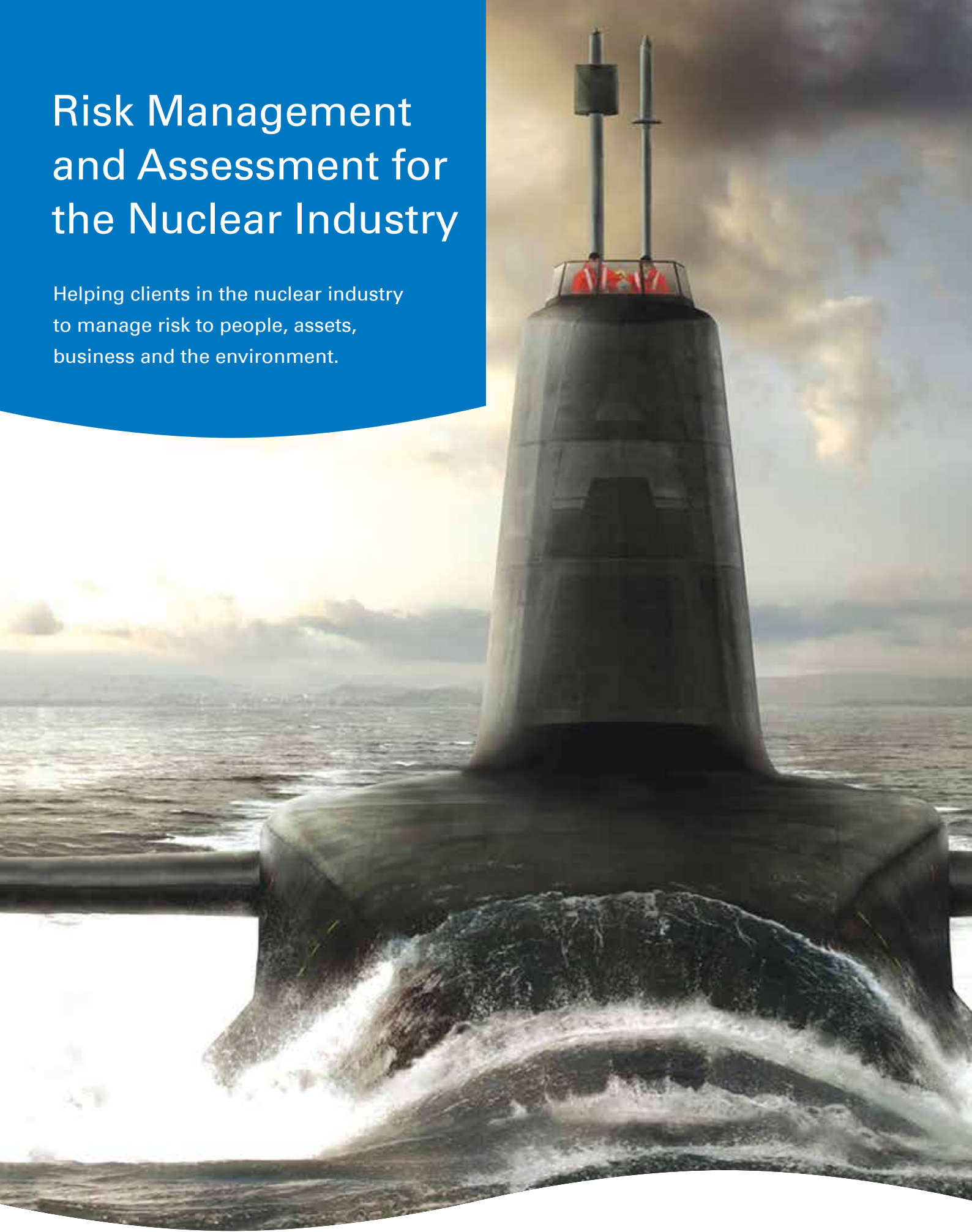


Risk Management and Assessment for the Nuclear Industry

Helping clients in the nuclear industry
to manage risk to people, assets,
business and the environment.





