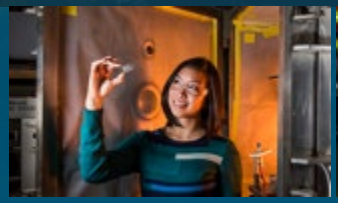
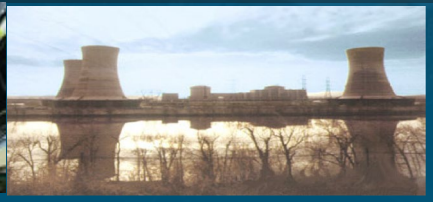
SNAP Post Processing

SAND2019-13336 PE





PRESENTED BY

Larry Humphries llhumph@sandia.gov

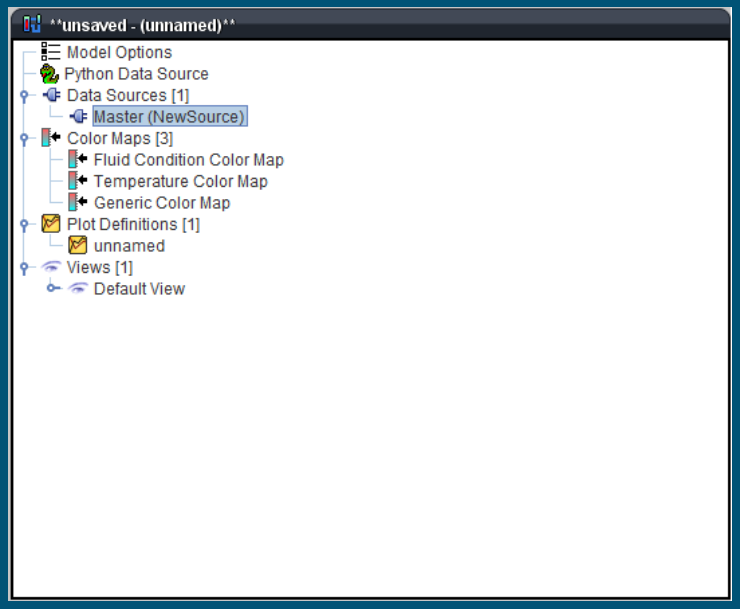
Objectives of Presentation

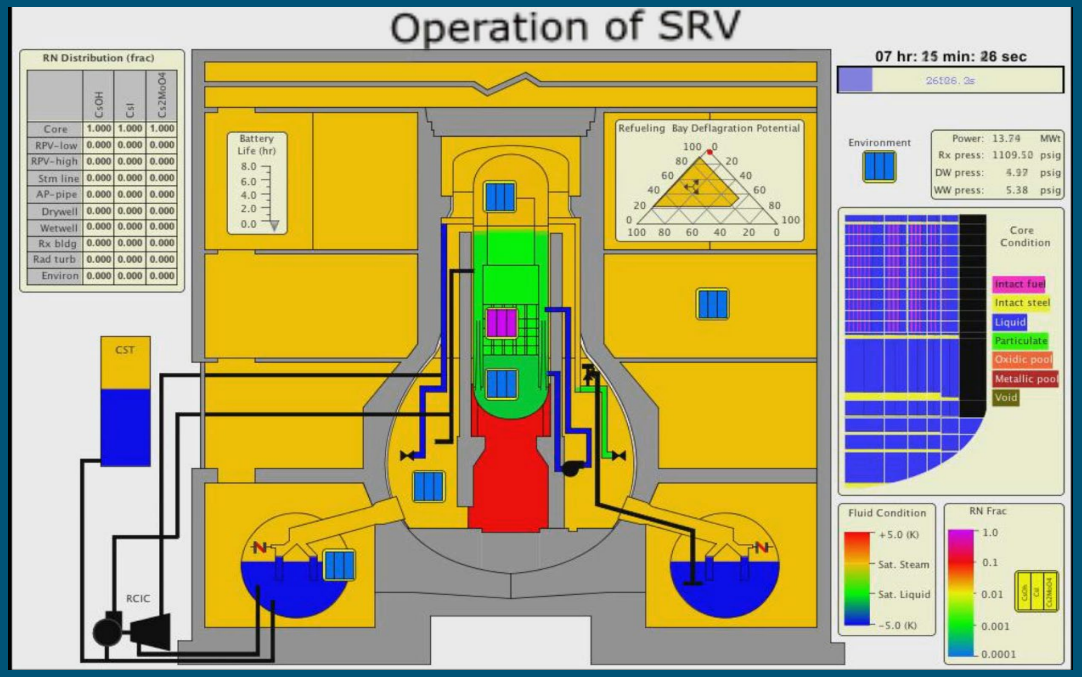
- Provide a review of the SNAP GUI for post-processing data
  - Working with Animations and View Ports
  - Data Connections
  - Color Maps
- Working with Drawing Tools
  - Indicators
  - Plant Components
  - Interactive Controls
- SNAP Demonstration
  - Creating an axial plot
  - Creating a deflagration bean
  - Stacked elements

