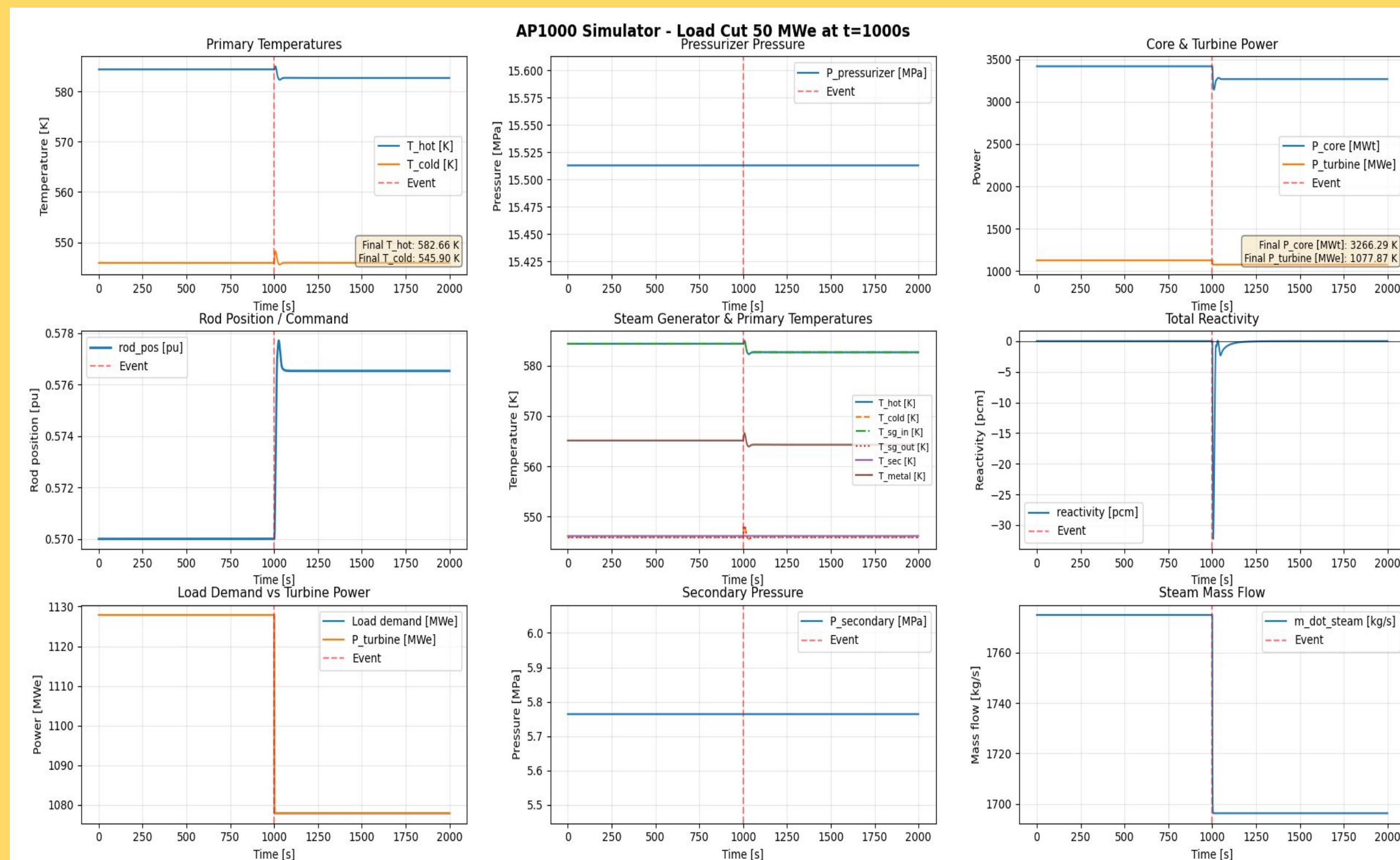


Pressurized Water Reactor Simulation and Visualization

Team #4 The Neutron Ninjas and the Coolant Kid

