Control System Studio Training - Alarm System Use

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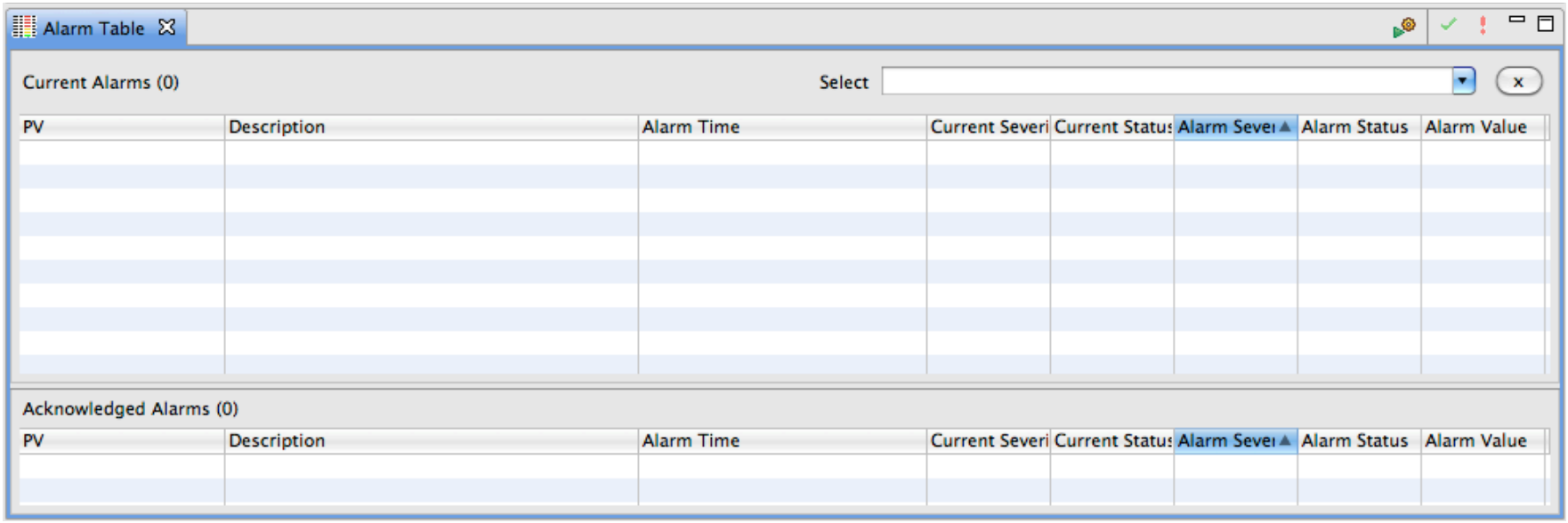
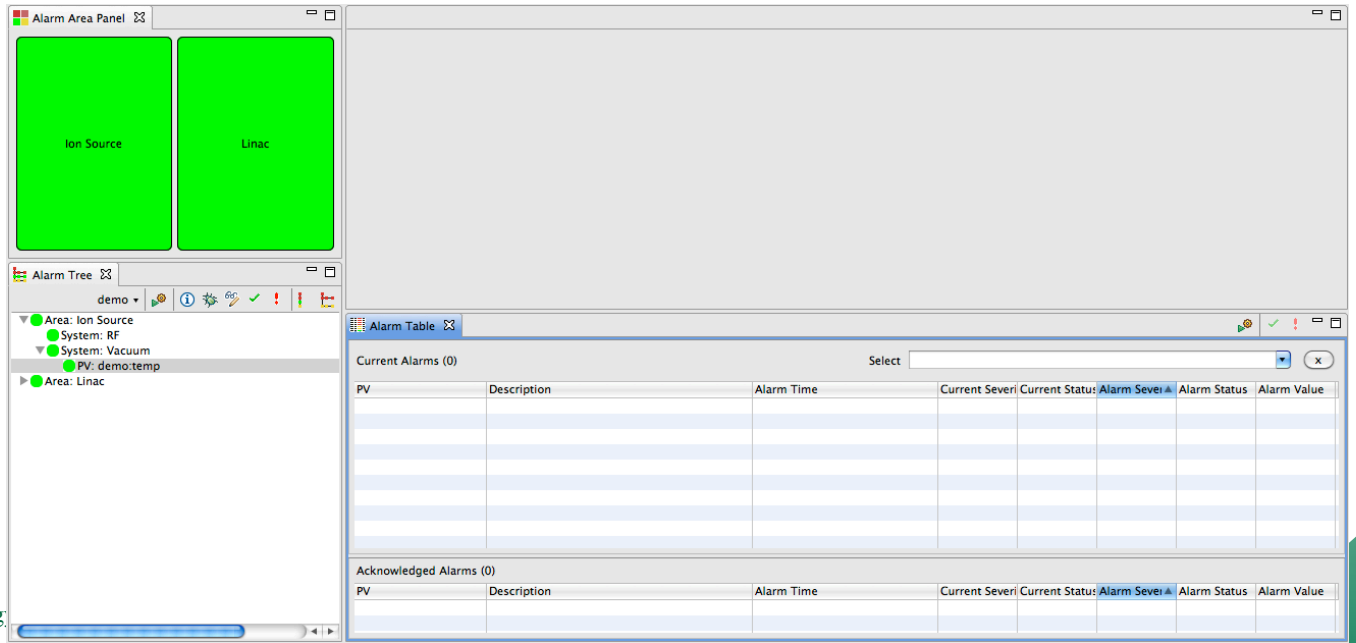
Operator Using the Alarm System

