SCADA Transformation in Wastewater

Cape May County Municipal Water Authority

Rob Winder – CMCMUA

Matt Ruth - Avanceon

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About CMCMUA

Vision

CMCMUA will be a leader in the pursuit and implementation of innovative, environmentally sustainable and reliable wastewater treatment and solid waste management systems.

Mission

To efficiently implement progressive and fiscally prudent solutions to safeguard the public health and protect Cape May County's unique natural environment in partnership with an engaged community and staff.

History

The construction phase for the four (4) regional systems, which include Ocean City, Cape May, Seven Mile Beach-Middle and Wildwood Lower, began in 1979 with the first facility completed in 1982 and the fourth plant finished in 1988.

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AVEVA
ENDORSED
System Integrator

Endorsed Operate

About Avanceon

Mission

Focused on guiding, implementing and supporting operational technology solutions for manufacturing, industrial and utility organization as they take the steps on their Digital Transformation journey.

Our Promise

To create organizational and personal success for our customers through the solutions we provide for them

History

Established in 1984 with the goal to help our customers translate their needs, walk with them through their implementations and elevate them to a successful outcome.

AVEVA Endorsed Integrator since 2009 focused on SCADA and Advanced Applications.

www.avanceon.com

AVEVA

Taking the key steps of Digital Transformation

Challenge

- Address Systemic Obsolescence at the MUA
  - Knowledge extinction from people retiring
  - Original systems no longer manufactured or supported

Solution

- Deployed AVEVA System Platform, OMI, Edge and Historian to digitize the tribal knowledge, streamline process visibility and leverage cutting edge technology benefits

Benefits

- Data presented as Information for true Decision Making
- Reliable and Redundant
- Accessible by Everyone from Anywhere
- Fully documented and Standardized for future growth

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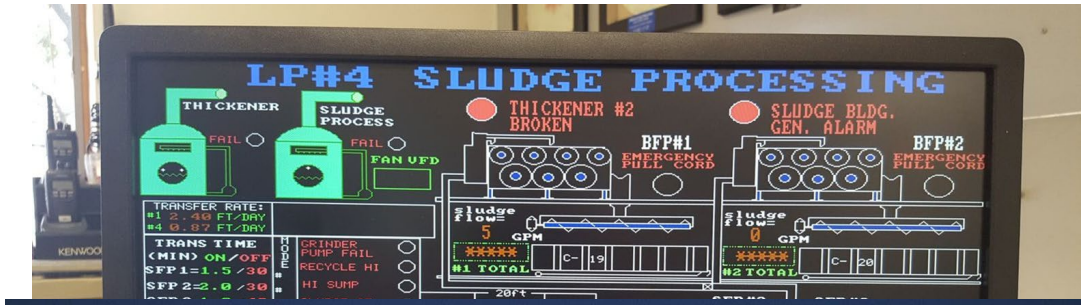
Obsolete SCADA

CMCMUA is 50! Time to Retire that SCADA System?

- Clean Water Act of 1972 triggered Wastewater Regionalization.
- CMCMUA was established in 1972 and started their designs.
  - Does anyone still have their Commodore 64?
  - Do you still have your owners manual?
  - Can you buy parts for your Commodore 64?
  - Are the games still attractive?
- How to migrate…



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The MUA Challenge

- Capital
- Institutional Knowledge
- That One Guy

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Project Chartered

Contract and Responsibilities

- SCADA software was the pivot point for the project's success
- All aspects of the projects to support the SCADA were set up under a New Jersey IT based contract
  - SCADA
  - IT Architecture
  - Control System Design
  - Electrical Design
  - Standards and Structure for all aspects of their operations
- Unique NJ IT based contract
  - No construction / fabrication
  - Allowed consistency with software platform(s) and integration firm
- 3 key decisions for the upgrade:
  - AVEVA
  - Schneider Electric
  - Avanceon

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AVEVA

AVEVA components

Addressing the needs of a modern Wastewater operations

- Foundations
  - System Platform
    - Security
    - Redundancy
    - Resource management
    - Standard instance management
- Visualization
  - Two Types of HMI to address redundancy
    - AVEVA OMI – HMI Container for Control Room and Plant function
    - AVEVA Edge – Pump Stations and Failover functionality
- Tools for Operations
  - Historian
  - Alarm Dialer – Win911
  - Reporting – Dream Reports
  - Asset Management

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Project Course and Scope

Standardization Across Five (5) Sites

- Cascade one plant and process at a time
  - Seven Mile (1st Contract)
  - Wildwood (2nd Contract)
  - Ocean City (2nd Contract)
  - Cape May (2nd Contract)
  - Landfill (3rd Contract)
- Each plant has 6 to 10 process areas
  - Plus 4 to 10 pump stations
- Decentralized Control Methodology
  - 56 PLC's in total over four sites
  - Thousands of data points

