PWR Steady-State Calculation Exercise

The goal of this exercise is to run a 1000 second steady-state calculation using the PWR Model. During the calculation, an animation of the steady-state output will be used to verify steady conditions are met for various key parameters. This calculation will be used in the next exercise to run a restart calculation that will simulate a cold leg small break LOCA.

Objectives

- Run a 1000 second steady-state calculation with the PWR model.

Overview of Steps

1. Preliminary Setup (Open the PWR Model).
2. Change the End Time of the Calculation.
3. Submit the PWR Model for a Steady-State Calculation.
4. Verify Steady Conditions Have Been Achieved.

Step 1 Preliminary Setup (Open the PWR Model).

1. If the PWR model you were working with in the previous exercise (Reflood Model Activation) is still open and you have successfully completed the previous exercise steps, continue to work with that model in this exercise. If not, then click on Day4/Morning/PWR_Steady-State/PWR-SS2.med.

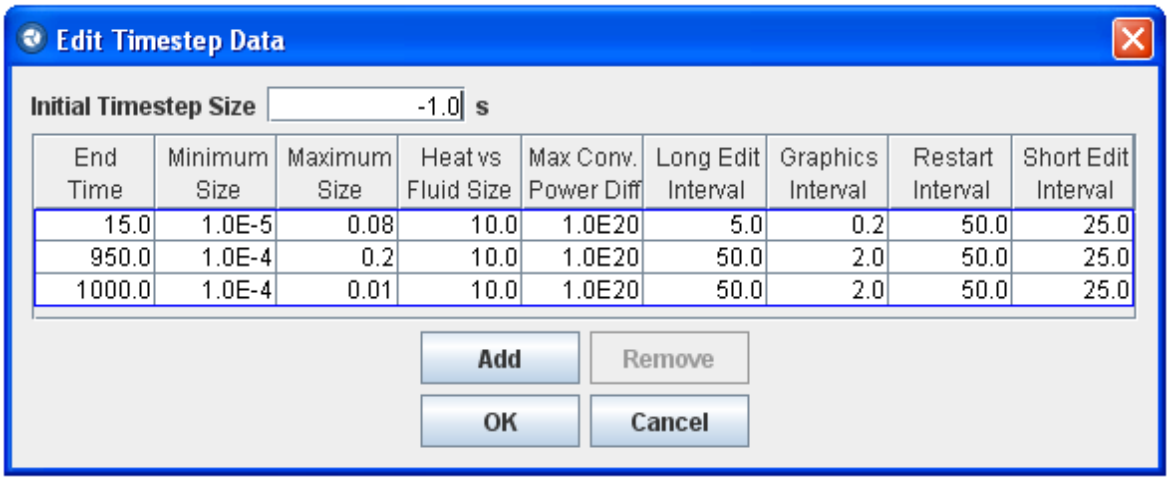
Step 2 Change the End Time of the Calculation.

The ending time of the input model needs to be modified to reflect the 1000 s steady-state calculation.

1. Locate and click in the “Model Options” in the Navigator Window.

2. In the Properties Window, locate the "Timestep Data" input box and expand it.

3. In the "Edit Timestep Data" dialog window, modify the input to match the input given below, then click the OK button at the bottom of the window.



Step 3 Submit the PWR Model for a Steady-State Calculation.

1. In the Model Editor, locate and click on the "Job Stream" tab at the bottom of the View Window.

2. A Job Stream has already been created for this exercise. The animation file is attached and should automatically come up when the job is submitted.

3. Lock the View Window by clicking on the lock icon located on the left side of the Toolbar. Click on the Execute button in the View Window. The job stream will submit the PWR model for execution.

4. If the animation file does not come up automatically, click on the play button in the Job Status window to get the calculation going, then:

A) Go to the Day4/Morning/PWR_Steady-State folder and double-click on the file PWR-Anim.med.

B) The animation file will appear in another Model Editor window. Connect the

animation to the steady-state calculation and click on the play button to get the calculation to play the results of the simulation.

Step 4 Verify Steady Conditions Have Been Achieved.

Using the animation, verify that steady conditions are being achieved. Note two tabs at the bottom of the View Window labeled "System View" and Steady State Plots". Use the information in these two tabs to view the progression of the calculation. Are steady conditions being achieved and is the solution acceptable in the calculation? Spot check the calculated values for key parameters against the desired target values and fill in the table below.

Key Parameters	Target Values	Calculated Values
Primary Pressure	15.5 MPa	
Secondary Pressure	5.8 MPa	
Loop T_{ave}	576 K	
Loop Mass Flow Rate	4259 kg/s	
Pressurizer Level (normalized)	0.458	

This completes the steady-state calculation exercise. The next exercise will use the initial conditions from this calculation to start a cold leg small break LOCA.