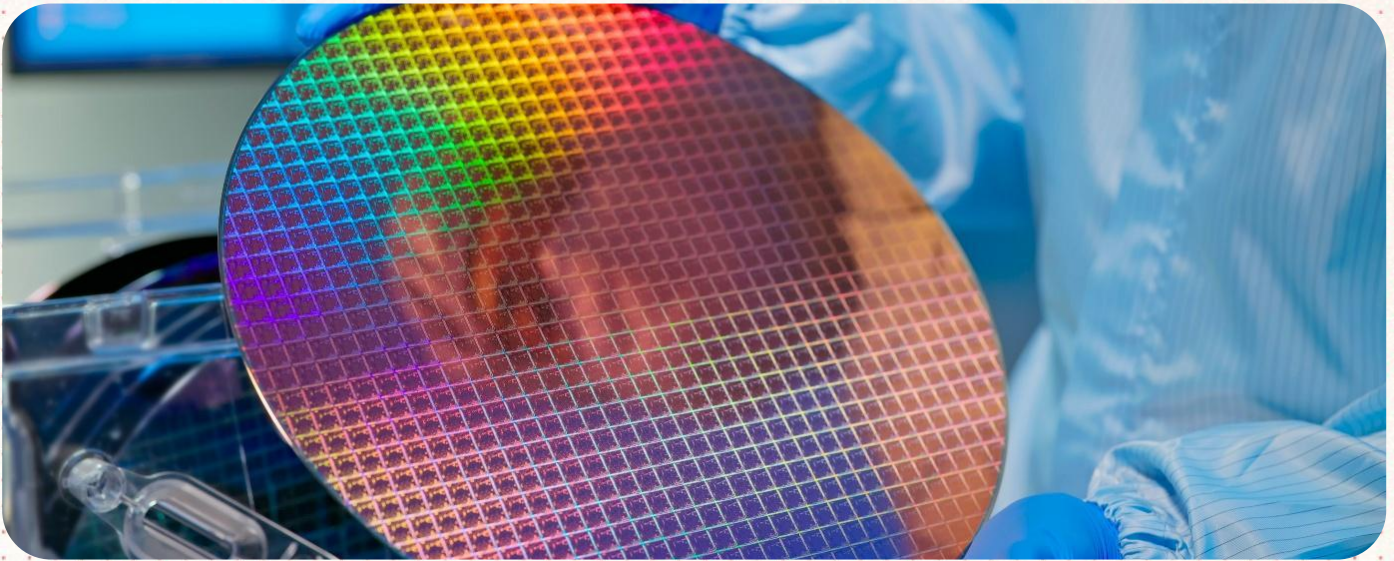


Safeguarding Semiconductor Manufacturing with Critical Life Safety System Integration

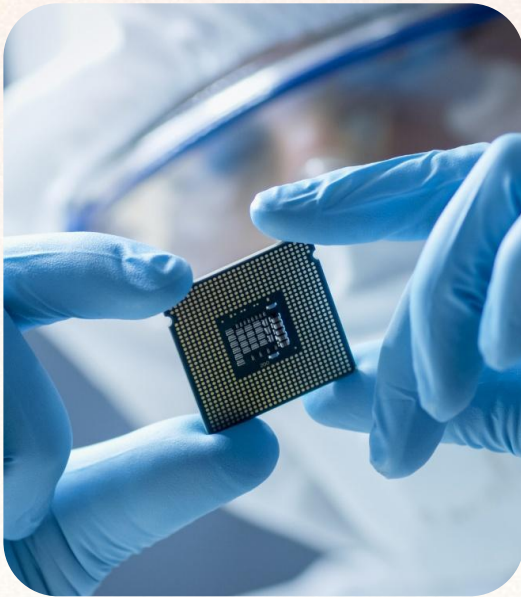


The Challenge:

Life safety systems (LSS) are a critical part of semiconductor fabrication, but they are complex to design and install since fabrication occurs in ultra-clean, multi-level facilities and installation requires coordination among numerous contractors and vendors. Any misstep at this stage can delay startup and result in lost revenue.

The Solution:

At Convergix, we bring proven expertise, disciplined coordination, and consultative insight to design and integrate LSSs accurately, on time, and without surprises. Our teams combine extensive design reviews, flexible resourcing, and clear communication to minimize cost and risk while keeping schedules on track.



Semiconductor fabrication facilities, or fabs, are some of the most advanced and sensitive manufacturing environments in the world. Inside these facilities, wafers are processed through hundreds of steps to eventually become the individual microchips needed to power modern electronic devices. As part of the fabrication process, a wide range of specialty gases and chemicals, some harmless and others highly toxic or combustible, are used for a range of functions including deposition, etching, and cleaning. Thus, protecting workers, equipment, and the environment from potential hazards when using these gases is critical.