Post Processing with SNAP

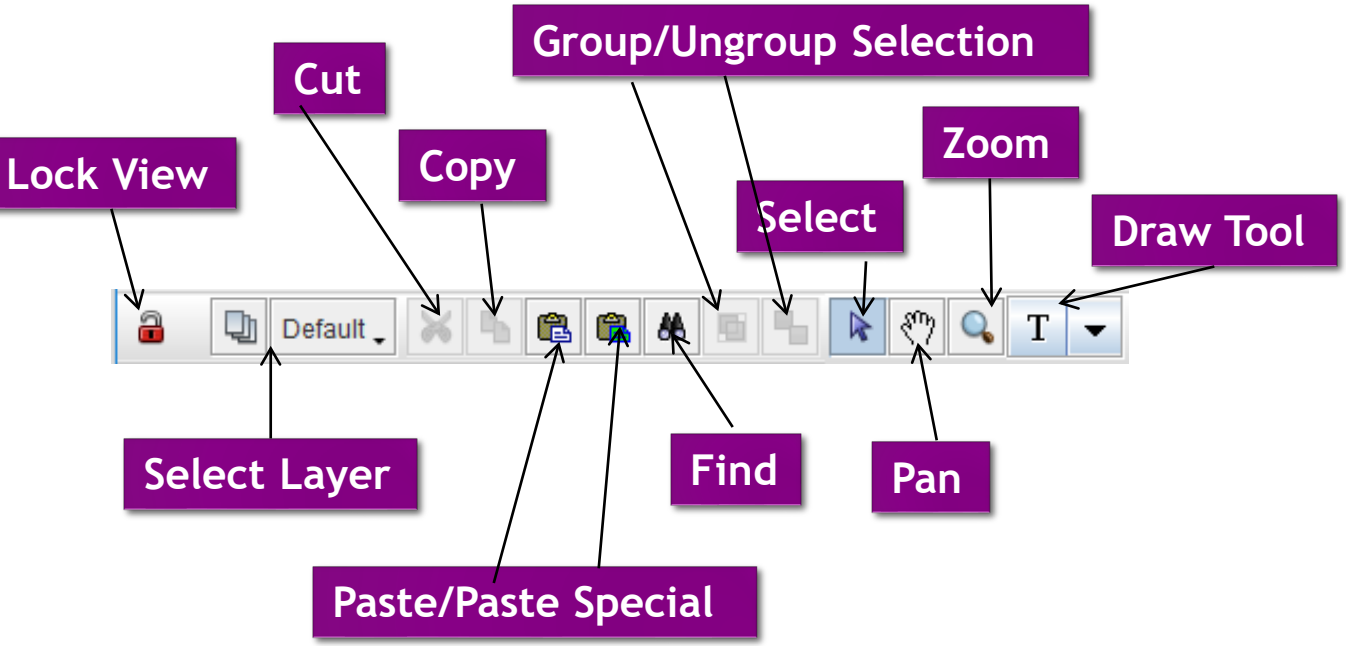
Animation Model is a separate model from the MELCOR model

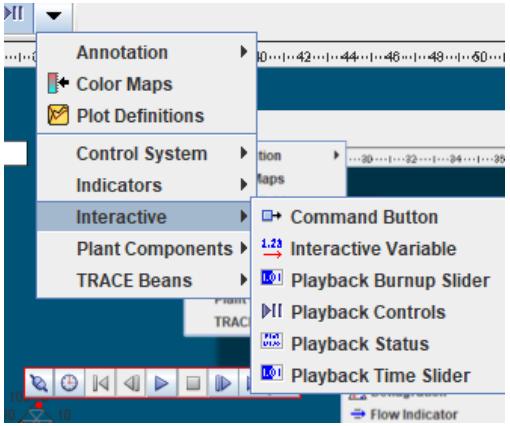
- File>New select Animation model
- Data connection to the plotfile(s) must be established
- Animations are displayed in View Port





