From Tablet to 4K: Integrating new screen Technologies into the Salem Simulator Environment

SCS Power Plant Simulator Conference

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Background – Past Upgrades

Simulator original installation circa 1983
- Simulator Vendor was Electronics Associates Inc. (EAI)
- Salem Plant uses compact control room concept

Past Simulator upgrades
- Digital Feedwater (Westinghouse WDPF) circa 1990
- PC Migration to OpenSim circa 1994, hybrid Instructor Station
- NETSIM Digital EHC circa 1995
- RELAP RCS Primary Model NESTLE Core Model circa 1996
- Simulator moved to Site and IO Replacement circa 2006
- THOR BOP Circa 2012
- No Major upgrades between 2012-2015
Background – Recent Upgrade

Upgrades in 2016

- Westinghouse OVATION Digital Feedwater
- Window 7
- OpenSim 6.1
- **Custom Instructor Station**
- S3R Core Model
- ABB Digital Voltage Regulator
- Main Power Transformer
The good old days

Legacy Simulator PC applications and Windows itself was developed when glass CRT displays were typically 15-20 inches and maxed out at 1280 x 1024 (4:3) Resolution

- Fixed size forms with fixed size fonts designed look reasonable and readable at that resolution
- Large displays restricted to projectors at relatively low resolutions
- Tablets un-heard of
- Touch Screens were a novelty
Advances in Display Technology

RESOLUTION REVOLUTION

- 720p (HD)  1280 x 720
- WXGA+  1440 x 900
- 1080p (Full HD)  1920 x 1080
- 1440p (QHD)  2560 x 1440
- QHD+  3200 x 1800
- 4K (UHD, 2010p)  3840 x 2160
- DCI 4K  4096 x 2160
- 5K (UHD+)  5120 x 2880
- 8K (UHD)  7680 x 4320
SIZE isn’t everything

- Displays can range from 8 inch tablets to 120 inch Monster Monitors
- 4K Monitors/TVs are becoming more affordable
- Programs do not automatically look better in 4K and may look worse
- HIGHER resolution SMALLER size yields sharper graphics but text may be too small to be readable
- LOWER Resolution LARGER size yields large readable text but blocky graphics and spread pixels
- From my experience for a 4K display at NORMAL 96 DPI font setting the screen should measure at least 40 inches for the small fonts to be readable.
- Smaller screens such as laptops now are available in 4K resolution. To allow for readable sized text at high resolution small size the Screen Font Size (Dots per Inch or DPI ) can be adjusted in Windows. Windows may set the font size larger automatically on high resolution laptop screens.

**PROBLEM:** Not all applications handle DPI changes without issues.

- From my experience large format screen ( > 60 inches ) in less than 4K resolution show blocky pixelated graphics and spread font pixels when read up close ( at distance is better ).
Advances in Display Technology

Don't TOUCH me there

- Instructors HATE Touch Screens (prefer mouse and keyboard)
- However for Tablets and Large Screens Touch Input is only option
- Many Windows Form features such as close “x”, scroll bars, and double-click are not easy to use via touch
- To be effective applications forms should be designed with Touch in mind
- Use BAB (Big Ass Buttons) and OFF (Old Fart Fonts)

CHALLENGE: Make use of Tablet PC's for low cost replacement of small LCD and Gas Plasma specialized simulator in-panel displays
CHALLENGE: Design Instructor Station that adapts to the screen format and input method it is run on.

The Times they are a changing...
CASE STUDY: Reactor Vessel Level Indication System (RVLIS)

- Consists of a small Gas Plasma display driven by several large circuit cards.
- Original display was fed simulator data via RS-232 Serial link.
- Simulator has two trains, A & B.
- First Train B became non-functional. There was no clear path for repair.
- Some Vendor replacement solutions available but costly (70K $)

Using Tablets for low cost replacement of Simulator displays
CASE STUDY: Reactor Vessel Level Indication System (RVLIS)

- Display area similar to 10 inch Tablet Display Screen
- Obtained DELL Tablet PC and verified that it would fit.
- Utilizing Visual Basic developed a simulated display for Train B
- Display data fed from simulator via Network.
- Display select buttons were already interfaced as DI’s through Panel I/O
- Installed Train B, well received by Instructors

Using Tablets for low cost replacement of Simulator displays

Simulator Train B
Front View

Rear View showing Tablet PC
Using Tablets for low cost replacement of Simulator displays

CASE STUDY: Reactor Vessel Level Indication System (RVLIS)

