

# Getting Operations Buy-In with High Performance HMI

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# AGENDA

- Project Overview
- Brief into ISA-101 HMI Standards
- Designing Screens for Operators
- Using Operator Feedback Effectively

# PROJECT OVERVIEW



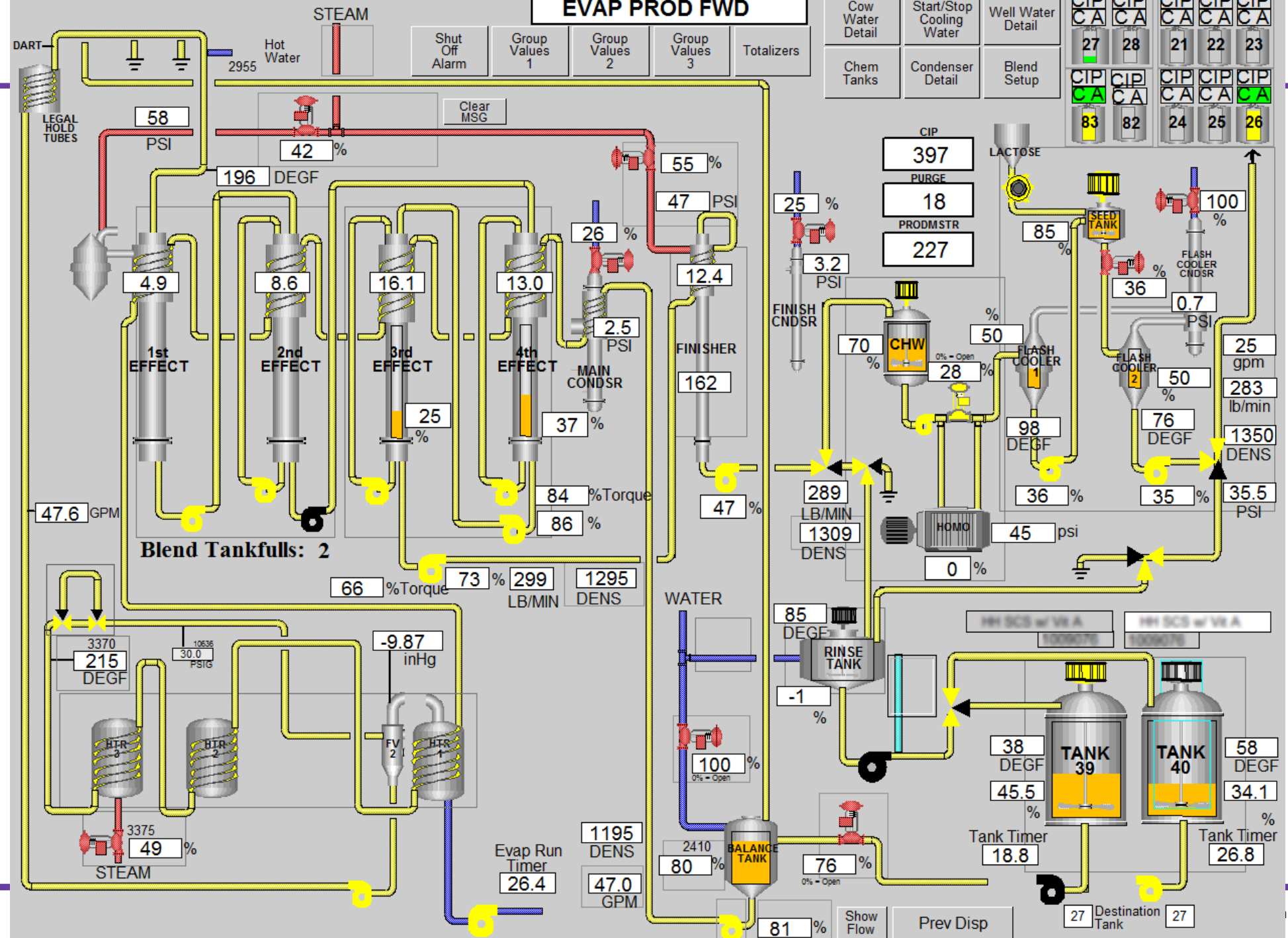
# Project Information

- Galloway Company is a Craft Dairy Ingredients Manufacturer.
- The project was an expansion to the evaporated milk department by adding a new evaporator.
- The expansion was designed in Control Editor and Control HMI, while the existing plant was ICC and FoxView.
- ISA-101 heavily influenced the design and implementation of the HMI for this project.