View Port





Draw Tool is used to access all drawing components

Graphics can be assigned to layers for better organization and control

- Individual layers can be locked to prevent editing certain components

Interactive elements on View Port can only be activated if the view is locked

- This is to prevent accidental interactions while editing the view components

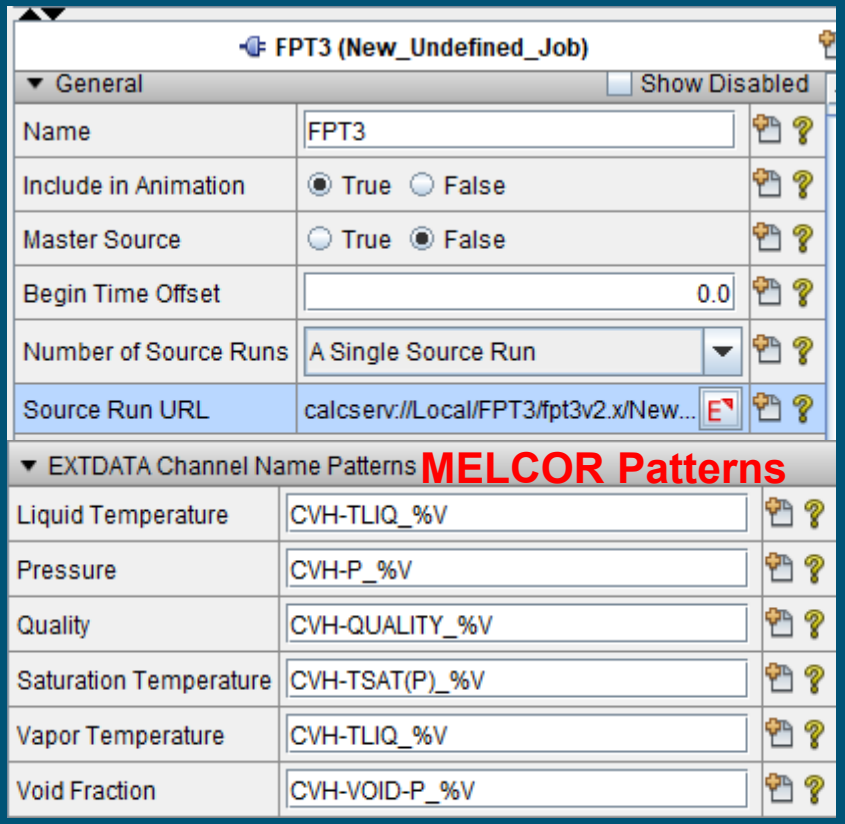
If the screen is locked you cannot edit any of the components

Data Sources

Attaching a plotfile

- Data Sources
  - Plot file data
  - Python Data Sources
- Multiple data sources can be specified
  - One source is designated master and used to determine Tstart, Tend, and time steps
    - Other sources are interpolated between time steps
- Selecting Data Source
  - Click on Master in the Data Source Tree in the Navigator and set the Source Run URL in the Properties to a completed Job
  - Click the Data Connector Icon
- Number of Source Runs
  - Data Source can span multiple plot files assuming they are from sequential restart runs.
- Patterns for variables can be specified for data sources
  - i.e., MELCOR, TRACE, RELAP5 have different patterns

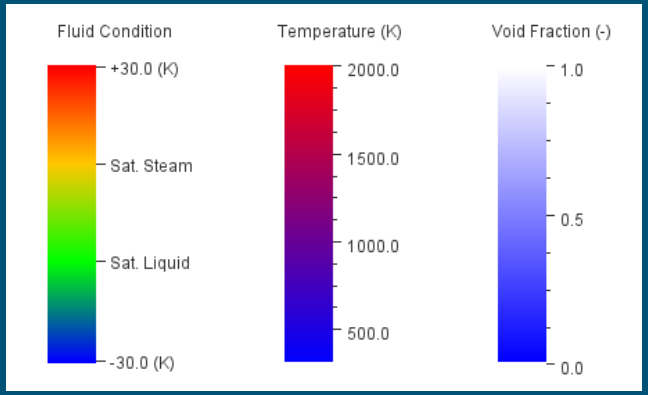
Click Data Connection to make connection to the data source.



Color Maps

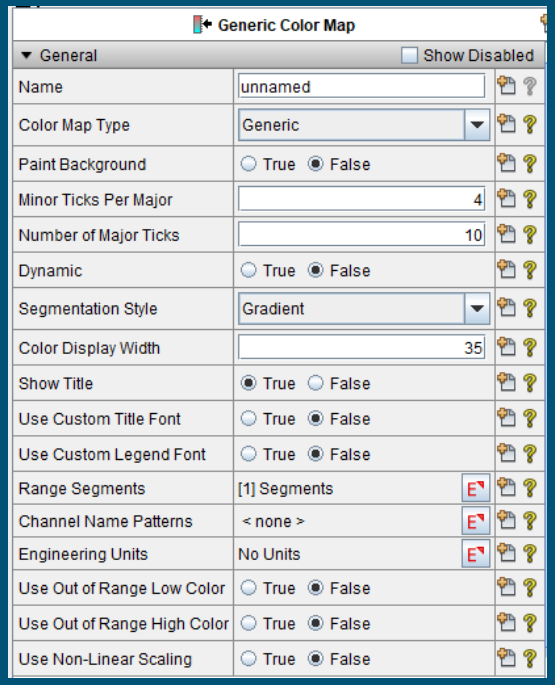
Built-in Color Map Options

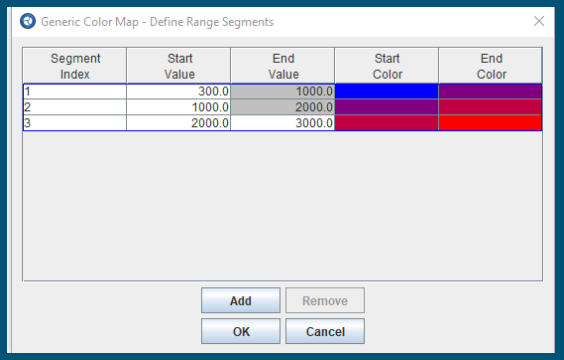
- Fluid Condition Color Map
- Temperature Color Map
- Void Fraction Color Map
- Generic Color Maps