- Menu *CSS*, *Alarm*, *Alarm Table*
- Ideally: no alarms



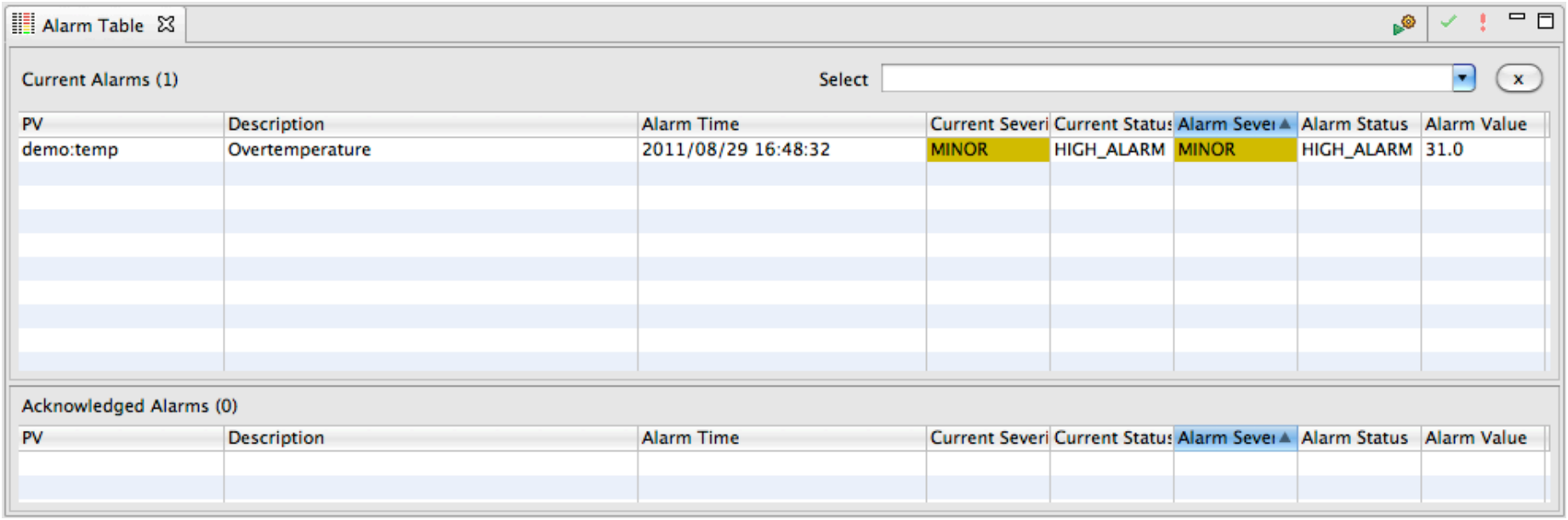
Operator Looking at Alarm User Interface

- **Other Alarm Views (Context Menu Alarm Perspective)**
  - **Alarm Tree: Displays all items monitored by the alarm server (with or without current alarm)**
  - **Area Panel: Overview of areas**
- **Still, all OK**



An Alarm Triggers!

Table shows what, when, …

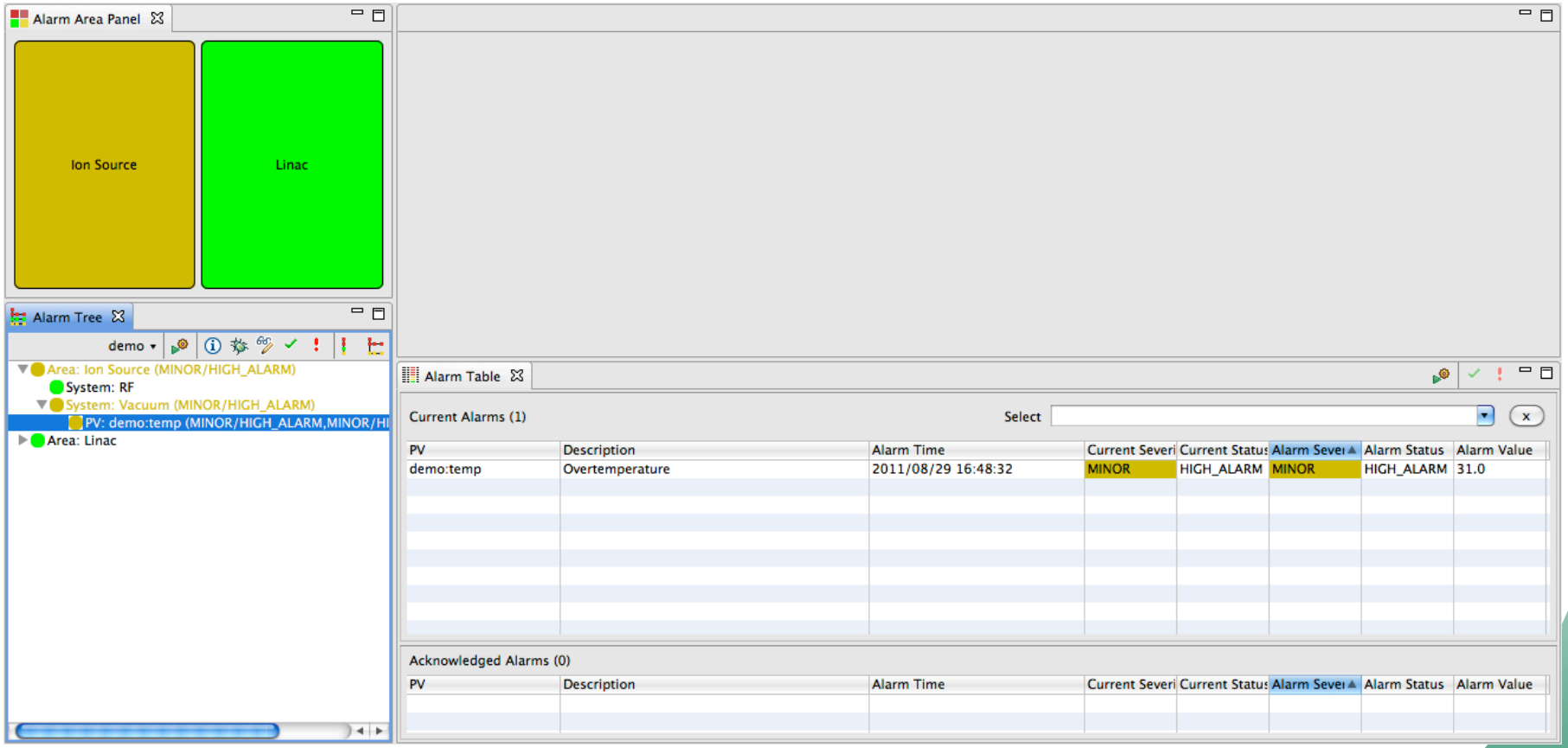


Annunciator would say:

"Minor alarm: Overtemperature"

An Alarm Triggers…

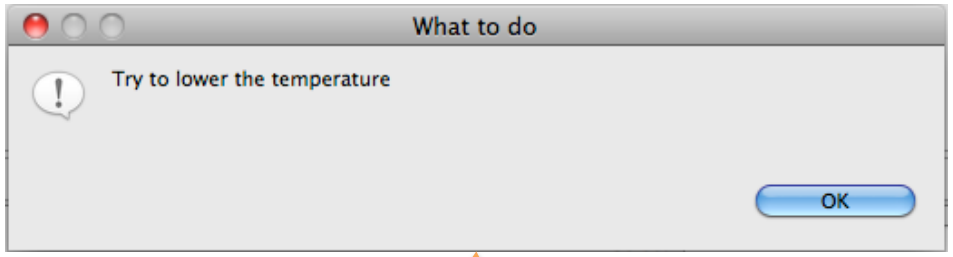
Some operators prefer just the Alarm Table, others also like to look at Area Panel or Tree View