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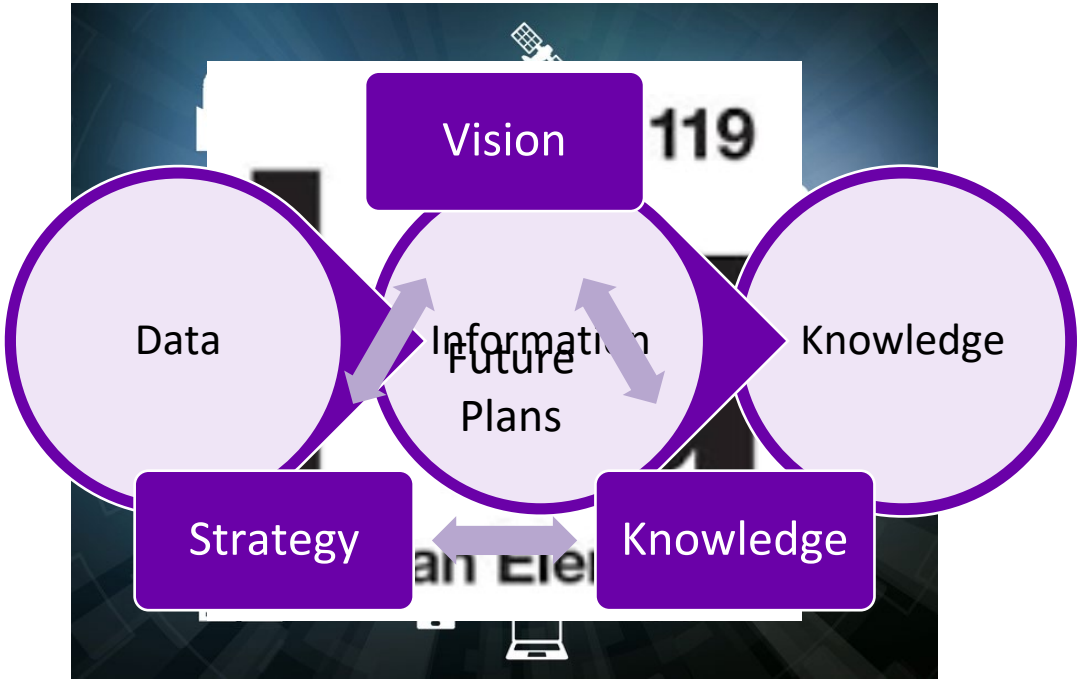
Key Requirements and Considerations of the System

- Address the Big Human Element Elephant
  - Engaging with new and existing operators
  - Simplify and Streamline the information
  - Make it easy
- Accessible by Everyone from Anywhere
- Shift to have Information / Knowledge
  - Away from “volumes of data”
  - Ability for operator to mine it and understand
- Reliable and Redundant
- Platform for future expansion