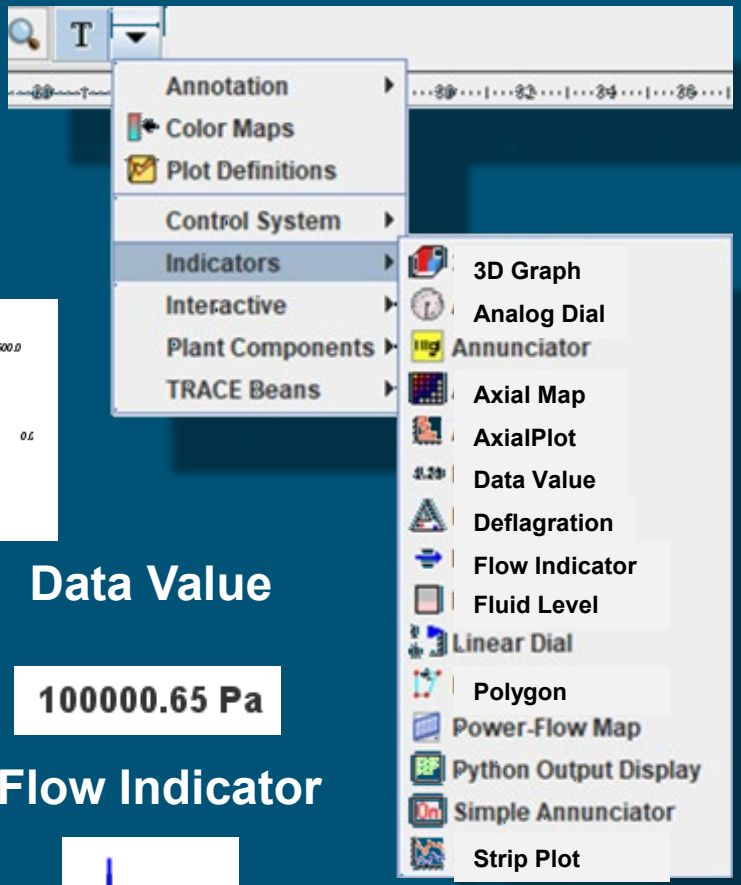
Creating a Generic Color Map

1. Right Click Color Maps in the Navigator>New
2. Right Click the new Generic Color Map>Add To View
3. Adjust some Properties
   - Set Color Map Type to Generic
   - Specify Dynamic as True
   - To create a pressure color map, set Channel Name Pattern to MELCOR "CVH-P_%V"
     - Review the MELCOR User's Guide to see all the available plot channels
     - %V is a place holder for the components Control Volume number (see notes for a detailed description on its use)