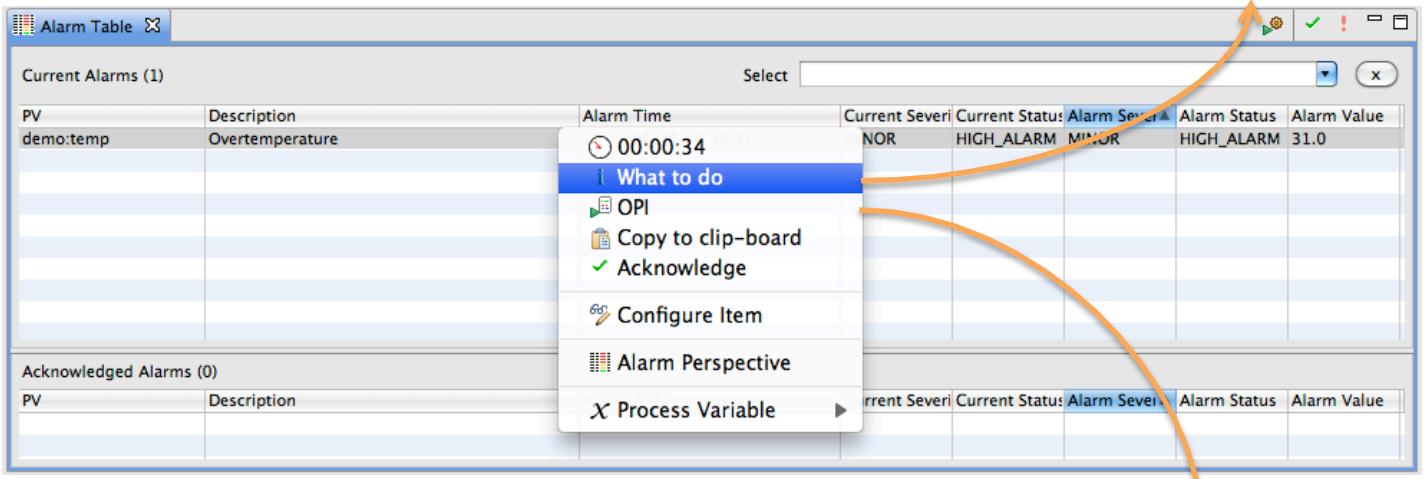


So there is a problem in the Ion Source Vacuum…

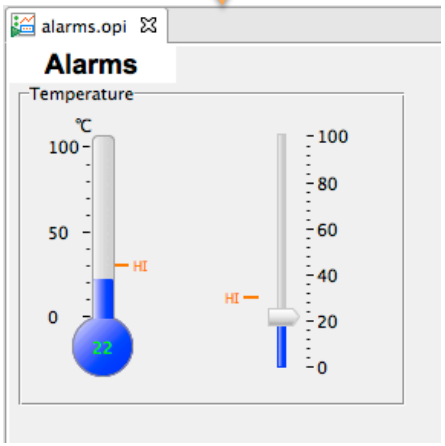
Context menu of Alarm

- Guidance

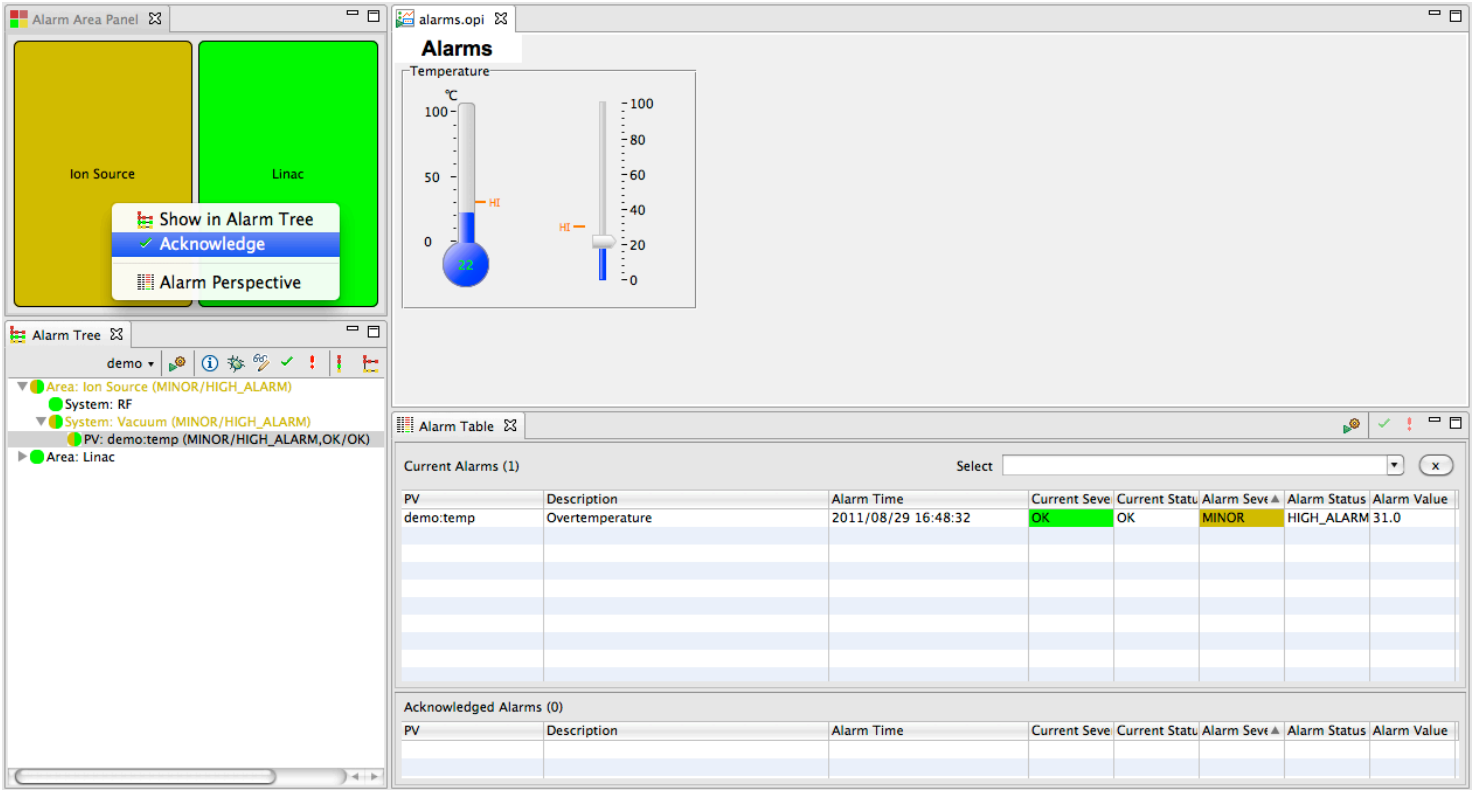




- Links to related OPIs

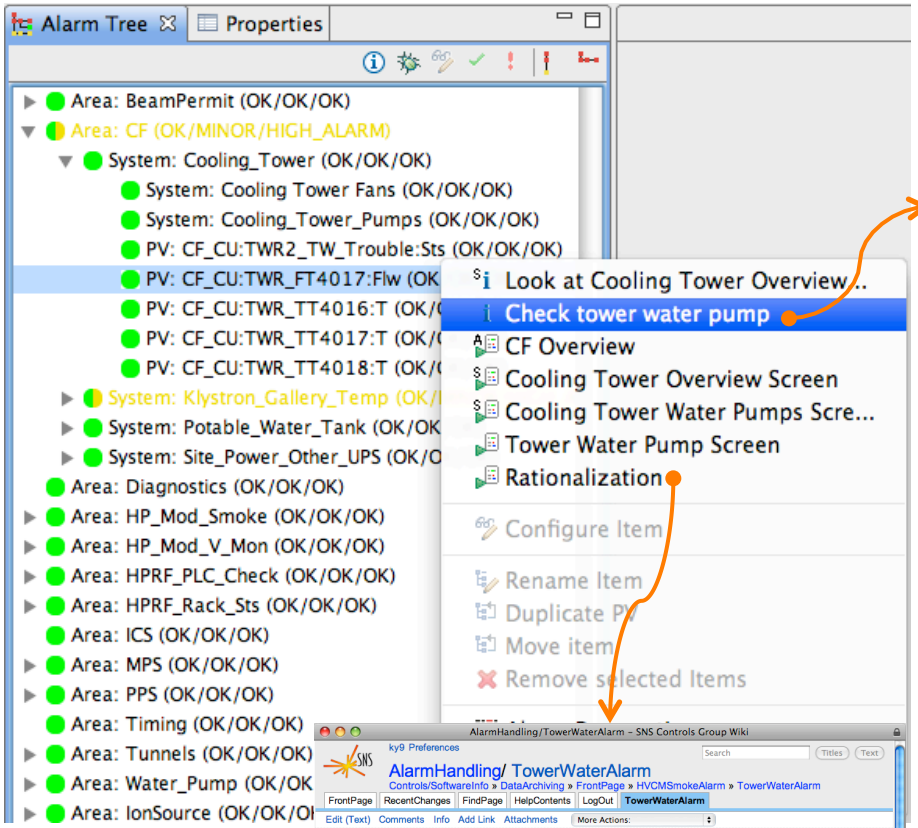


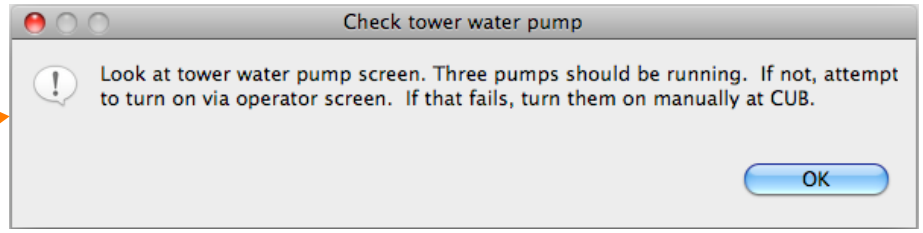
The Problem is fixed, Alarm clears



