The purpose of this project is to replace an existing, manually operated sludge pumping procedure with a fully automated one with the option of performing manually or semi-automatically.

The constraints of the project included:
- Design must be able to pump the correct consistency of sludge from the Clarifier station to the Oil Separation Unit
- Emergency Stop to ensure system and operator safety
- The system must be closed loop utilizing feedback

The objectives of the project included:
- Run through pumping procedure without human interaction
- Capable of manual override

The PLC controls the actions of the actuators and pump: open/close, run/stop. Input is received from the flow meter, pressure gauge and turbidity meter determining conditions in controlling the process.

**PLC Modes of Operation**

1. **AUTOMATIC**
   - No human interaction required
   - Driven by sensor input only
   - Closed loop operation

2. **SEMI-AUTOMATIC**
   - Assistance required only for starting
   - Open loop time based operation

3. **MANUAL**
   - Manually initiated
   - User selects North or South clarifier
   - User selects and actuates valves/pump

**Benefits of The Automated System:**
- Reduce manual labor hours
- Decrease excess water sent to the OSU
- Does not rely on human schedule
- Time efficient

**Programmable Logic Control (PLC)**

The PLC controls the actions of the actuators and pump: open/close, run/stop. Input is received from the flow meter, pressure gauge and turbidity meter determining conditions in controlling the process.