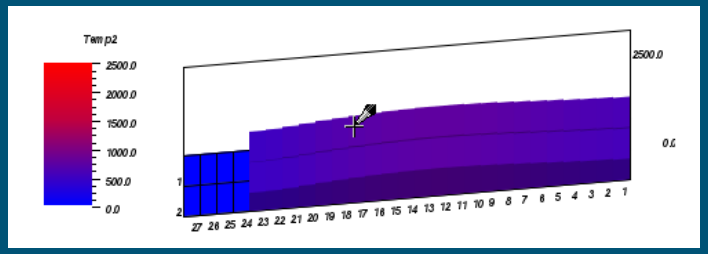




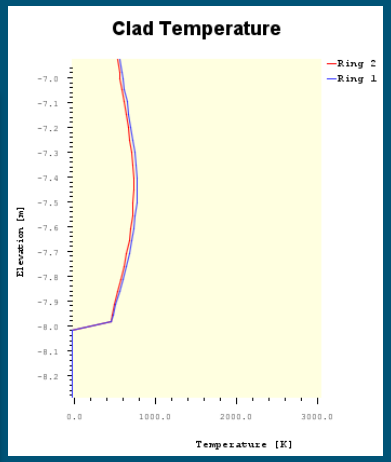
Indicators



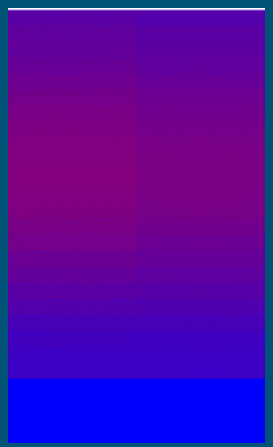
3D Graph



AxialPlot



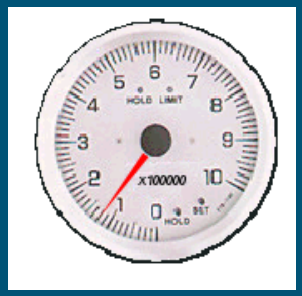
Axial Map



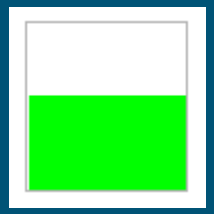
Data Value

100000.65 Pa

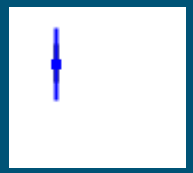
Analog Dial



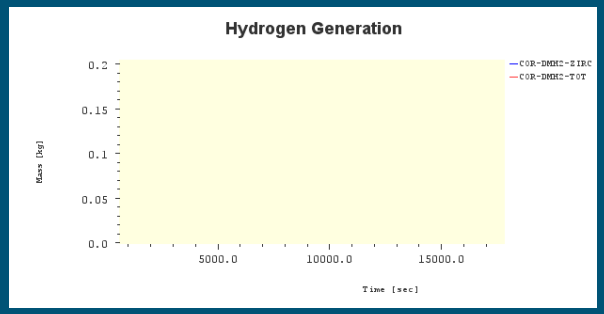
Fluid Level



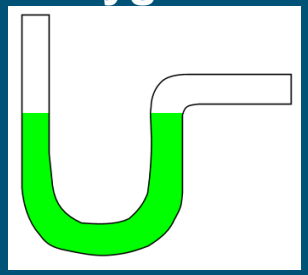
Flow Indicator



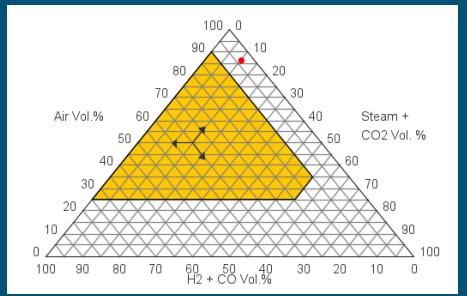
Strip Plot



Polygon



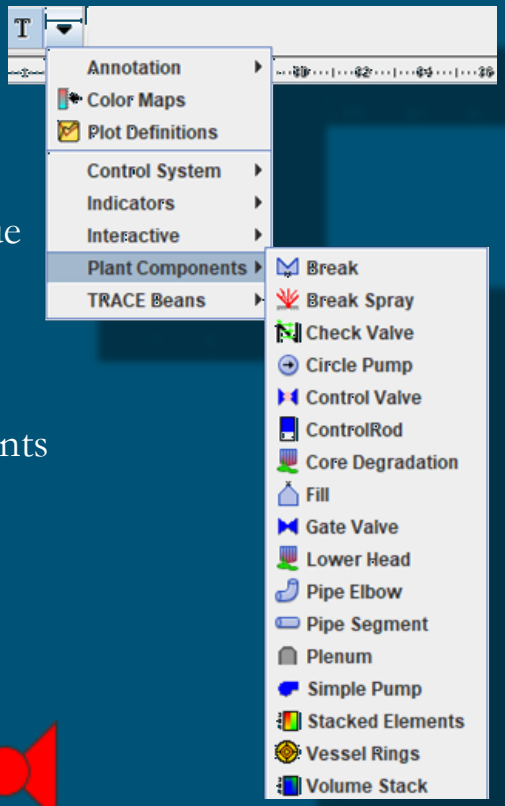
Deflagration

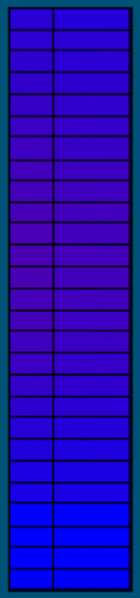


Plant Components

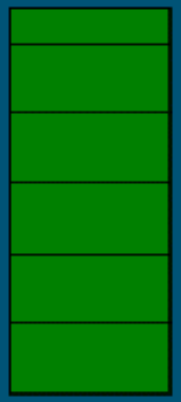
Represents a component

- Some of these components are unique to TRACE or other code.
- Simple Components
  - Sprays, valves, break, pumps
- Simplification of Complex Components
  - Core Degradation component
  - Lower Head component
  - Stacked Elements
  - Volume Stack



