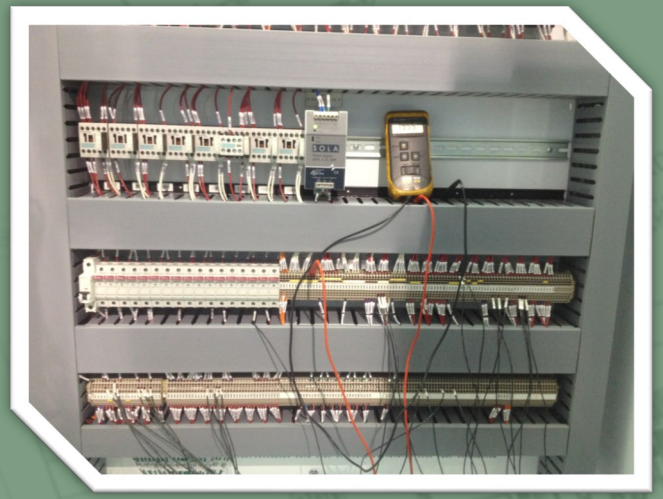
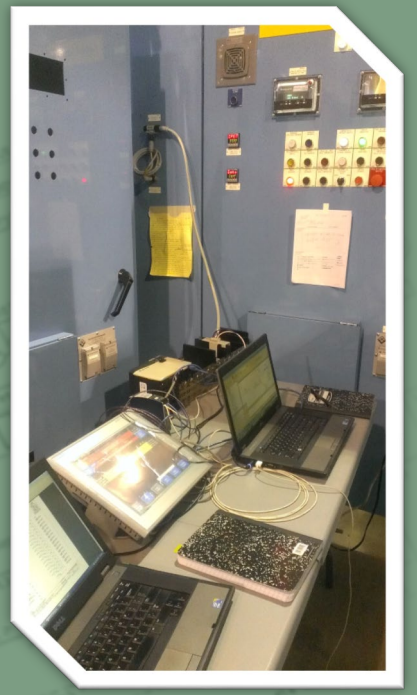
Outbound Technologies

2021 Virtual Operators Day

SCADA Equipment Maintenance & Best Practices





Outbound Technologies is a **Control System Integrator** committed to the pursuit of excellence

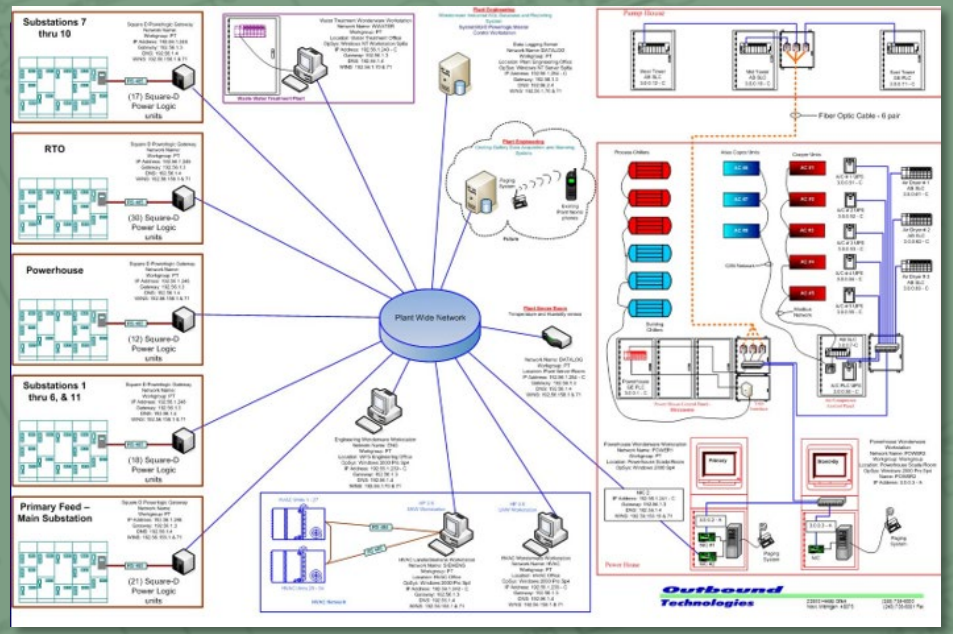
DATE: FEBRUARY 2021

JUST SOME HUMOR!

