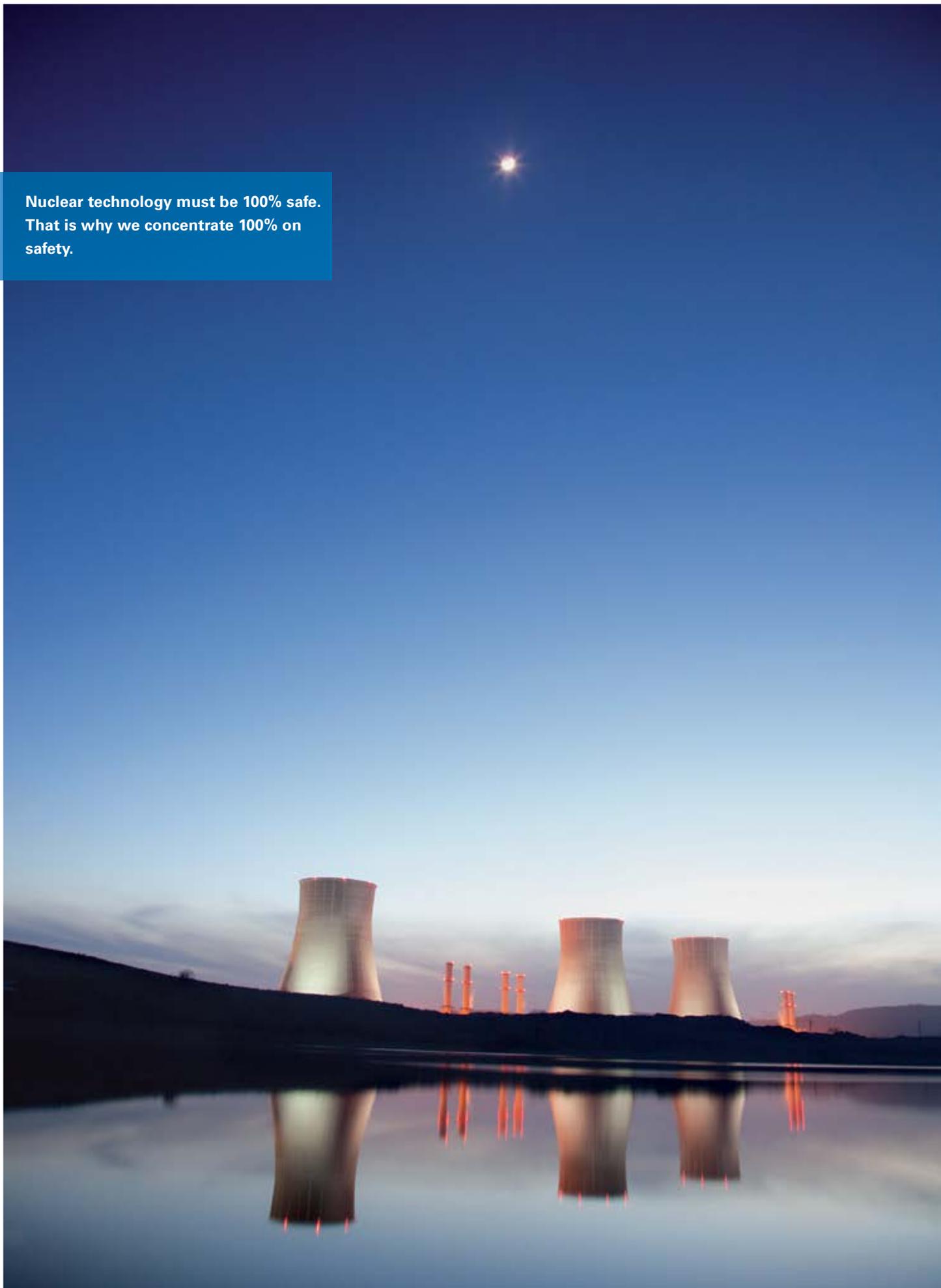




Right to the core. Guaranteed safe.

100% safety for nuclear technology and radiation protection.

**Nuclear technology must be 100% safe.
That is why we concentrate 100% on
safety.**



Peak demand for specialists. Especially decommissioning.