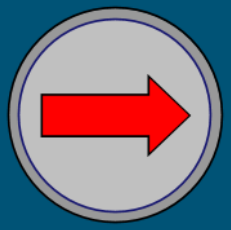


Stacked Elements



Volume Stack

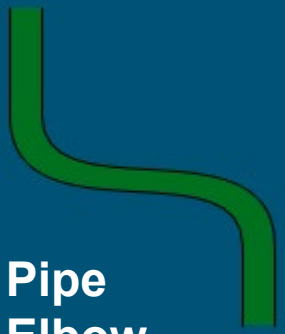
Break Spray



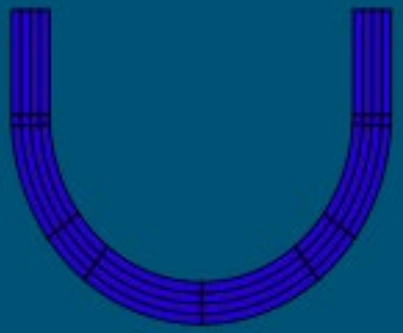
Circle Pump

Valve

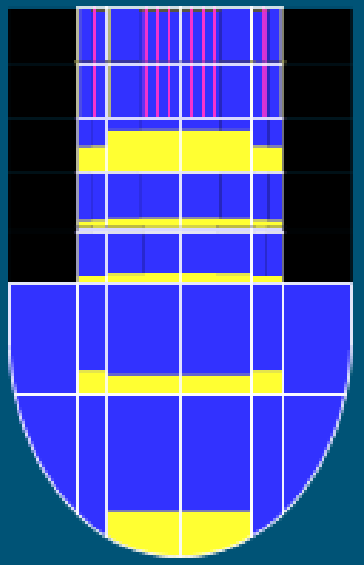
Pump



Pipe Elbow

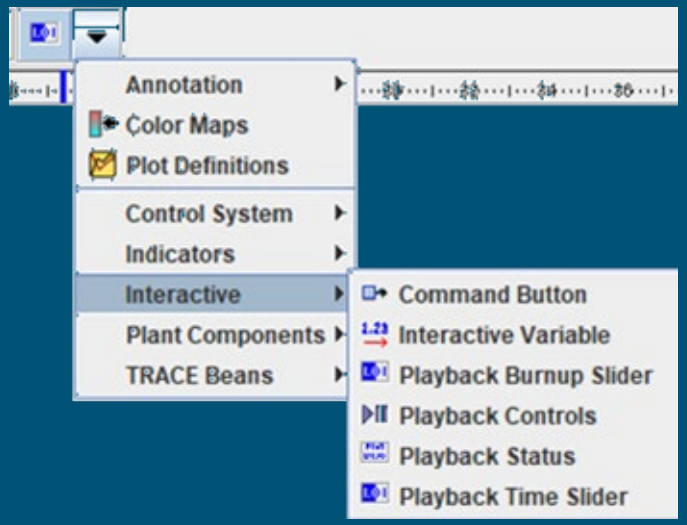


Lower Head



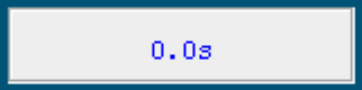
Core Degradation

Interactive Controls



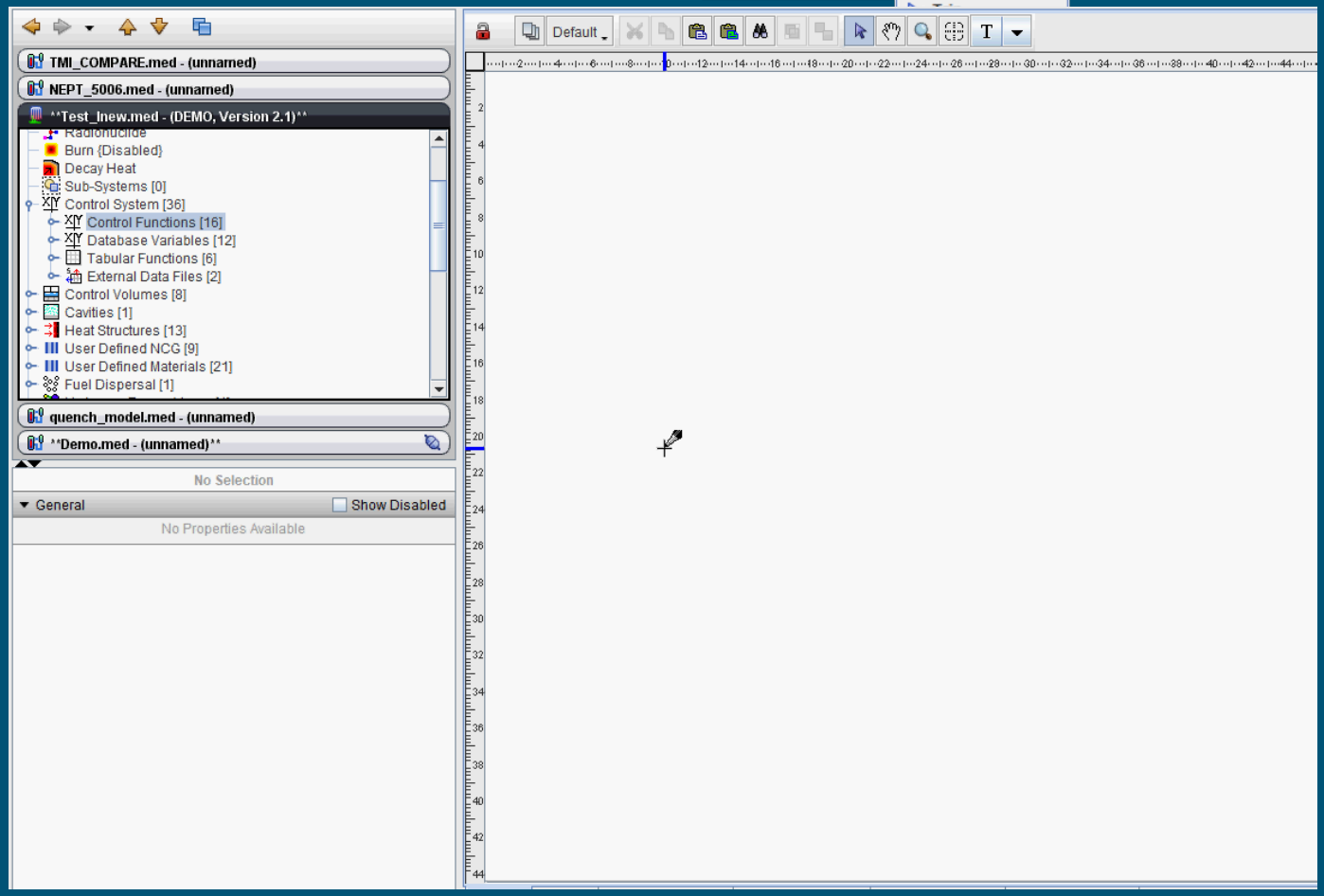
Playback Controls

Playback Status



Playback Time Slider

Viewing CF Layout in an Animation



Utility

- Debugging complex control function logic
- User can watch (debug) control function values