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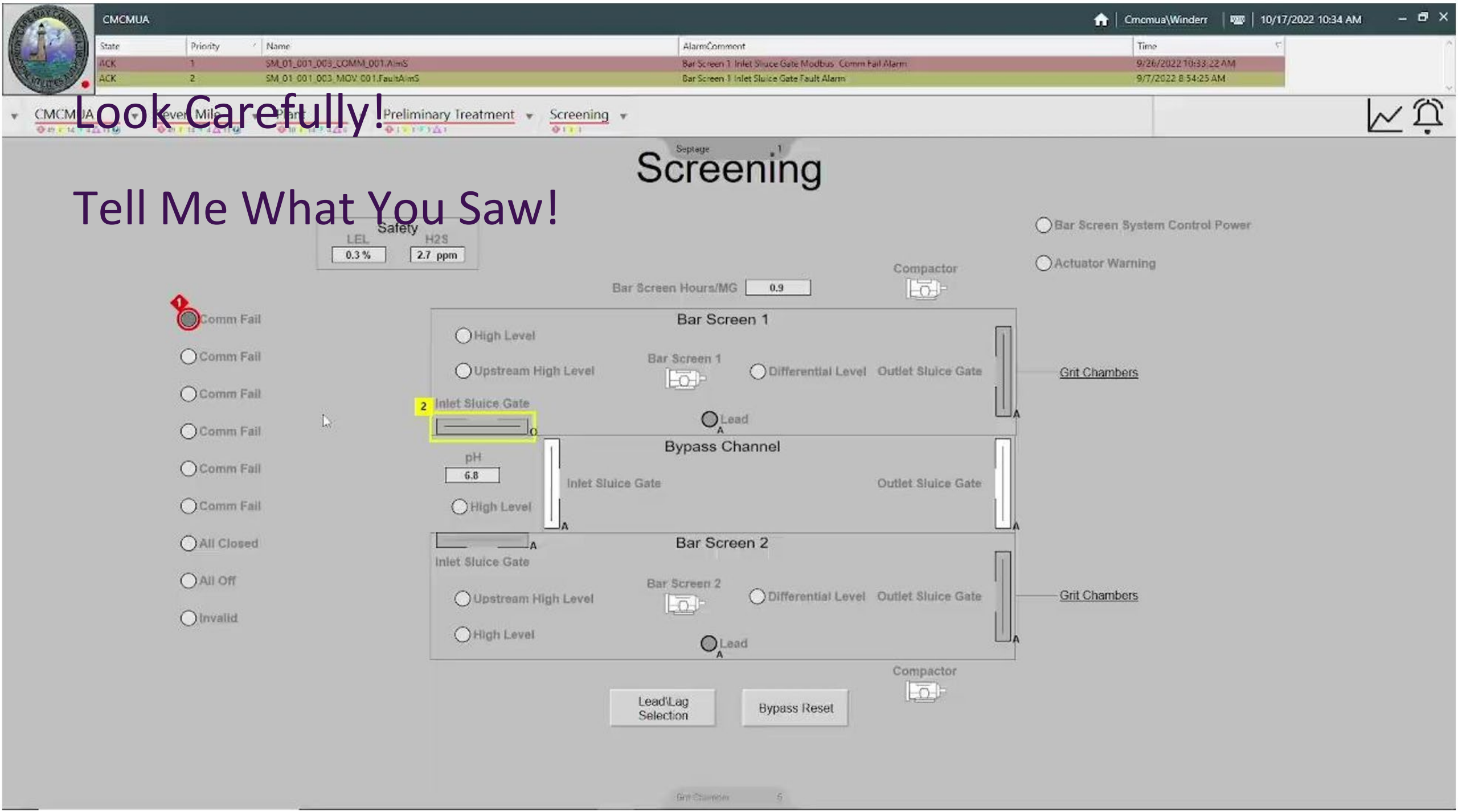
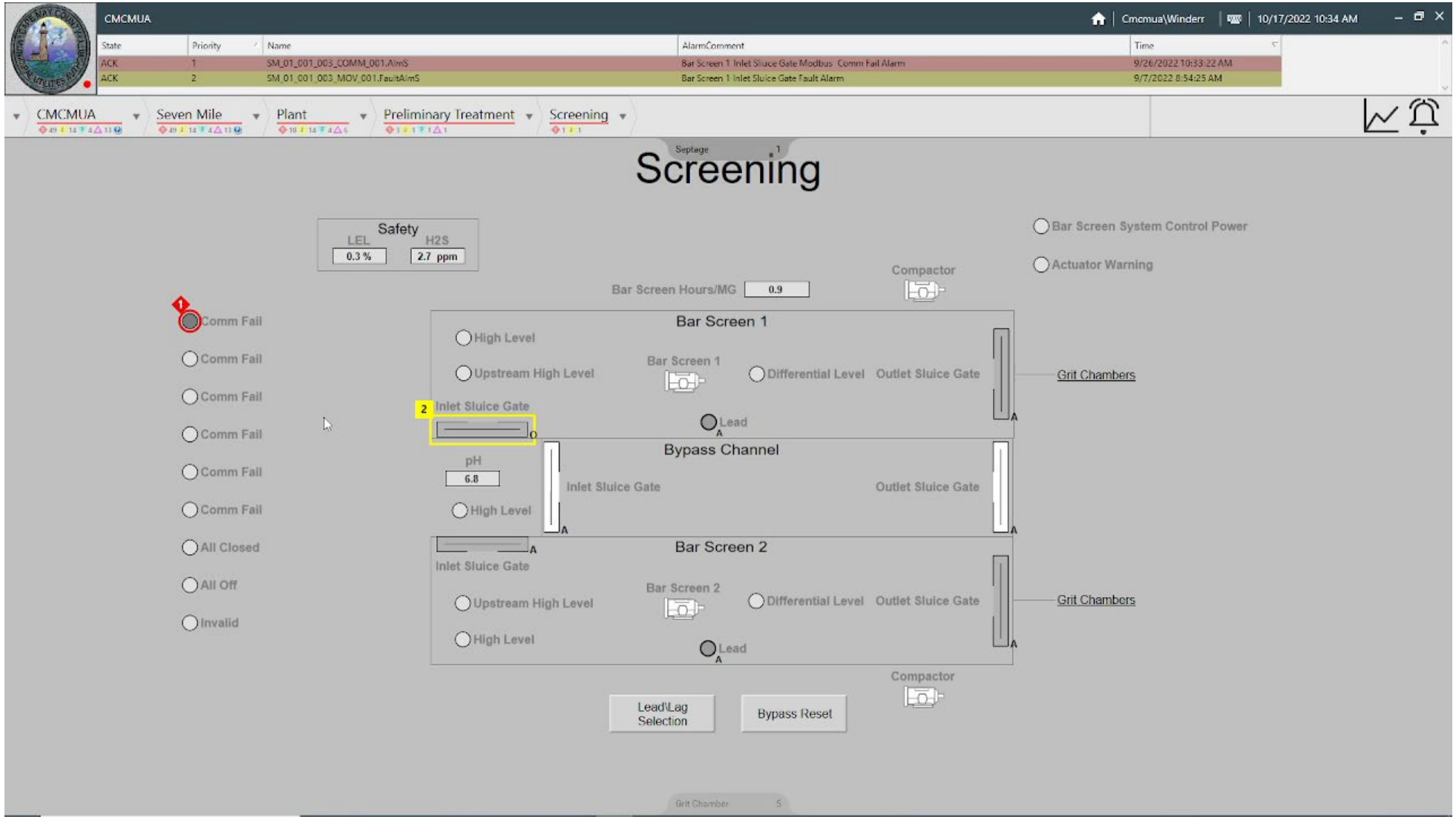

