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2013 Honeywell Users Group Americas

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Successes & Challenges for Designing Effective Level 1 and Level 2 Displays

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Helping People Perform
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Designing Effective L1 & L2 Displays

- Custom Shape Library
- Display Hierarchy Design Process
- “Control” Displays (L2) for key Chunks of Operation
- Scope Of Control Overview Display Canvas (L1)
- Lessons Learned

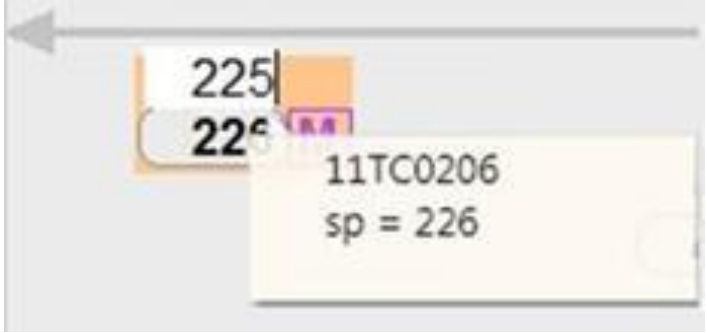
Custom Display Library

- Key Drivers for developing Custom Library
  - Desire to enable direct data entry interaction (No Face Plates)
  - Alarm Icon Presentation customization for dual coding and color salience control
  - Correspondence Coding for Associated Control Strategy Elements
  - Migration readiness support long term

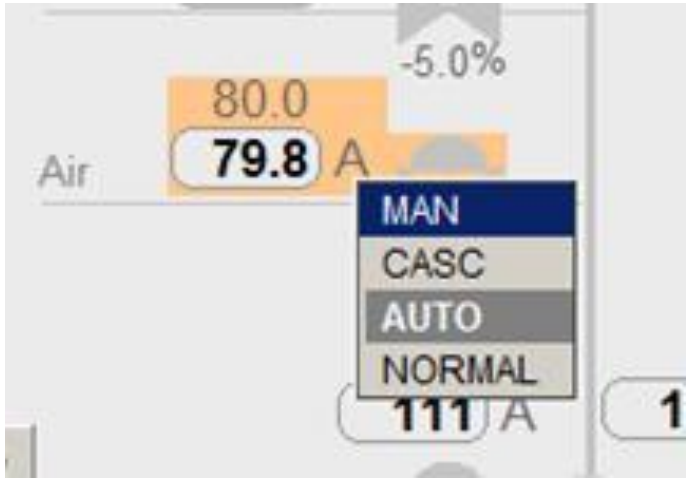
Hope for shared improvements in Base Solution Pack

Custom Display Library - Direct Data Entry

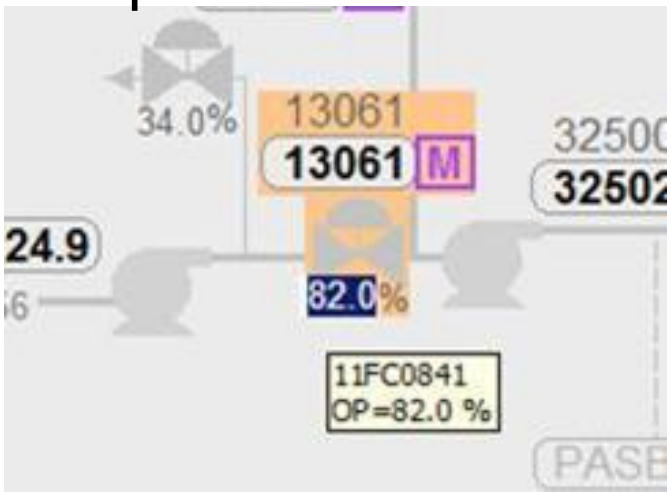
Set Point



Controller Modes



Output

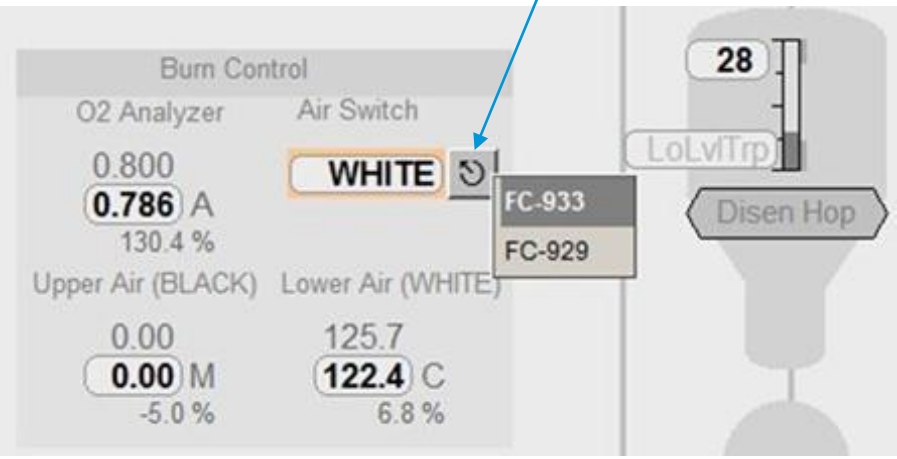


Custom Keypad

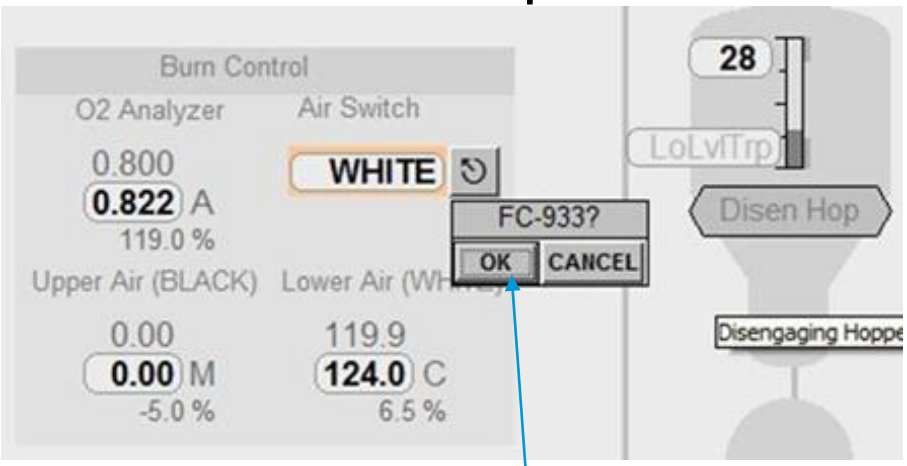
Custom Display Library - Direct Data Entry Discrete

