

# CROSS-FUNCTIONAL SAFETY FOR PLANT OPERATIONS

FOR THE CHEMICAL & PROCESS INDUSTRIES

## WITH EXPERT STATEMENTS ON:

- Human factors and risk culture
- Plant expansions and the SEVESO III Directive
- Impact of extreme weather events
- Challenges for occupational safety due to shifting demographics



**THE FUTURE** CALLS  
**EXPERTS NEEDED**



#### **MR. MAYER, WHAT ARE YOUR AREAS OF RESPONSIBILITY?**

I represent the permit management department at InfraServ Gendorf as department head. I am also in charge of the emission control and plant safety topics at the Chemical Park GENDORF.

#### **WHAT IS YOUR CURRENT ASSESSMENT FOR THE STATE OF THE SECTOR?**

Our observations are that the requirements for companies are growing. Increasing system complexity, changing standards and laws, demands on production flexibility, and extensive networking even across national borders. All of this is happening under the increased pressure to achieve greater operational efficiency. These are the central topics along which we align our solutions.

#### **WHAT ARE THE TOPICS CONFRONTING YOUR CUSTOMERS?**

In particular in Germany, where new sites are essentially impossible to develop for the process industry, modifying existing plants is a challenge for operators at sites that have in some cases grown over a period of more than one-hundred years. The escalating statutory requirements – currently, these include in particular the SEVESO III Directive and the resulting spacing requirements – render an expansion difficult to impossible in a worst case.

During the early years of industrialization, it was common to have employees' residences close to the production grounds. Over the years, entire cities grew around successful

**“ OPERATING A PLANT SAFELY NOT ONLY INCLUDES PROTECTING PEOPLE AND THE ENVIRONMENT, BUT ALSO PROTECTING THE PLANT AGAINST OUTSIDE INFLUENCES – REAL AND DIGITAL ”**

Godehard Mayer, Head of Permit Management

businesses. An organically grown proximity that today brings special challenges with it since the statutory requirements, but also residents' perceived need for protection, have grown significantly.

But this is just one of the topics keeping us busy these days. Global topics such as defending against cyber-attacks, shifting demographics, and even climate change have an impact on the safety of a process plant.

#### **DO YOU HAVE A PARTICULAR APPROACH FOR YOUR PROJECTS?**

Safety needs to be planned: in this respect we work closely together with plant planners and operators. InfraServ Gendorf also relies on proactive communication. Specifically in today's day and age where the group of stakeholders for a company is growing, clean, clear-cut, and early public

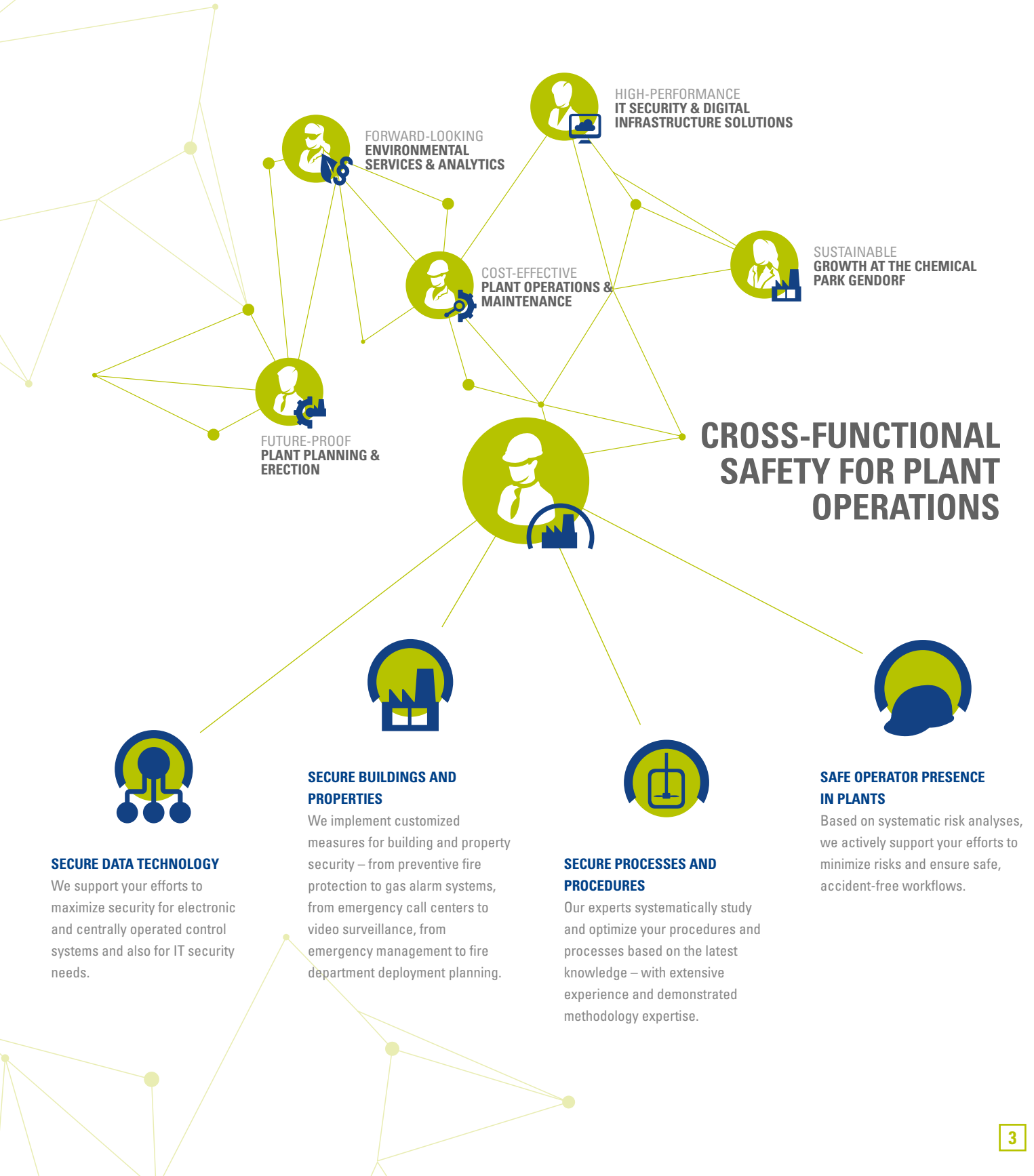
project communication is essential for the success of an endeavor.

