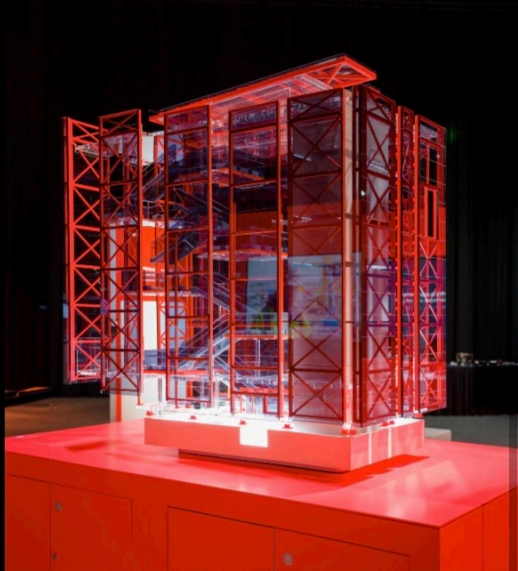
2025 SUMMER INTERNSHIP

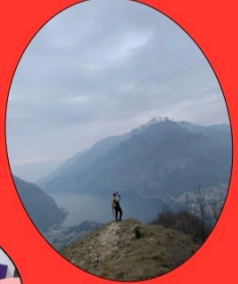
MIA ANDREU

Mechanical Engineering | Power & Energy



ABOUT ME

- From Raleigh, North Carolina
- Junior at New York University
- Mechanical Engineering with a minor in Aerospace & Mathematics
- Hobbies: Hiking, Crocheting & Knitting



MY INTERNSHIP

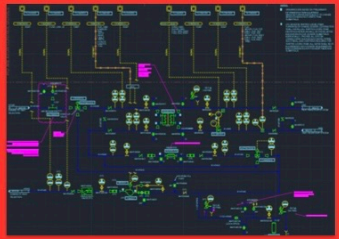
- First summer at WSP
- Mechanical Intern in Power & Energy, focused on combined heat & power systems
- Weekly knowledge sharing sessions (thanks Chris & Rob)
- Boilers, Chillers, Heat Exchangers, Cooling Towers, Compressors, Pipe Schedules & Stress

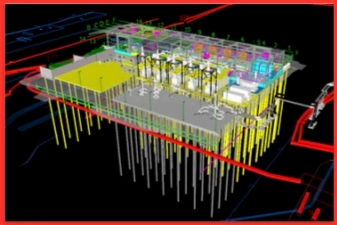
Ameresco BioGeneration Facility

Background: New Bio-Generation plant in Sacramento, intended to run on the electricity generated from biogas at the Wastewater Treatment Plant

Scope: Biogas is treated through the gas conditioning system and burned in 4 engine generators, a hydrogen fuel cell, & a backup boiler. Exhaust gas heat exchangers will recover rejected heat for distribution around the plant. Water in the heat loop will go through chemical feeders & provide potable makeup water to the city.

Role: AutoCAD to tag system layout from digestor equipment to the generators, potable make-up water, & backup boiler



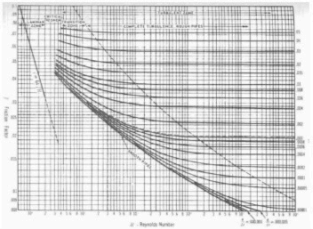


Pump Sizing

DEFINING $4C_D = f$ [friction factor]:

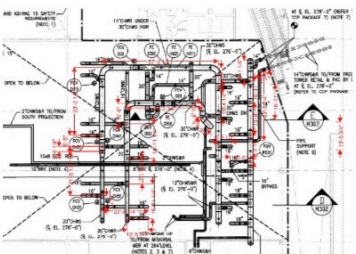
$$h_L = f \frac{L}{D} \frac{V^2}{2g}$$

DARCY'S EQUATION



Background: Chris's old project on the World Trade Center, using the loop to the Freedom Tower and back to the CUP to find the pressure drop.

- Measured pipe length on blue beam and counted elbows, valves, branches, & fittings
- Each fitting has an "equivalent length" or a coefficient k used to find the equivalent head loss through
- Used internal pipe diameter, friction factor, & velocity through each segment in the Darcy-Weisbach equation
- Summed up all segments and used the pressure change to match a pump in Bell & Gosset Systemwise



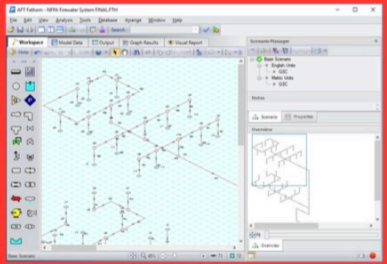
Cedar Bayou

Background: Installation of a new combined cycle plant for the Electric Reliability Council in Texas to increase their System Reserve Margin.

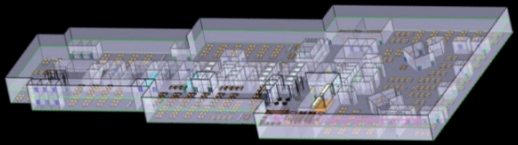
Scope: Installation of a gas turbine, a heat recovery steam generator (HRSG) with selective catalytic reduction (SCR), a steam turbine, and a hydrogen cooled generator will create and supply power to Center Point Energy's transmission system.

Role: Packaged pump sizing & heat exchanger calculations for customer understanding using AFT Fathom analysis data & Bluebeam

- Demineralized Pumps, Aqueous Ammonia Injection Pump, Service Water Pump, Screen Wash Pump
- Fuel Gas Heat Exchanger



TAKEAWAYS



Mechanical

- Sizing equipment & equipment types
- Specs & technical drawings
- Sustainable alternatives to gas heating systems

Software

- AutoCAD
- Revit
- Bluebeam

Thank you!

Chris Tso - Gordon Ngo - Andrew Koch- Kristin Sullivan

Power & Energy Team