Risktec is an established, independent and specialist risk management consulting and training company, and is part of the TÜV Rheinland Group.

About Risktec

Risktec was formed with the specific aim of helping clients to manage health, safety, security, environment (HSSE) and business risk, and has been part of the TÜV Rheinland Group since 2014.

We strongly believe the following key factors differentiate us in the marketplace:



OUR VALUES & CULTURE

The key values underpinning our culture are Teamwork, Integrity, Empowerment and Solutions. We work collaboratively, both within Risktec and when working with clients. We act with honesty, integrity and consistently high ethical standards. We empower everyone to deliver all aspects of a project to the best of their ability in a supportive, open and trusting environment. We are responsive and flexible to our clients' needs, delivering complete and pragmatic solutions.

OUR INDEPENDENCE

Our independence is achieved through our selected range of services, our company values and our legal structure. Our services are independent from design, construction and operations, and as such we offer truly impartial advice. Our company values include integrity, which means we are open about difficult issues. Finally, TÜV Rheinland has no shareholders with conflicting corporate goals to satisfy, enabling us to take a long-term view in everything we do.

OUR APPROACH

We are committed to providing clients with solutions, built on a sound understanding of the client's business and the issues they face. Throughout a project we work with our clients to ensure ownership of the solution. We believe this philosophy leads to mutually trusting relationships with our clients. We highlight the positives, but also do not shy away from identifying weaknesses. In this way we help clients to objectively understand their risks and the quality of their systems for managing them.

CLIENT SATISFACTION

Ultimately it is our clients who decide how well we are doing and we place great emphasis on their feedback. Consequently twice a year we survey the clients of all our active projects and we are delighted to receive consistently high levels of customer satisfaction (see page 10). This feedback drives continuous improvement across the business.

Our Experience

Risktec has a substantial track record of providing nuclear safety, security, licensing and engineering support to nuclear clients in the UK and internationally. We have extensive experience of a wide range of facilities which support all stages of the nuclear fuel lifecycle, with this experience covering the complete lifecycle of these assets, and a proven track record in meeting the challenges of specific projects. In working with us, clients can be assured of responsive, high quality technical support delivered by experienced consultants, tailored to meet specific circumstances.

FACILITIES

- Operating power reactors
- Small modular reactors
- Mining and enrichment
- Fuel fabrication and processing
- Spent fuel and waste management
- Handling and transportation
- Interim storage
- Long-term disposal
- Research and advanced reactors
- Radiological laboratories



CLIENTS

- Nuclear site operators
- Prospective licensees
- Reactor designers and vendors
- Design companies
- EPC contractors
- Equipment suppliers
- Industry bodies and regulators
- Research institutions



