COMPETENCE AREA “NUCLEAR POWER PLANTS”

NUCLEAR ENERGY REMAINS A KEY TECHNOLOGY

Nuclear energy continues to play an important role in securing power supply in Europe and across the globe. It is notable for its high availability – as a rule over 90% – combined with negligible CO₂ emissions. Almost every third kWh in Europe is produced from nuclear energy. In Europe new nuclear power plants are under construction or projected in the United Kingdom, France, Finland, Lithuania, Poland, the Czech Republic, Slovakia, Sweden, Hungary, Belarus, Russia, the Ukraine and Turkey.

Even after Fukushima, at least seven countries worldwide are planning to adopt nuclear energy for the first time. 448 nuclear power plants are currently in operation in 31 countries across the globe.

The experts for “Nuclear Power Plants” at VGB provide knowledge on all aspects of nuclear technology and operation, covering all intrinsic disciplines such as plant security, materials, electrical and I&C technology, decommissioning, interim storage and disposal.

Our “Central Reporting and Evaluation Office” records safety-relevant events from all nuclear power plants in a database and makes that database available to the members to facilitate learning from each other on a global scale.

In general, we create an efficient platform for the exchange of information and experience, represent the interests of our members to third parties, co-ordinate assessments and standards, qualify components, audit manufacturers, manage research and define the state of the art.
“NUCLEAR POWER PLANTS” – VGB’S EXPERTISE

- Safety cases
- Plant security
- Component integrity
- Reactor core layout
- Robustness of civil structures
- Mechanical and process engineering
- Electrical and I&C technology
- Practical radiation protection
- Management systems
- Event analysis
- Decommissioning and disposal

YOU TOO CAN BENEFIT FROM OUR KNOW-HOW AND SERVICES

Make use of our experience – e.g. in the representation of your interests vis-à-vis authorities, manufacturers and suppliers, or in the field of quality assurance.

Expand your knowledge by drawing on the extensive professional know-how of our experts.

Trust our expertise in the organisation of working groups and the initiation and supporting of joint projects.

Let us advise you – for instance on the identification of technical solutions and the assessment of technical developments.

Keep up to date with us – as we are constantly exchanging information with national and international organisations.

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COMPETENCE AREA “POWER PLANT TECHNOLOGIES”

A STRONG PILLAR OF POWER SUPPLY

Conventional power plants will be indispensable in maintaining secure energy supplies also in the coming decades. In that context, the focus in the past was increased efficiency and reduced emissions thanks to state of the art plant technology. In times of an increasing share of volatile renewable generation the issue of flexibility of conventional power plants is of growing importance. The fundamental challenges for operation of the power plants are safety, environmental friendly and competitive operation in a changing market-driven economic environment.

VGB’s Competence Area “Power Plant Technologies” is the platform for all questions concerning the technology, operation and maintenance of all power plant types, and covers all technical areas from boilers and turbines to I&C systems but also technical documentation, training, material and quality assurance. The focus is on both short-term issues relating to daily operation and long-term, strategically oriented topics. Communication is driven by the necessity to develop positions and establish solutions together.

The technologies and techniques used for generating electricity and heat from coal, gas, oil and other solid fuels such as biomass or waste, are highly complex and require a high level of know-how provided by VGB PowerTech.

Our integrated approach to addressing the various topics ensures the efficiency of the association’s work and thus also the benefits for our members.
POWER PLANT TECHNOLOGIES”
- Steam generators
- Materials and quality assurance
- Power plant operation
- Power plant design
- Machinery
- Electrical, I&C and IT systems
- Civil engineering
- Maintenance management

YOU TOO CAN BENEFIT FROM OUR KNOW-HOW AND SERVICES

Make use of our experience – for example in construction and installation supervision or project management at new power plants and conversions, in concepts for the development of materials for the new generation of power plants, or in the field of quality assurance.

Expand your knowledge at our training courses and specialist conferences, for instance on the topic of fuels and furnaces in steam generation facilities or IT-security.

Place your trust in our expertise in the organisation of conferences, workshops and working groups, and in the initiation and support of research projects.

Let us advise you – on matters including, but by no means limited to, damage analyses, design, construction, operation, asset valuation and arbitration and conciliation proceedings on contractual questions.

Stay up to date with us – for we are constantly addressing new, topical issues such as the development of flue gas treatment technology or combined heat and power generation.

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COMPETENCE AREA “RENEWABLES AND DISTRIBUTED GENERATION”

PRESSING AHEAD WITH THE ENERGY TURNAROUND

Use of renewable energy sources will play a decisive role in the energy supply of the future. The European Union has set the target of increasing the share of renewables in total energy consumption to 20 percent by the year 2020. This is associated with a rise to around 34 percent in electricity generation. These targets have been incorporated in the national action plans of the member states, and implementation of the corresponding measures is being monitored on a continuous basis.

