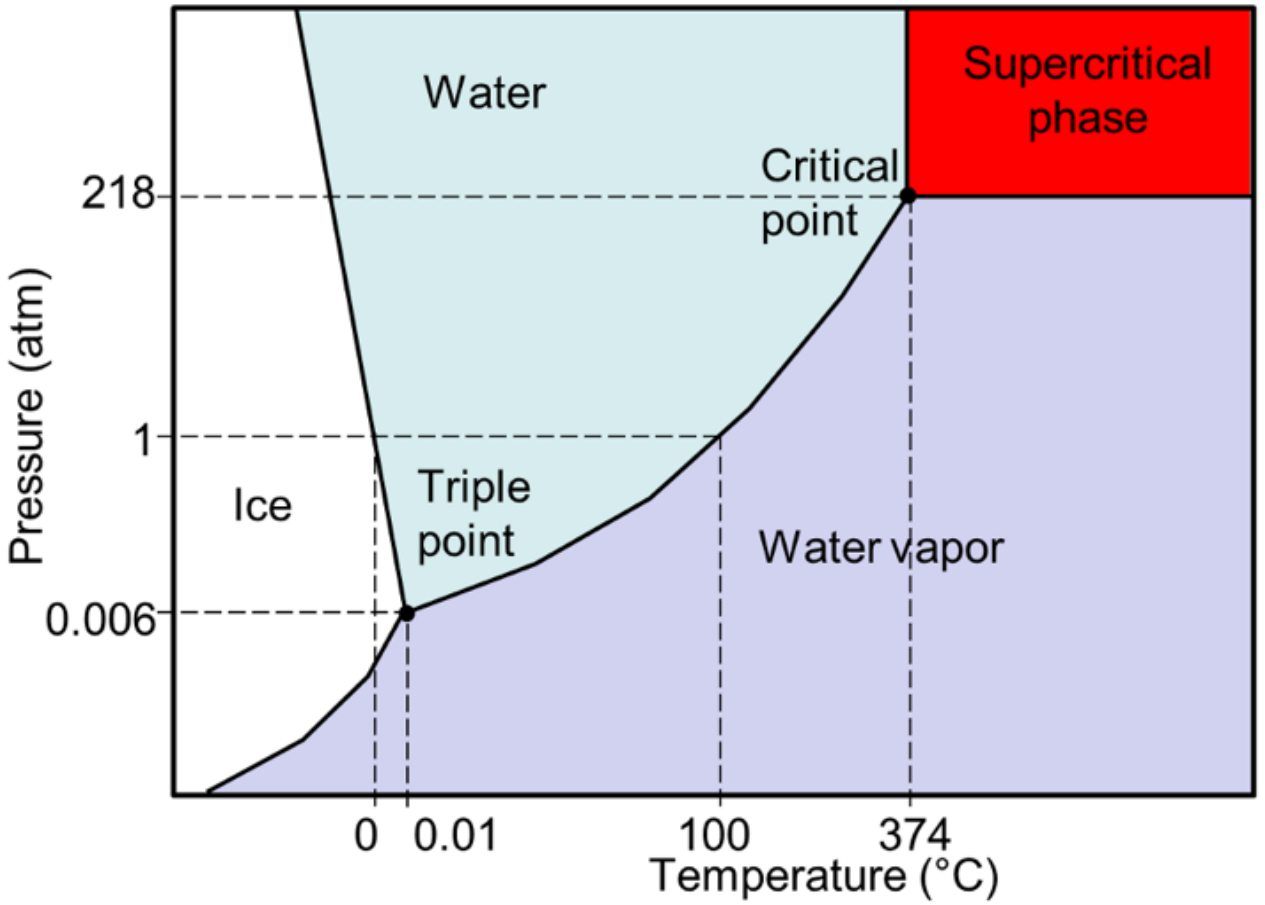
Orange County Sanitation District
Supercritical Water Oxidation Project