PLANT LIFECYCLE

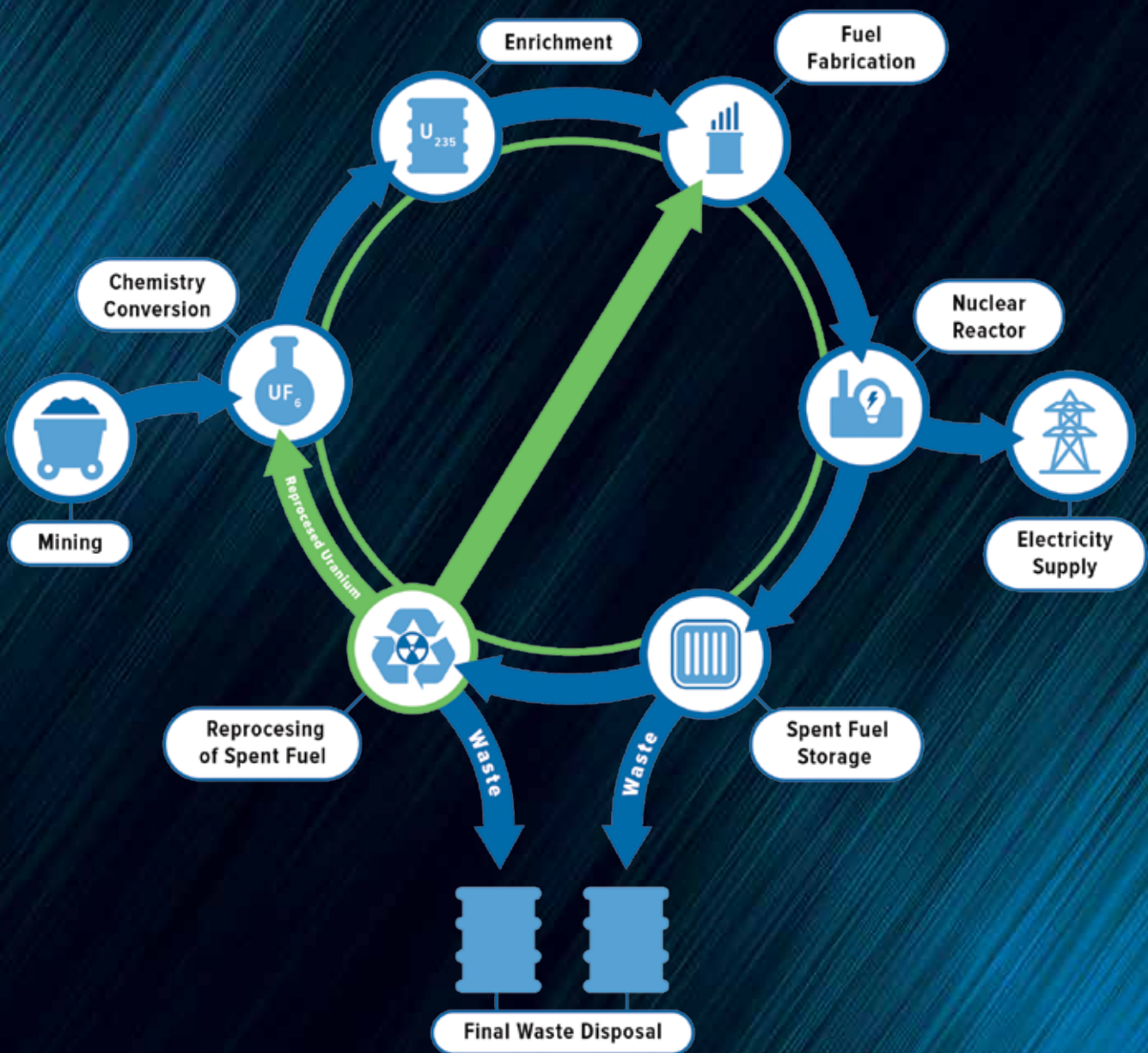
- Pre-licensing/concept design
- Licensing
- Design and specification
- Construction and commissioning
- Operations and maintenance
- Periodic review
- Plant modification
- Plant life extension
- Post-operational activities
- Decommissioning
- Care and maintenance



INDUSTRY CHALLENGES

- Ageing infrastructure
- Obsolescence
- Workforce demographics
- Skills gap
- Affordability
- Waste management
- Introduction of new reactor designs
- Digitalisation
- Security
- Regulatory changes
- Cultural challenges





Risktec has a wealth of experience of a wide range of facilities which support all stages of the nuclear fuel lifecycle with this experience covering the complete lifecycle of these assets.

Our Services...

RISK ENGINEERING

Identifying, analysing, evaluating and treating the risks associated with facilities, operations and equipment to acceptable levels.

HAZARD IDENTIFICATION

- Natural hazards
- Man-made hazards
- Internal hazards
- External hazards
- Site characterisation
- HAZID/HAZOP studies
- Facility walkdown / survey
- FMEA/FMECA studies
- Hazard register

DETERMINISTIC SAFETY ASSESSMENT

- Design basis criteria
- Design basis assessment
- Fault schedule
- Design extension conditions / beyond design basis assessment
- Safety functional requirements / limits and conditions of safe operation

PROBABILISTIC SAFETY ASSESSMENT

- Fault and event tree analysis
- Internal hazards modelling
- External hazards modelling
- System reliability analysis
- Risk analysis and evaluation
- Sensitivity and uncertainty analysis
- Consequence analysis
- Severe accident analysis
- Level 1 and Level 2 PSA
- Seismic PSA
- Living PSA