CMCMUA
Cmcmua\Winderr
10/17/2022 10:34 AM
State
Priority
Name
AlarmComment
Time
ACK
1
SM_01_001_003_COMM_001.AlmS
Bar Screen 1 Inlet Sluice Gate Modbus Comm Fail Alarm
9/26/2022 10:33:22 AM
ACK
2
SM_01_001_003_MOV_001.FaultAlmS
Bar Screen 1 Inlet Sluice Gate Fault Alarm
9/7/2022 8:54:25 AM
Look Carefully!
CMCMUA
Preliminary Treatment
Screening
Tell Me What You Saw!
Septage
Screening
Safety
LEL
0.3 %
H2S
2.7 ppm
Bar Screen System Control Power
Actuator Warning
Compactor
Bar Screen Hours/MG
0.9
Comm Fail
Comm Fail
Comm Fail
Comm Fail
Comm Fail
Comm Fail
All Closed
All Off
Invalid
Bar Screen 1
High Level
Upstream High Level
Bar Screen 1
Differential Level
Outlet Sluice Gate
Grit Chambers
Inlet Sluice Gate
Lead
Bypass Channel
pH
6.8
High Level
Inlet Sluice Gate
Outlet Sluice Gate
Bar Screen 2
Inlet Sluice Gate
Upstream High Level
Bar Screen 2
Differential Level
Outlet Sluice Gate
Grit Chambers
High Level
Lead
Compactor
Lead\Lag Selection
Bypass Reset

Situational Awareness

- Situational Awareness is the ability to identify, process, and comprehend the critical information about an incident.



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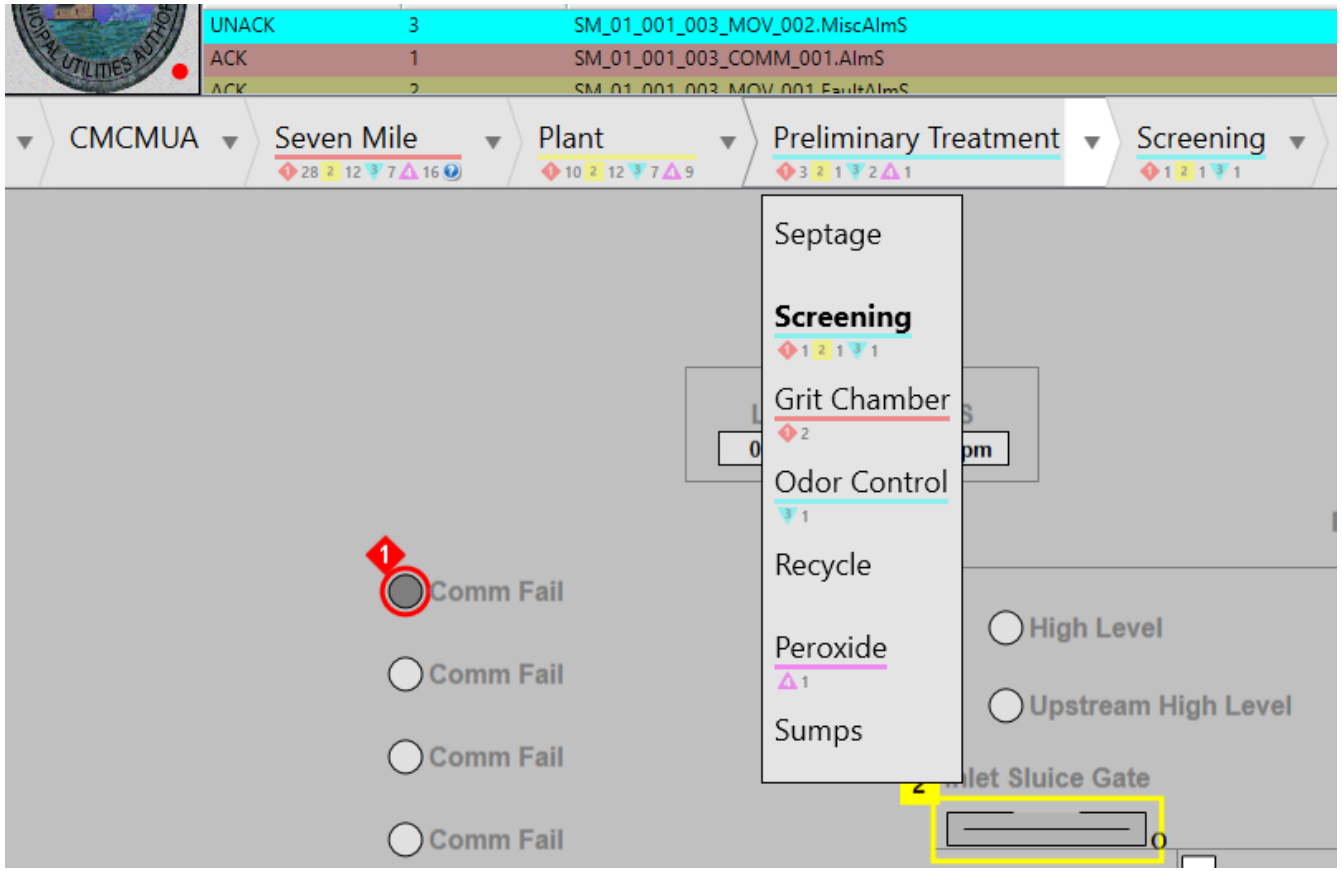
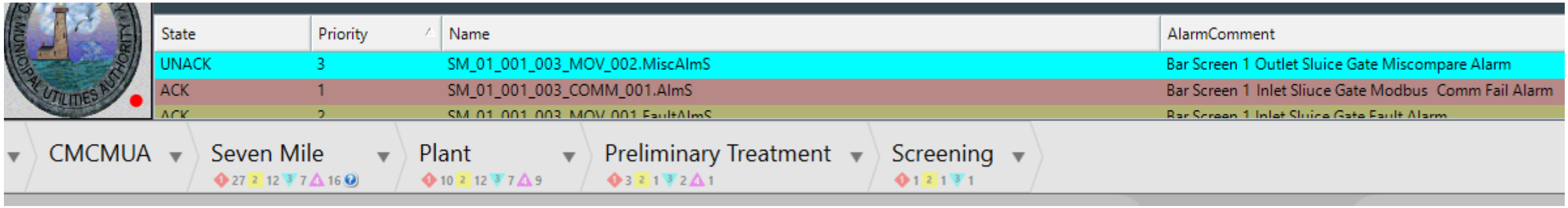
Contextual Alarming