Together with hydro power, the use of wind energy, photovoltaics and power generation from biomass will rank among the main pillars of the renewable energy supply. These technologies will be supplemented by a wide range of approaches to distributed generation and the incorporation of storage technologies, and will have to be integrated in the existing and future energy supply systems.

VGB PowerTech accompanies and supports you on the way to using renewable energy sources sustainably and efficiently. The committees in the “Renewables and Distributed Generation” division – in particular Hydro Power, Wind Energy, Biomass, Biogas, Storage Technologies and Distributed Generation – deal with the technical and economic issues and with the integration of renewable energy sources into the existing and future energy supply structures.

We create a platform for the exchange of information and experience, represent the interests of our members to third parties, issue statements and assessments, and we are involved in research and development projects.
THE “RENEWABLES AND DISTRIBUTED GENERATION” COMPETENCE CENTER PROVIDES

- Exchange of information and experience
- Assessment of technical developments
- Identification of optimum technical solutions
- Support in technical issues
- Compilation of industry standards (VGB-Standards)
- Publication of position papers
- Representation to authorities and commissions
- Communication with national and international associations
- Evaluation and initiation of research projects

YOU TOO CAN BENEFIT FROM OUR KNOW-HOW AND OUR SERVICES

Make use of our experience – for example in the representation of your interests vis-à-vis authorities, manufacturers and suppliers, as well as in standardisation committees.

Expand your knowledge at our training courses and specialist conferences, for instance on the topic of “Maintenance of Wind Power Plants”.

Place your trust in our expertise in the organisation of conferences and working groups, and in the initiation and support of research projects.

Let us advise you – on matters including, but by no means limited to, the identification of technical solutions for optimum deployment of technologies using renewable energy sources, and distributed generation.

Stay up to date with us – as the conditions surrounding the expansion of renewables are constantly changing, we provide you with information on current topics – for example comparisons of national subsidy systems.

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COMPETENCE AREA
“ENVIRONMENTAL TECHNOLOGY, CHEMISTRY, SAFETY AND HEALTH”

ENVIRONMENTAL COMPATIBILITY AS THE KEY TO THE FUTURE

Under the present economic and political conditions, the focus in the field of power and heat generation is increasingly on the environmental compatibility of the process as a whole, i.e. reducing emissions and increasing the efficiency of power plant. These rising demands can nowadays be fulfilled by using state of the art plant engineering accompanied by a continuous process of optimisation. The further development of environmental standards on national and international basis therefore requires research and development for adapted improved technologies.

Making the process of power and heat generation and distribution environmentally friendly in the given circumstances is a complex task, requiring interdisciplinary cooperation between various industries and disciplines.

The Competence Area “Environmental Technology, Chemistry, Safety and Health” creates an independent, international platform for discussion and exchange of ideas on all questions of environmental compatibility. VGB, with its concerted know-how, contributes to the resolution of these complex issues and to defining the state of the art in the environmental sector, and is also actively involved in research and development in this field.
“ENVIRONMENTAL TECHNOLOGY, CHEMISTRY, SAFETY AND HEALTH” GROUPS TOGETHER EXPERT KNOWLEDGE ON:

- Emissions/immissions and noise control
- Water management in plants
- Power plant by-products/by-products of waste incineration plants
- Chemistry in power plant operation
- Occupational health and safety, and fire protection
- Climate- and environmental protection

YOU TOO CAN BENEFIT FROM OUR KNOW-HOW AND SERVICES

Make use of our experience – e.g. in the representation of your interests vis-à-vis authorities, manufacturers and suppliers, and on standardisation committees.

Expand your knowledge – knowledge in our training courses and specialist conferences, e.g. on the subject of “Chemistry in Power Plants”.

Trust our expertise – in the organisation of conferences, further training courses and working groups, involvement in legislative procedures and the initiation and supporting of research projects.

Let us advise you – for instance in the identification of technical solutions for the optimum deployment of technologies to improve and optimise plant performance.

Keep up to date with us – as we are your contact and information provider in the complex world of rapidly changing national and international environmental laws.

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VGB “TECHNICAL SERVICES”

TECHNICAL SERVICES FROM VGB POWERTECH E.V.

Technical services are an integral part of VGB PowerTech’s work. They are to be regarded as an enhancement to the services for our members and cover all aspects of engineering, operation and maintenance in power plants.

The technical services comprise:
- Materials Laboratory
- Water Chemistry
- Oil Laboratory
- Engineering Consultancy
- Construction and Installation Supervision

These services are used by members worldwide to achieve sustainably safe, fault-free and cost-effective operation. We listen to your problems and establish solutions which are notable for their cost-effectiveness and technical expertise.

We care for your problems and elaborate solutions characterised by economy and technical competence.