RISK REDUCTION AND ALARP/ALARA

- Optioneering and ALARP assessment
- Risk reduction workshop
- Cost benefit analysis

SAFETY CASES

- Strategy, methods and principles
- Safety case development or updates across facility lifecycle
- Living safety cases
- Periodic safety review
- Bowtie analysis
- Licensing support and compliance demonstration
- Regulatory support

NUCLEAR SECURITY ASSESSMENT

- Identification of vital areas
- Physical security assessment
- Information technology and operational technology security assessment
- Cyber security assessment
- Security reviews
- Security bowtie analysis
- Integration of safety and security
- Regulatory support



ENVIRONMENTAL

- Environmental impact assessment
- Environmental statements
- BPEO / BPM assessments

SPECIALIST SAFETY ASSESSMENTS

- Fire and explosion assessment
- Chemotoxic assessment
- Criticality analysis
- Shielding assessment
- Fragility assessment
- Radiation protection
- Radiological dose assessment
- Radiological consequence assessment
- Industrial hazards safety assessment
- Conventional safety assessment

HUMAN FACTORS ENGINEERING

- Human factors engineering screening
- Human factors integration planning and management
- Task assessment
- Ergonomic assessment
- Human Machine Interface (HMI) assessment
- Alarm management
- Human error identification, quantification and error reduction

DESIGN SUBSTANTIATION

- Design/engineering substantiation
- Electrical, instrumentation and control system substantiation
- Equipment qualification
- SIL assessment
- ARM assessment

OPERATIONAL SUPPORT

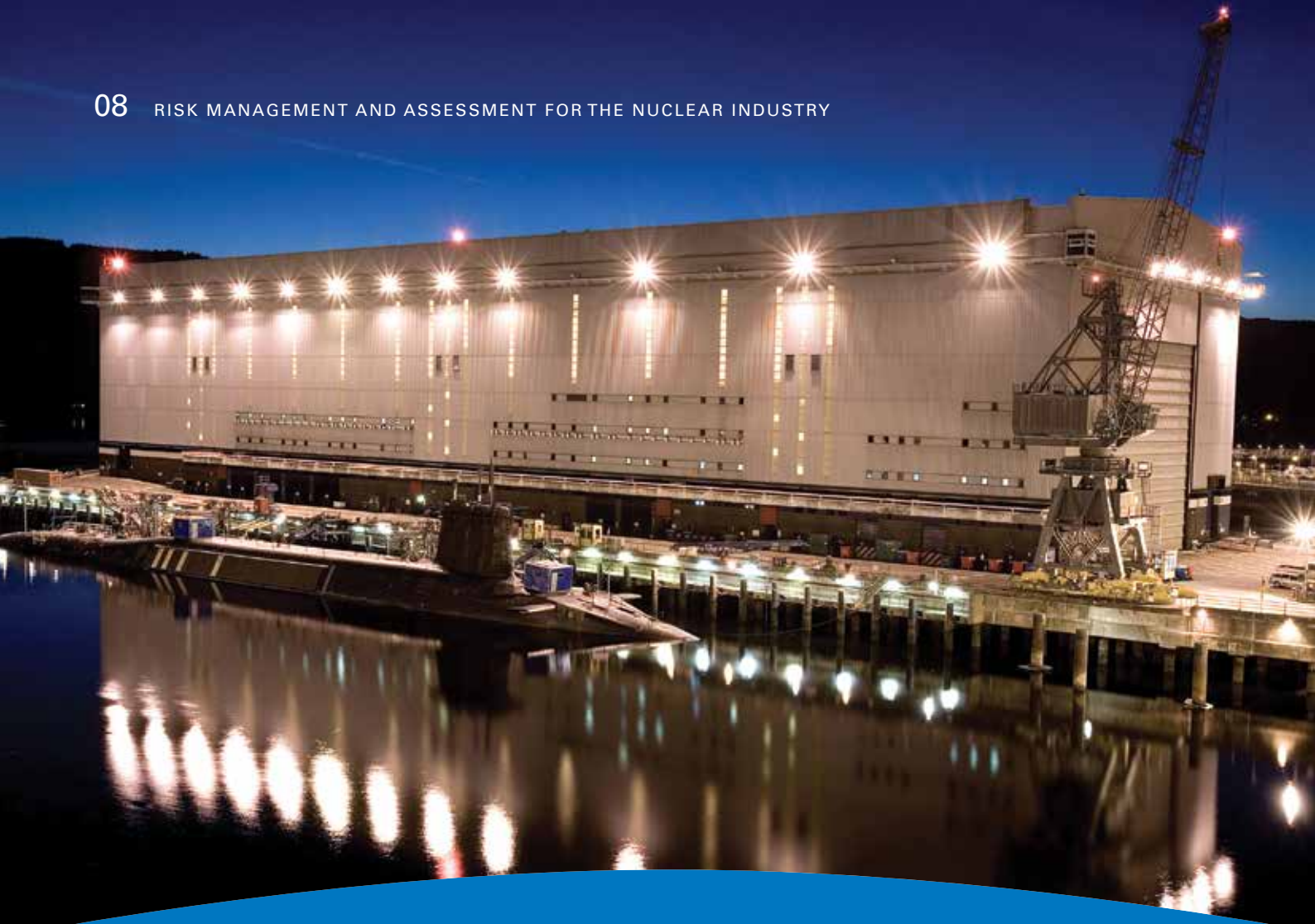
- Reliability-centred maintenance
- Equipment reliability
- Maintenance, inspection and testing optimisation
- Decommissioning strategies, plans and programmes
- Obsolescence management
- Project management
- Life extension justification