Model Editor

- Add the control functions to a view within the model editor
- Select those control functions you want to add to your animation and copy

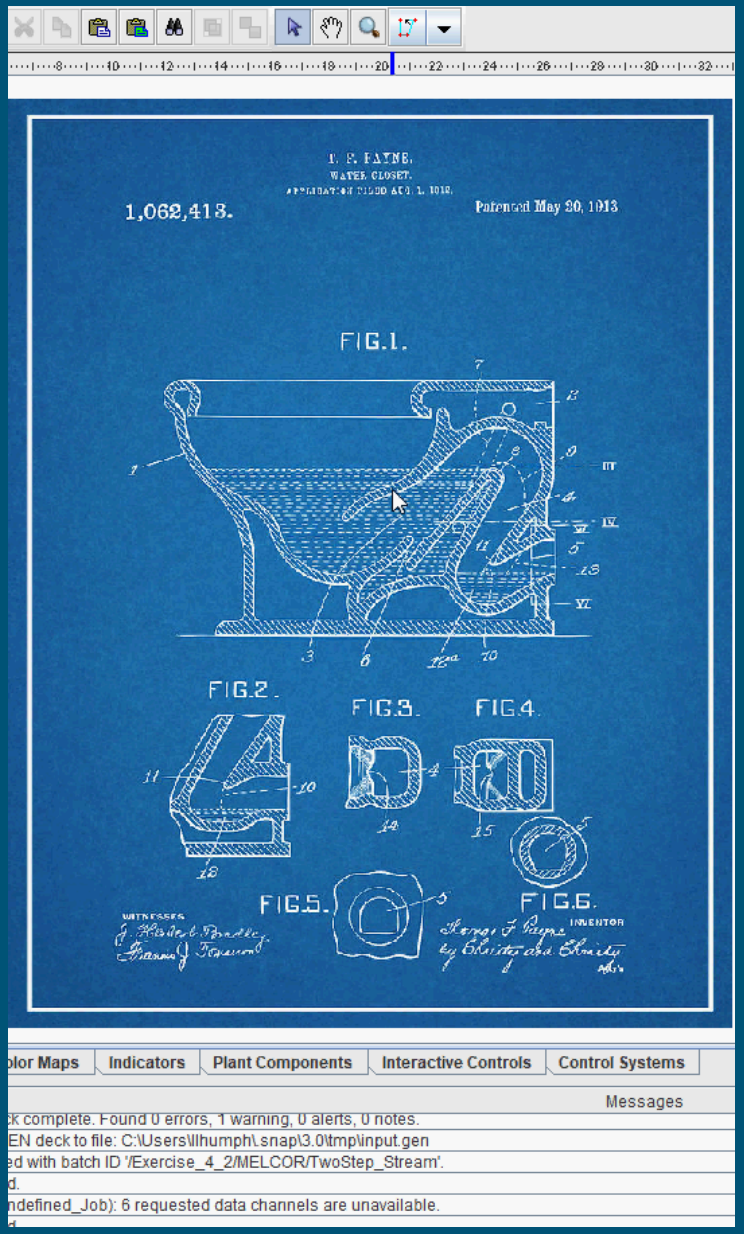
Animation Editor

- Paste directly into a view
- Add any interactive controls
- Modify any formatting
- Lock view and play back

Creating a Basic Animation Element

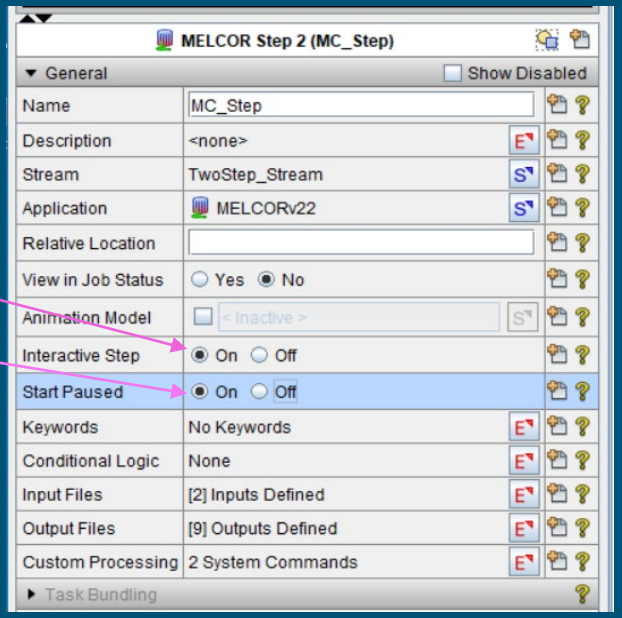
Creating a Polygon

- Select Polygon from the Annotation section of the View Port Toolbar (review earlier slides if you can't remember what the Toolbar looks like)
- Start clicking in the View port and the drawing logic will become clear (left click to set a point, right click to remove the last point)
- If you click on top of an old point it will close the polygon and the instance will be complete.