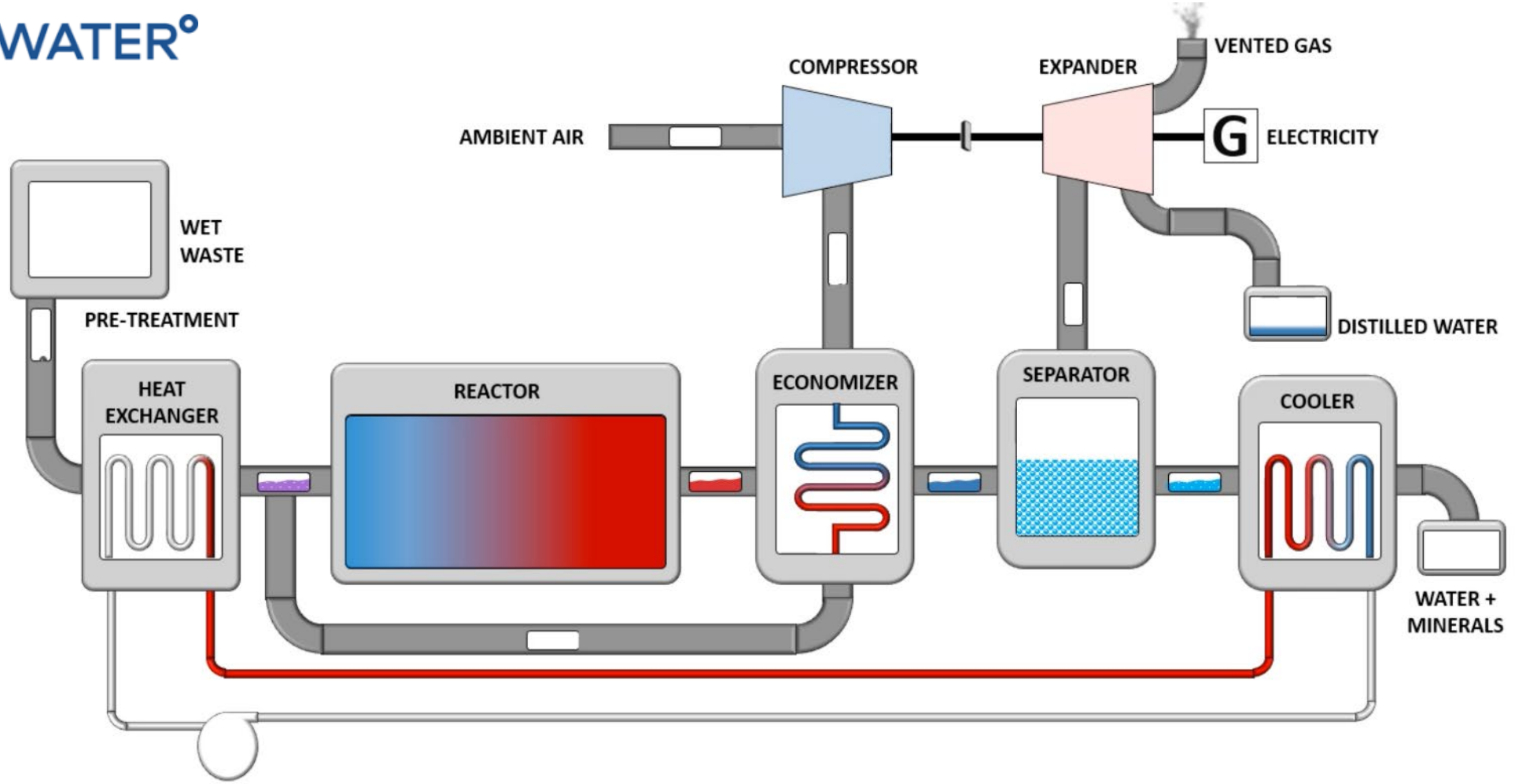
What is Super Critical Water



The properties of H2O change significantly above 3200 psi and 705 degrees Fahrenheit.

Supercritical Water Oxidation Process

374WATER°



Fate of Chemicals in Solids

SCWO Process

7 N Nitrogen 14.007

N Forms
- Organic
- Urea, ammonium
- Heterocycles

→ **Vent gas**
N species are mostly transformed to N_2 gas

Gas composition
<3 ppm_v NH_3
<5 ppm_v NO_x
<3 ppm_v SO_x
No odor

15 $3s^2\ 3p^3$ P Phosphorus 30.974

P Forms
- Organic
- Phosphate

→ **Solid minerals**
Phosphate precipitates $Ca_3(PO_4)_2$
$MgNH_4PO_4 \cdot 6H_2O$