INDEPENDENT VERIFICATION AND REVIEW

- Safety case verification
- Independent peer review
- Independent nuclear safety assessment
- Independent technical assessment

TRAINING

- Nuclear safety training
- Nuclear safety case training
- Nuclear safety case awareness training
- Nuclear security training



RISK MANAGEMENT

Managing nuclear safety, H&S, security, environmental and business risk.

HSSE MANAGEMENT SYSTEMS

- Developing integrated HSSE Management Systems
- Translating HSSE requirements into operating documentation
- Developing change management systems
- Developing document management systems
- Conducting independent third-party audits and reviews
- Facilitating pragmatic and cost-effective, risk-based improvement strategies and programmes
- Developing business continuity management systems
- Testing and auditing business continuity plans

BUSINESS CONTINUITY MANAGEMENT

- Threat identification
- Business impact assessment and risk analysis
- Developing business continuity strategies
- Documenting business continuity plans
- Developing business continuity management systems
- Testing and auditing business continuity plans

EMERGENCY PLANNING & CRISIS MANAGEMENT

- Identifying potential emergency and crisis scenarios
- Developing emergency and crisis management strategies, plans and procedures
- Emergency control centre reviews and optimisation
- Facilitating desktop and field drills and exercises
- Assessing and auditing adequacy of emergency arrangements

SECURITY RISK MANAGEMENT

- Security management arrangements
- Security management strategies and response plans
- Conceptual security arrangements
- Nuclear site security plans
- Security awareness and training programmes
- Security audits and reviews
- Investigation of security incidents

CULTURE & BEHAVIOUR

Accelerating cultural and behavioural improvement, and ensuring a solid foundation for building sustainable improvements in risk control.



CULTURE & BEHAVIOURAL SAFETY IMPROVEMENT

- Safety culture/climate assessment and cultural change support
- Safety leadership workshops
- Behavioural safety strategy, programme development and associated support
- Behavioural safety management
- Incident investigation and root cause analysis

SECURITY CULTURE

- Security culture assessment and cultural change support
- Security leadership workshops

COMPETENCE MANAGEMENT

- Analysis of current arrangements against best practice competency standards
- Capture of baseline competency requirements - organisational, team and personal
- Role and task analysis
- Competency assessment and training needs analysis (TNA)
- Competency management system development
- Developing and verifying competence assurance systems

WORKPLACE SAFETY

- Worksite risk assessment method development, linked to contractor management and safe systems of work
- User friendly procedures and working instructions
- Permit to work systems
- Health and industrial hygiene assessment

LEARNING & RESOURCING

Training in Risk and Safety Management leading to formal qualifications or tailored to meet your specific requirements.