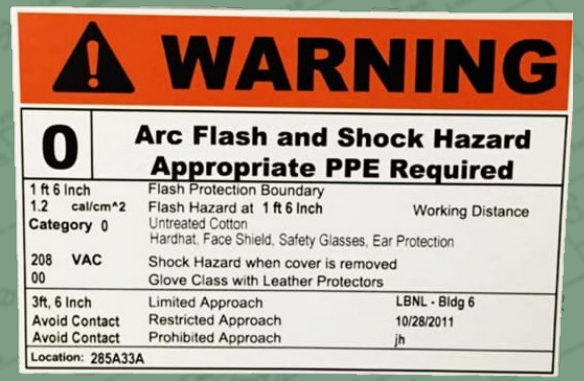
SCADA 101

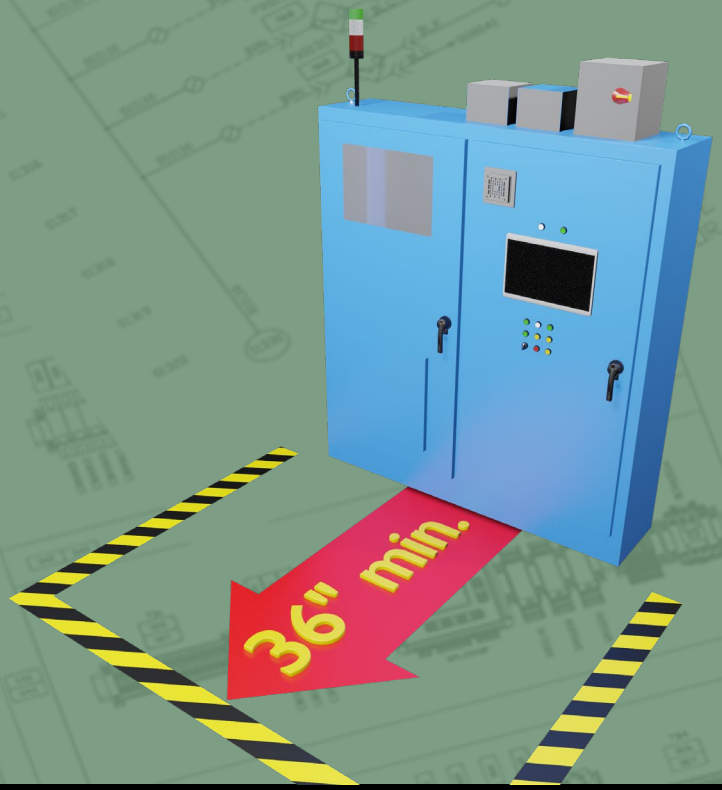
What is a SCADA System?

- Supervisory Control and Data Acquisition
  - Communicates with several PLC's and intelligent devices over an industrial network
  - Can control a system, monitor a system(s), and/or do both
- Why use SCADA?
  - Visibility into your process either remotely or locally
  - Can generate automated reports for compliancy
  - Can store and trend historical data for various uses
  - For a visual and centralized interface into a large process system with several PLC's and devices
  - Scalable and manageable
  - Remote diagnostics and troubleshooting
  - Much more
- What does your system include?
  - Control panels, PLC's, UPS's, Field Devices, Cabling, and Servers