- Larger View of Train A showing actual PLANT vs. SIMULATOR final display.
CASE STUDY: Reactor Vessel Level Indication System (RVLIS)

- Soon after the Train B display was replaced with the Tablet solution the original Train A also failed
- Train A was replaced with a Tablet solution
- Total cost to replace Train A and B RVLIS < $1200.00
CASE STUDY: RM-2300 Radiation Monitor Display

- Consists of small LCD type display with membrane keyboard
- Plant driven as an RM-2000 main unit feeding an RM-2300 display (in control room)
- In late 1990’s the Plant Vent Monitor (R41) DCP was installed in the simulator with a STIMULATED RM-2300 RM-2000 vendor solution with the RM-2000 driven by simulator data using a Rube Goldberg contraption consisting of a Voltage Control Oscillators controlled via GPIB from a MS-DOS pc getting simulator via an RS-232 Serial Link
- In the early 2000’s the Containment APD (R11) DCP was installed in the simulator with an updated vendor solution consisting of a STIMULATED RM-2300 driven my a vendor supplied RM-2000 simulation running as a task on the MST Computer, data path is via shared memory and network.
- The Plant Vent Monitor (driven with Function Generators) became non-functional with no clear repair path.
- Quote from Vendor to drive the Plant Vent RM-2300 using the RM-2000 Simulation scheme was > 60K $. This seemed excessive.
- Based on RVLIS experience it was decided to replace the R41 RM-2300 with a simulated solution

Using Tablets for low cost replacement of Simulator displays
CASE STUDY: RM-2300 Radiation Monitor Display

Simulated solution Options

- **Option 1**: simulate full RM-2300 in glass panel form
- **Option 2**: simulate display area via screen and salvage or contract membrane hard switches
- **Option 3**: simulate display area via screen and use mockup faceplate for switch area

Option 1 would have screen look and feel which would stick out as an obvious plant difference
Option 2 would be ideal but would could have additional cost
Got buy off from Instructors that switch functionality would not be needed as they were mostly interested in the displayed numbers. (the stimulated R11 would still be available to demonstrate switch functions such as source check)
Based on above Option 3 was chosen
CASE STUDY: RM-2300 Radiation Monitor Display

Option 3 faceplate mockup with Tablet Driven display area

Paper photograph mockup of (static) Switch area

Tablet PC drives active display area through clear faceplate window
Using Tablets for low cost replacement of Simulator displays

CASE STUDY: RM-2300 Radiation Monitor Display

Rear View of simulated RM-2300 showing Dell 8 inch Tablet PC

Clear Plastic faceplate with paper mockup, hole for active display area

Dell slides behind faceplate and drive active area through clear area
Using Tablets for low cost replacement of Simulator displays

CASE STUDY: RM-2300 Radiation Monitor Display

Total cost to replace R41 RM-2300 < $500.00
Using Tablets for low cost replacement of Simulator displays

CASE STUDY: Tablet Instructor Station

- Typical legacy Instructor Station applications are not well suited for display on a small tablet due to fixed form and font sizes and form interactive items not well suited for Touch Screen
- As part of custom Instructor Station effort PSEG designed an Instructor Station application with a tablet PC display option
Typically Form and Font sizes appear Smaller at Higher Resolutions and same size screens (OpenSim Example)

1080P 1920x1080 Normal Fonts

4K 3840 x 2160 Normal Fonts everything is smaller
Typically Form and Font sizes appear Smaller at Higher Resolutions and same size screens (Trex Example)
In Windows the Screen (System) Font (DPI or Dots Per Inch) may be changed to make things larger. Typical settings are:

- 100% Smaller/Normal: 96 DPI
- 125% Medium: 120 DPI
- 150% Larger: 144 DPI
Legacy Simulator PC applications Scaling Issues

Higher DPI settings result in Desktop FONTS and FORMS to appear Larger which can aid readability on physically small (i.e.; laptop) Screens.

LARGE 144 DPI
Larger Forms and Text
Legacy Simulator PC applications Scaling Issues

Problem: Not all applications, including some commercial ones, properly display things in other than Normal 100% Font Scaling (some examples)

- Overlapping placement of form items
- Button off form

CHALLENGE: Design Instructor Station forms that scale to readable size without need to change System Font Size
PSEGIS Custom Instructor Station Scaling

PSEGIS Instructor Station designed to scale Forms and Fonts to appear similar in size over different screen Resolutions

1080P 1920 x 1080 Normal Fonts (96 DPI)

4K 3840 x 2160 Normal Fonts (96 DPI) has more space for icons on button bar
PSEG Custom Instructor Station Scaling

All form elements (fonts, button size, list size) should scale with the form when it is resized to allow the form to be displayed with a consistent readable size across different Screen Sizes and Resolutions.
PSEGIS Instructor Station used during ADFWCS testing/installation

PSEGIS Instructor Station running on an 80 4K Monitor mounted on cart was used during Digital Feedwater for testing and Crew familiarity Training. Panel Mimic allowed for future panel changes to be operated in place with the Simulator before hard panel changes made final.