Providing specialist risk, HSSE and engineering associates to work at client offices, project locations or industrial sites anywhere in the world.



TRAINING AND EDUCATION

- Postgraduate Certificate, Diploma or Master's Degree (MSc) in Risk and Safety Management
- Degree Apprenticeship in Risk and Safety Management
- Risktec Professional Qualification (RPQ) in Risk and Safety Management
- Training courses from single modules to multi-year programmes for corporate clients
- Game based learning
- Delivery via face-to-face, distance or blended learning
- Accredited by professional engineering institutions and industry bodies

RESOURCE SOLUTIONS

- Delivered by our professional resource solutions business, ASTEC, which has access to a huge pool of professional associates
- Short-term or long-term assignments

Client Satisfaction

Twice a year we survey the clients of all our active projects. The response rate is high for such surveys and we very much appreciate the time and effort spent by our clients in providing feedback to us. This feedback greatly helps us strive to continuously improve our service.

The survey asks questions encompassing all aspects of our service, from responsiveness and flexibility, through technical quality, to commercial issues. We are delighted to receive consistently high levels of customer satisfaction across all questions. This means we are able to build long-term sustainable relationships with all our clients, with over 85% of our revenue coming from existing clients. However, we also continuously seek new clients and each year over 30% of our clients are new.

Example high levels of client satisfaction:*

- **97%** of clients rate the technical knowledge of our personnel as very good or good (we view 'fair' as not good enough).
- **97%** of clients view us as easy to do business with.
- **98%** of clients believe they have received good value from Risktec compared to other consultants.
- **99.7%** of clients would recommend us.

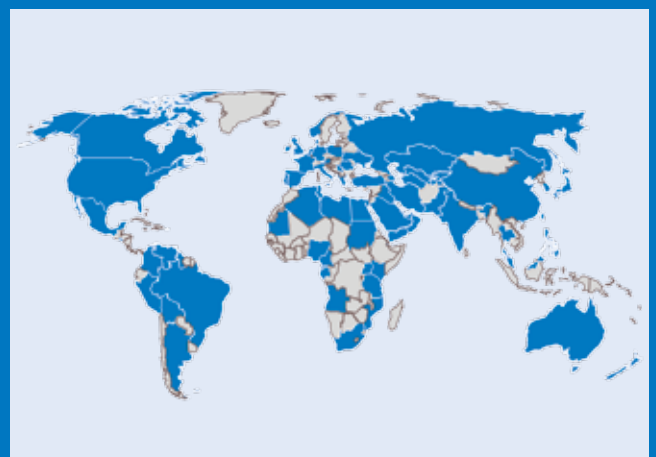
*Cumulative survey results to date. The current scores are displayed on our website

risktec.tuv.com

Global Experience with Risktec

Risktec has its principal office in Warrington in the UK, with other offices in key locations in Europe, Middle East and North America. Our activities are supported by a comprehensive network of TÜV Rheinland offices and local representatives in other regions around the world. Our intention is to be close to our clients.

We have delivered projects in over 70 countries worldwide.





RISKTEC OFFICES WORLDWIDE

UK Principal Office

Wilderspool Park
Greenall's Avenue
Warrington WA4 6HL
United Kingdom
Tel +44 (0)1925 611200

TÜV Rheinland Headquarter

TÜV Rheinland Group
Industrial Services
Am Grauen Stein
51105 Cologne, Germany
tuv.com

Europe

Aberdeen
Crawley
Derby
Edinburgh
Glasgow
London
Rijswijk

Middle East

Abu Dhabi
Dubai
Muscat

North America

Calgary
Houston

For further information,
including office contact
details, visit:

risktec.tuv.com

or email:

enquiries@risktec.tuv.com



TÜVRheinland[®]

Risktec

risktec.tuv.com
enquiries@risktec.tuv.com