- As the Operator drills down into the system the alarm notifications become screen specific.





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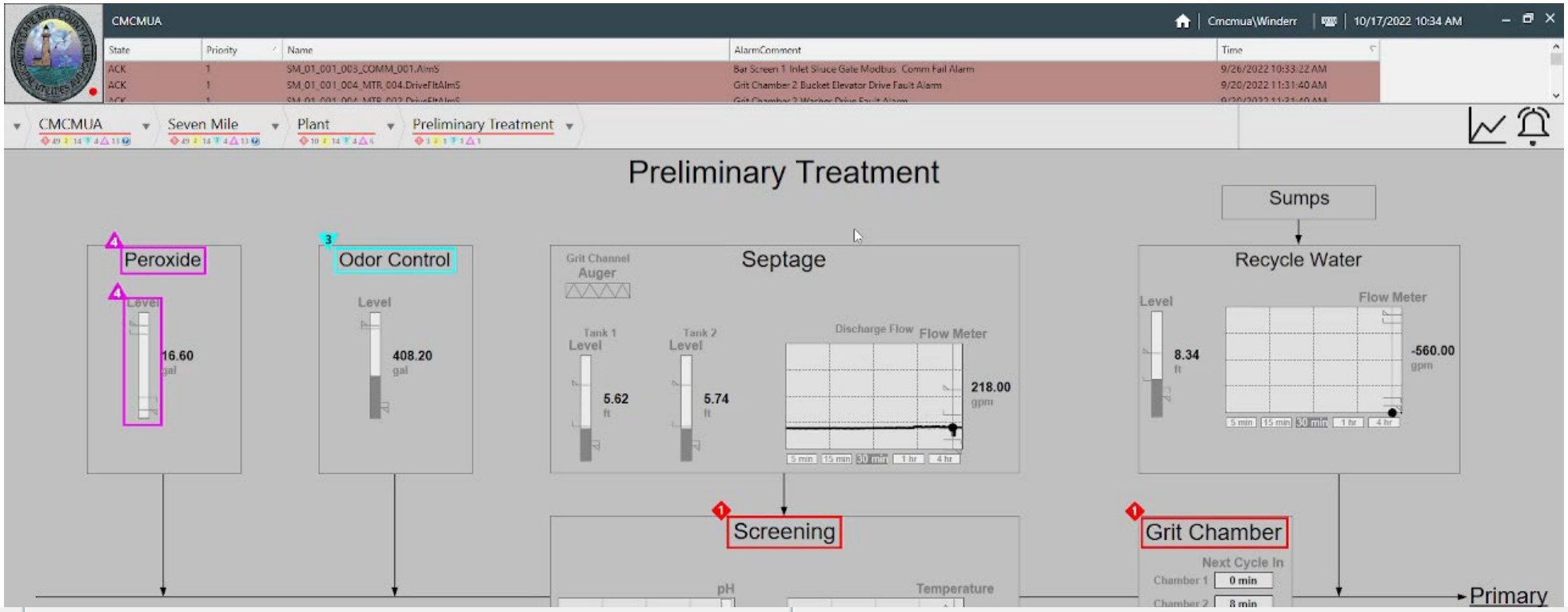
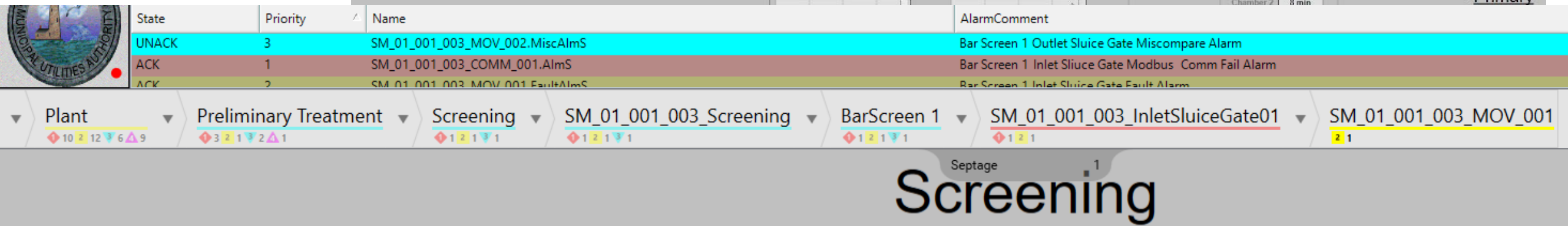
Naming Convention