Menu appears on Click

Select Menu

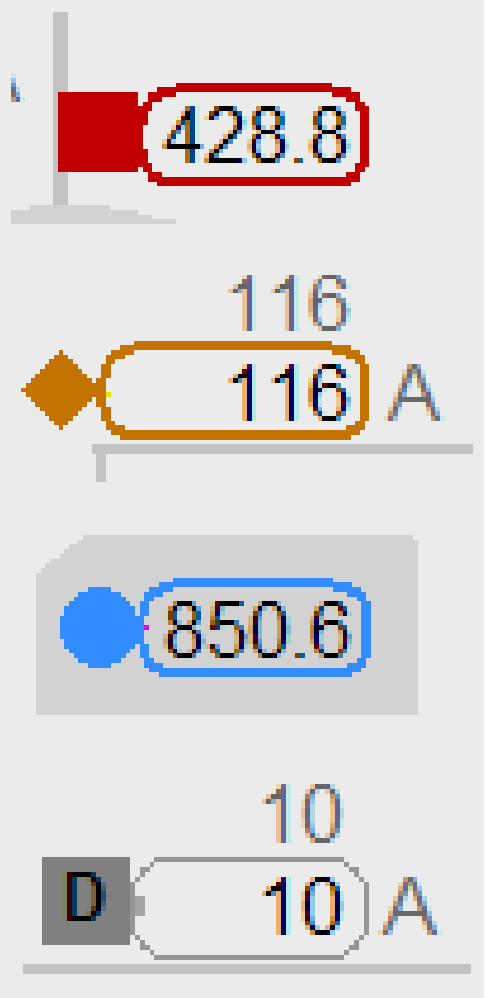


Confirmation Step



Confirmation Req'd

Custom Display Library - Alarm Icon Presentation



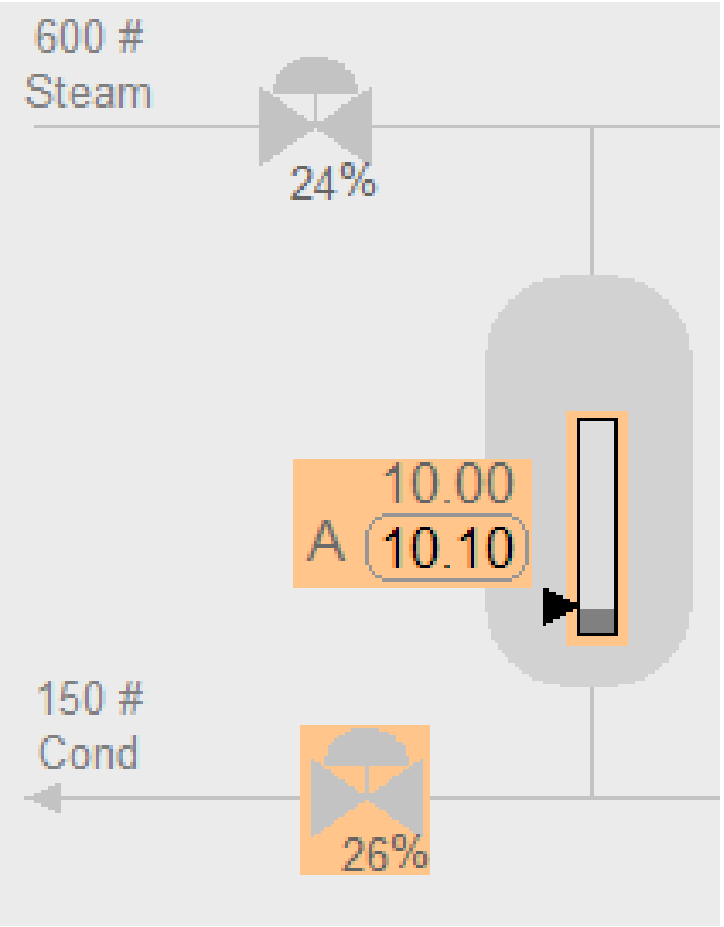
Priority 1 Alarm – “High-high” or Urgent alarm state

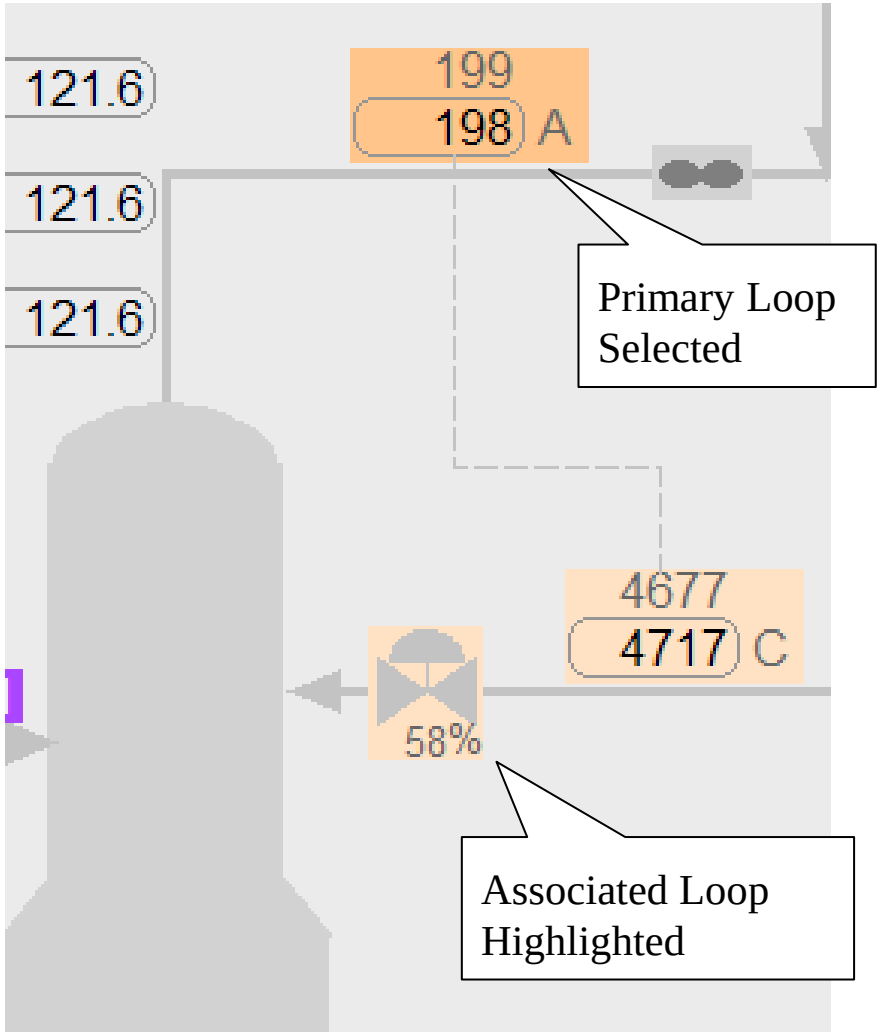
Priority 2 Alarm – “High” priority alarm state