# ISA-101 Basics



# EVAP PROD FWD



Shut Off Alarm	Group Values 1	Group Values 2	Group Values 3	Totalizers
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Cow Water Detail	Start/Stop Cooling Water	Well Water Detail	CIP CA	CIP CA	CIP CA	CIP CA	CIP CA
Chem Tanks	Condenser Detail	Blend Setup	27	28	21	22	23
			CIP CA	CIP CA	CIP CA	CIP CA	CIP CA
			83	82	24	25	26

ISA-101

# MORE THAN JUST GRAYSCALE





# What is ISA-101?

It **IS NOT** a list of rules to follow when building screens.

It **IS** a guide through the process of standardizing on better HMIs.

It focuses on:

- Developing your own **HMI Philosophy, Style Guide, and Toolkit**
- The HMI design process, focusing on situational awareness
- Long-term management and maintenance of HMIs.

Only applying one part of the standard, e.g., getting rid of color, without applying other areas will only lead to **operator complaints** and no actual **improvement** to the HMI.



PROJECT EXECUTION:

# DEVELOPING STANDARDS



A person wearing a white hard hat and a high-visibility safety vest is seen from behind, sitting at a workstation in a control room. The workstation features several computer monitors displaying various data and charts. The person's hands are on a specialized control panel with numerous buttons and a joystick. The entire scene is overlaid with a semi-transparent purple filter.

# HMI PHILOSOPHY



# HMI Philosophy: What are your objectives

- Consider the following:
  - Display Hierarchy
  - Alarming
  - Use of Color,
  - Information Density
  - User Interaction
  - Security
- Our areas of focus: Consistency, Use of Color, Information Density
- Lesson Learned: Earlier Operator Involvement

The background is a blurred industrial scene with a person in a white lab coat using a tablet. The scene is overlaid with a semi-transparent purple filter. The text 'HMI' is in white and 'STYLE GUIDE' is in cyan.

# HMI STYLE GUIDE



# HMI Style Guide: Display Hierarchy and Nav

- Display Levels
  - Level 1: KPIs and Overviews
  - Level 2: Car Dashboard
  - Level 3: Under the Car Hood
  - Level 4: Hayne's Repair Manual
- Navigation
  - Higher Levels displays will have links to lower-level displays
  - Breadcrumbs would show your position in the display hierarchy.

# HMI Style Guide: Use of Color

- Display Background: Light Gray
  - Consistent background color makes it possible to avoid color conflicts with other graphic elements
- Equipment State
  - White for Active (Running Pump or Open Valve)
  - Dark Grey for Passive (Stopped Pump or Closed Valve)
  - Light Gray for Non-Automated
- Alarm Colors: **Don't use anywhere else**
- Text Colors
  - Blue for Process Values, Dark Gray for labels, White background for Text Entry fields



# HMI Style Guide: Alarming

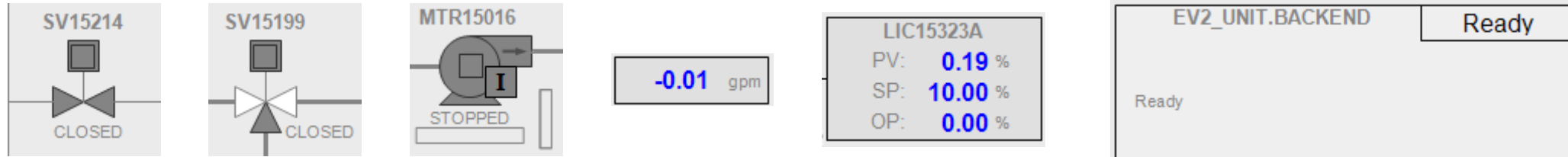
- Spell out alarm levels (Priorities) and how they should be used. Consider ANSI/ISA-18.2 standard to help with alarm management.
- Specify how each alarm level will be communicated to the operator.
  - What is the color for each alarm level?
  - Which levels are visible on Level 1 or 2 displays?
  - How will Alarm Groups be used?
  - How will the Current Alarm Display be used? Always open, only upon request?