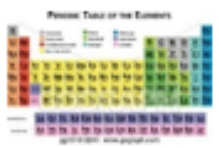
16 S Sulfur 32.066

S Forms
- HS^-, COS, organic
- Mercaptans

→ Sulfates, Hydrates
$CaSO_4$

Emerging Contaminants
- Pharmaceuticals
- PFAS, 1,4-D

→ Mineralized to CO_2
Fluoride dissolved, CaF_2



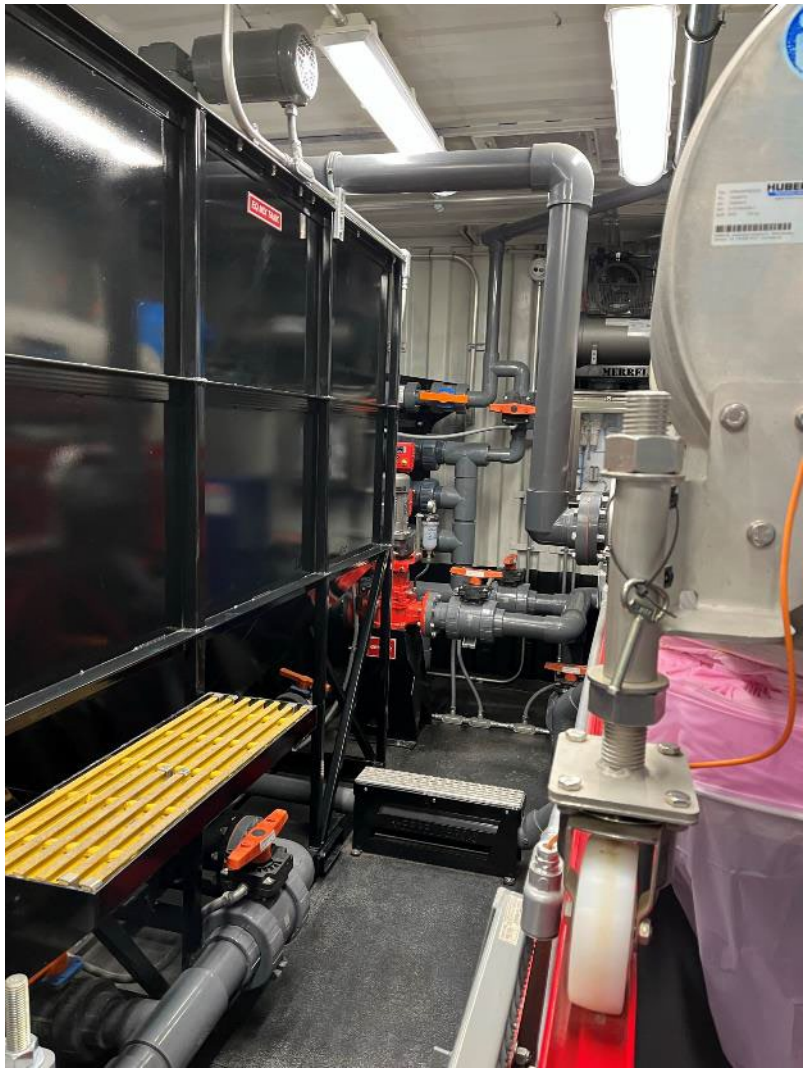
Metals

→ -Dissolved
-Precipitates

Plant No. 1 – Fountain Valley

374Water And OC San

The Inner Workings



The Inner Workings

The Inner Workings

What We Have Learned

Tests of OC San Sludge

- Southern California Air Quality Management District asked for air emissions data as part of the permitting process.
- OC San Biosolids sent to the existing one-ton-per-day unit.
- Test results are promising.

Project Budget

Project Item	Current
374Water Contract (Equipment and Operation)	$5,207,595
Public Works Site Prep and Utilities	$1,222,960
OC San Costs (Staff, Permitting, Etc.)	$1,043,207
Contingencies	$467,267
Total Project Cost	$7,941,029

Project Schedule

Milestone	Date
Site Prep Completed	January 2024
Deliver and Install Units	March 2024
374Water Start-up and Commissioning	April 2024
Demonstration Testing	June 2024
OC San Own and Operate	September 2024

Next Steps…

- Demonstrate the industrial machine at 6 tons/day
- Investigate 30 ton/day unit with energy recovery.
- How can we concentrate problem compounds?
- What path do we take to a 200 ton/day unit?
- What else might SCWO help with?
  - Leachate
  - Food waste
  - GAC/Ion Exchange Resin