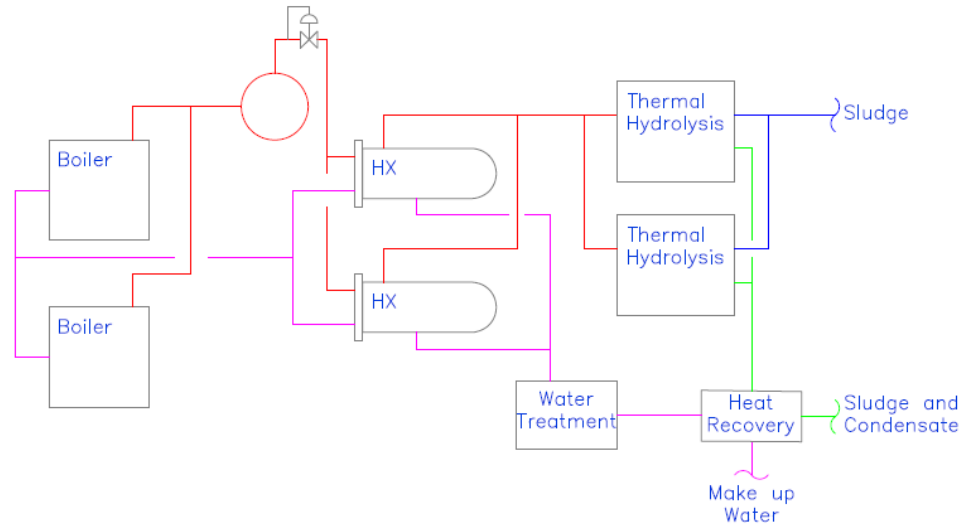


# Protecting Boiler



# Protecting Boiler

- Reduces wear and tear on the boiler.
- Change working fluid to hot oil (inertia).
- O&M on HX instead of boiler.
- Reduces water treatment.
- Might superheat steam.
- Double insulate piping.
- Add volume (inertia).
- Unfired equipment.





# Questions?

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