- A unique way of identifying specific equipment in order to control, monitor, document, and historize information across multiple platforms.





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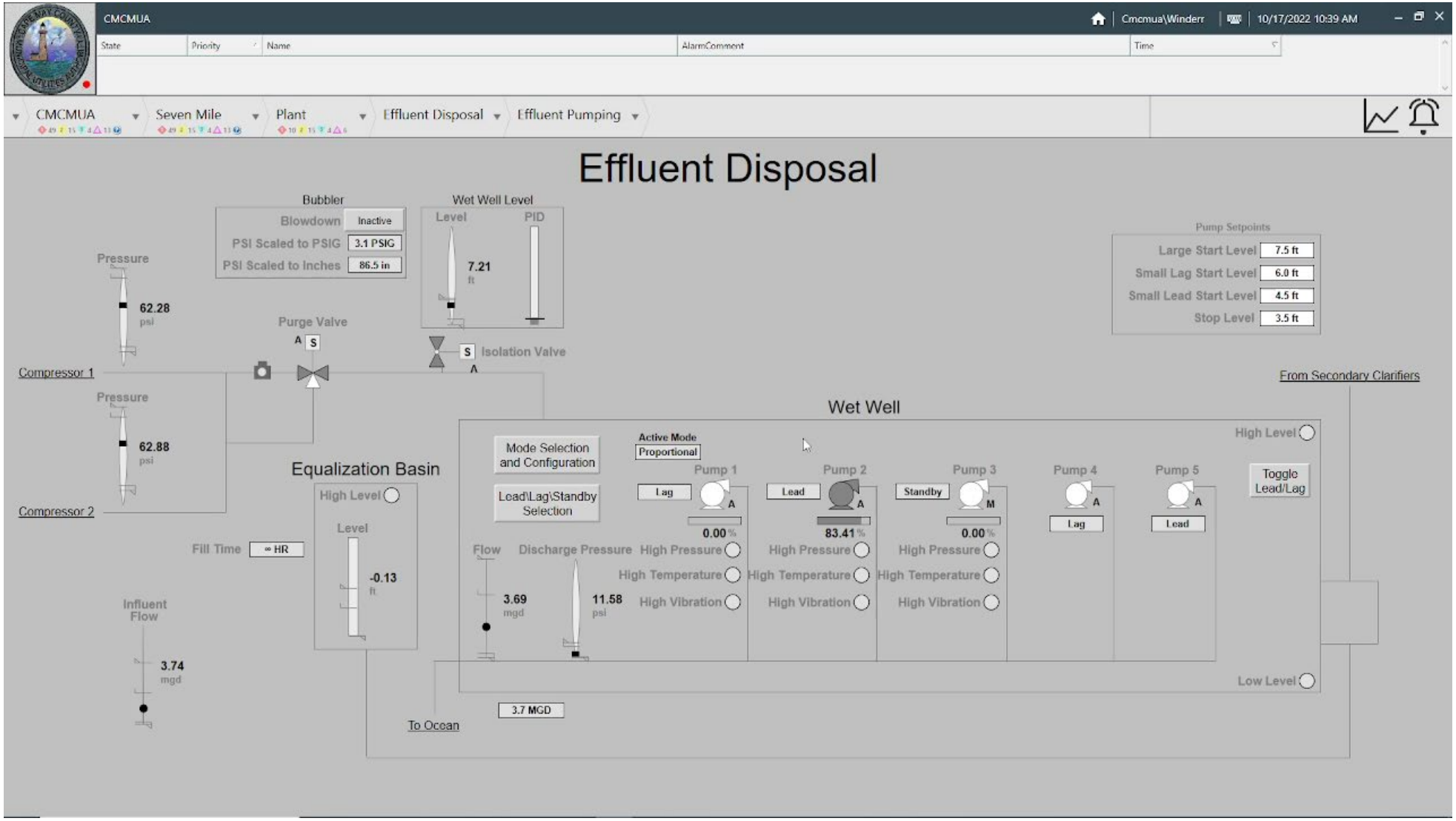
Equipment Faceplates

