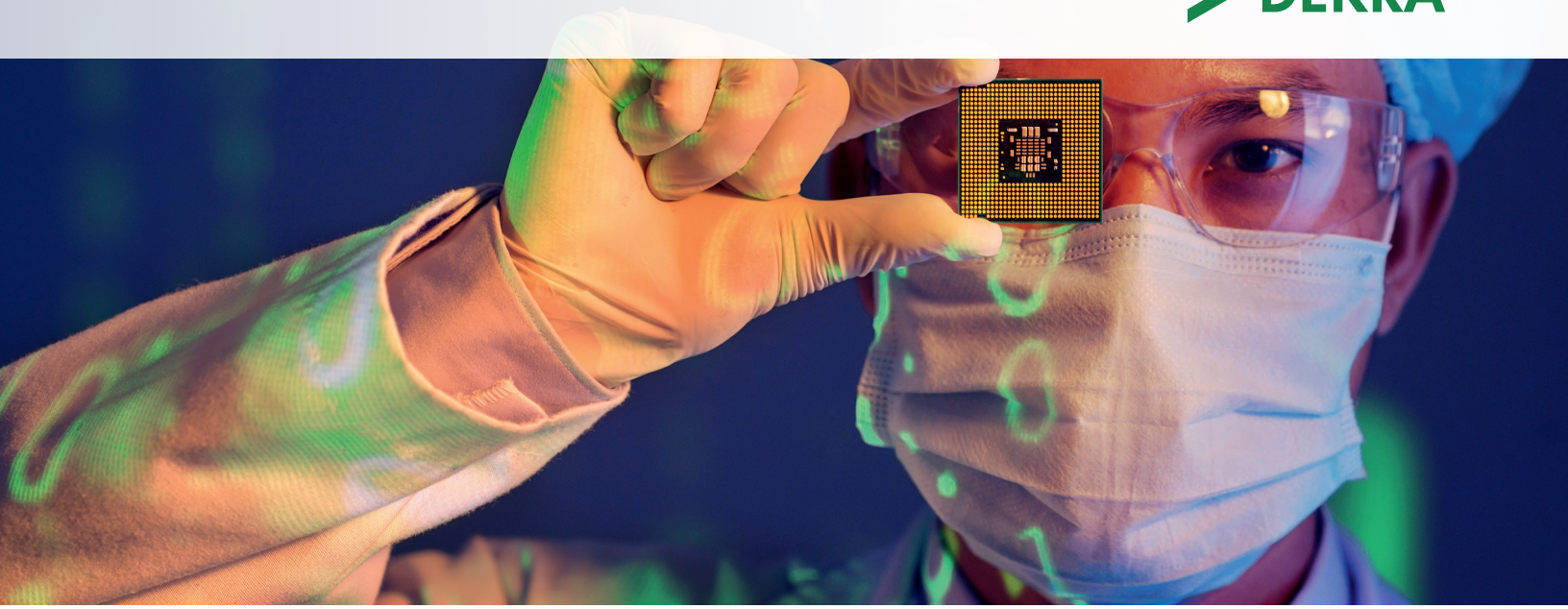

CASE STUDY

LOPA for Risk Assessment of Potential Toxic Gas Exposure

Industries that work with hazardous or potentially hazardous materials, such as the semiconductor industry, must remain constantly vigilant in order to prevent incidents resulting in loss of life or injury to people and damage to the environment or assets. As risk analyses and viable solutions can be complex, process safety experts are a company's best resource for combatting hazards and safeguarding personnel and operations. Layers of Protection Analysis (LOPA) is a tool combining the expertise of process safety engineers with the knowledge of company staff to identify risks and customize safety measures in an efficient and effective manner.

Evaluation and Verification of Protective Mechanisms Installed by a Semiconductor Company

Our experts were contacted to evaluate the protective mechanisms installed by a semiconductor company whose processes involve flammable, toxic gases. In an effort to ensure the safety of its employees, the company had put in place mechanical devices such as double-skinned piping and ventilated containment cabinets around pipework fittings as well as gas detectors and alarms.

Our process safety experts were called in to verify that these measures adequately responded to the degree of hazard and to review the integrity of the overall arrangements.

Scenario Identification, Layers of Protection Evaluation and Recommendation for Improvement Measures

We visited the site, took stock of the facilities and protective measures in place and discussed the process with employees.

Having assembled the process information and site operating experience a team was convened to undertake a LOPA. The first step was to identify possible scenarios leading to gas leakage. Next, the experts calculated the severity of the consequences of the leaks taking into account the type of gas, ventilation, room size, rate of leak and other conditions. Examining company records based on gas detection alarms, the team could evaluate the frequency of gas releases and their causes. Our experts then evaluated the layers of protection in place and calculated failure risks of these mechanisms. This included a close analysis of the failure potential of the gas detectors and their consequent integrity as a layer of protection. When carrying out a full LOPA, the failure frequency of the initiating cause, together with the probability of safety measures failing, is compared to the risk tolerance level of the organization, which at the time of this inspection had not been determined, in order to assess the acceptability of the risk.

Ultimately, our experts were able to make a series of recommendations to improve worker safety by improving leak detection methods and safety procedures.

Trusted Advisors for Process Safety Excellence

In this and in every case, we are equipped with the experience and knowledge to customize our services to suit clients' needs. This customer-centered approach, backed by a commitment to scientific rigor, makes us the trusted advisor worldwide in process safety.

Would you like to get more information?

Contact Us

DEKRA Process Safety

The breadth and depth of expertise in process safety makes us globally recognized specialists and trusted advisors. We help our clients to understand and evaluate their risks, and work together to develop pragmatic solutions. Our value-adding and practical approach integrates specialist process safety management, engineering and testing. We seek to educate and grow client competence to provide sustainable performance improvement. Partnering with our clients we combine technical expertise with a passion for life preservation, harm reduction and asset protection. As a part of the world's leading expert organization DEKRA, we are the global partner for a safe world.

Process Safety Management (PSM) Programs

> Design and creation of relevant PSM programs
> Support the implementation, monitoring, and sustainability of PSM programs
> Audit existing PSM programs, comparing with best practices around the world
> Correct and improve deficient programs

Process Safety Information/Data (Laboratory Testing)

> Flammability/combustibility properties of dusts, gases, vapors, mists, and hybrid atmospheres
> Chemical reaction hazards and chemical process optimization (reaction and adiabatic calorimetry RC1, ARC, VSP, Dewar)
> Thermal instability (DSC, DTA, and powder specific tests)
> Energetic materials, explosives, propellants, pyrotechnics to DOT, UN, etc. protocols
> Regulatory testing: REACH, UN, CLP, ADR, OSHA, DOT
> Electrostatic testing for powders, liquids, process equipment, liners, shoes, FIBCs

Specialist Consulting (Technical/Engineering)

> Dust, gas, and vapor flash fire and explosion hazards
> Electrostatic hazards, problems, and applications
> Reactive chemical, self-heating, and thermal instability hazards
> Hazardous area classification
> Mechanical equipment ignition risk assessment
> Transport & classification of dangerous goods

We have offices throughout North America, Europe, and Asia.
For more information, visit **www.dekra-process-safety.com**
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