

How to Make Replacements and Upgrades Go Smoothly

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Purpose of Upgrades or Replacements

- Upgrades are performed to replace outdated or obsolete equipment or equipment due for replacement or to add functionality.
- These include PLCs, heated sample lines, analyzers.
- For very old systems, this also includes pressure regulators, flow meters, gauges, and solenoid valves.
- Upgrades also include replacing older technology.
 - Water Baths to Thermocoolers
 - Temperature switches to transmitters
 - Smaller OIT panels to RealView Panel PCs
- Functionality improvements include
 - Adding HSL temperature control
 - Completely automated CGA/linearity racks
 - Cylinder Pressure Alarms
 - Analyzer slides

Analyzer & Sample System Replacements

- Need to define what is staying and what is being replaced – are the components remaining in the system compatible and adequate to handle the new system. Be as concise as possible:
 - Analyzer depth – are extra supports needed? Do components need to move?
 - Analyzer style (vacuum versus pressure)
 - Power outlets (some analyzers have external pumps and require an extra outlet)
 - Sampling system components (pressure regulators and flow meters)
 - Sample dryer (style and size) – water baths often had low entry points into the bulkhead and thermoelectric coolers have high entry point requirements
 - Heated sample line; probe support bundle

Communications

- Communication of all of the efforts of the project is one of the most important ways to improve the smoothness of the installation.
- It is important that the expectations of the customer is understood during the planning stages. This includes:
 - Understanding if any calibration gas cylinders are to be changed or added, and making sure the gases are available in time for the installation
 - Would it be better to use an O2 Cylinder rather than instrument air for O2 span calibrations?
 - Is it a good time to expand the CO analyzer range or change other analyzer ranges?

Communications

- Understanding the constraints of the timeline for the customer and CiSCO. What are the outage dates and when does the work need to be completed.
- Is there any functionality questions that need to be understood such as Startup/Shutdown process code verification or updates
- What are the responsibilities of the customer and do they understand their role and timeline to complete their portion of the work. Who is doing the tear out of older equipment or how to prepare the installation of the sample lines.
- Providing photos and dimensions of the existing shelter equipment and layout
- Understanding the certification requirements and if CiSCO is involved with those activities

Heated Sample Line Replacements

- CiSCO has changed its recommended sample lines to parallel construction lines by Thermon or Obrien/Ametek:
 - Will temperature control be required?
 - How to install HSL temperature controllers, on the rack or on an enclosure
 - Does the HSL power breaker need to be changed from 3 phase to single phase?
 - Customer needs to install the sample lines, CiSCO will terminate and fit the lines.
 - Do larger penetrations need to be made at the probe enclosure and the sample line bulkhead?
 - Is a new HSL bulkhead be needed to allow a slope of the line to the Thermocooler.
 - Would the Probe Support Bundle be eliminated to move calibration, backflush and power elements to the sample line?

Analyzer & Sample System Replacement Preparations

- Is a plant visit by CiSCO required, expected or beneficial?
- What drawings are available – whose system was it, have there been any modifications potentially undocumented, that need to be addressed?
- Are there any existing system problems or shortcomings that need to be discussed?
- Would photos of the system be provided for equipment layout planning?

Analyzer & Sample System Replacements Planning

- Define installation – who will install what?
 - If a heated sample line is being replaced, who is doing the installation?
 - Are the analyzers the same size?
 - Are panels needed to fill holes?
 - Are support rails needed? (Occurs when old analyzers aren't as deep as the new analyzers.)
 - Do we need to move or add electrical?
- How much downtime is expected?
- What is the plant availability? Does the plant need to be in an outage for us to perform the work?
- Safety requirements – are there special requirements for your site?
- Are there tools and other items that need to be supplied?