- Equipment Faceplates give the Operator detailed information and the ability to control the equipment and change all setpoints associated with that specific piece of equipment.



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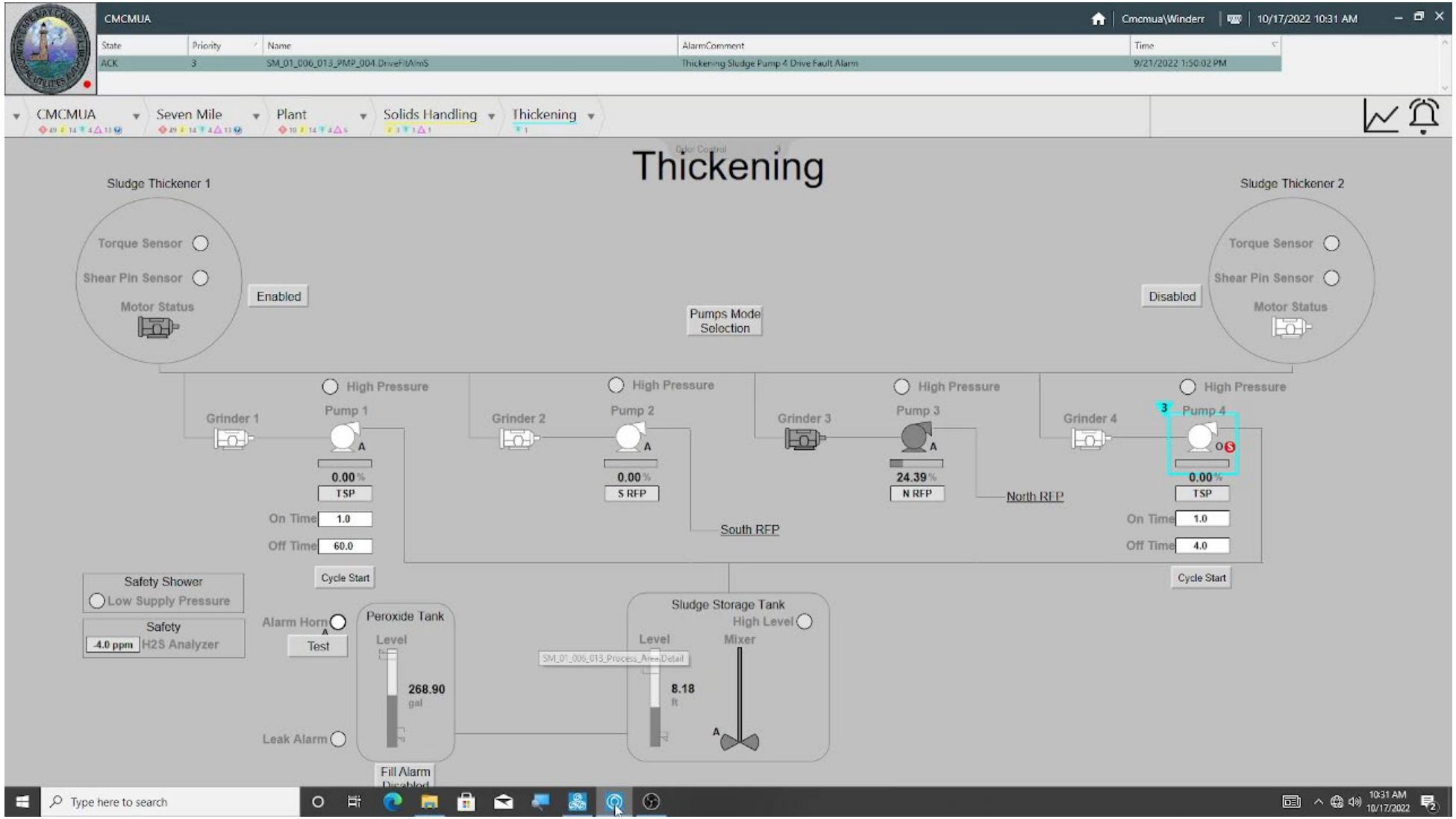
Safeties

- How come my equipment is not running?
  Safeties are now on the equipment faceplate so the Operator knows exactly why a piece of equipment did not start.