- **By default, the alarm system latches alarms**
  - **"Current" severity of PV is OK, but MINOR alarm is remembered until alarm is ✔ Acknowledged**

Guidance, Related Displays, Commands





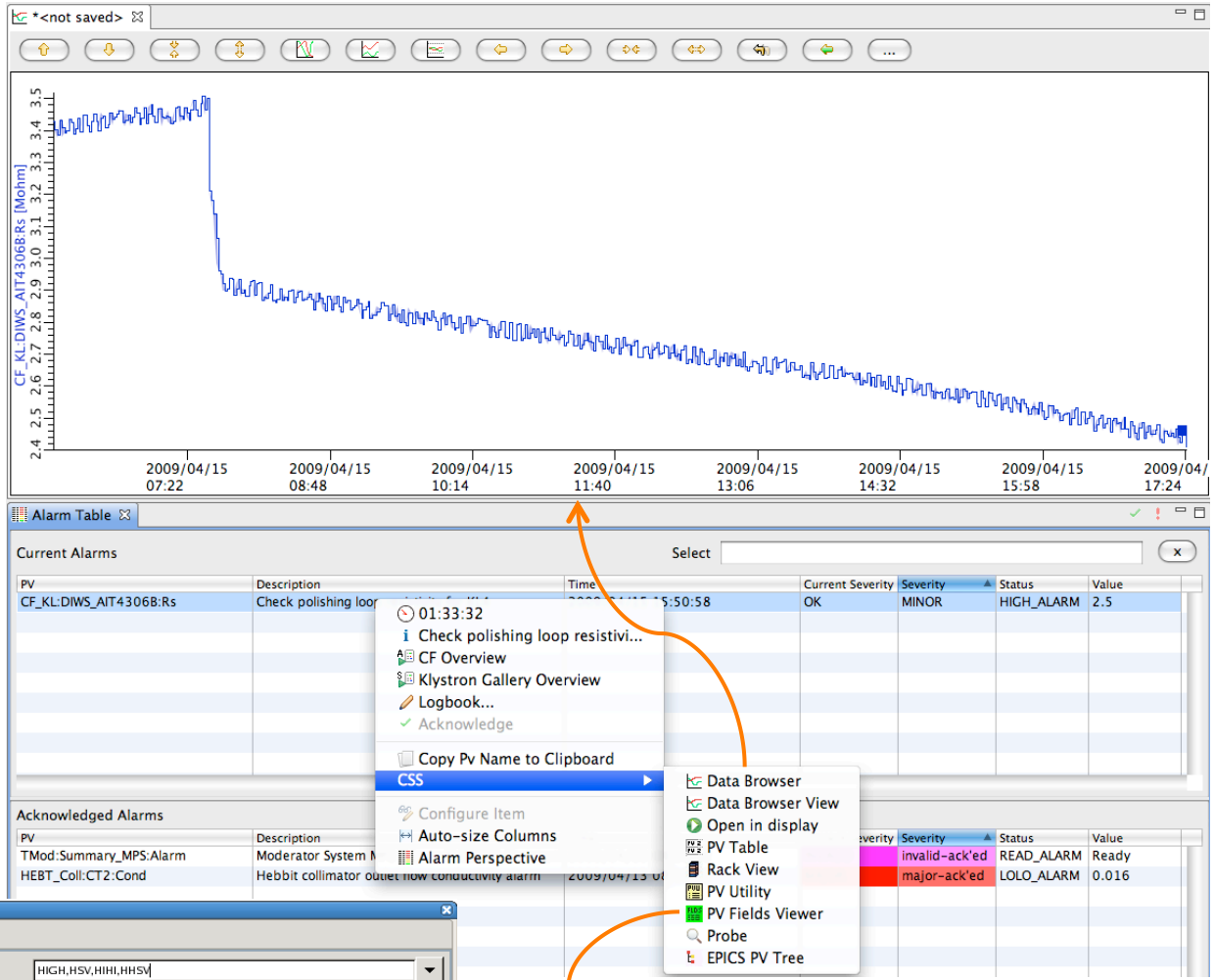
- ☑ **Basic Text**
- ☑ **Open EDM/OPI screen**
- ☑ **Open web page**
- ☑ **Run ext. command**