Priority 3 Alarm – “Low” priority alarm state

Disabled alarms

Custom Display Library - Correspondence Coding



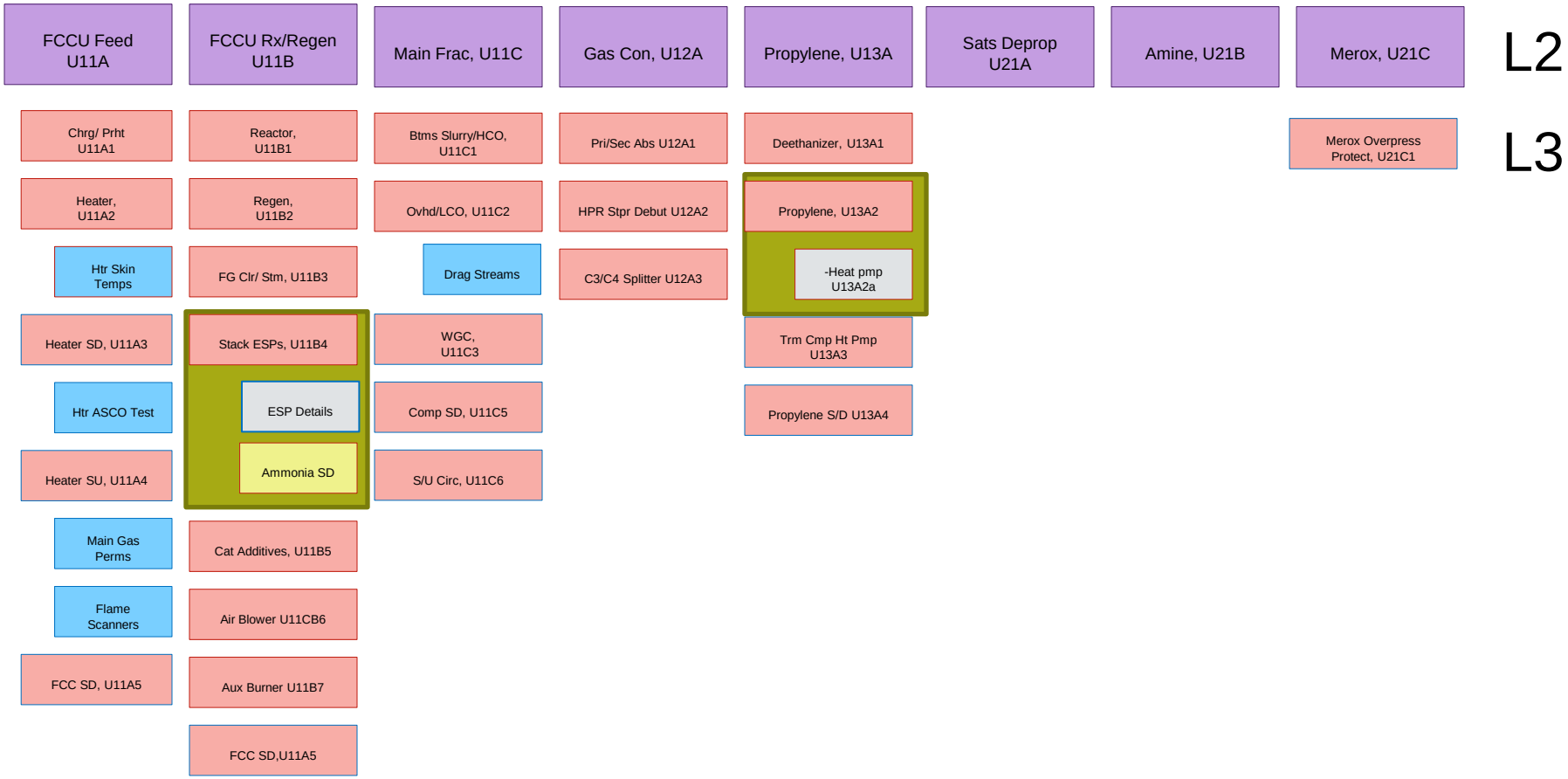


Display Hierarchy Design Process

- Workshops with subject matter experts
  - Operators, supervisors, engineers
  - Facilitator with prior HMI experience
  - Pre Work to layout first pass as starting point
- Specifying “Chunks” or key steps of operation (L2)
  - Approach focused on section of process that are “managed”
  - Avoid narrow focus such as Heater. (eg. Reaction section includes heater)
- Identify Task Specific requirements needing details
  - Managed Start Up systems, Special periodic batch operations

Lots of colored sticky notes

Display Hierarchy - Workshop results



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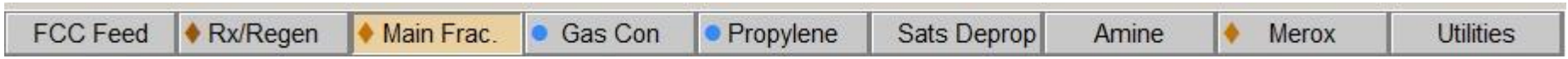
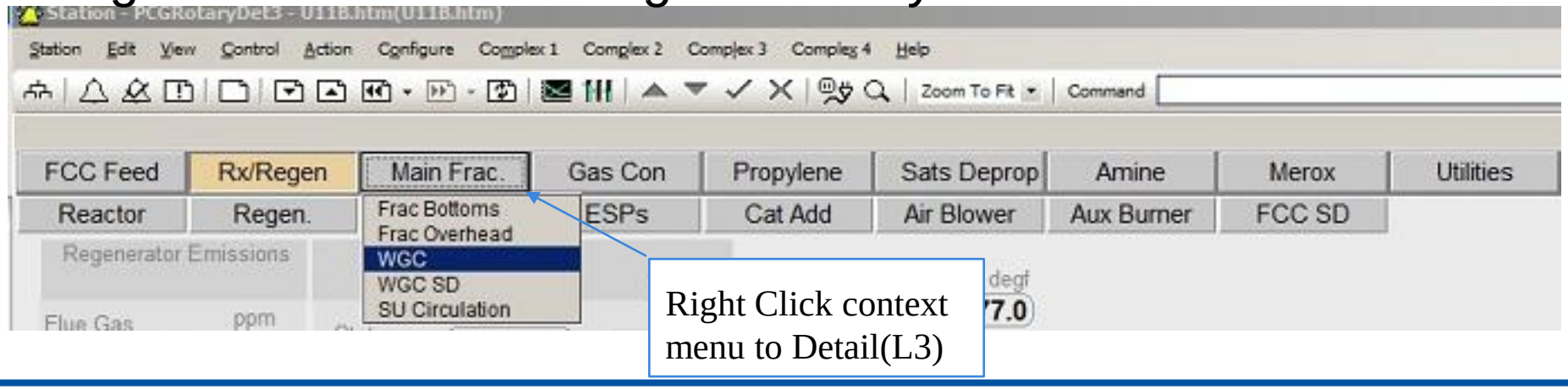
Display Hierarchy - Navigation Results

Graphic Navigation Bar (Top row contains ALL Level 2)

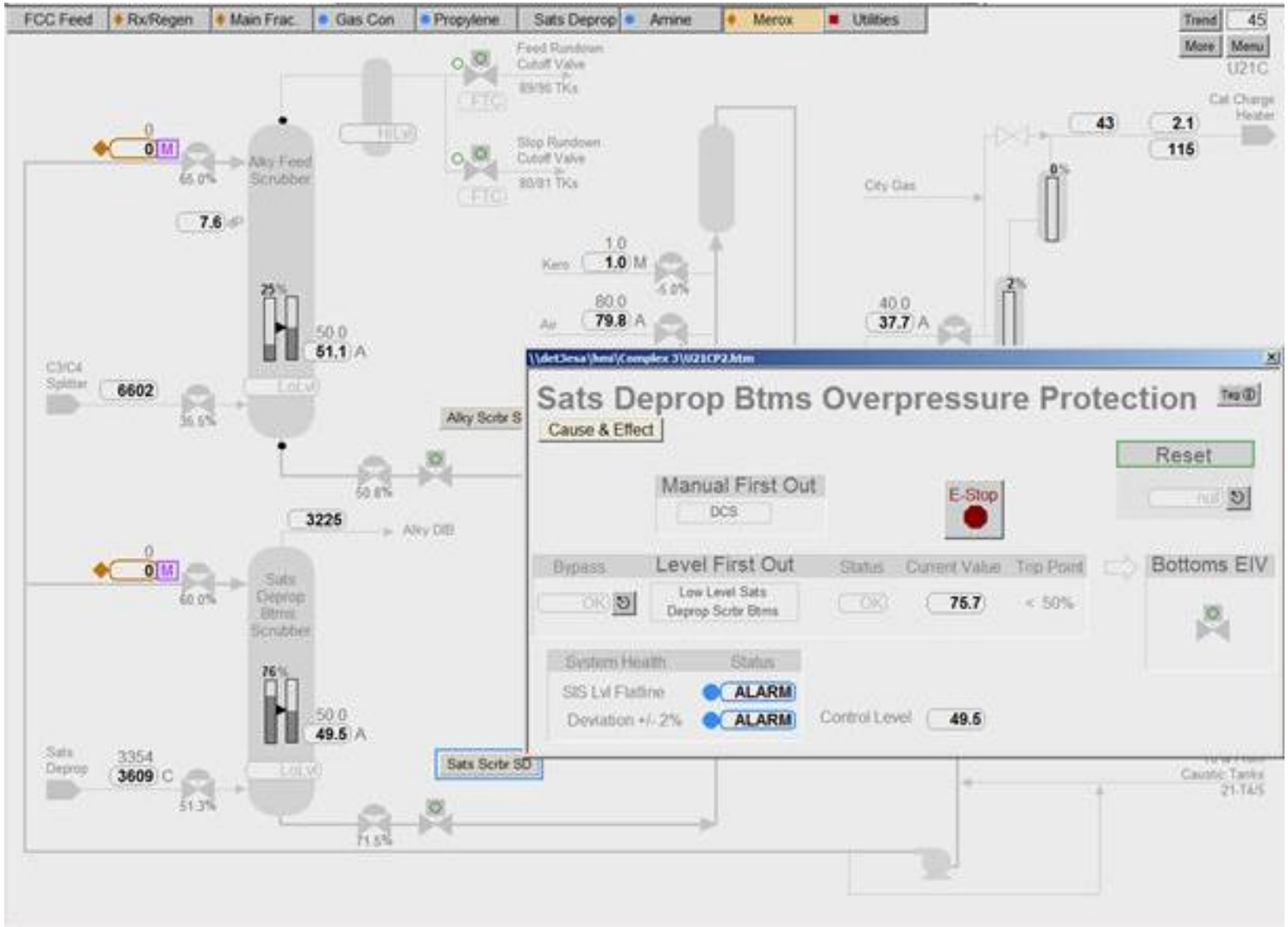


Navigation to Detail graphic within Level 2 Group

Right Click Menu to navigate directly to a L3 Detail



Display Hierarchy – Task Specific and Popup



“Control” Displays (Level 2)