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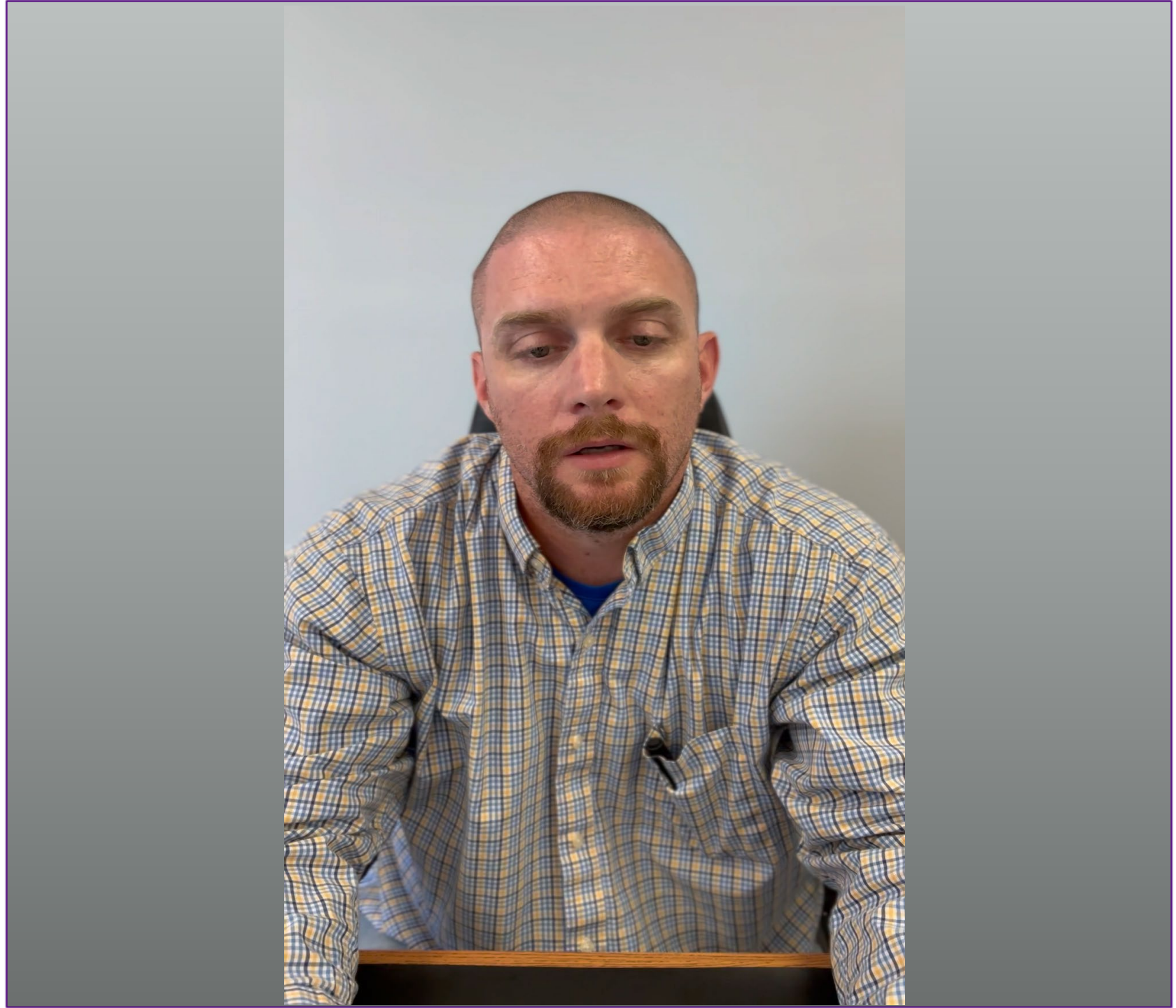
Boots on the Ground!

- Data is displayed as information.
- All information is in context.



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IT Security

AVEVA System Platform Supports

- Next Gen Firewalls
- Micro Segmentation
- Anti-Virus Solutions
- Multi-Factor Authentication
- Windows Active Directory

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Results and Next Steps

- CMCMUA looked at their 40 year SCADA problem and came up with an innovative solution
- By leveraging the unique IT contract vehicle they developed a project to propel their operations to the future
- The Project Delivers on the key goals
  - Reliable and Redundant - Fail safe for operational uptime
  - Secure - Highest level of cyber protection
  - Accessible by Everyone from Anywhere
  - System fully documented
  - Standardized for future growth
  - Platform for future expansion
- The future is bright for the system and the municipality to get the benefit from I4.0 technology for their operations and customers

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Questions?

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State your name and company.

Please remember to…

Navigate to this session in the mobile app to complete the survey.

Thank you!

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