The future of nuclear energy may have become uncertain, but however things look, expertise is required to handle its complex processes. We support you from the early stages of authorization and construction all the way through to operation and decommissioning.

The civil use of nuclear energy began in Germany more than 40 years ago. Over the years we have gathered extensive expertise in all fields of nuclear technology: whether for research reactors, pressurized-water reactors, boiling-water reactors, fast breeder reactors, high-temperature reactors or at uranium enrichment plants.

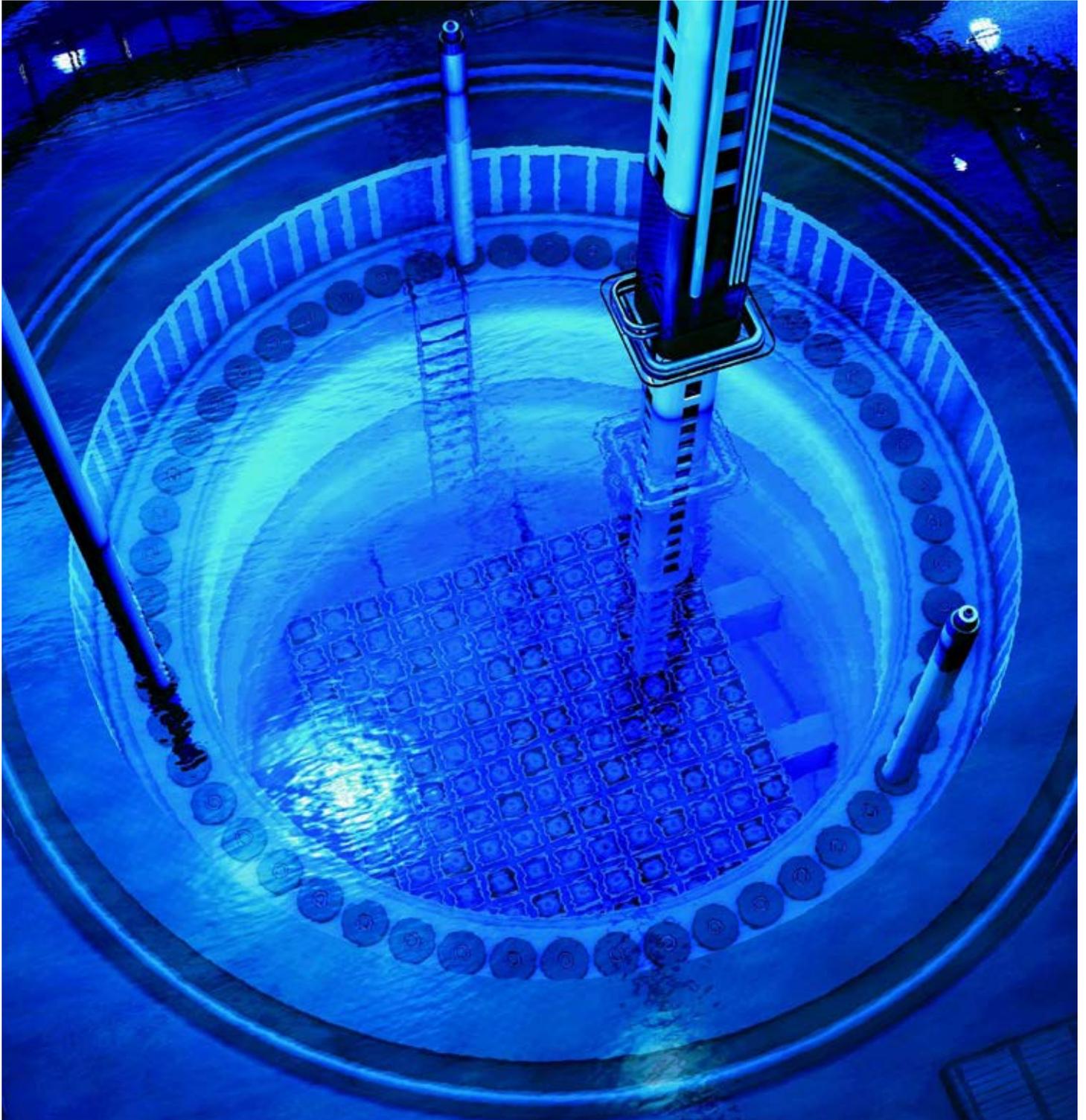
Our experienced specialists can support you in every phase of nuclear technology and radiation protection projects. We offer a comprehensive range of services from quality management and operations monitoring to decommissioning.