- Starting with Control (L2) display design first, can best set the frame work for Detail (L3) display design
- Iterative process between “Detail” (Level 3) and “Control” for consistent orientation will be minimized
- Creative License Required for Operations Specific Mental Model presentation on Control Display
- Review common activities with operators to ensure content requirements are captured
- Focus reviews on achieving proper mental model to “manage” this section of the process

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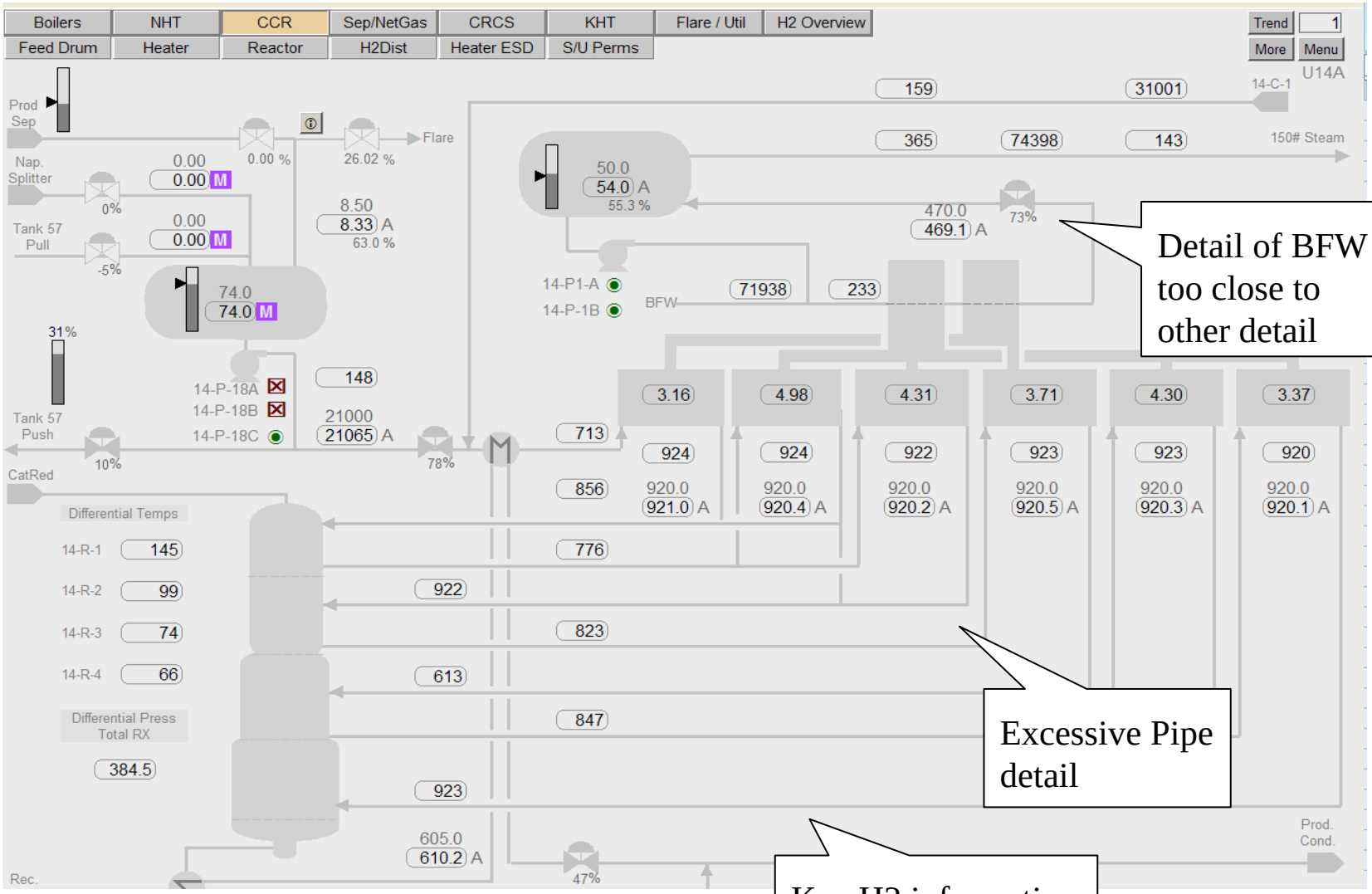
“Control” Displays (Level 2) – P&ID Style



Detail of BFW too close to other detail

Excessive Pipe detail

Key H2 information missing

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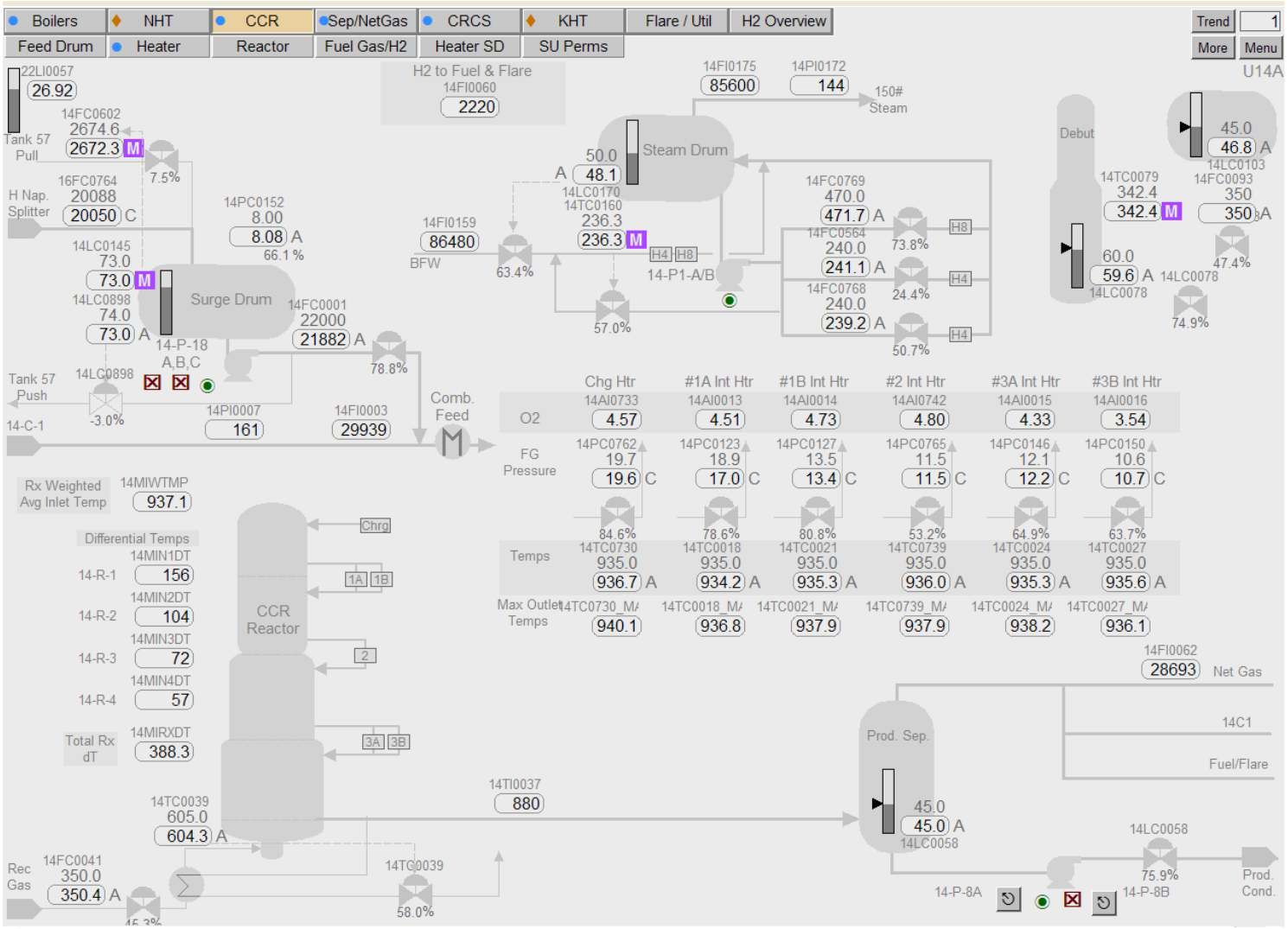
“Control” Displays (Level 2) – Creative Style