One crucial component for offering this protection is provided using life safety systems (LSS) that continuously monitor for these gases at extremely low concentrations, sometimes measured in parts per billion. Over the last decade, the Convergix engineering services team has built deep expertise in designing, installing, integrating, and commissioning LSSs across numerous semiconductor fabs.

Overcoming Common Challenges with LSS Design and Installation

Designing and installing LSSs for a semiconductor fab comes with a variety of challenges. With numerous contractors and trades working across ultra-clean, multi-level spaces, priorities can shift quickly. Successfully navigating these challenges comes from disciplined coordination, clear communication, and flexible planning. Below are some of the challenges we typically encounter, and overcome, throughout the LSS design and installation process.

Navigating Complex Installation Environments

Semiconductor fabs are incredibly complex construction environments. Facilities span multiple levels, with ultra-clean production environments usually located on the top level, dense networks of piping and cable running between levels, and various electrical and control systems in the lower levels. During construction, delicate tubing must be run across multiple levels and sensors need to be installed in crowded areas. Since these fragile systems risk facing damage from others working, we've developed various procedures and policies that include installation best practices and quality control processes to double-check every connection before we turn over systems.

Coordinating Across Multiple Vendors and Internal Stakeholders

When building a fab, up to a thousand contractors may be on site simultaneously, making clear and consistent communication essential. For example, we must work closely with the appropriate vendors to ensure exhaust systems are in place and upstream information is accurate before an LSS can be deployed. Instead of making assumptions that everything is ready for us when it's supposed to be, we actively collaborate with general contractors, other trades, and the fab's internal project managers to verify information and keep schedules on track.

Adapting to Evolving Schedules

Like many projects, fab construction projects often evolve midstream, resulting in adjustments to requirements and timelines. Based on years of experience, our team can anticipate these shifts and help keep projects on track as we frequently procure hardware in bulk upfront and can quickly adapt installations without costly delays or excessive change orders. This helps fabricators stay on track with aggressive production ramp schedules that can involve scaling from processing just hundreds of wafers per day to more than 5,000 within a few years.

Additionally, the installation of the LSS and our role in the construction comes at a critical stage since we are often one of the last vendors to touch the equipment before hand-off to the manufacturer's commissioning team. Any delays or errors at this stage could directly impact their ability to ramp up production. To mitigate this, our onsite teams remain agile and are always supported by a dedicated project manager. Using robust daily communication systems, we can coordinate across trades, track progress, and quickly resolve issues.

Ensuring Accurate Control System Integration

The control system of the LSS must be programmed to ensure the appropriate action is taken in the event a gas is detected. This could include tasks such as triggering an alarm, closing a valve, or shutting down a tool. While our team is experienced in this programming, we are also well-versed in working with an organization's engineering team to integrate the LSS hardware with the control system.



The Value of Utilizing Experienced Engineering Services

Our team has designed and integrated thousands of LSSs for multiple semiconductor facilities, including both greenfield fabs and brownfield sites undergoing expansions or modernization. Across two recently constructed fabs, we installed LSSs on more than 700 individual tools. As a result of this extensive experience, our team often plays a consulting role in these projects, bringing additional value by identifying design inconsistencies, flagging gaps in scope, and advising customers on alternate approaches.

Additionally, because of our experience, our team is not only capable of procuring and installing all the components needed for an LSS, including field devices, individual PLCs, cables, and tubing, but we can also supply all the major hardware to complement LSS installs such as PLC enclosures and interface boxes for multi-gas monitors.

Customers often value our team not only for technical execution but also for the peace of mind we bring to projects. As one project manager noted, "When I go home at night, I don't lose sleep over the work Convergix is doing because I know the work will be done right, on time, and without surprises."

Scale Safely with Proven LSS Integration for Your Fab

As semiconductor manufacturing continues to expand, the demand for proven LSS integration partners will also grow. Our engineering services team offers the ideal blend of technical skill, project agility, and consultative expertise to help semiconductor manufacturers protect workers, safeguard the environment, and maintain uptime to keep the world's electronics supply chain running.

While LSS installation may represent a small fraction of total fab construction costs, the systems are essential, and installation timing is critical. The Convergix engineering services team ensures these systems are in place when needed so fabricators can safely bring tools online, ramp wafer production, and generate revenue without delay.

Don't leave critical systems to chance.

Scale safely with proven engineering expertise.