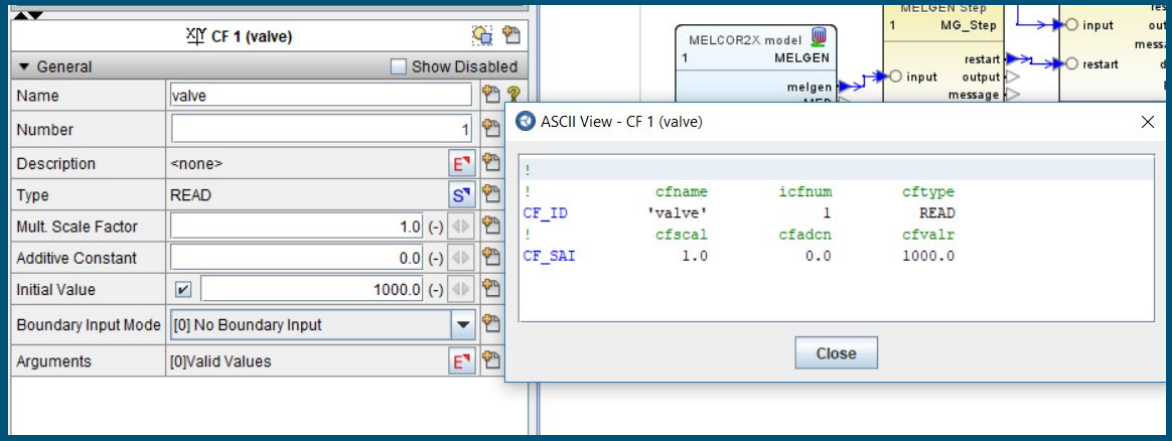


Running an interactive model – Model editor + coupled animation

Load Model in the Model Editor
- Modify the MELCOR Step
  - Activate interactive step
  - Start paused



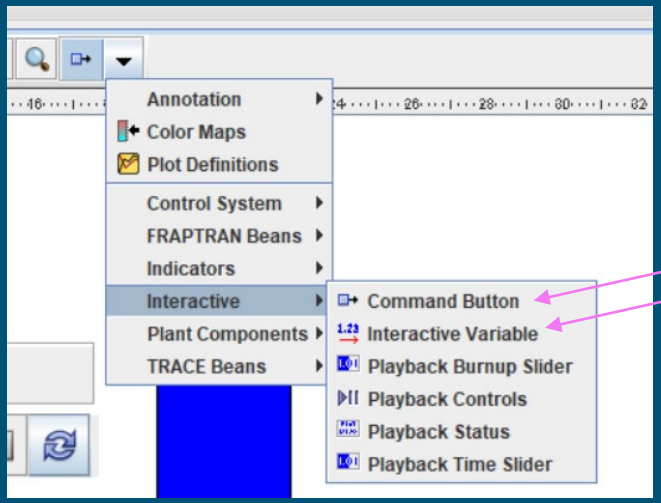
Interactive variables are defined in the control functions
- READ for a real variable
- L-READ for a logical variable



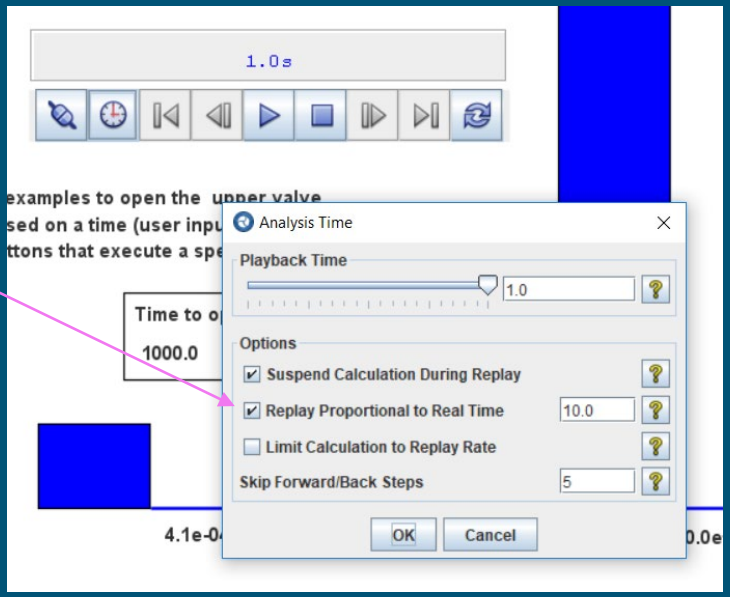
Setting up a coupled interactive animation

Interactive variables are selected using the interactive functions

- Command button for selects pre-specified values
- Interactive variable takes user input (e.g., time to close the valve)



Slowdown the calculation for this example to 10X of real time



Running an interactive model

Launch the calculation in the Model Editor

- Use the two-step job stream in the Model Editor
- MELCOR will initialize as paused

Open the Animation Display

- Data source is the calculation from the Model Editor (see below)
- Connect the Animation model and start the calculation.