



## Background

Over 70% of the earth's water supply is salinated, and industrial water contamination further reduces the available supply of fresh water. Current desalination technologies are too expensive for widespread use.

In response to this problem, the Petroleum Research and Recovery Center (PRRC) has patented hollow nano-fibers capable of desalinating water at significantly lower cost than reverse osmosis. Desalination modules created using these fibers have the additional benefit of being portable and space efficient. A typical array of modules is predicted to filter up to 80,000 gallons of water per day.



Figure 1: Field Tested Trailer System with H.F. Modules

## Objectives and Requirements

This semester's water desalination team was tasked with improving methods for epoxy injection of our hollow fiber modules. This semester's tasks included:

- Design gravity fed injection system
- 3D print design and scale sizing
- Produced water lab research
- Design/construct produced water module

## Completed Tasks

### Gravity Fed Injection System:

- Designed to allow the gravitational and centrifugal force to aid in the epoxy injection process
- Minimal waste of lab materials

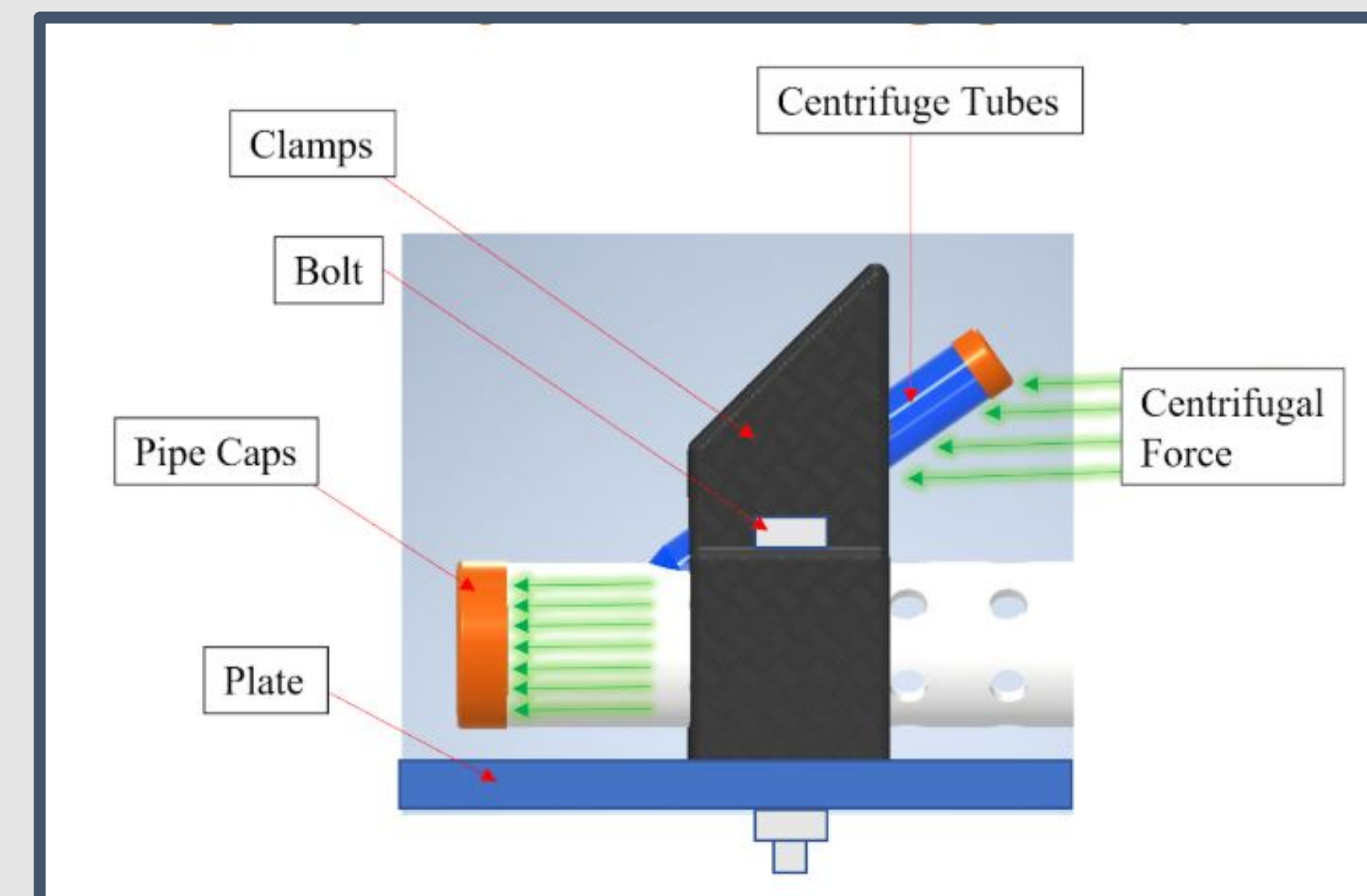


Figure 2: Illustrated Injection Process

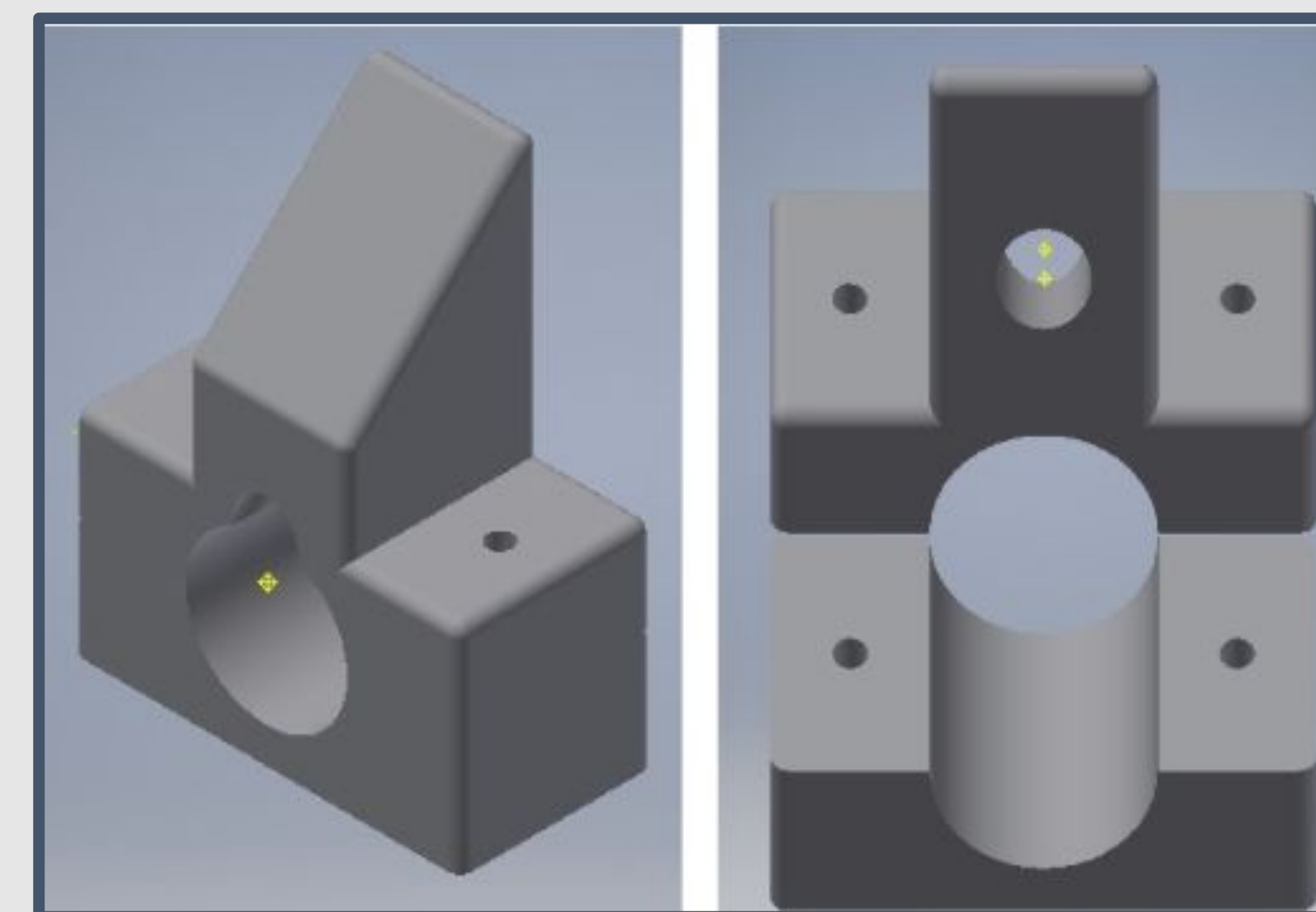


Figure 3: CAD modeled clamp design

### Produced Water Module Prototype:

- New module would have two influent entries for superheated produced water and an effluent exit at the center



Figure 4: Prototype assembly

## Future Work

### Produced Water Purification:

- Assist scientists/engineers with the introduction to produced water purification
- Lab tests and scaling developments for commercialization
- Research and Development to improve efficiency
- Prove methods are effective
- Develop a system that can be streamlined for Oil and Gas operations as well as Industrial use.