#### **WHAT SETS INFRASERV GENDORF APART?**

InfraServ Gendorf supplies cross-functional expert knowledge from a single source – from the point of view of the planner, the plant operator, or as service provider (e.g. for plant maintenance). This 360° view of a process plant gives us the ability to achieve the best result for customers. This is our commitment.

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# INTEGRATED SOLUTIONS FOR THE CHEMICAL & PROCESS INDUSTRY





# HUMAN FACTORS AND RISK CULTURE IN INDUSTRY



**Industrial workers operate highly-complex technical systems. In critical situations, improper decisions – frequently made under deadline pressure or stress – can have extremely serious consequences.**

Up to 90% of critical incidents have their root cause in human factors. In addition to deadline pressure and stress, the reasons for these include increasingly complex systems and the associated information volumes, increased levels of automation with concurrently declining system transparency, and last-but-not-least headcount reductions.

This calls for concepts that minimize sources of error and promote safe actions.

Many companies do not have an ingrained safety and prevention culture. Whether and to what degree safety is filled with life fundamentally depends on what priority the company assigns to safety.

The human role as a safety factor and as a safety resource is frequently overlooked. Many policies restrict workers in their daily work habits without giving them the answer for “why”.

An in-depth study of human factors means to better assess the potential effects of worker behavior and to foster awareness for risks and safe conduct.

**„MANY COMPANIES DO NOT  
HAVE AN INGRAINED SAFETY  
AND PREVENTION CULTURE“**

Robert Bayr, Head of Process Safety and Publicly Appointed Occupational Safety Expert (Section 29b BImSchG)

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# CHALLENGES PRESENTED FOR PLANT EXPANSIONS

BY THE SEVESO III DIRECTIVE

Encroaching construction or legacy batch processing plants, use changes in the environment, escalating statutory safety requirements for people, the environment, or cultural assets, growing sensitization of the population: expansions or changes of existing plants present ever new challenges for operators. Operators and authorities are currently implementing the requirements of the European SEVESO III Directive, which has been incorporated into the German incident directive.

The objective of the rule is to minimize the consequences of a potentially serious accident in an incident plant by maintaining appropriate spacing to protected areas (e.g. residential areas). Regulations to prevent incident risks – some of which have resulted in costly consequences – already existed prior to implementing the SEVESO III Directive. High-profile examples in Germany include the relocation of TICONA at the Kelsterbach site (county Groß-Gerau) in connection with the expansion of the Frankfurt Airport (costs for the airport operator: EUR 640 million) and the case of the garden center of Franz Müksch OHG in Darmstadt. Based on the ruling of the European Supreme Court, this case created a precedent on the implementation of every construction permit application in the proximity of industrial plants.

The SEVESO III Directive requires member states to ensure that appropriate safety spacing is maintained between operations governed by the directive and the identified protection objects.

The planning phases for existing facility areas or in their immediate surroundings



“EXISTING PLANTS MAY ALREADY BE EXPOSED TO POTENTIAL CONFLICTS”

Godehard Mayer, Head of Permit Management

differentiate between caution spacing (“greenfield planning”) and appropriate spacing (implementing case-by-case studies).

Existing plants may already be exposed to potential conflicts due to incompatibilities between facility areas and protected uses, and modifications of a plant can become difficult or may even be prevented entirely due to an existing batch processing plant.

In order to achieve planning reliability for operators of plants and municipalities, spacing expert appraisals are suited for

defining appropriate spacing and to identify expansion opportunities even for municipal land.