# HMI TOOLKIT



# HMI Toolkit: Using Control HMI

- Device Symbols for Valves, Motors, PIDs, Sequences, etc.



- Graphic Symbols were aligned with the Strategy Templates that were developed
- Supporting Symbols such as Buttons, Navigation Flags
  - For example, provides consistent colors for Disabled, Off, and On buttons
- Element Styles for Font, Color, etc. to keep them consistent
  - Active/Passive, Label, Actual Value, Display Background, etc.

PROJECT EXECUTION:

# DESIGN and DEVELOPMENT

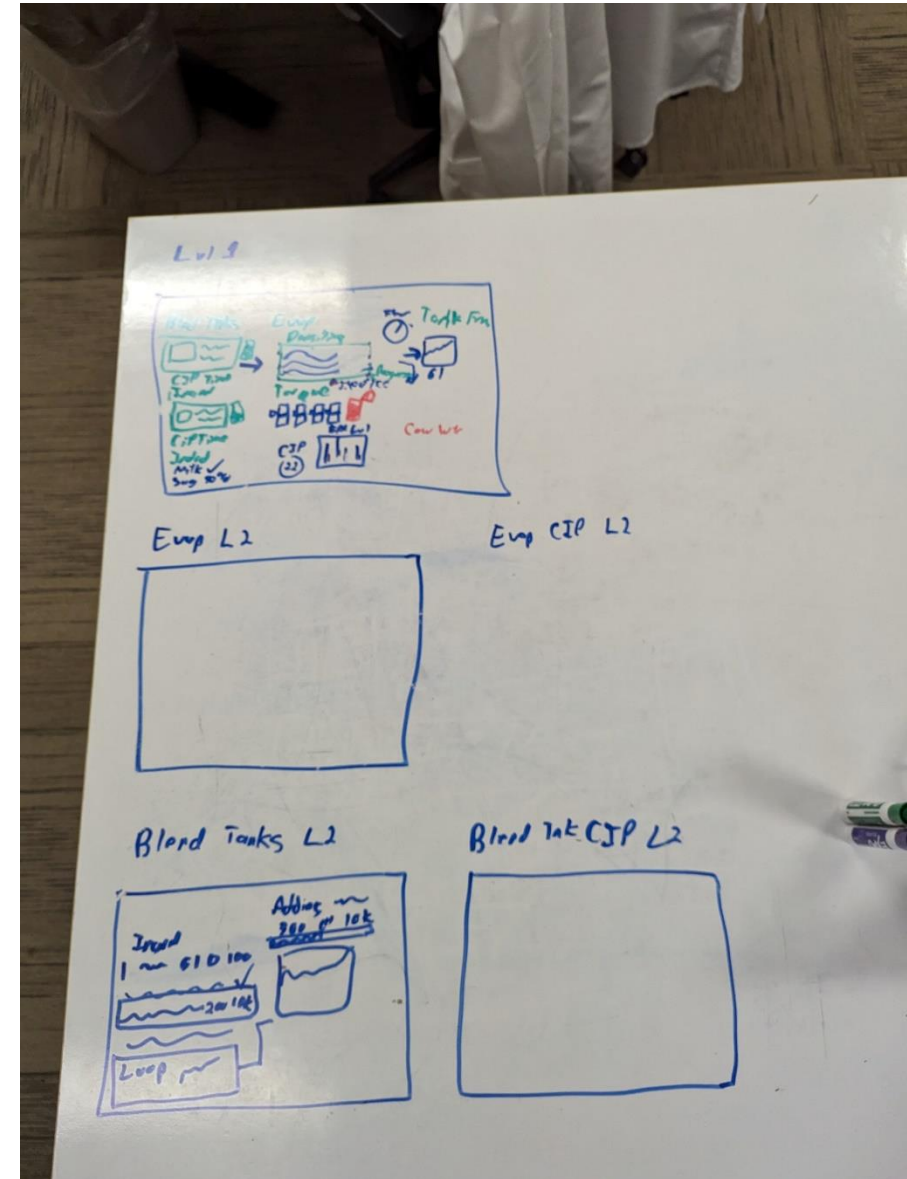


# HMI Design: Operator Interviews

- Talked about our HMI Philosophy
- Have some probing questions like:
  - What information do you need from the HMI?
  - What information would you pass on to the next operator at shift change?
  - What paperwork do you have to fill out?
- Have them show you their HMI and ask them to tell you what's happening with the process. Pay attention to what they look like.
- Have the operator walk you through their startup process.
- Show some example screens with your HMI Toolkit if you have them.