Westinghouse OVATION Classroom Graphics

PSEGIS Mimic allowed operation of OVATION SLIM Stations from Mimic or from SLIM hardware mounted on another cart prior to panel install.
PSEGIS Instructor Station running in Tablet Mode

When run on a small Tablet PC the PSEGIS Instructor Station morphs into a more Touch friendly format.
PSEGIS Instructor Station Tablet Mode Forms

PSEGIS layout in Tablet Mode

- Large Function buttons aligned on left side for touch operation by left Thumb when held
- Simulator Function Forms appear in this client area
- All Touch buttons may be disabled using this button
- Buttons on right side for right Thumb firing of Event and Remote Triggers

Touch Buttons Are ENABLED, CLICK Above to Disable for Safe Transport
# PSEGIS Instructor Station Tablet Mode Forms

## PSEGIS Tablet Mode Initial Condition Summary

![Screenshot of PSEGIS Instructor Station Tablet Mode Forms](image)

### Initial Condition (IC) List, use drop-down to search/filter ICs

<table>
<thead>
<tr>
<th>IC#</th>
<th>Description</th>
<th>Rx Power</th>
<th>Rods Bank D</th>
<th>RCS Boron</th>
<th>Gen Mwe</th>
<th>Pm Pressure</th>
<th>CoreLife</th>
<th>Date</th>
<th>Snapped By</th>
<th>IC Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>001</td>
<td>100% BOL Cycle 22</td>
<td>100.4</td>
<td>227</td>
<td>1093.74</td>
<td>1220</td>
<td>2235</td>
<td>BOL</td>
<td>12/28/2016 - 07:24:52</td>
<td>Shaver, D</td>
<td>Protected IC</td>
</tr>
<tr>
<td>002</td>
<td>100% MOL Cycle 22</td>
<td>100.2</td>
<td>227</td>
<td>857.59</td>
<td>1220</td>
<td>2235</td>
<td>MOL</td>
<td>12/28/2016 - 07:29:21</td>
<td>Shaver, D</td>
<td>Protected IC</td>
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<tr>
<td>003</td>
<td>100% EOL Cycle 22</td>
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<td>227</td>
<td>29.72</td>
<td>1220</td>
<td>2235</td>
<td>EOL</td>
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<tr>
<td>004</td>
<td>90% MOL Cycle 22</td>
<td>90.6</td>
<td>190</td>
<td>888.06</td>
<td>1090</td>
<td>2235</td>
<td>EOL</td>
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<td>Shaver, D</td>
<td>Protected IC</td>
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<tr>
<td>005</td>
<td>75% EOL Cycle 22</td>
<td>74.7</td>
<td>160</td>
<td>106.71</td>
<td>880</td>
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<td>EOL</td>
<td>12/28/2016 - 07:43:02</td>
<td>Shaver, D</td>
<td>Protected IC</td>
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<tr>
<td>006</td>
<td>50% BOL Cycle 22</td>
<td>49.7</td>
<td>144</td>
<td>1304.88</td>
<td>540</td>
<td>2235</td>
<td>BOL</td>
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<td>Shaver, D</td>
<td>Protected IC</td>
</tr>
<tr>
<td>007</td>
<td>40% BOL Cycle 22 equ xe</td>
<td>40.5</td>
<td>146</td>
<td>1348.15</td>
<td>410</td>
<td>2235</td>
<td>BOL</td>
<td>12/28/2016 - 07:51:29</td>
<td>Shaver, D</td>
<td>Protected IC</td>
</tr>
<tr>
<td>008</td>
<td>Available</td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td>Protected IC</td>
</tr>
<tr>
<td>009</td>
<td>15% BOL Cycle 22 Turb @ 1800 RPM</td>
<td>15.1</td>
<td>130</td>
<td>1507.66</td>
<td>0</td>
<td>2235</td>
<td>BOL</td>
<td>08/07/2016 - 20:55:59</td>
<td>Shaver, D</td>
<td>Protected IC</td>
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<tr>
<td>010</td>
<td>4% BOL Cycle 22 equ xe</td>
<td>4.6</td>
<td>130</td>
<td>1648.29</td>
<td>0</td>
<td>2235</td>
<td>EOL</td>
<td>08/07/2016 - 20:56:47</td>
<td>Shaver, D</td>
<td>Protected IC</td>
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<tr>
<td>011</td>
<td>21 RHR Pp I/S 320 psig 342 F</td>
<td>1.0</td>
<td>0</td>
<td>1067.37</td>
<td>0</td>
<td>308</td>
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<td>Shaver, D</td>
<td>Protected IC</td>
</tr>
<tr>
<td>012</td>
<td>Mode 5 Tc 180 RCS 303 psig 21/22 RHR I/S 22/23 RCP I/S 5 1.4</td>
<td>0.6</td>
<td>0</td>
<td>1350.90</td>
<td>0</td>
<td>297</td>
<td>EOL</td>
<td>09/20/2016 - 08:22:31</td>
<td>Shaver, D</td>
<td>Protected IC</td>
</tr>
<tr>
<td>013</td>
<td>Mode 5 Tc 147 RCS 303 psig 21/22 RHR I/S 23 RCP I/S PZR 80% Cold Cal</td>
<td>0.6</td>
<td>0</td>
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<td>0</td>
<td>155</td>
<td>EOL</td>
<td>08/21/2016 - 19:30:25</td>
<td>Shaver, D</td>
<td>Protected IC</td>
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</table>