Analyzer & Sample System Replacement Documentation

- Defining the scope of the documentation and regulatory requirements for the replacements:
 - Are Monitoring Plan updates needed and included?
 - Is a hard copy Monitoring Plan needed?
 - QA/QC Document – will this be updated? Does one already exist? Can it be provided?
 - Prepare and plan for certification requirements due to new equipment.
 - Is there a revised air permit that needs to be reviewed?
 - An updated DAHS Specification might be required.
 - New maintenance: PMP/PTP documents
 - New spare parts list

Analyzer & Sample System Replacement Preparations

- We need to define number of personnel to be onsite and for how many days.
- What assistance will the plant provide (if any)?
- Is there a plant person assigned to lead the project?
- When does equipment need to be shipped prior to the installation phase?
- Maintenance of other equipment is essential - equipment that has not been maintained and fails during installation is out of scope and will result in extra charges; make sure there are adequate spare parts or repair parts onsite.
- Ensure quarterly tests are completed for the analyzers to be replaced.

PLC and OIT Replacement

- Allen Bradley – SLC PLCs – these are obsolete and need to be replaced if they fail (or whenever you can).
- Allen Bradley – CompactLogix and ControlLogix. CiSCO recently moved to the latest version of CompactLogix, the 5000 series (5069).
- OIT Panels – Allen Bradley, Automation Direct, or Panel PC.
- RealView desktop PC as an option, or panel PCs may replace an OIT and include RealView Software.
- Replace other vendor's equipment (Datalogger).

PLC and OIT Replacement

- DCS Communication
 - Is it Serial? Will it need to stay that way? What are the options?
 - CiSCO will propose an Ethernet solution if possible and may insist on it.
 - Need to make sure the DCS communication is defined in the proposal stage.
 - DCS hardware and software changes are not in CiSCO's scope.
 - Site DCS person is needed to confirm signal scaling and help with loop checks.
 - Hardwired signals avoid a lot of these issues with DCS communication.

PLC and OIT Testing

- CiSCO performs a PLC/OIT/DAHS integration testing before shipment
 - All PLC I/O is verified. Analog signals are confirmed to be accurate for scaling between the PLC and DAHS reports
 - All alarm logic is confirmed
 - Calibration and CGA/Linearity gas sequencing is confirmed.
 - Startup/Shutdown process logic is confirmed
 - DAHS calculations are confirmed by the Environmental group
 - Often hardware may not be fully tested since full integration can only happen in the field. So these efforts minimize control and data errors.
 - Errors may be discovered during the installation due to inaccurate documentation of alarm logic from the original system drawing errors or undocumented I/O or logic changes over the years

Testing the System Changes

- CiSCO personnel, along with plant personnel, need to ensure the new system is fully functional - calibrations run correctly, CGAs/Linearity checks are functional and accurate (even running a linearity while offline to ensure gasses are flowing correctly), alarms and buttons are all functional in OIT/RealView, communication with DCS is functioning and accurate.
- CiSCO uses a site acceptance test checklist to guide and document the testing of the system I/O and functionality.
- Customer should be present to verify the DAHS Settings.
- Customer must be present to verify the I/O signal loop checks between the CEMS and the DCS.
- Signoff of daily field service reports from CiSCO technicians to acknowledge the status of the installation and identify any issues and delays that are happening.

Certification

- Upgrades must have certification requirements planned in. Is CiSCO helping with the certification? To what extent?
- 40CFR75 details the requirements. 40CFR60 does not.

Event: Replace Analyzer:	Time to complete
• Old Analyzer required to run linearity if operated more than 168 hours in a quarter for Part 75	Prior to removal
• New analyzers must pass Daily Cal check	Immediately, starts Clock for all tests
• New Analyzers must pass 7-day Drift Test	21 Days
• New analyzers must pass Linearity Check Hours	168 Op Hours
• New Analyzers must Pass Rata	720 Op Hours
• Submit Event Report via ECMPS	
Event: Replace Sample Line:	
• Perform Calibration Check	Immediately
• Perform Abbreviated Cycle Response Time test	720 Op Hours
• RATA	720 Op Hours
Event: Replace PLC:	
• Update ECMPS	720 Op Hours

Questions?