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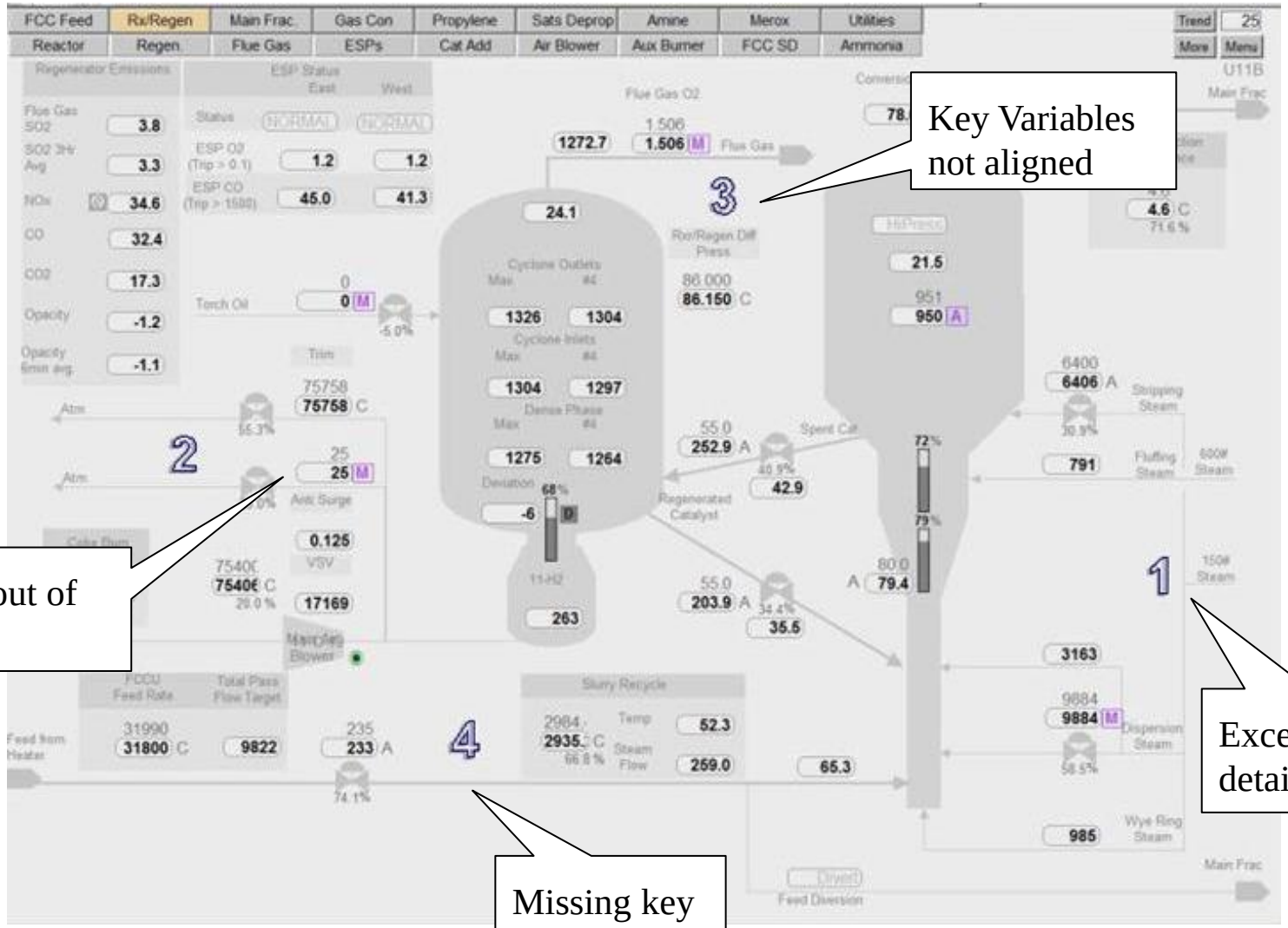
“Control” Displays (Level 2) – Alignment Issues



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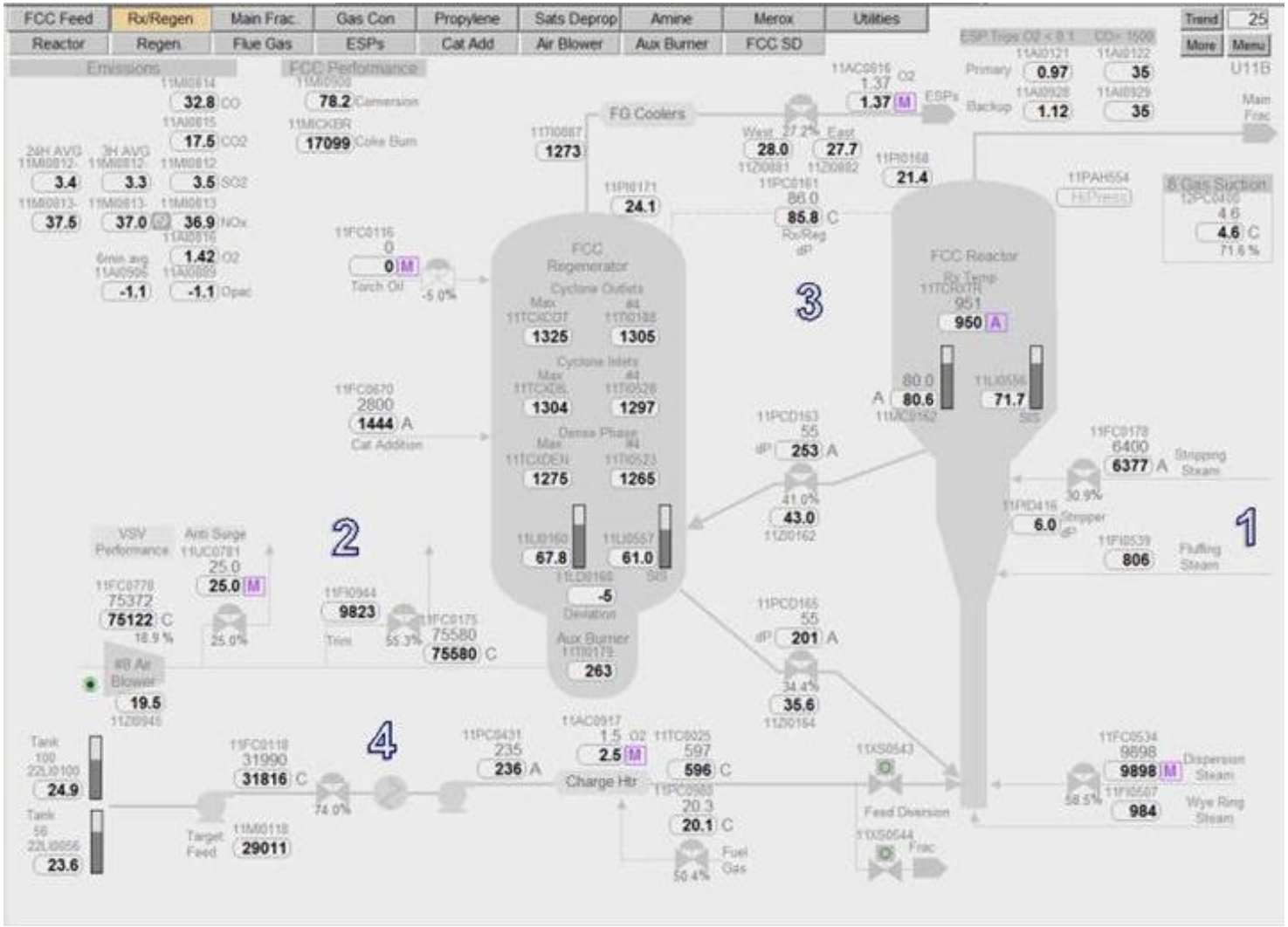
“Control” Displays (Level 2) – Better Aligned



