5 Signs Your Thermal Oxidizer Needs a Controls Upgrade

When to Modernize Your PLC, HMI & Safety Systems

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Thermal oxidizers are built to last decades, but the controls technology running them isn't. A unit installed in the early 2000s may be mechanically sound but running on a PLC platform that's been discontinued, with an HMI that no one can find parts for, and safety logic that doesn't meet current NFPA 86 standards. Here are five signs it's time to modernize.

Sign 1: Your PLC Platform Is Obsolete or End-of-Life

If your oxidizer runs on an Allen-Bradley PLC-5 or SLC 500, a Siemens S5, or a GE Series 90-30, you're operating on hardware that the manufacturer has officially end-of-lifed. That means no new parts, no firmware updates, and dwindling expertise. When a processor card fails, you're not looking at a 2-day repair - you're looking at a hunt for refurbished parts on eBay and hoping they work.

> **Allen-Bradley PLC-5 and SLC 500 platforms are officially discontinued. Rockwell Automation recommends migration to ControlLogix or CompactLogix for continued support.**

Sign 2: Your HMI Is a Monochrome Text Display (or Worse, a Paperless Recorder)

Modern HMI touchscreens provide real-time process visualization, trend displays, alarm management, and diagnostic information. If your operators are navigating a 4-line text display or reading paper charts, they're flying blind. A modern HMI doesn't just look better - it reduces operator error, speeds up troubleshooting, and provides the data you need for regulatory compliance.

> **A modern HMI upgrade typically pays for itself within 12-18 months through reduced downtime and faster troubleshooting - often before the first annual stack test. (Source: industry consensus from Kono Kogs, PTE Inc)**

Sign 3: You're Getting Nuisance Alarms and Unexplained Shutdowns

Frequent nuisance alarms are more than just annoying - they create alarm fatigue, where operators start ignoring or silencing alarms because they assume they're false. This is a documented safety hazard. If your system trips on phantom high-temp alarms, valve position faults that don't exist, or flame failures during stable operation, the root cause is often degraded I/O cards, failing relays, or EMI-sensitive legacy wiring - not actual process problems.

> **According to EEMUA Publication 191, a well-managed alarm system should average no more than one alarm every 10 minutes during normal operations. Many legacy oxidizer controls far exceed this benchmark.**

Sign 4: Your Safety System Doesn't Meet Current NFPA 86 Standards

NFPA 86 - the Standard for Ovens and Furnaces - has evolved significantly since many oxidizer control systems were designed. Current editions have stricter requirements for burner management system (BMS) logic, safety instrumented function (SIF) implementation, and valve proving. If your flame safety relay is a standalone device from the 1990s rather than an integrated BMS, you may have compliance gaps that could surface during an insurance inspection or, worse, during an incident investigation.

NFPA 86 requires a Safety Instrumented System (SIS) approach for critical safety functions. Legacy standalone flame safety relays may not meet current SIL (Safety Integrity Level) requirements.

Sign 5: You Can't Get Diagnostic Data or Trend History

Modern environmental regulations - particularly Title V permits with CAM (Compliance Assurance Monitoring) requirements - demand documented proof that your oxidizer is operating within permitted parameters. If your controls can't trend bed temperatures, log alarm events, or export data for regulatory reports, you're relying on manual operator logs. That's a compliance risk and a liability. A controls upgrade with proper data logging and historian capability turns your oxidizer from a compliance headache into a documented, auditable system.

EPA's CAM rule (40 CFR Part 64) requires facilities to monitor and record control device operating parameters that demonstrate continuous compliance. Legacy systems without data logging capability make this documentation requirement extremely difficult to meet.

Closing

A controls upgrade doesn't mean replacing your oxidizer. The combustion chamber, ceramic media, and structural components can last 20-30 years with proper maintenance. But the PLC, HMI, instrumentation, and safety systems are technology - and technology has a shorter lifecycle. Upgrading controls extends the life of your existing equipment investment while improving safety, compliance, and operational efficiency.

VIR Automation specializes in thermal oxidizer and RTO controls - from single-loop PID tuning to full PLC/HMI migrations. Contact us at (317) 536-3058 or visit virautomation.com for a free assessment.