You benefit from the wealth of our expertise, gained from experience with numerous national and international projects. Thanks to their meticulous dedication, our inspectors guarantee the quality, safety and reliability of all components and systems used.

Choose safety from a single source. Your personal contact with us will support you in complying with and maintaining all safety and quality standards, while observing national and international regulations.

Nationally and internationally. Our expertise knows no bounds.

In Germany and around the world. From research reactors to high-temperature reactors and when authorizing, monitoring and inspecting or decommissioning. For safety processes at nuclear power plants, reliability and expertise are a 100% must have.



Case study 1:

The Mülheim-Kärlich nuclear power plant near Koblenz (Rhineland-Palatinate) is a pressurized water reactor with an electrical output of 1302 MW. Building of the power station was started in 1975 and completed in 1986. It was subsequently operated by RWE on a trial basis for generating power. In 2004, authorization to decommission the Mülheim-Kärlich nuclear power plant was granted and deconstruction of the plant began. During the various licensing stages, we continuously provided safety analysis work: from construction to operation and decommissioning. In so doing we acted as the expert organization according to section 20 of the German Atomic Energy Act on behalf of the authorization and supervisory authority for the state of Rhineland-Palatinate.

Case study 2:

In South Africa a high-temperature reactor was to be authorized and built. Our experts supported the South African National Nuclear Regulator (NNR) during the plant's licensing process in cooperation with a partner company from the United Kingdom. This task was primarily carried out directly on site in South Africa.

At present we are involved in deconstruction of the plant with the following tasks:

- Expert analysis of the application to amend the decommissioning authorization and dismantling phase 1a of the Mülheim-Kärlich plant
- Monitoring the phasing out of the plant, including periodic tests, evaluations and accompanying inspections of changes during the phase-out
- Safety analysis of measures involved in the dismantling activities including:
 - Deconstruction and disassembly
 - Radiation protection, fire prevention and occupational health and safety
 - Measures to protect the phasing out systems
- Accompanying inspections of the deconstruction of plant systems and components

The main tasks we took care of during the project:

- Analysis and evaluation of the plant safety reports, including detailed assessments of the safety functions and systems
- Implementation of accompanying safety analyses, especially with regard to the controlling of incidents
- Regular checks of the applicant's and plant designer's organizations
- Evaluation of the manufacturers of major component (e.g. pressure tank) and qualification of the manufacturing process
- Supervision of the manufacturing of major components

We know how to support our clients. Extensively, expertly and efficiently.

Right to the core: we are your professional partner, assisting you in all issues related to nuclear technology and radiation protection throughout Germany and internationally.

We support nuclear authorization and supervisory authorities, operators of nuclear power facilities, plant construction and installation companies, manufacturers of components and providers of services for the nuclear power market. Our services provide you with efficient solutions to ensure 100% safety of your projects.

Our services in detail and at a glance.

Quality management, safety management, safety culture

- Manufacturer assessment and qualification on the basis of national and international, conventional and nuclear regulations, for example the German Nuclear Safety Standards Commission (KTA), American Society of Mechanical Engineers (ASME), French Rules for Mechanical Components (RCC-M)
- System and process inspections (conformity certificates)
- Inspections and consultancy in the field of safety management and safety culture
- Document reviews
- Accreditation to ASME Appendix VIII – Code of Federal Regulations (CFR) 150

Conformity analyses of systems and components

A conformity analysis is carried out for components and systems, primarily in the following fields:

- Machine technology (hoisting devices)
- Electro-technology and control technology
- Pressure tanks for nuclear technology

Plant and process safety

We focus on the following aspects in a safety assessment of a nuclear plant, taking into account plant-specific requirements and conditions:

- Assessment of the safety concept and safety classification
- Reactor design and thermodynamics
- Functional analyses
- Incident analyses
- Fire prevention
- Life cycle analyses

Inspection body for nuclear technology (accredited according to DIN EN ISO/IEC 17020)

We are not only accredited for inspection activities - we also support you in:

- Expediting
- Construction supervision and factory acceptance tests
- Supervision of non-destructive testing

Non-destructive testing (NDT)

Our experts are specialists in the application of advanced non-destructive testing methodologies. In addition to our capabilities in conventional testing and inspection services (VT, PT, MT, ET, RT, UT, LT), we can help you to solve special issues with the following services related to NDT:

- Training, consulting, procedure preparation and technical justification
- We have a large pool of technicians for a wide range of advanced ultrasonic methods such as
 - Sampling Phased Array
 - Phased Array
 - SAFT analyses
 - Time of Flight Diffraction
 - V-Tofd
 - Pulse Echo methods
- Research and development related to advanced ultrasonic methods
 - Procedural aids and inspection planning
 - Bespoke inspection design
 - Ultrasonic beam simulation
 - Defect reporting aids
 - Complex geometry inspections, such as nozzles
- Acoustic Emission Testing

Materials science

We offer highly skilled material experts and laboratory methodologies for testing of the mechanical behaviour of materials and consulting you in all kind of questions about the choice of materials.

- Material qualification and selection
- Destructive laboratory tests
- Corrosion tests
- Damage analyses

Monitoring techniques

100% safe in service means: knowing the actual condition of piping systems and pressure devices. We are familiar with monitoring techniques (online/offline) that were developed in the German plants and qualified by the authorities according to German safety standards.

- Basic supervision of piping systems in shutdowns
- Strain and high temperature strain measurement systems
- Potential-drop method for cracked components
- Data logging and transmission of physical, mechanical and thermal sensors

Radiation protection

We take care of the following:

- Location and environment
- Dispersion calculations and emergency management
- Testing X-ray apparatus
- Radiation protection planning
- Testing of accelerators and of radionuclide laboratories
- Leak tests on radioactive emitters
- Radioactive waste disposal
- Approval procedures and measurements
- Gamma spectrometry, in-situ measurements and laboratory measurements
- Radiation protection measurements
- Containment calculations and radiological occupational health and safety

Operations monitoring

We support you in:

- Periodic functional tests
- Non-destructive testings
- Expert analysis of changes
- Operational radiation protection
- Calculation and analysis of radioactive discharges and releases
- Dose determination

Decommissioning and deconstruction of nuclear plants

Our services in detail:

- Expert analysis of deconstruction plans and evaluation of radiation protection
- Qualification of disassembly procedures and handling equipment
- Waste flow management and control
- Approval procedures
- Radioactive waste disposal
- Consultancy for transportation and storage of radioactive materials
- Expert analysis of waste stores

We are passionate about details. Put us to the test.

We support, develop, promote, test and certify everywhere the world. We do things precisely, because details are often decisive: for more safety, for more quality of life – and for your success. However, there is even more at stake. When it comes to corporate policies of

sustainability and the responsible use of resources, we like to lead by example. The principles of the UN Global Compact are maxims close to our hearts. We believe the future should not be left to chance.



Competence to the power of six – our business streams

Industrial services

Ensure your buildings, machinery and systems are safe and last a long time, allowing you to concentrate on your core business.

Mobility

Stationary and mobile vehicle inspections are at the core of our business. We also offer a variety of innovative services to address a variety of issues related to all forms of transport.

Products

We test, evaluate and certify products in every corner of the globe. By making use of our intelligent solutions, such as those on TUVdotCOM, you quickly bring prototypes to market.

Life care

Our experts invest a lot of energy and thought into helping people consciously and healthily lead a positive and productive life at home and work.

Education and consulting

We provide a range of tailor-made concepts designed to provide people and companies with the training they need to meet the challenges of global markets.

Systems

Our certifications of management systems and comprehensive IT services assure efficient business processes.



TÜV Rheinland
Industrie Service GmbH
Am Grauen Stein
51105 Cologne
Germany

is@tuv.com
www.tuv.com