"Control" Displays (Level 2) - Validation

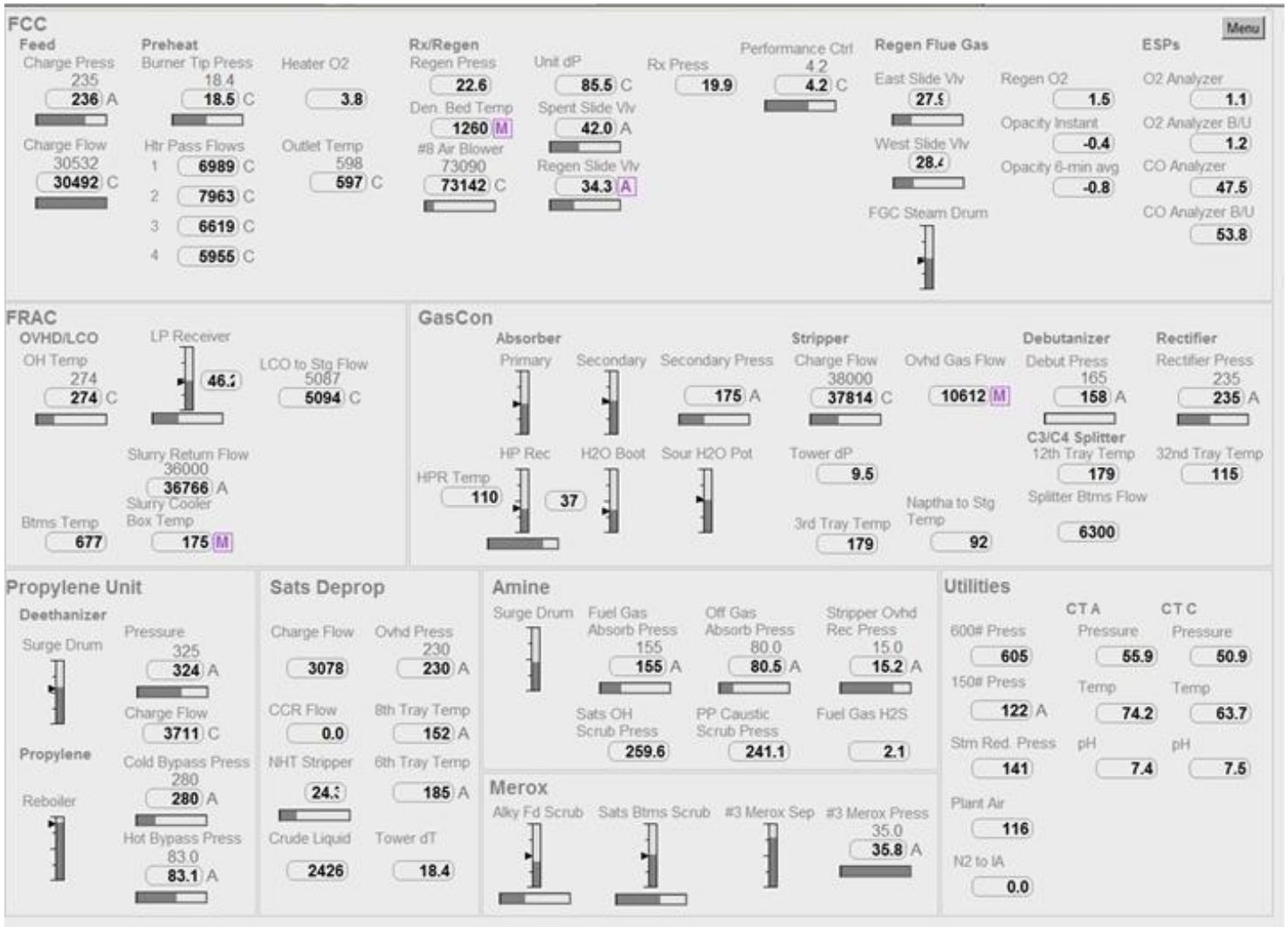
- Follow up observation survey of screen utilization (L2/L3 common placement across all shifts)

• Crude Train ***Control*** display	• Crude Debut **Detail** display	• Air Preheat **Detail** display • Vac OH **Detail** display Or ** What needs attention **	• Air Preheat **Detail** display • Vac Heater ***Control*** display
• Crude Col ***Control*** display • Crude 2nd Stg **Detail** display	• Preflash/Heater ***Control*** display	• Crude Col ***Control*** display Or ** Used for Operating **	• Vac Col ***Control*** display

Console Overview Displays (Level 1)

- Key Process Indicators - Survey Work
- Leading Indicator Selection – Trend Identification
- “Panes of Glass” Required to create the “Canvas” for overview
- Always Up Situation Awareness objective
  - No plans to integrate L2/L3 navigation in L1 Displays
  - Large Overview Screens assumed for “Canvas”

Console Overview - KPI Selection



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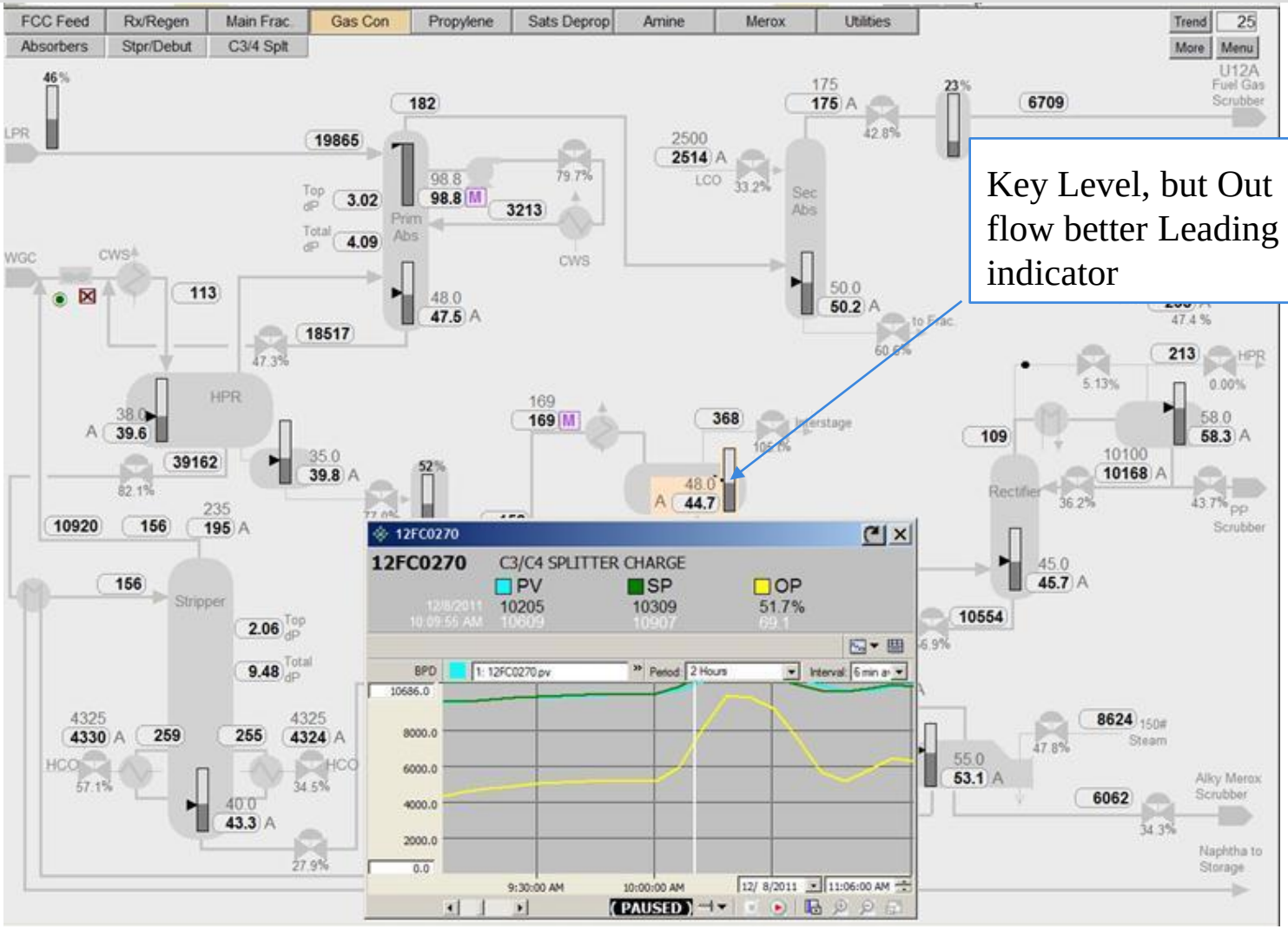
Console Overview – Leading Indicators