Maintaining the Electrical Equipment in the Panel





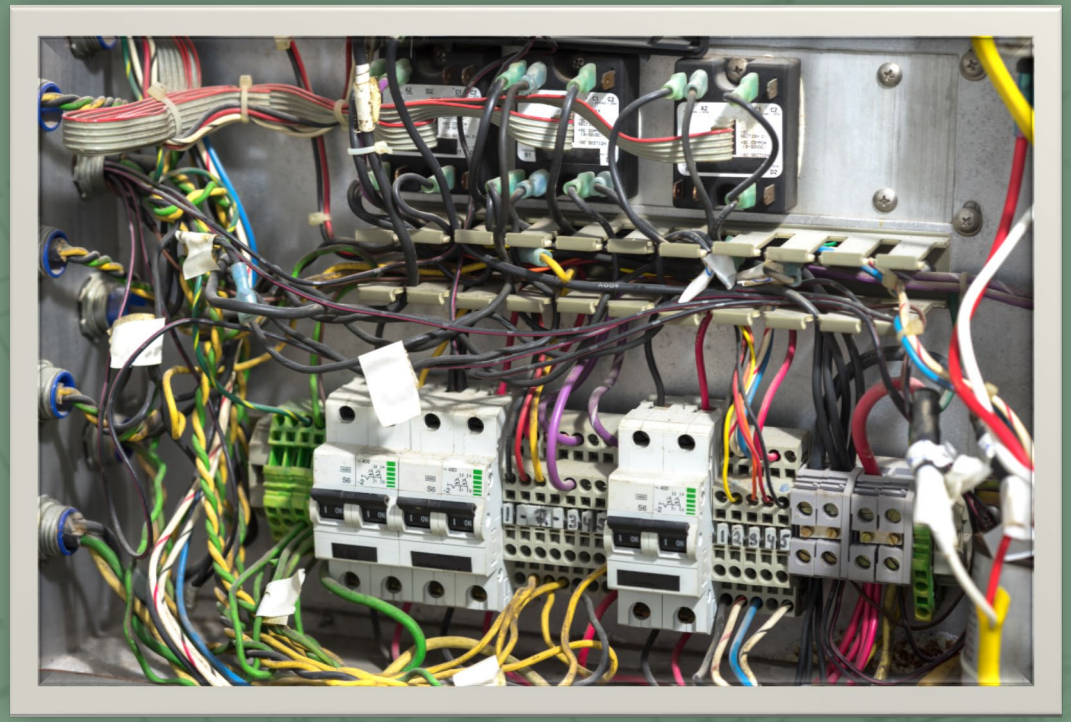
EXTERIOR

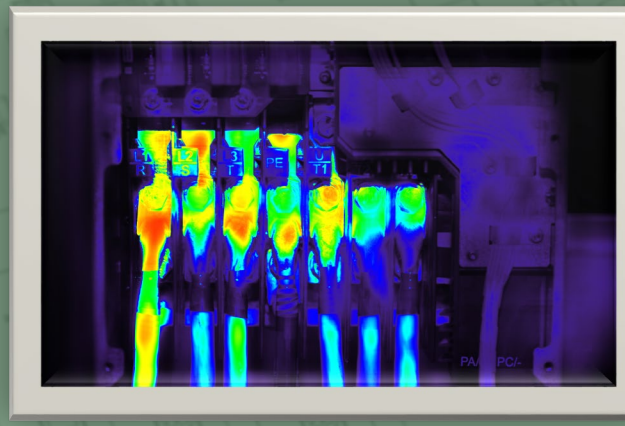
- General Inspection
  - LOTO instructions
    - OSHA Requirements
    - Site specific requirements
  - General safety labels
    - NFPA 79
    - Interlock wiring notice
  - SCCR labeling
    - Was not required before 2007
  - Proper distances clear around the panel
    - Min 36” in most cases

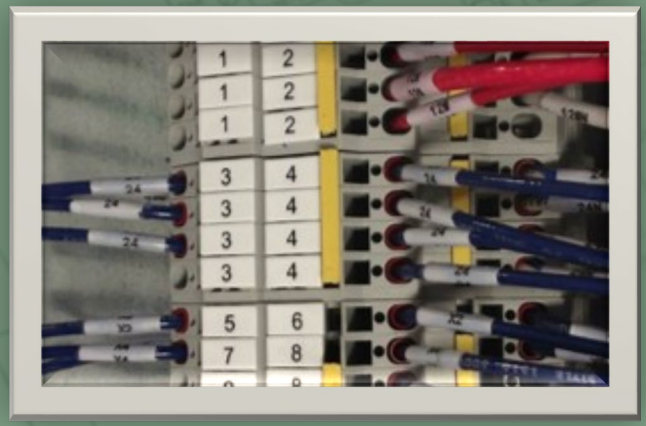
Maintaining the Electrical Equipment in the Panel 2

WIRING

- Tidy up wiring
- Loose Wires
  - Thermal Inspection of Panels (every 2 years)
- Missing Wire Labels
- Make sure wiring around door pinch points is clear
- Jumpers
  - Purple = permanent
- Wire Duct Covers in place







Maintaining the Electrical Equipment in the Panel 3

DRAWINGS & SPECIFIC TASKS

- Specific Maintenance
  - Develop and maintain a log or other record of panel specific tasks
  - Include items such as:
    - Alarm Dialers
    - Heaters/Air Conditioners

- Maintain As-Builts
  - Allows speedier emergency repairs
  - Reduce cost of changes
  - Print pocket should contain a current set
  - For printed drawings without soft copies, take high resolution pictures and save on network server for backup