Hierarchical:
Including info of *parent* entries

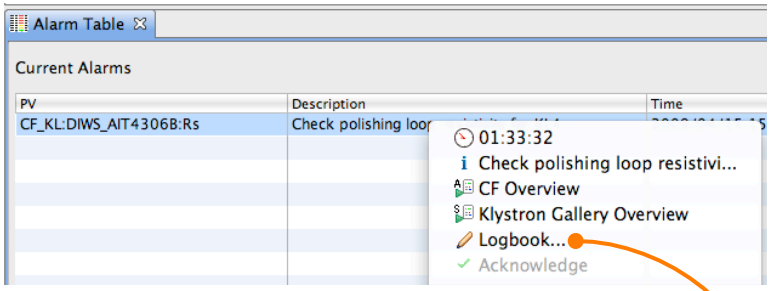
Merges Guidance etc. from all selected alarms

Context Menus Connect the Tools

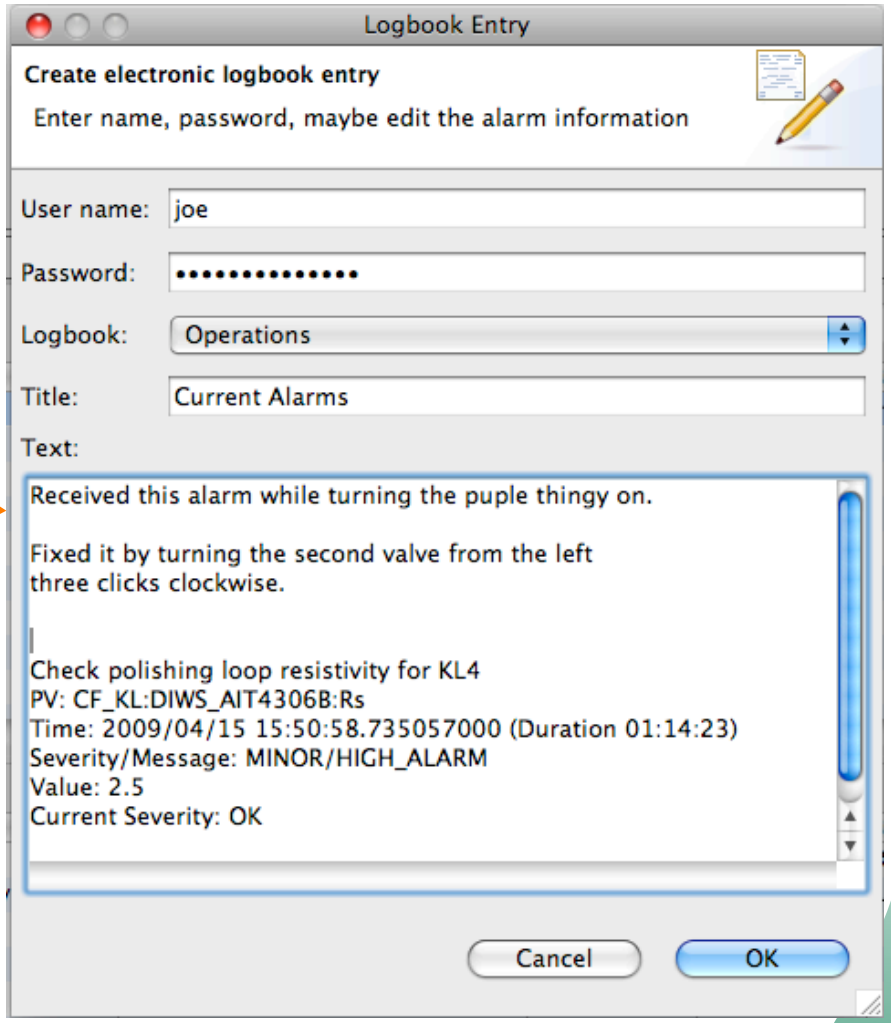
Send alarm PV to any other CSS PV tool



E-Log Entries



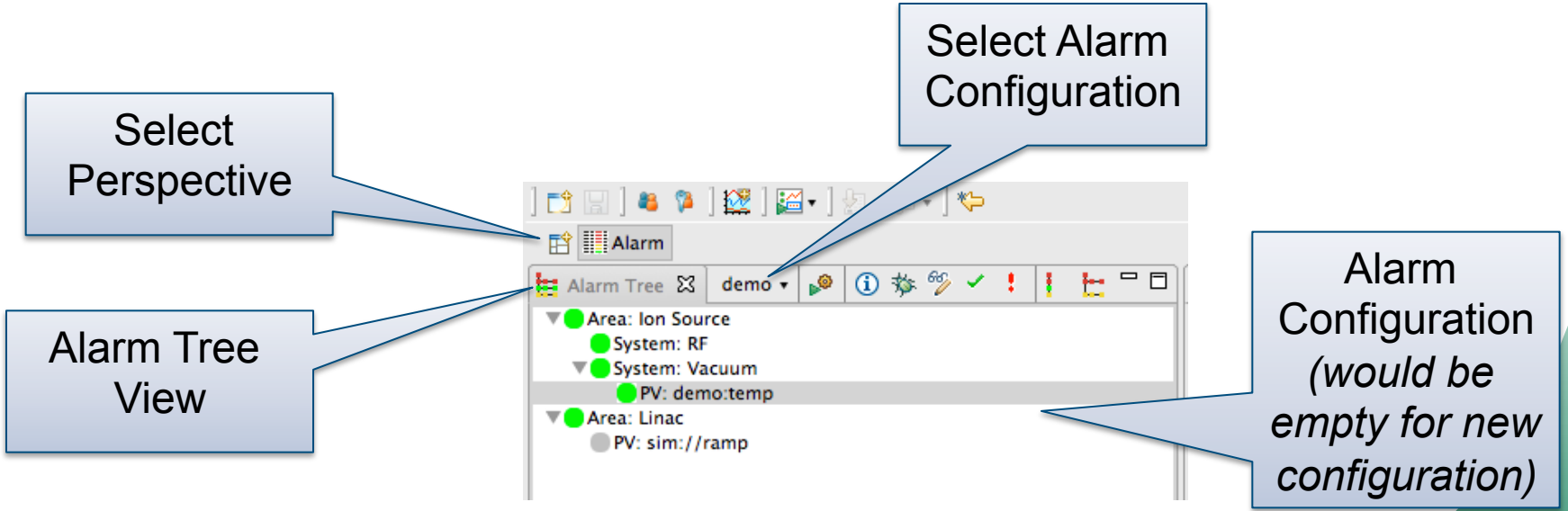
- "Logbook" from context menu creates text w/ basic info about selected alarms. Edit, submit.



- Pluggable implementation
- Similar: EMail

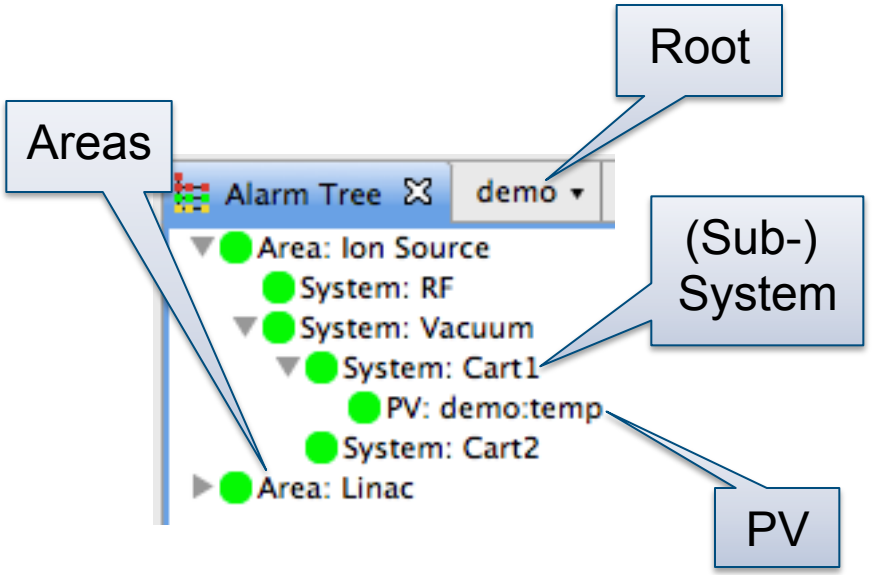