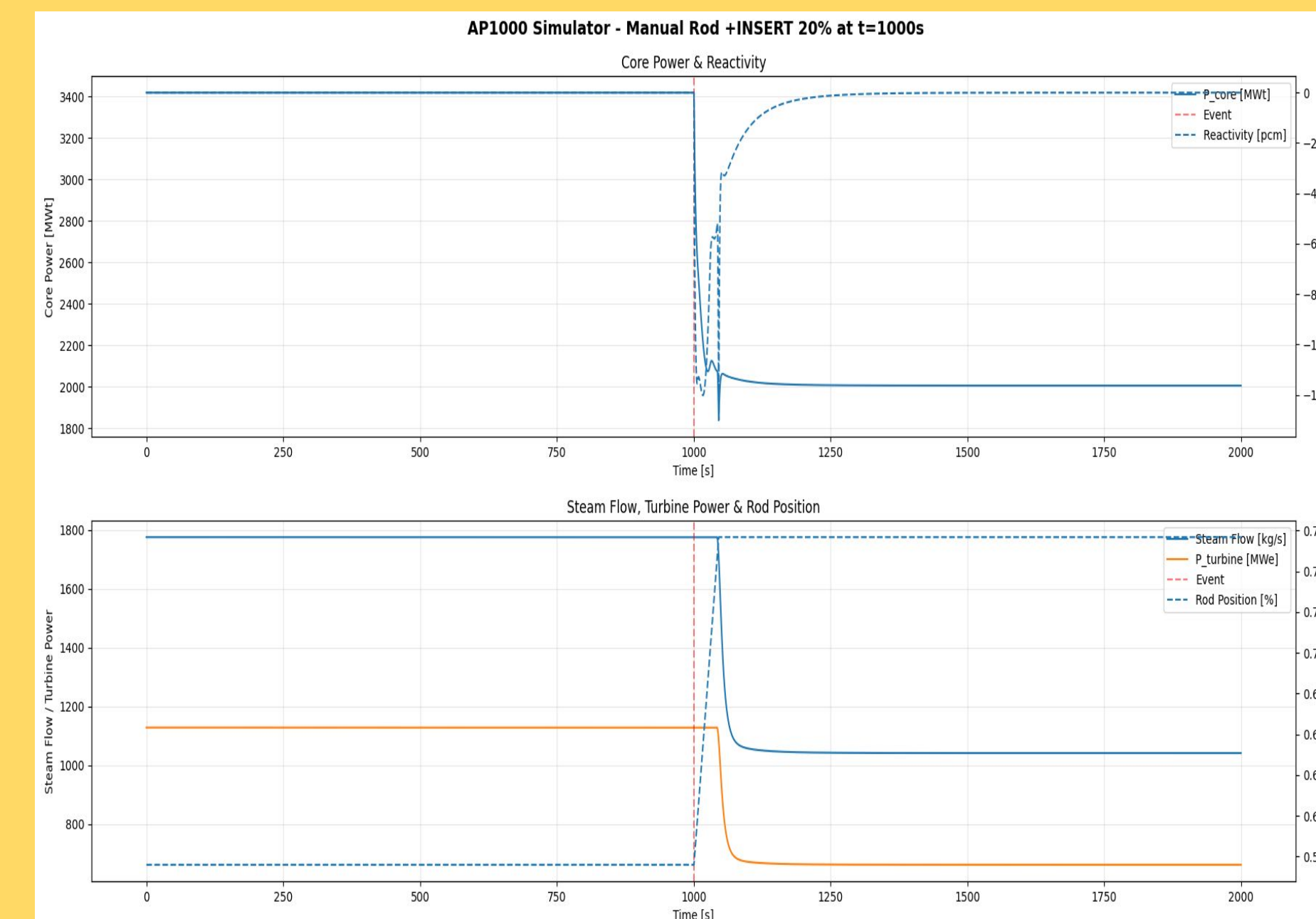
Mila Edwards, Chris Estler, Tracy Gonce, Ian Mylenbusch, and Daniel Oswalt