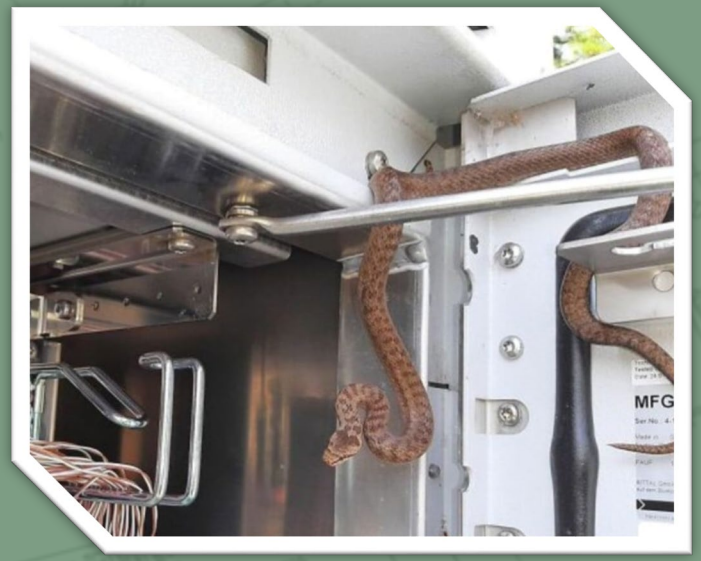
Cleaning Panels

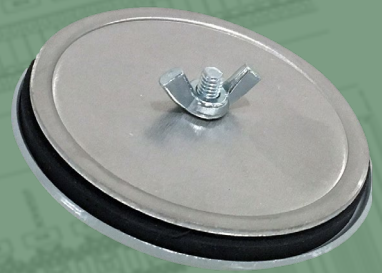
EXTERIOR / DOOR

- Clean Filters/Fan Kit
- Verify AC and Fans running
- Remove Debris from around panel
  - Important for Heat Dissipation and Fire Safety
- Pilot Lights
  - Test
- Panel mounted loop controllers functional
- Missing Tags
- Hole Plugs
- Hinge Lubrication
- Door Seals

INTERIOR

- Latching mechanisms operate
- Disconnect in working order
- Interior Lights
- Signs of smoke damage or smells
- Signs of water damage or mold



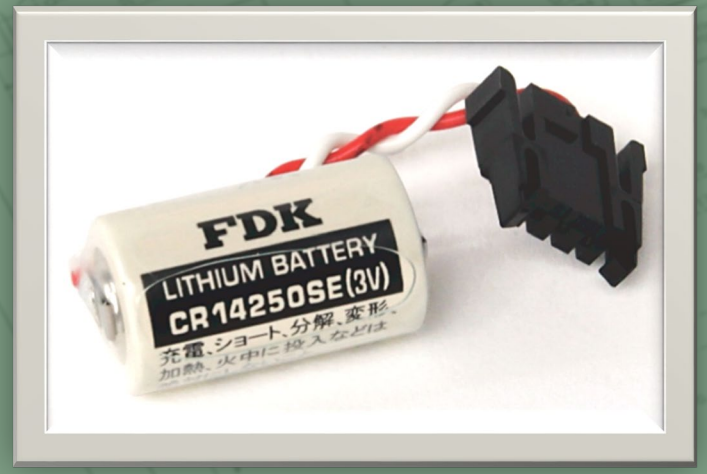


PLC Maintenance

- Check Wire Terminations
- Any Fault Lights?
- Any Flashing Lights?
- Run light lit? Communications are up?
- Is the Run/Rem/Prog Key Present?
- Check power supply voltages and log results
  - If voltages are trending down, the power supply is failing.
- Ensure that cables have proper service loop lengths
- Ensure that cables are free of kinks/pinch points

PLC Batteries and Back-up Procedures

- Make sure that you have a backup copy of the current program for all PLC's
  - Thumb drive/Compact Flash version in the panel if possible
  - Server copy saved as well
  - PLC suppliers have software that will handle this automatically
    - AB's FactoryTalk Asset Center for example
  - Work with your System Integrator to ensure copies are onsite, not just with them.
- Older PLC's have batteries with limited lifespans
  - Replace every 3 years or sooner, check PLC specs
  - Add to scheduled maintenance routine