Configuring the Alarm System

- **Open Alarm Tree**
  a) **Menu *CSS/Alarm/Alarm Tree***
  b) **Use *Alarm* Perspective**
- **Select alarm configuration**

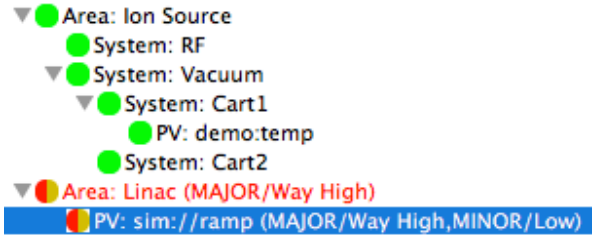


Alarm Configuration Hierarchy

- **Root**
  - Name of the alarm configuration
- **Area**
  - Top-level elements
- **System**
  - Anything below ‘Area’
  - Can have (Sub-)System below other System
- **PV**
  - Alarm trigger PV
  - Can be below Area or System



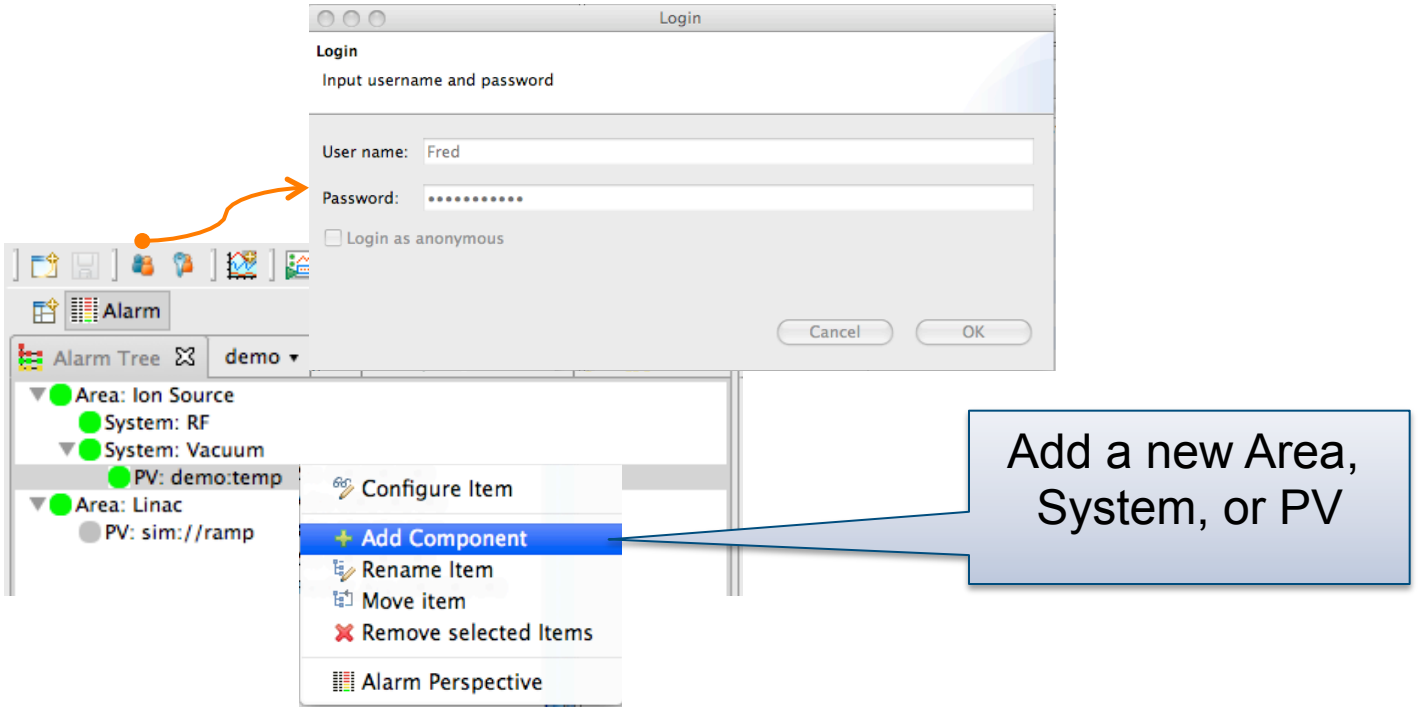
Why Hierarchy?



