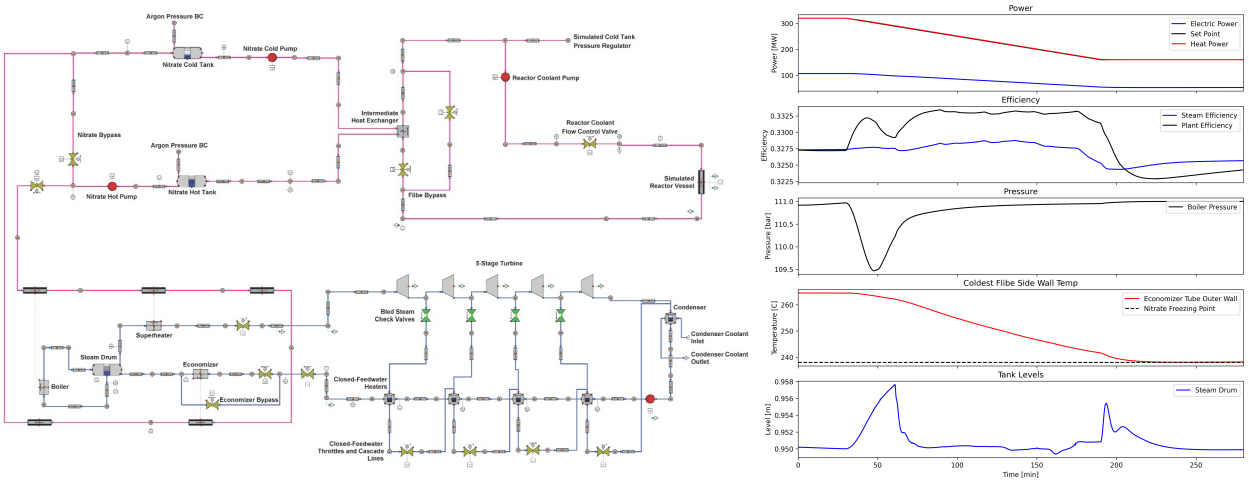
DYNAMIC MODELING AND SIMULATION OF A POWER GENERATING STEAM RANKINE CYCLE FOR A FLOURIDE SALT-COOLED HIGH-TEMPERATURE REACTOR NUCLEAR POWER PLANT



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Nuclear Fluoride Salt-Cooled High-Temperature Reactors (FHRs) have the potential to greatly improve nuclear technology in terms of safety and cost. By combining molten salt coolant technology from the Molten Salt Reactor (MSR) and TRISO fuel technology from the Very High Temperature Gas Reactor (VHTR), FHRs may operate at significantly lower pressures than Light Water Reactors (LWRs) and with a more robust fuel source that is excellent at containing fission products. However, as no FHR has been built, there are still many design questions to address. This thesis investigates how an FHR could potentially interface with a Rankine steam cycle to produce electricity. This includes preventing the freezing of the molten salt by using an intermediary salt loop as well as investigating various steady-state and transient conditions such as power ramps, perturbations in condenser coolant, and load-following.