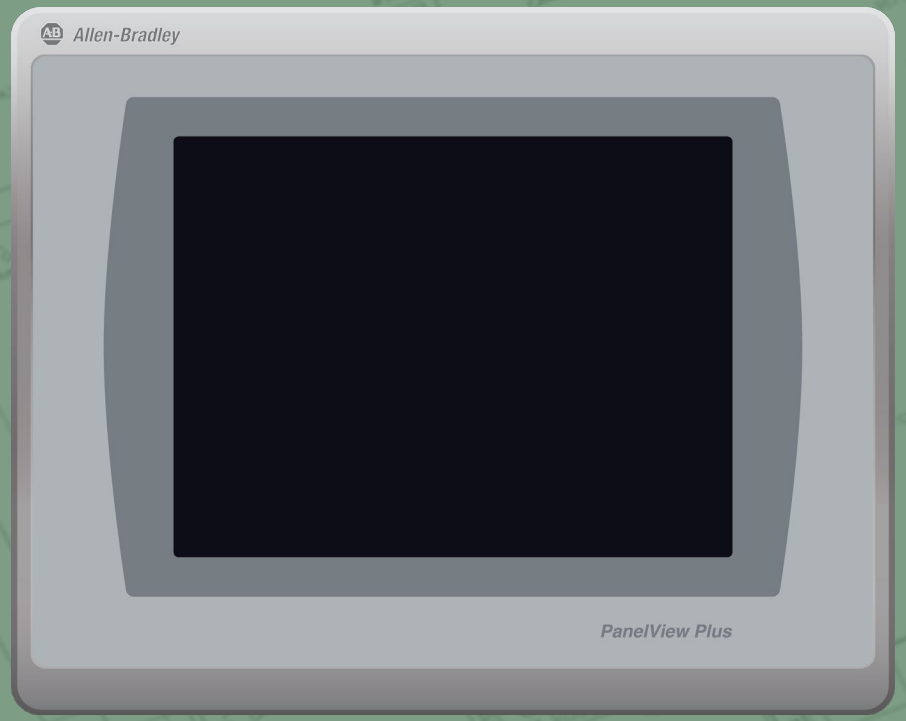


UPS/Back-up Power

- Battery gauge indicator is a quick way of checking the battery health
- If the UPS is capable, connect to it and check the detailed diagnostics
- Check the battery's age vs expected lifespan
- Most UPS's have a "TEST" button. Hold for several seconds to execute the test.
  - Safe simulation of a power outage
  - Test quarterly
- If a generator is used for backup power
  - Does it activate fast enough to ensure continuous operations?
  - Develop a testing procedure with generator vendor and add to maintenance schedule

Panel HMI Maintenance

- Caution on Screen Cleaning
  - Never spray water or other liquids directly on screen unless it is IP rated to handle it.
- General Cleaning:
  1. Remove power from the terminal.
  2. To clean the display and to help prevent scratches, use a clean sponge or soft cloth with mild soap or detergent.
  3. To avoid water spots, dry the display with a chamois or moist cellulose sponge.
- Remove Paint and Grease
- To remove paint or grease from the bezel that is properly mounted in a NEMA, UL Type, or IP rated enclosure, follow these steps.
  1. Rub lightly with isopropyl alcohol (70% concentration).
  2. Use a mild soap or detergent solution to remove residue.
  3. Rinse with clean water.
- Possible Fan Cleaning on back of HMI and HMI panels
- Backup of program to USB/Network when you Backup PLC.

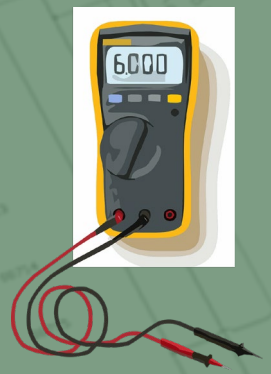


Servers and Network Equipment

- Verify cables are routed together and not blocking equipment ventilation and fans.
- Confirm all equipment has adequate space around the rack for ventilation.
- Clean the back side of the equipment inside the rack and make sure all fans are clear of dust and particle build up. This causes an increase in heat and shortens the life of the equipment.
- Confirm UPS operation and develop a testing procedure with IT personnel. Test UPS operation quarterly.
- Have qualified personnel check the storage, event logs, backup status, CPU/Disk utilization and operating system updates quarterly.
- For network equipment inside panels, make sure to keep cables neatly organized, use proper service loops so the cables do not get stretched or bent.
- Confirm network cables are not run near power wiring.