Key Level, but Out flow better Leading indicator

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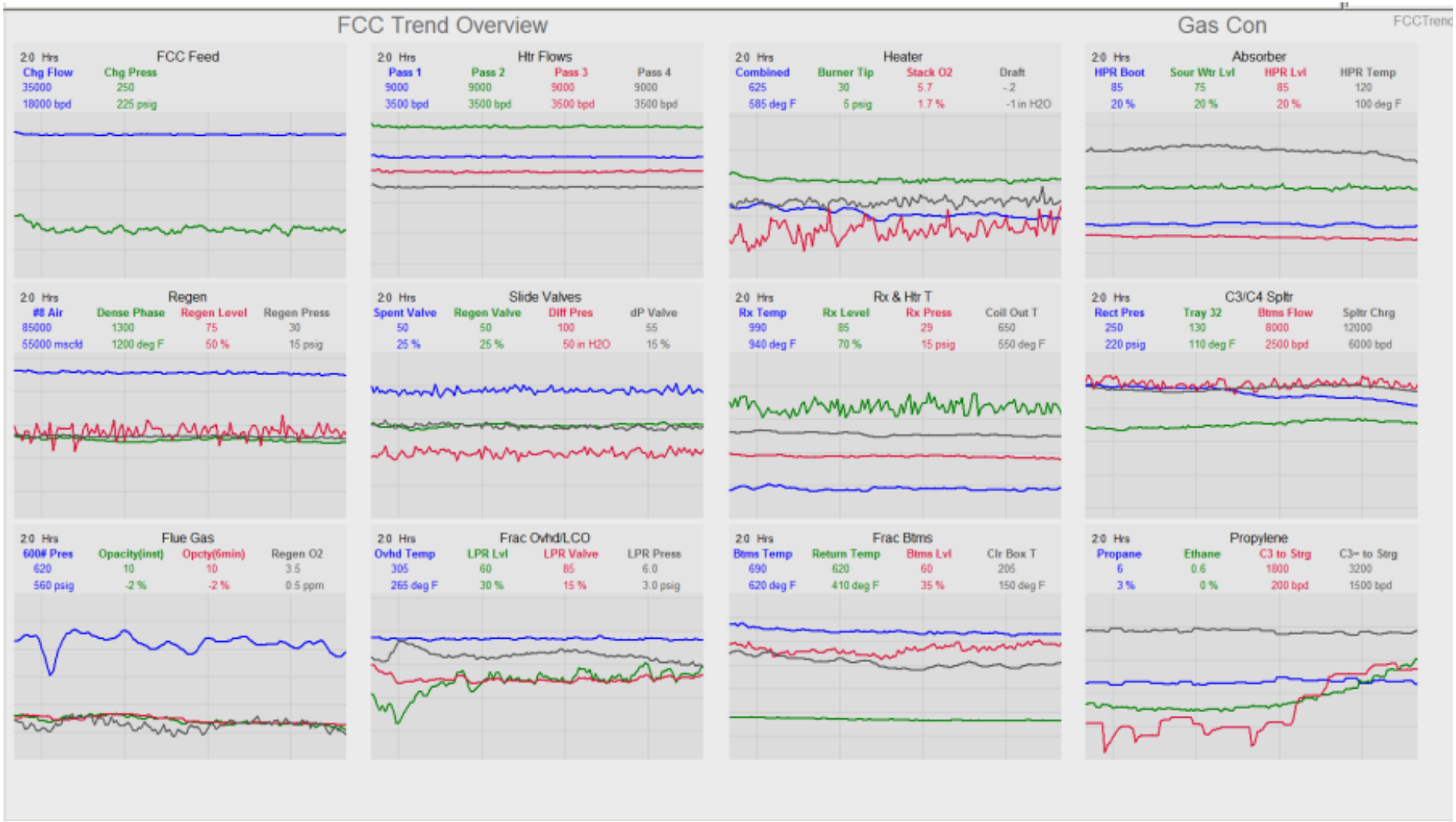
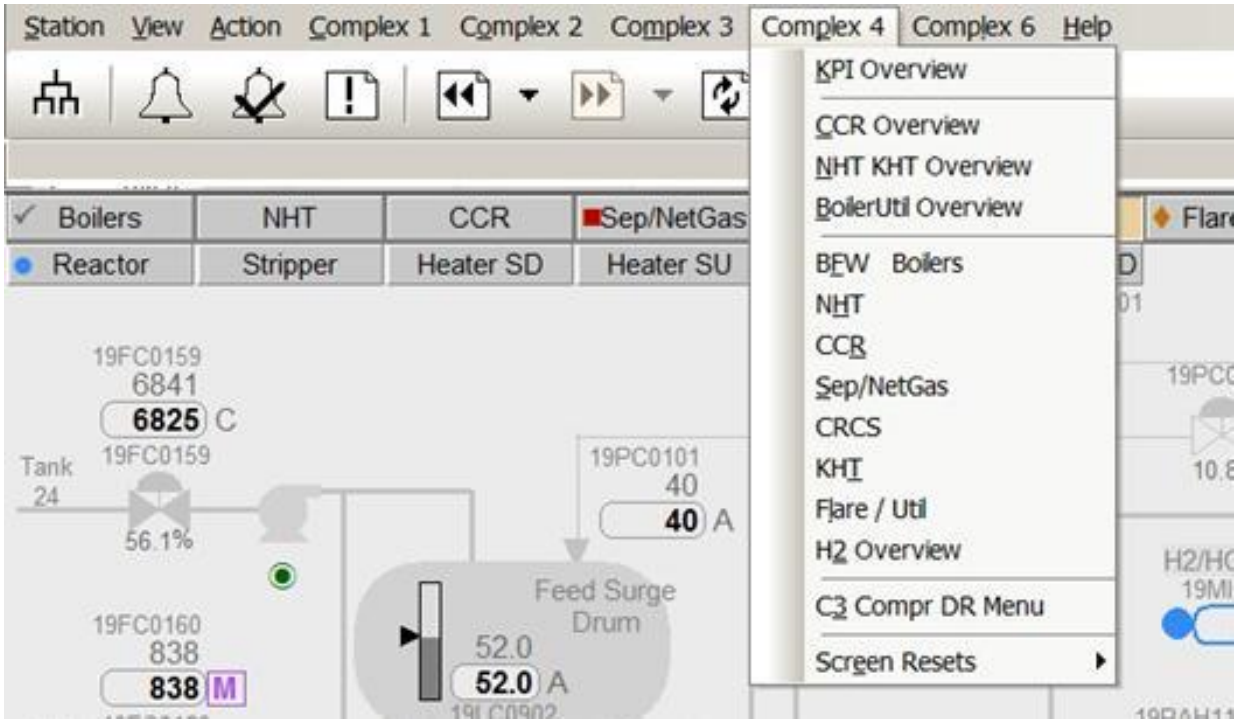
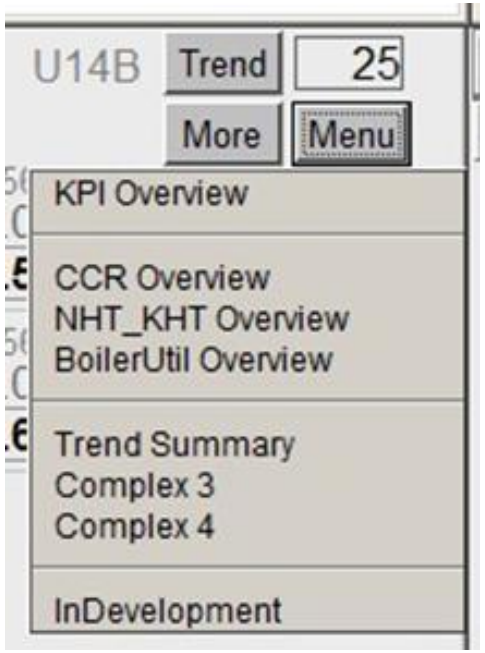
Console Overview – Trend Overview