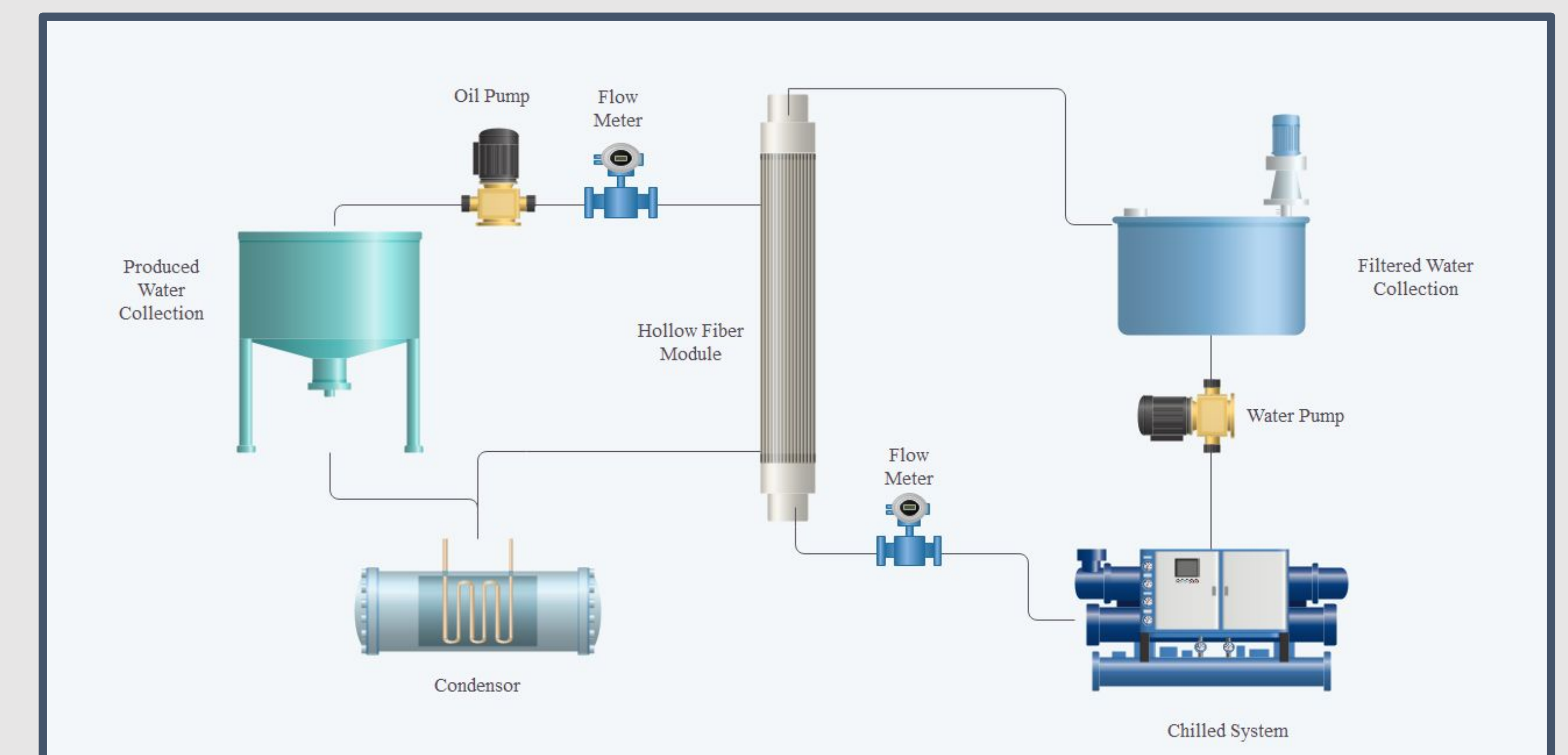


Figure 5: Schematic of Produced Water Purification

## Spring 2020 Water Desalination Team



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