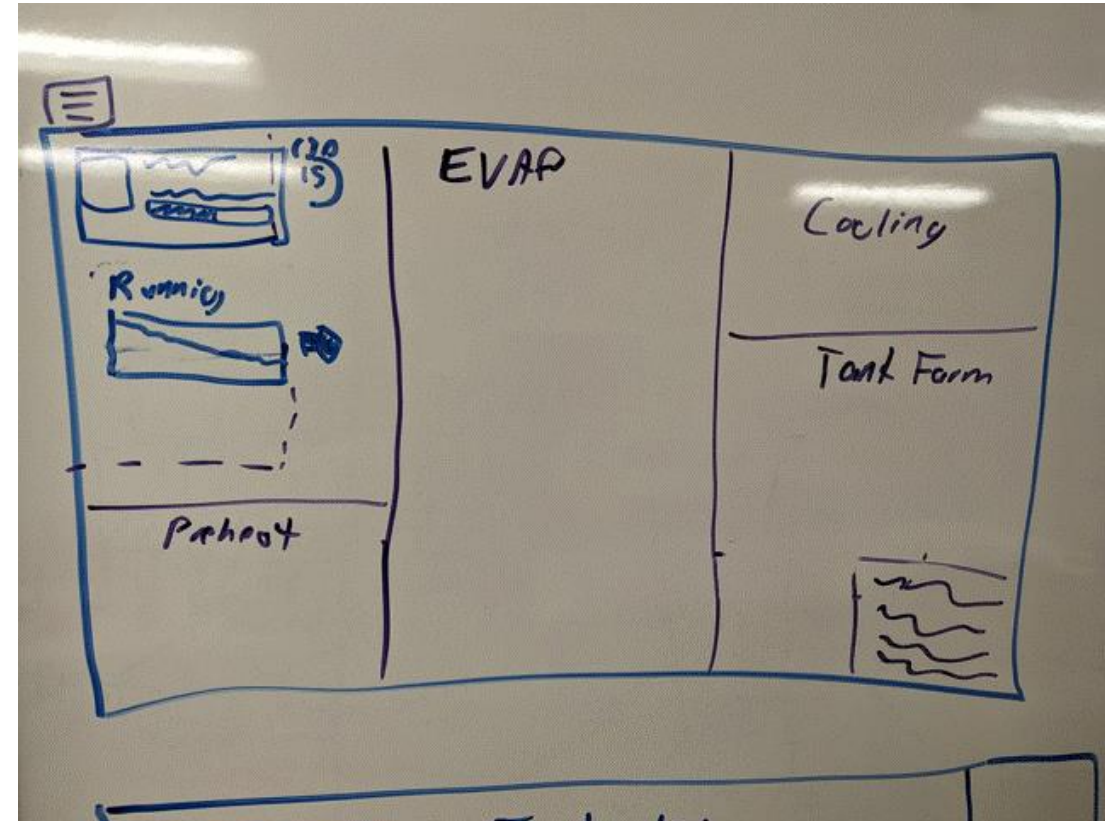
# Screen Discovery

- Figure out what your screens are. Work top down, at least to start.
  - Level 1: High-level overview of an operator's responsibilities.
  - Level 2: Different parts of your process.
  - Level 3: Major pieces of equipment.
- List your screens on the whiteboard in a tree view. Fill in the top 3 pieces of information you know you'll need on each screen.