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For TOUCH use Page Buttons instead of Scroll Bar
## PSEGIS IC Reset Selection

<table>
<thead>
<tr>
<th>IC#</th>
<th>Description</th>
<th>Snapped By</th>
<th>IC Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>120</td>
<td>100% BOL 4GWDT CYCLE 22 NEED CHECK</td>
<td>n/a</td>
<td>LOR or ILOT Training</td>
</tr>
<tr>
<td>121</td>
<td>SG-2346</td>
<td>n/a</td>
<td>Protected IC Reset</td>
</tr>
<tr>
<td>122</td>
<td>ESG-2305</td>
<td>n/a</td>
<td>LOR or ILOT Training</td>
</tr>
<tr>
<td>123</td>
<td>SG-2337 Snap for Day 2 2016-09-13</td>
<td>Sanders</td>
<td>LOR or ILOT Training</td>
</tr>
<tr>
<td>124</td>
<td>45% BOL Stabilized for LOR</td>
<td>Lackey, M.</td>
<td>LOR or ILOT Training</td>
</tr>
<tr>
<td>125</td>
<td>Test Setup</td>
<td>Williams, P.</td>
<td>LOR or ILOT Training</td>
</tr>
<tr>
<td>126</td>
<td>09-01 NRC ESG-2 (Do NOT Snap Over)</td>
<td>Sanders</td>
<td>LOR or ILOT Training</td>
</tr>
<tr>
<td>127</td>
<td>1800 Group Day 3</td>
<td>n/a</td>
<td>LOR or ILOT Training</td>
</tr>
<tr>
<td>128</td>
<td>174 1 and press demo</td>
<td>n/a</td>
<td>LOR or ILOT Training</td>
</tr>
<tr>
<td>129</td>
<td>Day 3 group 2 S/U</td>
<td>n/a</td>
<td>LOR or ILOT Training</td>
</tr>
<tr>
<td>130</td>
<td>CC leak validation for Wayne</td>
<td>n/a</td>
<td>LOR or ILOT Training</td>
</tr>
<tr>
<td>131</td>
<td>9-30 Kevin Crew</td>
<td>n/a</td>
<td>LOR or ILOT Training</td>
</tr>
<tr>
<td>132</td>
<td>9-30 Gustavo Crew</td>
<td>n/a</td>
<td>LOR or ILOT Training</td>
</tr>
<tr>
<td>133</td>
<td>Snapshot if IC 117 2200 ILOT Crew, Day 7</td>
<td>n/a</td>
<td>LOR or ILOT Training</td>
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</table>
PSEGIS Action List