When spacing requirements are not met, probability risk studies can be relied upon for the deterministic solution finding approach conventionally used in Germany.

# EFFECTS OF CLIMATE CHANGE

## ON BUILDINGS AND PLANTS (TRAS 310/320)



**Climate change is likely to cause an increase in extreme weather events (storms, heavy precipitation, snow loads) with the associated effects on buildings and plants. The standards for handling these climatic changes were already described in TRAS 310 and 320, and plant operators are now required to implement these.**

Increased global temperatures have changed water cycles in the atmosphere and the probability of heavy precipitation has increased. The corresponding data for Germany have been reflected in TRAS 310 "Precautions and measures for precipitation and flooding as hazard sources", which specifies a basic climate change factor (safety factor) of 1.2 for designing protective measures.

By contrast, the meteorological data for changes in wind speeds and snow and ice loads in Germany have until now not identified a clearly discernible trend.

For wind (incl. tornados), snow and ice loads as hazard sources, TRAS 320 makes no proposals in the form of a climate change factor that takes climate change into account.

Safety measures as protection against flooding have for some time been planned and implemented on the basis of the data. Climate change has resulted in a paradigm shift in recent years, and flooding protection has become forward-looking. Flooding safety measures can be adapted to expected changes by using leading-edge information systems and simulation models.

A detailed hazard source analysis is required if hazard sources due to flooding cannot be reasonably excluded in operating areas. Plants outside of the operating area cannot be overlooked in this case (e.g. overloaded water treatment plants: impact on production facilities).

While a "simplified" hazard source analysis can already reasonably exclude flooding as a hazard source for certain regions, this is not possible for the hazard sources wind, snow and ice loads.

The standards in TRAS 320 mandate that relevant hazard sources must be identified on the basis of available data, that plant design (e.g. statics) must be reviewed, and that appropriate measures must be derived as needed.

**„CLIMATE CHANGE HAS RESULTED IN A PARADIGM SHIFT IN RECENT YEARS“**

Birgit Seeliger, Fire Protection Planning Specialist

# CHALLENGES FOR OCCUPATIONAL SAFETY DUE TO SHIFTING DEMOGRAPHICS

Shifting demographics present new challenges for employers: the lifespan of a working career is lengthening and the workload will in the foreseeable future need to be tackled by employees who are older on average. At the same time, young skilled workers are not available to fill the gaps.

The increased age results in increasingly noticeable physical strains typical for occupational profiles. The challenge then is to maintain a person's ability to work over the full lifespan of their gainful employment.

Ability to work in this case includes the ability and the willingness of the employee to work, and is also affected by working conditions, work design, and work organization.

The basis for avoiding occupational health risks is formed by the aforementioned physical, psycho-social, and organizational



**„ WORKLOADS WILL IN THE  
FORESEEABLE FUTURE NEED  
TO BE TACKLED BY EMPLOYEES  
WHO ARE OLDER ON AVERAGE “**

Dr. Stefan Kirschner, Head of Occupational Safety

risk factors. Occupational health risks at workstations need to be identified to extend the lifetime employment span in operations.

With respect to operational measures, the objective is to identify occupational risk factors that are inconsistent with healthy aging on the job.

The objectives are:

- to design the work in the operation compatible for any age group.
- to avoid occupational illnesses and to foster health and the ability to work already during early career stages.
- to continue developing available occupational safety instruments in keeping with a changing work environment.

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# THE FUTURE CALLS EXPERTS NEEDED



## WHO WE ARE

As specialists for integrated solutions surrounding plant lifecycle and as the operator of the Chemical Park Gendorf, InfraServ Gendorf is among the most experienced expert enterprises in the chemical and process industry. More than 1,100 employees and specialists from six areas of expertise work here across the trades on technologies and solutions for today's and tomorrow's customer challenges.

## WHAT DRIVES US

The people at InfraServ Gendorf are driven by a common bond that is deeply embedded in our DNA: the best result for our customers. We achieve this by allowing room for the professional passions of our employees, by fostering their special expertise while at the same time networking with other disciplines on a routine basis. This ultimately results in integrated solutions that stand up to the test of time because they keep the big picture in mind.

## WHAT WE BELIEVE IN

We know that we have a special responsibility as a company in the chemical industry – both for our own business and employees, but also for our neighbors and the environment and the region we live in. We confront this responsibility on a daily basis with exceptional personal dedication – not only because it is ingrained in our own belief system, but also as an expression of our commitment to corporate social responsibility (CSR).

### CONTACT

InfraServ GmbH & Co. Gendorf KG  
Industrieparkstraße 1  
84508 Burgkirchen a.d. Alz  
Germany  
Phone +49 8679 7-4624  
Fax +49 8679 7-3060  
E-Mail [vertrieb@infraserv.gendorf.de](mailto:vertrieb@infraserv.gendorf.de)  
[www.infraserv.gendorf.de](http://www.infraserv.gendorf.de)