# Screen Design

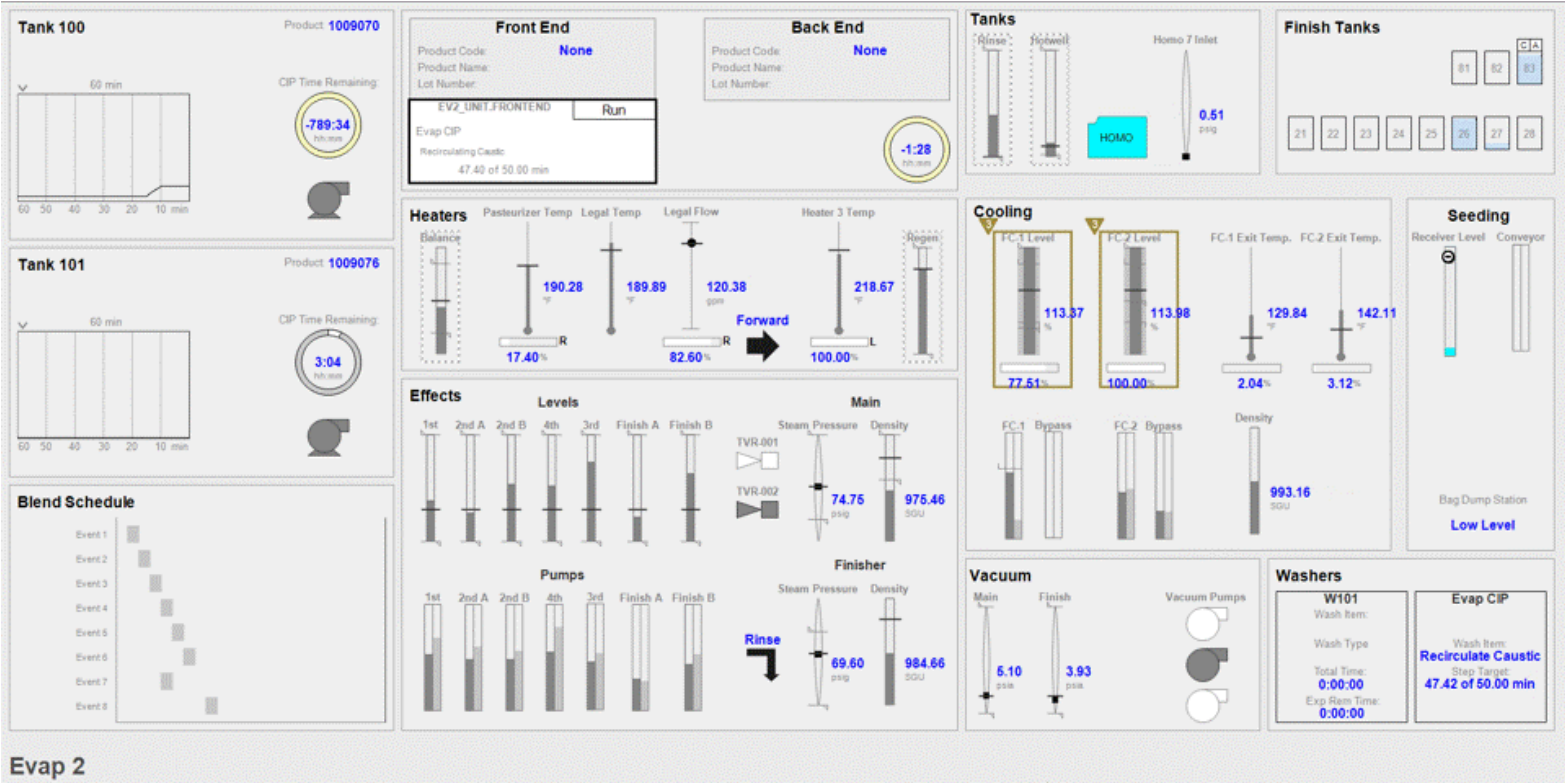
- Start with Level 2 displays. This is where you want the operator to spend 80% of their time.
- Take that most important information and start filling in the screen.
- Focus on providing information over data. Think of alternate ways to display that information.





# HMI Development

- Start building the screens you drew on a whiteboard.
- Use the Situational Awareness Library to give info over data.
- Review with operations multiple times.





# Using Operator Feedback Effectively

- Bad Option 1: Always give them exactly what they ask for.
- Bad Option 2: Tell them you can't do it because of the standard.
- What does that leave us? First, we have to understand why they're asking for the change.
  - Is there information that is too hard to get to on your HMI?
  - Does a screen not give them enough information to understand what's going on in the system.
- Talk to them about it. Sometimes you'll find they really care about X, but they're just used to seeing XYZ.

When working with operators,

Look for ways to give them the **information** they're **looking for**, even if it's **not in the same form** they originally expected.



# GET IN TOUCH



SURVEY



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THANK YOU!