Mentor: Dr. Holbert

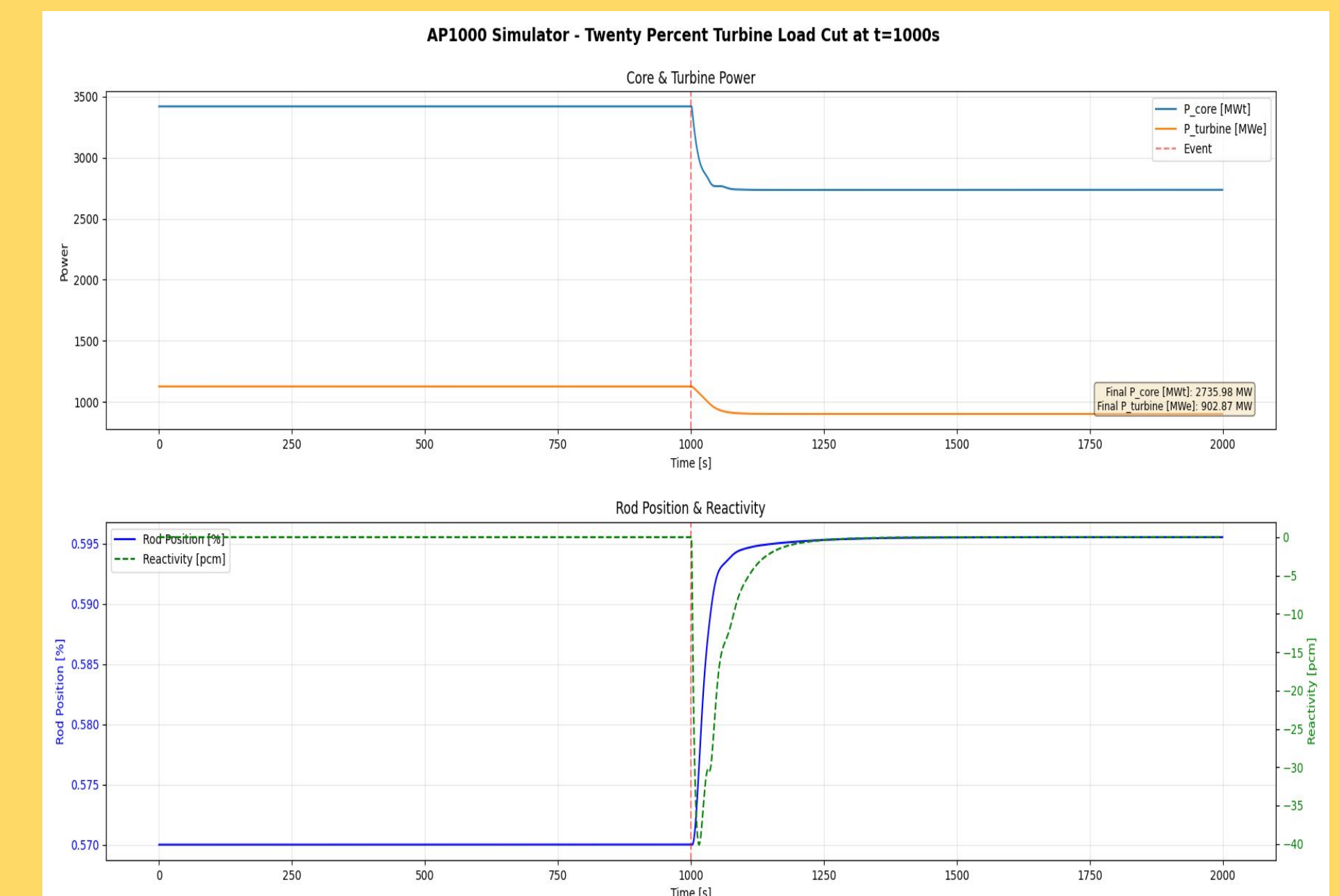


Results of a steady state scenario followed by a 10% load cut at 1000 seconds

$$U = f \cdot P/A (T_f - \theta_{avg})$$



Scenario 1: 20% turbine load cut



Scenario 2: 20% manual rod insertion

Team #4 created a Python-based simulator for a modern multi-loop pressurized water reactor (PWR) nuclear power plant. The plant includes a nuclear steam supply system (NSSS) with a reactor core, hot and cold legs, pressurizer, and steam generator connected to a turbine. The user is able to control rod position and the turbine load. The Python code is very portable and can be modified or improved upon later. This simulator includes a graphical user interface (GUI) displaying time-varying state variables such as reactor power, reactivity, primary temperatures and pressures, steam flow, and electric power. Also included is a user manual that steps through two simulation scenarios: (1) Turbine load cut and (2) Manual rod insertion.