## MALFUNCTIONS

<table>
<thead>
<tr>
<th>Malfunction Code</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>AF0181A</td>
<td>21 AUX FEEDWATER PUMP TRIP</td>
</tr>
<tr>
<td>AF0181B</td>
<td>22 AUX FEEDWATER PUMP TRIP</td>
</tr>
<tr>
<td>AF0182A</td>
<td>21 AFP PRESS OVRD PROT FAILS</td>
</tr>
<tr>
<td>AF0182B</td>
<td>22 AFP PRESS OVRD PROT FAILS</td>
</tr>
<tr>
<td>AF0183</td>
<td>23 AUX FW PMP OVERSPEED TRIP</td>
</tr>
<tr>
<td>AF0293</td>
<td>AFWST Leak at Specified Level</td>
</tr>
<tr>
<td>AF0294A</td>
<td>21 AFP SUCTION LINE LEAK [Inactive]</td>
</tr>
<tr>
<td>AF0294B</td>
<td>22 AFP SUCTION LINE LEAK [Inactive]</td>
</tr>
<tr>
<td>AF0294C</td>
<td>23 AFP SUCTION LINE LEAK [Inactive]</td>
</tr>
<tr>
<td>AF0295A</td>
<td>21 AFP DISCHARGE LINE LEAK [Inactive]</td>
</tr>
<tr>
<td>AF0295B</td>
<td>22 AFP DISCHARGE LINE LEAK [Inactive]</td>
</tr>
<tr>
<td>AF0295C</td>
<td>23 AFP DISCHARGE LINE LEAK [Inactive]</td>
</tr>
<tr>
<td>AF0352A</td>
<td>21 AFP FAILURE TO START ON IMMEDIATE LO SG LEVEL SIGNAL</td>
</tr>
<tr>
<td>AF0352B</td>
<td>22 AFP FAILURE TO START ON IMMEDIATE LO SG LEVEL SIGNAL</td>
</tr>
<tr>
<td>AF0352C</td>
<td>23 AFP FAILURE TO START ON IMMEDIATE LO SG LEVEL SIGNAL</td>
</tr>
<tr>
<td>AF0353A</td>
<td>21 AFP FAILURE TO AUTO START ON ANY (ALL) SIGNALS</td>
</tr>
<tr>
<td>AF0353B</td>
<td>22 AFP FAILURE TO AUTO START ON ANY (ALL) SIGNALS</td>
</tr>
<tr>
<td>AF0353C</td>
<td>23 AFP FAILURE TO AUTO START ON ANY (ALL) SIGNALS</td>
</tr>
</tbody>
</table>

---

**Single-Click List Select**

- To Next System
- To TOP Page
- Page UP
- Page DOWN

Use Mouse to Drag Corner to adjust form/font size...
PSEGIS Instructor Station Tablet Mode Forms

PSEGIS Action List System Selection

MALFUNCTIONS

REMOTE FUNCTIONS

PREV

All Systems

Search->

I/O OVERRIDES

SEARCH

Search Desc Keyword

All Systems

Search Device Tag

ALL ACTIONS

Search Device Tag

All Systems

RT-01

AF Auxiliary Feedwater

RT-02

AN Annunciator Systems

RT-03

BF Boiler Feed (SG Feedwater)

RT-04

CA Control and Station Air

RT-05

CC Component Cooling

RT-06

CN Condensate

RT-07

CS Containment Spray

RT-08

CV Chemical and Volume Control

RT-09

CW Circulating Water

RT-10

DF Digital Feedwater (S)

RT-11

EH Electro-Hydraulic Control

RT-12

EL Electrical Distribution

RT-13

GE Electrical Generation

RT-14

HD Heater Drain

RT-15

MC Miscellaneous Systems (S)

RT-16

MS Main Steam

RT-17

NI Nuclear Instrumentation

RT-18

PC Plant Computer-Based Systems

RT-19

PR Pressurizer Systems

RT-20

RC Reactor Coolant

RT-21

RD Control Rod Drive

RT-22

RH Residual Heat Removal

RT-23

RM Radiation Monitoring

RT-24

RP Reactor Protection and Safeguard

RT-25

SG LEVEL SIGNAL

RT-26

SS LEVEL SIGNAL

RT-27

TT LEVEL SIGNAL

RT-28

CLOSE

Page UP

Page DOWN

Use Mouse to Drag Corner to adjust form/font size----

PSEGIS Power LLC
# PSEGIS Instructor Station Tablet Mode Forms

## PSEGIS Action Insertion

![PSEGIS Instructor Station Tablet Mode Forms](image)

