Pre-upgrade **checklist** for brownfield control system project

What every Processing Manager or Operations Lead should lock down before project kick-off

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Upgrading a control system in a brownfield plant is never just about new technology.

It’s about managing risk, sequencing shutdowns, working around ageing infrastructure, and making sure your team is ready to operate the new system from day one.

This checklist is designed to help operations leaders, project owners and engineering managers make sure the right groundwork is in place before a single cable is touched.

The projects that succeed do these things early - and do them well.

System Assessment

- [ ] Conduct a complete inventory of current control system hardware and software
- [ ] Validate the condition, version and support status of the existing PLCs, DCS, SCADA, I/O, and networks
- [ ] Map the current network topology, including all third-party integrations
- [ ] Review alarming strategy, control logic, and HMI design for inconsistencies or legacy workarounds
- [ ] Interview site operators and maintainers to surface undocumented quirks or known issues

Infrastructure and Field Readiness

- [ ] Physically inspect existing electrical systems: MCCs, power distribution, cabinet space, conduit and cable tray capacity
- [ ] Confirm available and spare I/O channels, terminals, and field cable health
- [ ] Identify any legacy instruments or field devices that may be incompatible with the new system
- [ ] Plan and budget for site access to complete this work ahead of the shutdown

Planning and Scope Definition

- [ ] Define the true scope: Is this a like-for-like system replacement, an expansion, or a hybrid
- [ ] Map stakeholder priorities: ops, maintenance, engineering, IT, process owners
- [ ] Lock down project objectives, constraints, success metrics and reporting lines
- [ ] Build a realistic timeline that factors in shutdown windows, resource availability, FAT/SAT
- [ ] Develop a phased upgrade strategy to reduce commissioning risk

Shutdown and Commissioning Planning

- [ ] Develop a detailed shutdown schedule with clear sequencing for commissioning activities
- [ ] Protect critical path access for control system commissioning – prioritise this in shutdown planning
- [ ] Identify all competing shutdown activities and resolve schedule clashes early
- [ ] Include fallback plans for phased commissioning or delayed switchover scenarios

Team Engagement and Training

- [ ] Identify the people most affected by the change (operators, electricians, instrument techs)
- [ ] Develop a training plan that includes scenario-based sessions and simulation/testing prior to go-live
- [ ] Get the site team involved in FAT, SAT and simulation so they’re comfortable on day one
- [ ] Establish who will own the system post-upgrade – monitoring, support, updates

Cybersecurity and Compliance

- [ ] Review relevant standards (e.g. IEC 62443) and ensure they’re built into the system spec
- [ ] Confirm roles and responsibilities for system hardening, patching, backups, and user access
- [ ] Audit connectivity between OT and IT systems and plan secure data pathways

Documentation and Continuity

- [ ] Scope and schedule all documentation deliverables: control philosophy, I/O lists, P&IDs, network diagrams
- [ ] Assign ownership for keeping system documentation up to date post-commissioning
- [ ] Plan for a full post-project review and lessons learned

External Partnerships

- [ ] Choose a systems integrator or partner experienced in brownfield upgrades
- [ ] Engage vendors early for compatibility and lifecycle support insight
- [ ] Confirm FAT requirements, simulation tools, and remote support capabilities

Ready to proceed?

Even the best-designed systems fall down without proper groundwork. Use this checklist to get alignment across your team before your next brownfield control system upgrade.

Need help scoping or validating your existing system?

Reach out to our Brownfield Specialist Group to set up a discovery workshop.

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