

Safety Technology

Safety First

The basis for nuclear safety is guaranteeing and complying with nuclear protection aims:

- Monitoring reactivity,
- Removing decay heat,
- Encapsulating radioactive materials and
- Limiting exposure to radiation

The last two aims are particularly important for decommissioning and dismantling nuclear power plants with and without a reactor. We answer all of your questions regarding nuclear safety based on the ALARA principle with hazard analyses, accident and incident analyses, preparation of approval documents such as safety reports according to the Radiation Protection Ordinance (StrlSchV) or nuclear legislation, preparation of fire protection documents, and design of radiation protection systems.

Our solutions for

> Fire protection



> Licenses



> Operational monitoring



> Radiation protection



Our solutions for:



Licenses

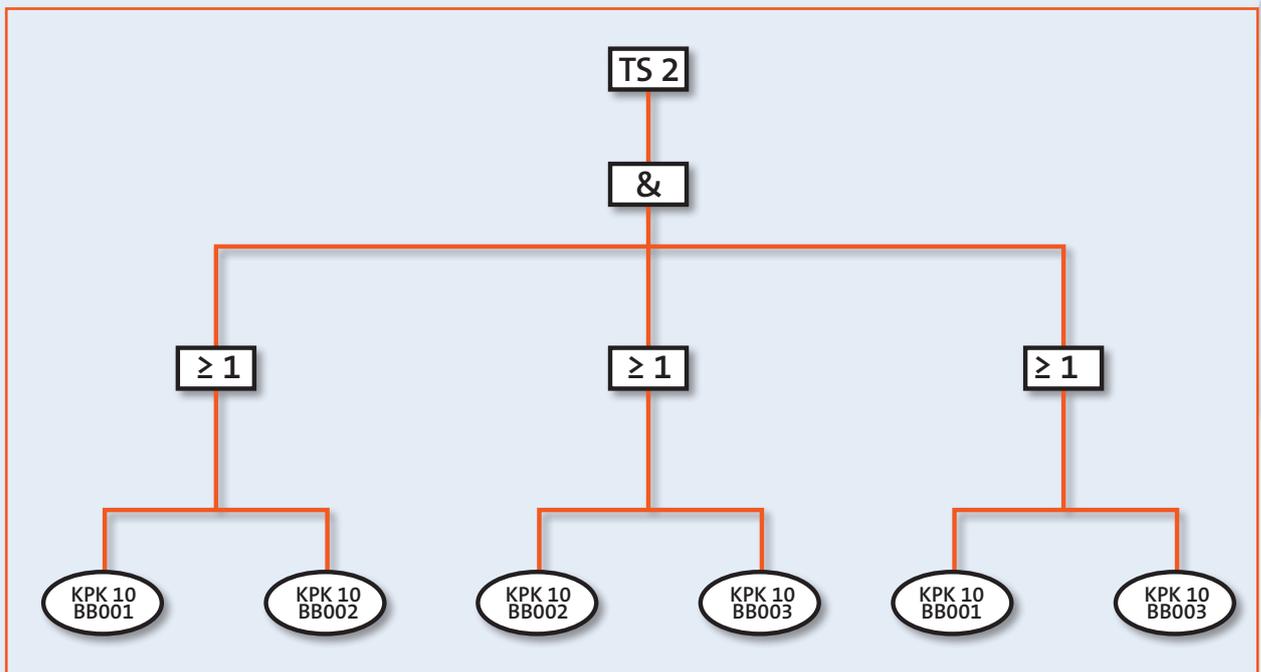
Safety and licenses

Preparing approval documents

- Preliminary Safety Analysis Report (PSAR)
- Interim Safety Analysis Report (ISAR)
- Final Safety Analysis Report (FSAR)
- Environmental Impact Analysis Report (EIA)

Carrying out all necessary analyses for the safety report

- Hazard analysis
- Accident and Incident analyses
- Failure Mode and Effects Analysis (FMEA)
- Contributions to the periodical safety inspection
- Contributions to probabilistic safety analyses (PSA)



Fault tree analysis

Our solutions for:



Radiation protection

Radiation protection

Design

- Shielding calculations
- Radiation protection concepts incl. radiation protection instruments
 - Description of radiation protection measures
 - Definition of radiation protection areas
 - Layout planning (Entrance/exit control area, locks, complete building)
 - Specification of personal radiation protection equipment
- Design, specification, procurement, assembly of the radiation protection instruments
- Implementation of country-specific limit values
- Reduction of staff exposure to radiation
- Calculation of the release of radioactive material and the consequences

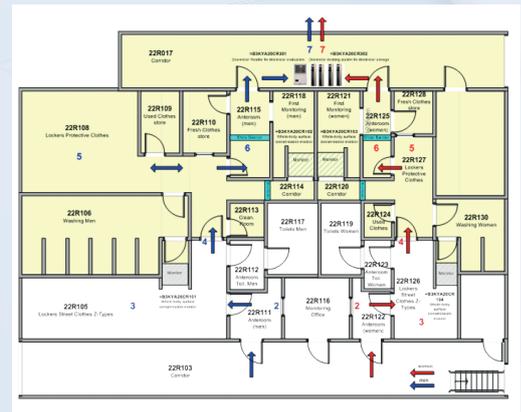
Instruments

Specification of the measuring equipment, procurement, installation, commissioning, training:

- Personal and site dosimetry
- Contamination measuring equipment
- Gamma spectrometry
- Emission control