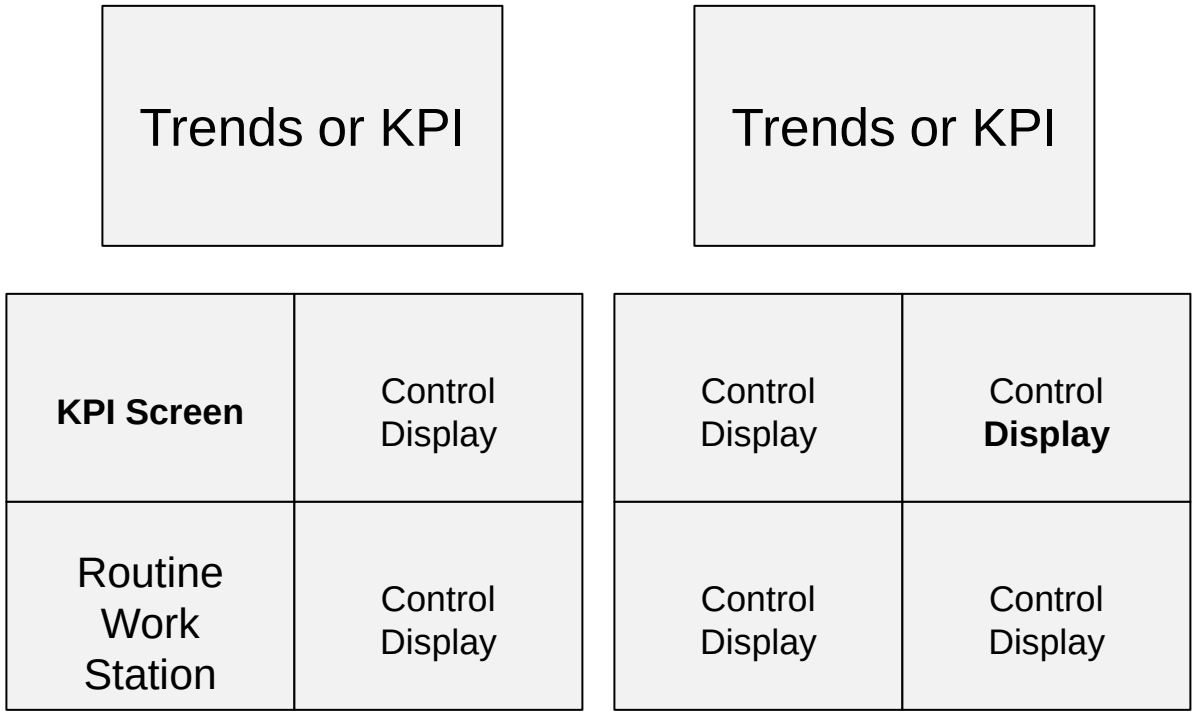


Console Overview – Navigation to Overview

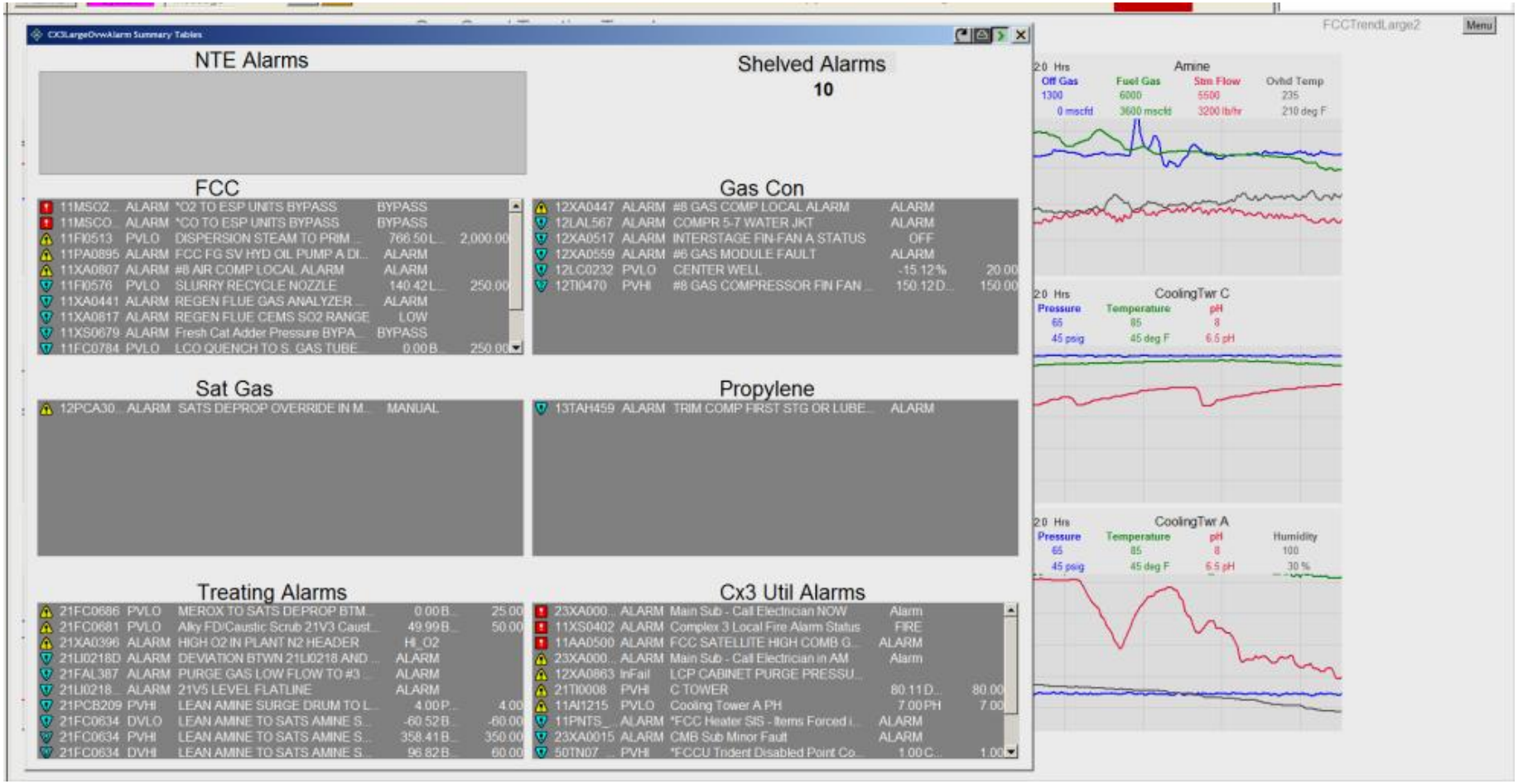




Console Overview - “Canvas” of Console



Console Overview – Alarm Table Option



Lessons Learned

- Correspondence coding in the shapes on process displays (Control and Detail) was very effective
- A good navigation organization that is “Always On Screen” is critical
- Control Displays require multiple reviews with operators
- Good communication and Education are critical to the success of implementing KPI and /or Trend overview displays.

Lessons Learned (cont)

- Evolving Process for KPI displays. Items to Consider
  - Salient Bands of operation on Bars
  - Direction of Change iconography historical sophistication
  - Matching Alarm coding to normal displays
- A complete HMI package should be rolled out at the same time.
  - L3 and L2 roll out without L1 displays leads to Screen use culture soak. Difficult to rewire use of screens to Overview approach.
- Opportunities for scientific analysis between Trends and effective KPI displays

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