Instrumentation Maintenance Best Practices

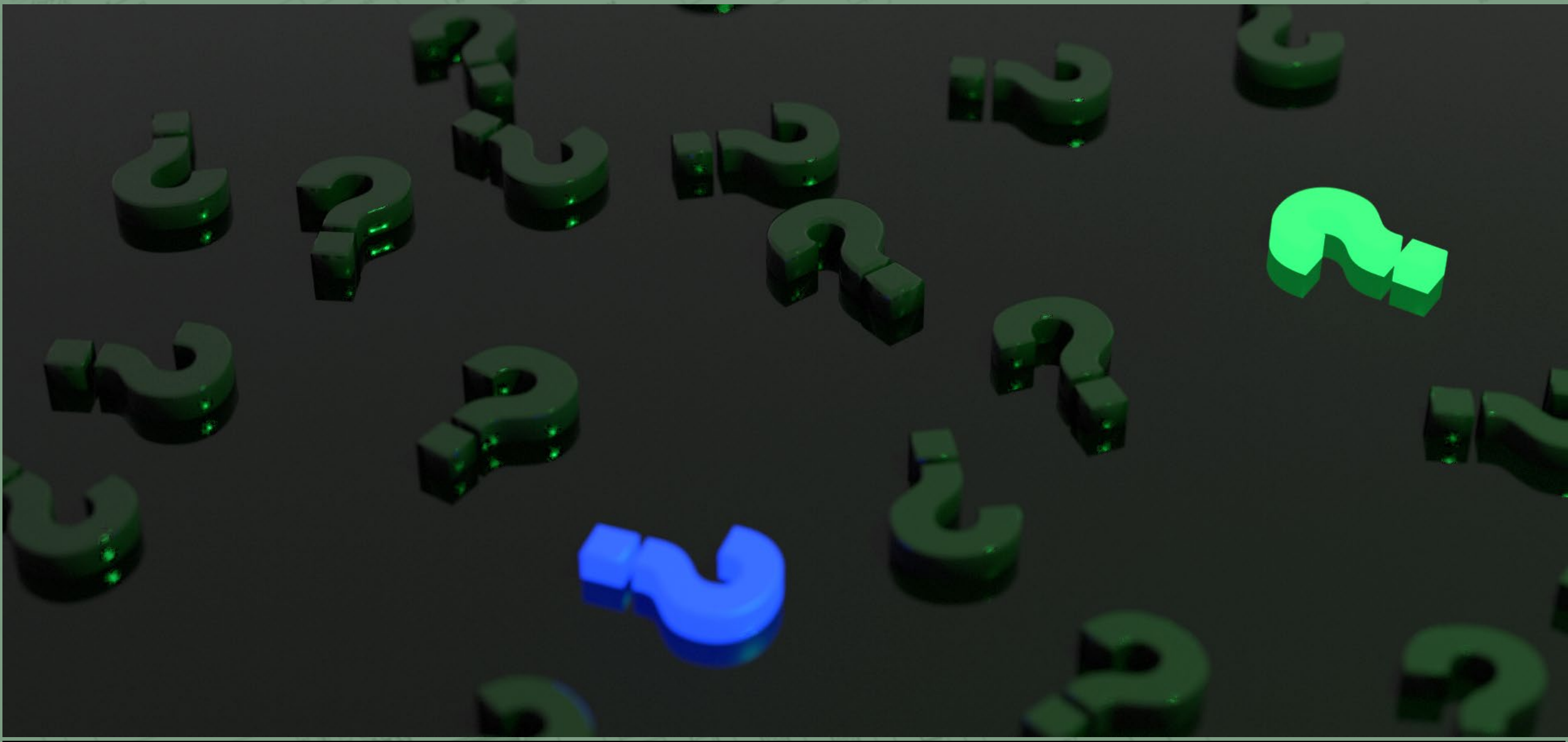
- Follow manufacturer recommendations
- Calibration checks
  - Annual
- SCADA Values vs. Device values vs actuals
  - i.e. Is the observed tank level the same as the device.
- Loose Connections
  - Sulphur Dioxide used to remove chlorine can compromise copper connections.
- Inspect Mounting
- Inspect tubing/piping for crimping, wear, and tear and replace as necessary
- Proper sealing
- Indicator Lights/Beacons
- Physical Cleaning
  - Recommended Quarterly
  - Wet debris can cause false readings and shorts or cause probes to not read
  - Radar/Sonar – Watch for cones getting coated with mist



Preventive Maintenance Scheduling

- The best way to ensure that Panels are maintained is to add them to your existing Preventative Maintenance Scheduling system or implement one if needed.
- A spreadsheet of tasks to be completed with dates can be used at a minimum.
- It works as “proof” of maintenance being completed when equipment fails. This could be useful when working with the suppliers to correct the issues.

QUESTIONS???



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