Calculation of radioactivity and dose rates

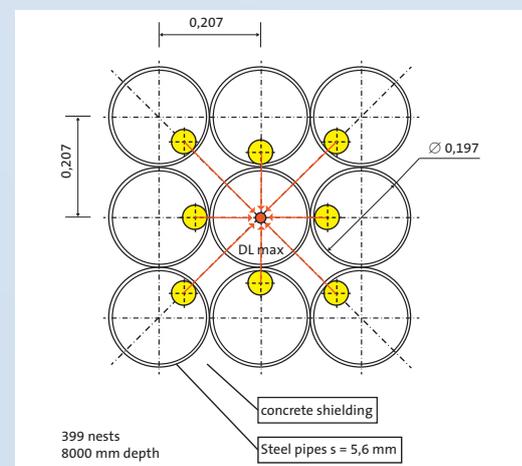
- Identification of radiation sources, nuclide vectors
- Compilation of information regarding nuclide-specific radioactivity of radiation sources
- Activity-dependent nuclide analysis
- Determination of relevant nuclide vectors
- Calculation of radioactivity of specific components
- Appropriate grouping of sources
- Dose and performance calculations using qualified simulation tools
- Calculation of local dose rate for:
 - Specific components
 - Work stations and rooms
- Design of shielding
- Calculation of individual and collective doses for operating staff and the population during both standard and accident operation including maintenance and repair



Control area entrance/exit



Control area



Shielding calculation model

Our solutions for:



Operational monitoring

Monitoring emissions

Monitoring radiological emissions

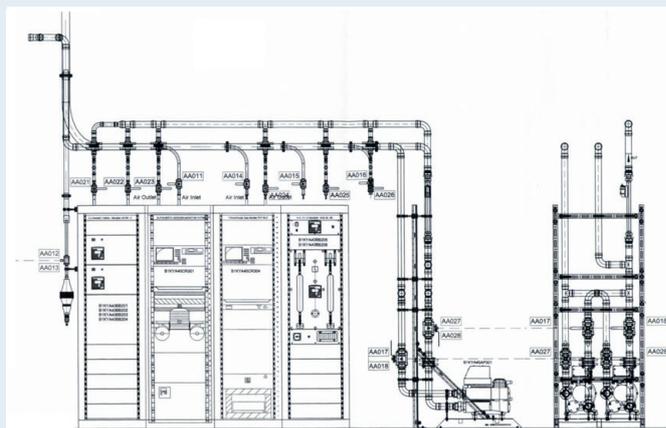
Specification of the measuring equipment, procurement, installation, commissioning, training:

- Sampling system, pipework and control system for isokinetic sampling
- Collection unit and/or monitor for aerosols, tritium, carbon, iodine, noble gases

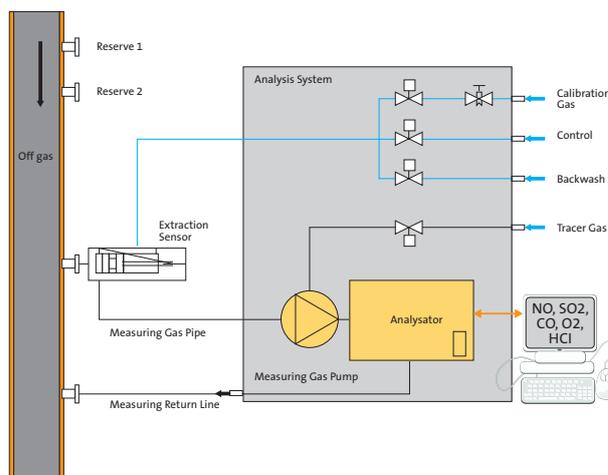
Monitoring chemical emissions

Specification of the measuring equipment, procurement, installation, commissioning, training:

- Sampling system, pipework and control system
- Analysis instruments for: CO₂, NO₂, NO_x, C_{org}, HCl, CO, NO, SO₂, O₂



Monitoring radiological emissions



Monitoring chemical emissions

Our solutions for:



Fire protection

Fire protection

I.Care.fire: From construction to dismantling, IT-supported fire protection

- Problem
The fire protection concept must be prepared/adjusted:
 - In case of structural changes
 - In case of shifting fire loads
 - During construction of new facilities, operation, decommissioning and dismantling
 - At fixed intervals
- Costs
 - Inspection of the plant and collection of inventory data (fire load)
 - Manual input, preparation and analysis of lists

Module 1

- Recording of plant inventory
- Target / actual comparison
- Updating spatial data

I.CARE.fire *mobile*

Module 2

- Revealing weak points
- Events analysis
- Balance analysis

I.CARE.fire *PRA*

Module 3

- Visual simulation of dismantling steps
- Removal of spatial confinements
- Management of fire loads

I.CARE.fire *design*

Module 4

- Implementation of the dismantling concept
- Documentation of the work steps

I.CARE.fire *operate*

Overview of I.Care.fire modules

I.CARE.fire offers you:

- Time and cost savings
- User-friendly operation
- High level of safety thanks to a simplified process for site inspection
- The actual state which is digitalised and documented by photographs
- Simplified target/actual comparison
- Increased safety standards based on a wide variety of documentation options
- Documented changes – traceability promotes sustainability
- Immediate availability in the nuclear power station (Intranet, WLAN, network connection)

Overview of our services in the field of safety technology

- We carry out:
 - Nuclear safety and licensing
 - Radiation and fire protection
 - Safety and incident analysis
- Design, delivery, calibration and commissioning of measuring systems for:
 - Monitoring radiation protection
 - Monitoring chemical and radiological emissions
- We prepare and review documents for nuclear licensing
- Determination and assessment of:
 - Reliability
 - Availability

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