**Malfunction List showing Items for Selected System**

<table>
<thead>
<tr>
<th>MALFUNCTIONS</th>
<th>REMOTE FUNCTIONS</th>
<th>I/O OVERRIDES</th>
<th>ALL ACTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Show All</td>
<td>By System -&gt;</td>
<td>Search&gt;</td>
<td></td>
</tr>
<tr>
<td>CC0172C</td>
<td>23 COMPONENT COOLING PUMP TRIP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CC0172A</td>
<td>21 COMPONENT COOLING PUMP TRIP</td>
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<td></td>
</tr>
<tr>
<td>CC0172B</td>
<td>22 COMPONENT COOLING PUMP TRIP</td>
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<td></td>
</tr>
<tr>
<td>CC0172C</td>
<td>23 COMPONENT COOLING PUMP TRIP</td>
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<td></td>
</tr>
<tr>
<td>CC0303</td>
<td>CC LEAK INSIDE CONTAINMENT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CC0326</td>
<td>RCP Therm Bar Vlv 2CC131</td>
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<td></td>
</tr>
<tr>
<td>CC0328A</td>
<td>CC LEAK at Pump 21 Discharge</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CC0328B</td>
<td>CC LEAK at Pump 22 Discharge</td>
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<td>CC0329B</td>
<td>CC LEAK at 22 Safety Relief</td>
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<tr>
<td>CC0330</td>
<td>CC LEAK at Non Safety Relief</td>
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</tr>
<tr>
<td>CC0331</td>
<td>CC LEAK after Seal WTR HX</td>
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</tr>
<tr>
<td>CC0332</td>
<td>CC LEAK after LetDown HX</td>
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<td></td>
</tr>
<tr>
<td>CC0333A</td>
<td>CC LEAK at Tank A Discharge</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CC0333B</td>
<td>CC LEAK at Tank B Discharge</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CC0361A</td>
<td>21 COMPONENT COOLING PUMP Fails to Start on Low Pressure [Inactive]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CC0361B</td>
<td>22 COMPONENT COOLING PUMP Fails to Start on Low Pressure [Inactive]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CC0361C</td>
<td>23 COMPONENT COOLING PUMP Fails to Start on Low Pressure [Inactive]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Single-Click List Select**

- To Next System

**18 List Items**

- For TOUCH use Page Buttons instead of Scroll Bar
PSEGIS Full Desk Mode Panel Mimic Navigation

Click on Panel Section of Interest
PSEGIS Full Desk Mode Panel Mimic Navigation

Entire Panel Section is Live, Click on Bezel Section Titles to Zoom further
PSEGIS Full Desk Mode Panel Mimic Navigation

Bezel Section Zoomed and Centered
Is a Custom Instructor Station a Good Idea?

- Pretty much EVERYBODY would say NO because….
- All existing Vendor Instructor Station are all pretty much the same in functionality and get the job done so why change that if you are used to that
- It is NEVER Good to be One of a Kind
- Issues with Future Support if author leaves Utility
- Time wasted developing an Instructor Station better spent doing “real” simulator work
- Making Sausage is Not Pretty. Future users (Instructors) may be exposed to early bug ridden attempts that leave bad first impression
- If you attempt to do your own Instructor Station you are kind of a jerk.
Is a Custom Instructor Station a Good Idea?

So why did I attempt a Custom Instructor Station?

- Because I am a jerk.
- In additions to Instructors, I am also a user of the Simulator. If I can do some things to make my job easier I am going to try. For the Simulator and Plant Event Compare testing that I need to do I found the Data Collection capabilities of existing vendor products lacking.

  Wanted to incorporate the following Wish List Items

  1. Make Instructor Station usable and readable on touch screens from small tablet to large 4K Monitors
  2. Keep the basic functions simple and familiar (no changes to Scenario Guides needed)
  3. Data Collection Trends default to auto-scaling over entire Time (X) and Value (Y)
  4. Direct integration with MS Office products. Direct Export of Data Collection Trends to MS Word as well as MS Excel
  5. Direct Import/Export of Scenario Guide Action Tables between MS Word Scenario Guide and Data Collection Program (plug Scenario Guide Doc into USB port, import and export Actions and Trigger)
  6. Scripting built into Data Collection Monitor Files for automated testing
  7. Initial Condition list searchable by critical value ranges as well as IC Description keywords, Snapped Date Range or IC Snap Owner
  8. Use a single executable to handle Control Bar, IC and Action Select and Insert and Action Summary instead of separate executable for each
Conclusions

- Small Tablet PC’s can be used as low cost replacement of broken or obsolete “small display” Simulator Panel items.
- Making Simulator Applications useable across a wide range of display resolutions, sizes, and touch input capability requires special coding of form resizing.
- And finally, we established that I am Jerk.

QUESTIONS?