1. **Organization**
   - Easier to maintain than plain list of PVs
2. **Help Operators Locate Alarm**
   - Especially when there are many alarms, if can be useful to know where they are
   - Use physical "Areas", i.e. location along the machine!
3. **Guidance, Related Displays**
   - Guidance for an Area or System will be displayed for all Subsystems and PVs below that point in the alarm configuration tree
   - Examples:
     - General Ion Source contact information (phone numbers, …)
     - Linac Overview display link

Editing the Alarm Configuration

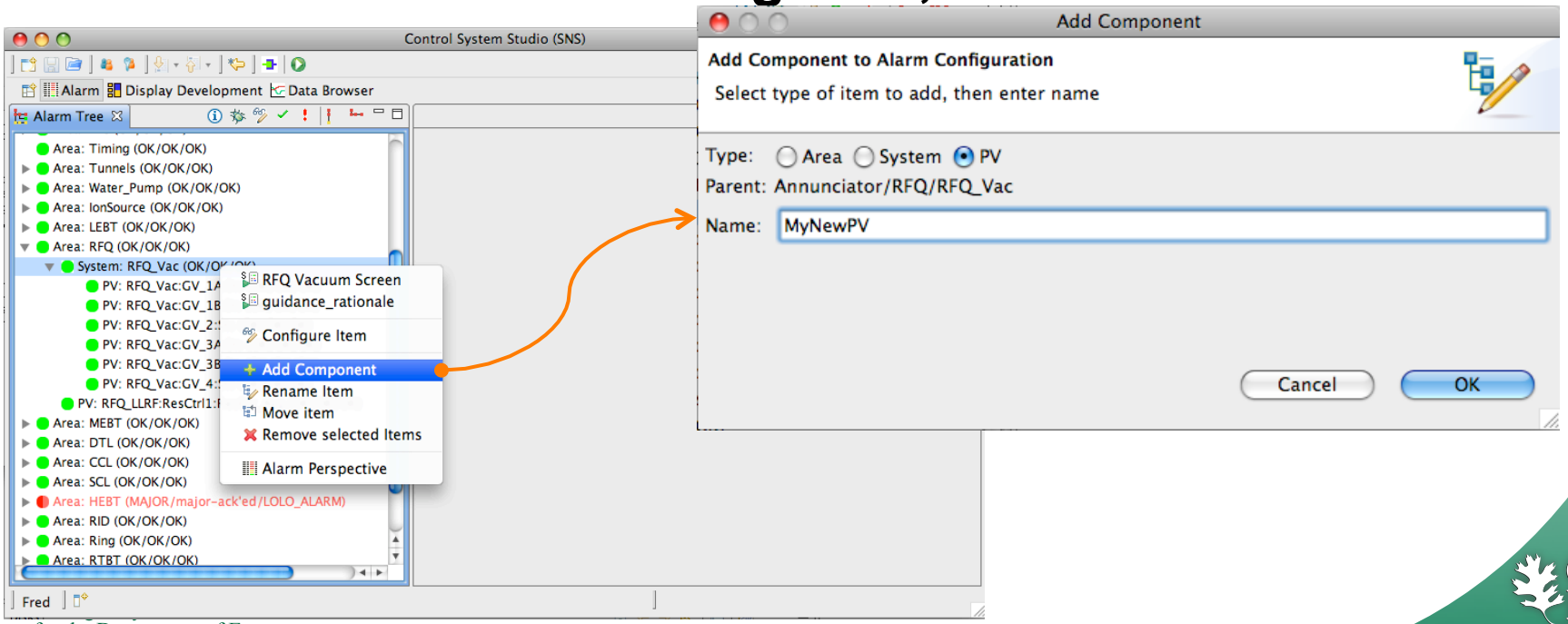
- Open Alarm Tree
- Log in
- Use Context Menu to add, edit, remove, ...



Add PV or Subsystem

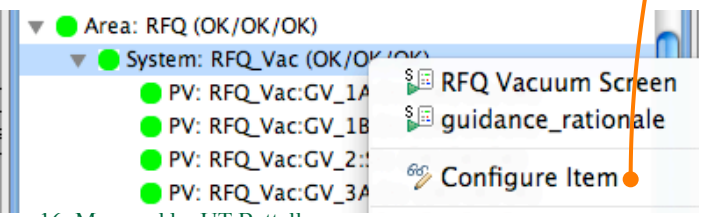
1. Right-click on ‘parent’
2. “Add …”
3. Check either Area, System or PV
4. Enter name

