**Who am I**

First generation college student. I have completed a bachelors in mechanical engineering and recently am finishing up my masters in mechanical engineering.

**Why SoCalGas**

Some of my peers fellow engineering students aim to use their engineering knowledge and look to the sky, stars, rockets, planes. I am looking for a place to grow and hold a long-term career in the field of using my engineering technical to serve the public.

**What are my qualifications?**

My academic qualifications consist of me completing my bachelor’s degree in mechanical engineering as well as finishing up my master’s degree in mechanical engineering. I have taken courses that relate to the technical knowledge that you expect an engineer to have such as fluid mechanics, computational fluid dynamics and power plant design.

Outside of my academics I have successfully completed my fundamentals of Engineering Exam and I am Engineer in Training. I have had internships with public utilities such as Southern California Edison and Southern California Gas Company.

**Experience**

I have a bachelor’s degree in mechanical engineering and have experience in collecting data and analyzing data to create reports. During my time at Southern California Edison, I assisted in the gathering and analyzing data from field survey of company assets to identify trends and create reports for senior management. I have traveled across the service territory to conduct these audits.

In my current role in the Southern California Gas Company, I have continued to hone my skills in streamlining work processes and in data analysis and reporting. I have automated data scraping of public websites such as the California and federal legislation and enforcement actions from regulatory bodies to track and summarize complex and evolving policy and legislative actions. I have worked on several projects that involved creating and analyzing large data sets to identify key trends and insights with have included the impact of proposed rulemaking from regulatory bodies as well as state and federal legislation. I have also developed strong communication and presentation skills, which have allowed me to effectively communicate complex data to stakeholders at all levels of the organization.

I am excited about the opportunity to bring my skills and experience to your team. I am confident that my analytical abilities, attention to detail, and strong work ethic will enable me to make meaningful contributions to your organization.

Technical

**What are characteristics of a fluid?**

Volume dependent characteristics – mass, density,

Volume independent characteristics – viscosity, Temperature, Pressure

**What is Reynolds number? Characterization**

Reynolds number is the ratio of viscous forces and inertial forces.

Re < 2100 – Laminar (v near the wall is 0, velocity is parabolic)

2100 > RE < 4500 – Transitive

RE > 4500 – Turbulent (velocity is uniform)

**What is viscosity?t**

Viscosity describes the fluids’ resistance to flow.

**What is Capillary?**

Capillary describes the effect of the adhesive forces and cohesive forces of a liquid within a narrow tube. If adhesive forces dominate the fluid sticks to the tube creating a “U” Shape. If the cohesive forces dominate the fluid sticks to itself creating a upside down “U” Shape.

**What is Bernoulli EQ and assumptions?**

It’s the conservation of energy equation for a flowing fluid that is derived from the Naviar Strokes Equation. The components are Pressure + Kinetic Energy and Potential Energy.

Assumption:

1. Steady flow
2. Incompressible flow
3. Viscous forces are negligible.

**Knowledge about Pipes.**

Pipes are designated by classes that have differing Maximum allowable operating pressures. Material and coatings are used to deter corrosion in pipes. The internal roughness of a pipe affects the friction losses.

**Extended Bernoulli equation**

It’s the conservation of energy equation for a flowing fluid that is derived from the Navier Strokes Equation. The components are Pressure + Kinetic Energy + Potential Energy + head loss from the viscous forces, the minor losses from pipe fittings and the energy that can be extracted/added by turbines and pumps.

Assumption:

1. Steady flow
2. Incompressible flow

**Continuity EQ?**

Conversation of mass. Mass fluid remains constant.

**Knowledge about Pipe Systems?**

Parallel – pipes that start and end from the same terminal. Pipes in series suffer more pressure head loss compared to a single pipe but maintain the same flow rate.

Series – pipes of differing diameters that are connected together from end. Pipes in parallel has more flow rate compare to a single pipe but maintain the same pressure head.

**What is Cavitation? Causes? Signs? Prevention?**

Cavitation is the sudden vaporization of fluid inside of the pump.

Causes:

Fluid coming in too fast.

Fluid is coming in too hot.

Signs:

Noise

Vibration

Wear and Tear of the pump bearing

Prevention:

Increase the Available,

Decrease the Required

**Knowledge of equipment**

Turbines – Extract Energy

Pumps – Adds Energy

Heat exchanger

Condensers – remove heat from vaporization of steam

Superheaters are heat exchangers that increase the energy of the steam

Reheaters are superheaters that add energy to the steam that’s already been passed through a turbine.

**Knowledge of Pumps**

Parallel – pumps that start and end from the same terminal. Pumps in series suffer more pressure head loss compared to a single pump but maintain the same flow rate.

Series – pumps of differing diameters that are connected from end. pumps in parallel has more flow rate compared to a single pump but maintain the same pressure head.

**Laws of Thermodynamics**

1st Law: Conservation of Energy. Energy is not lost or created. It simply transitions from one state to another.

2nd Law: In an isolated system, the change of entropy is always increase.

3rd Law: The change in entropy remains constant as Temperature reaches absolute 0

0th Law: Thermal equilibrium. If two systems are in equilibrium with a third system. Then the original two systems are in thermal equilibrium.

**What is enthalpy?**

**Enthalpy is all of the useful internal energy that can be used to generate work.**

**What is entropy?**

**ENtroy is the energy that can no longer be used to created useful work.**

**What is an open system, isolated system, closed system,**

Open system: There are changes in energy and mass

Closed system: Mass remains constant and There are changes in energy.

Isolated System: Mass and Energy remain constant.

**What are all the processes?**

**Isothermal**

**Isentropic**

**Adiabatic**

**Isochoric**

**Define a Power Cycle**

**Is a thermodynamics process that involves the transference of heat and work that comes in and out of the system by varying the pressure temperature and other state variables withing the system.**

**Define Carnot Cycle and processes.**

**Ideal cycle- reversible**

1-2 isentropic compression

2-3 Isothermal Expansion

3-4 isentropic Expansion

4-1 Isothermal Compression

**Define Rankine Cycle and process.**

**Steam engine. Non reversible.**

1-2 adiabatic compression in a pump:

2-3 Constant pressure heat addition in a boiler:

3-4 adiabatic expansion in a turbine:

4-1 Constant pressure heat rejection in a condenser

**Define Rankine + (with reheat) Cycle and process.**

**The optimal way of increasing boiler pressure is to reheat the vapor as it exits from a first stage turbine and redirect it to a second turbine.**

**Define Rankine ++ (regen and reheat) Cycle with processes.**

**Use regeneration to heat up the liquid before sending it to the boiler. The regen extracts steam from the turbine to provide a heat source to the regenerator.**

**Define Otto Cycle with processes.**

1-2 Isentropic compression

2-3 Constant volume heat addition

3-4 Isentropic expansion

4-1 Constant volume heat rejection

**Define Diesel Cycle with processes.**

Combustion engines. Closed system.

1-2 Isentropic compression

2-3 Constant pressure heat addition

3-4 Isentropic expansion

4-1 Constant volume heat rejection

**Define Stirling Cycle with process.**

-Ideal Cycle. Reversible. Highest efficiency. Very Expensive.

1-2 constant volume heating

2-3 isothermal Expansion

3-4 constant volume cooling

4-1 isothermal Compression

**Define Ericsson Cycle with processes.**

1-2 isothermal Expansion

2-3 Constant pressure heat addition

3-4 isothermal Compression

4-1 Constant volume heat rejection

**Brayton Cycle**

1-2 Isentropic compression

2-3 Constant pressure heat addition

3-4 Isentropic expansion

4-1 Constant pressure heat cooling