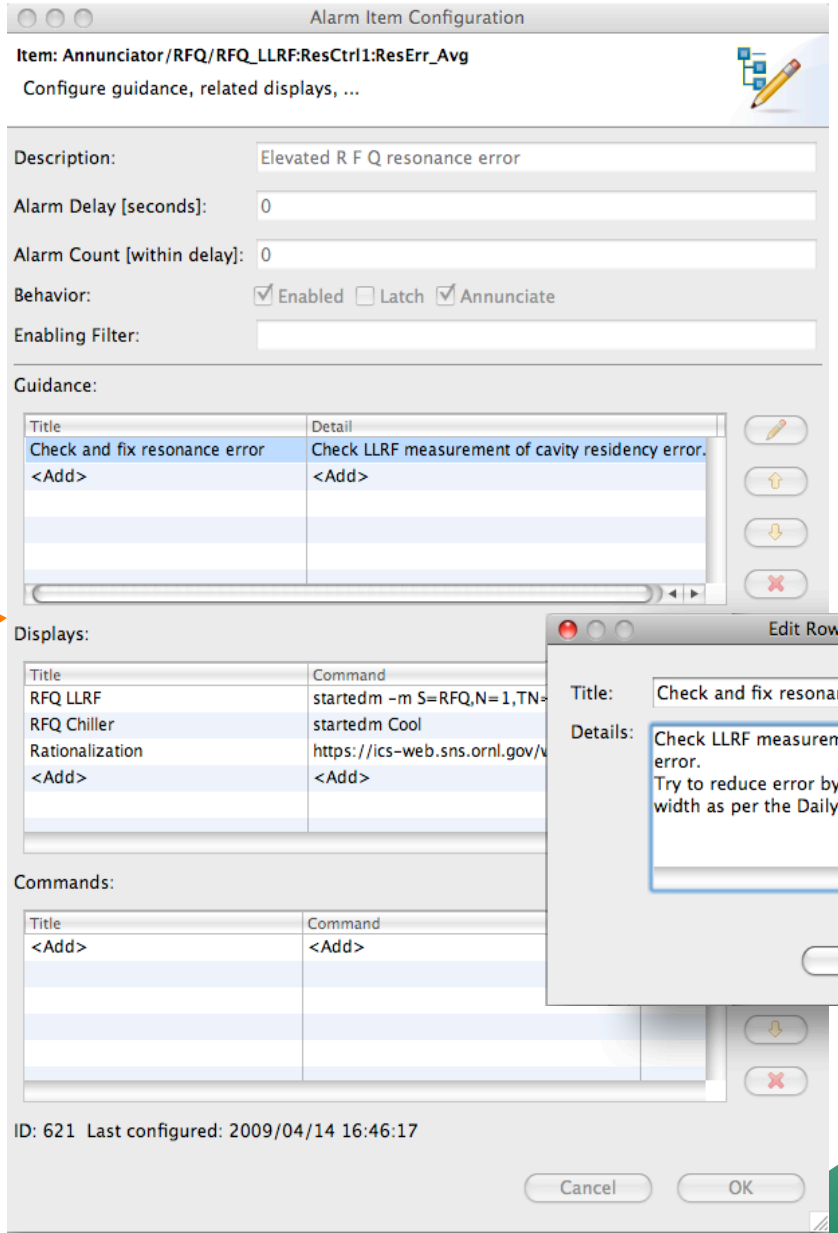
Online. No search for config files, no restarts.



Configure PV

- Again online
- Especially useful for operators to update guidance and related screens.





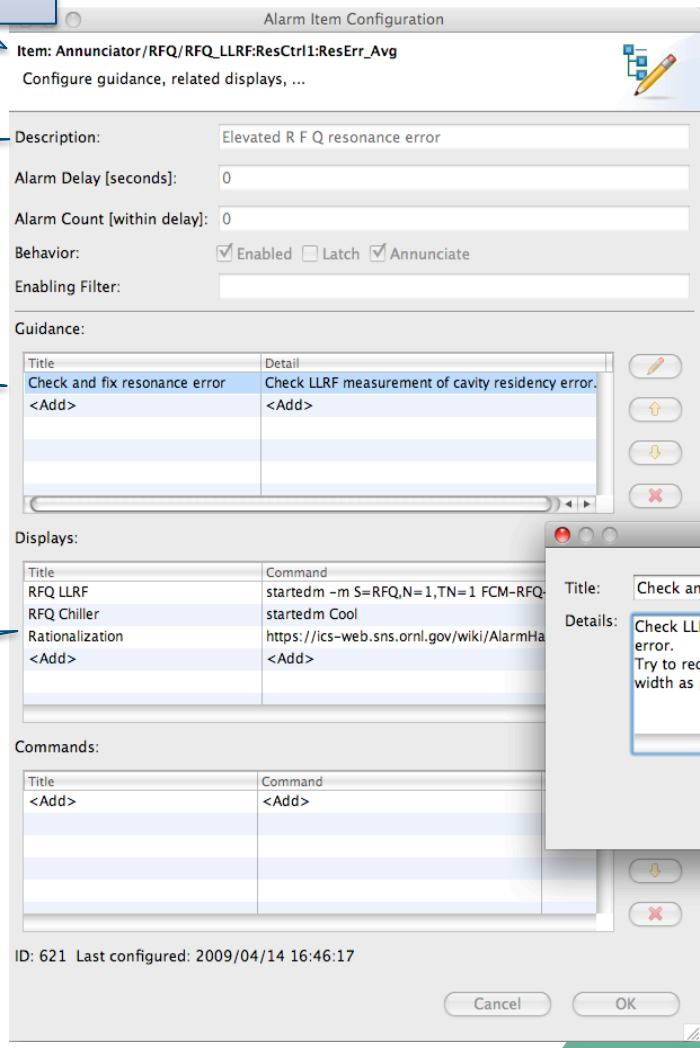
PV Configuration

Full Path to PV in Alarm Tree

Description: Also used for Annunciation

Guidance: Simple Title & Detail that should help operators handle the alarm

Display Link Options:
/CSS/path/to/display.opi
http://www.google.com
https://some.host.org
scriptname arg1 arg2



See online help for more details

Exercise: Edit Alarm Configuration

- Open Alarm Tree View
- Select the Alarm Configuration (‘root’) assigned to your team
- Add areas like “Front End”, “Linac”, “Target”
- Add Systems like “Vacuum”, “Cooling”
- Create simple BOY display that shows alarm trigger PVs and allows you to control them
- Add alarm trigger PVs to alarm configuration
  - Add some simple guidance like “Fix it”
  - Use path to your BOY *.opi as Display Link

Exercise: Use Alarm Configuration

- Switch to the Alarm Perspective
  - Can do that from context menu of alarm tree
- Use the display to trigger an alarm
- See how alarm is indicated in the table, tree, area panel
  - Open the guidance, related display
  - Cause the alarm PV to stop alarming
  - Acknowledge the alarm

General Alarm Server Behavior

- Latch highest severity, or non-latching
  - like ALH "ack. transient"
- Annunciate
- Chatter filter ala ALH
  - Alarm only if severity persists some minimum time
  - .. or alarm happens >=N times within period
- Optional formula-based alarm enablement:
  - Enable if "(pv_x > 5 && pv_y < 7) || pv_z==1"
  - … but we prefer to move that logic into IOC
- When acknowledging MAJOR alarm, subsequent MINOR alarms not annunciated
  - ALH would again blink/require ack'