OBJECTIVE
It is our objective to detect undesirable influences on a plant at an early stage and to remove them or limit their effects by directly involving ourselves in the manufacturing, installation and commissioning process and subsequent operation.

VGB “TECHNICAL SERVICES”
TECHNICAL SERVICES FROM VGB POWERTECH E.V.

MATERIALS LABORATORY, WATER CHEMISTRY AND QUALITY SUPERVISION

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ENGINEERING CONSULTANCY

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VGB “TECHNICAL SERVICES”

MATERIALS LABORATORY

The VGB Materials Laboratory has over 30 years experience in the field of damage analysis and condition assessment of power plant components. In addition to that we are active in practically oriented research and development in the field of materials technology. We perform the work both on site with our customers and in our state of the art in-house laboratory.

General findings obtained in the course of this work are passed on to our member companies through the exchange of experience in the VGB committees and in regular workshops and seminars. This makes a significant contribution to increasing the safety and availability of the plants. The following examination methods are available in our work:

- Technical metallography
- Classical metallography
- Component metallography
- Endoscopy – Spectrographic analysis
- Scanning electron microscopy (SEM)
- X-ray diffraction (XRD)
- Microhardness and small load hardness testing
- Creep strain measurement
- Ultrasonic testing (UT)
- Surface crack detection testing (PT and MT)
- Corrosion tests
- Wall thickness measurement
- Surface roughness measurement
- Calculation of component remaining lifetime to TRD 508
- Temperature monitoring

Over and above this, the feedback of experience is ensured by regular practical training on the topic “Materials Laboratory” and seminar “Damage Analyses”.

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VGB “TECHNICAL SERVICES”

WATER CHEMISTRY

The Water Chemistry department of Technical Services provides services and consultancy on questions of water chemistry ranging from water demineralisation through the water-steam cycle to cooling water. Together with examinations of ion exchanger resins, carried out in the VGB laboratory, extensive chemical and physical measurements can be conducted on site at the plant concerned. A broad range of modern measuring methods and techniques are available (e.g. mobile laboratory, oxygen, sodium and hydrogen measuring instruments, measurement of degassed cation conductivity, organic X monitor and silicometer). By means of this available equipment, it is possible not only to conduct regular monitoring of the operation of water treatment systems, the water-steam cycle and district heating water, but also to perform fault analyses in the following fields:

- Water desalination systems of the membrane and ion exchanger types
- Tests on resins (in our in-house laboratory)
- (Disruptive) influences on media quality downstream from treatment systems (demineralisation and condensate polishing systems)
- (Disruptive) influences on feedwater and steam quality
- Assessment of corrosion processes induced by water chemistry
- Monitoring and supervision of pre- and post-operational cleaning procedures (acid washing)
- In-process disturbance analysis

Over and above this, the feedback of experience to the member companies is ensured by regular seminars on the topics of water treatment and chemistry in the water-steam cycle.

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VGB "TECHNICAL SERVICES"

OIL LABORATORY

All services around oil management are carried out in our state-of-the-art oil laboratory for analysing lube and insulating oils. The oils investigated range from oils used in conventional electricity generation and in plants for renewable energy conversion up to industrial plants of the chemical and steel industry.

Oil examination leads to safe operation and cost optimisation, i.e. the avoidance of unnecessary oil changes results. Sub-inhibition of lubricants is a particular service of VGB oil management, because the addition of inhibitor according to needs often increases lifetime of oils thus avoiding oil changes.

The oil laboratory is dealing with:
- Independent oil analysis in own laboratory
- Assessment of lube and insulating oils
- Tailor-made solutions to extent lube oil lifetime
  ⇒ inhibition with additives
- General consulting in oil issues
  ⇒ optimisation of lubricant systems
- Support during oil changes
- Certification of oil suppliers

Over and above this, the feedback of experience to the member companies is ensured by regular seminars on the topics of water treatment and chemistry in the water-steam cycle.

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QUALITY SUPERVISION

The aim of the Team Quality Supervision is to improve plant safety and availability in new plant and during overhauls.

The construction and installation supervision team represents the interests of the customer vis-à-vis the supplier. Compliance with contractual stipulations is monitored in accordance with instructions and standards.

This field of activity covers relevant power plant components such as:
- Structural steelwork
- Flue gas desulphurisation
- Boiler components
- Turbine generators
- Piping
- Pumps

Assurance of quality in manufacture and installation is achieved by:
- Review of licenses, certificates and documentary evidence
- Monitoring of construction and installation in progress
- Inspection of welding work performed
- Checking of rubber lining and corrosion protection work to be performed
- Witnessing or performance of non-destructive testing and verification of the results
- Final inspection of the finished components and review of the documentation

Construction and installation supervision is based on the VGB-Standards, which are derived from the exchange of experience in VGB committees and from the analysis of damage and failures.

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ENGINEERING CONSULTANCY

Engineering consultancy is provided in close cooperation with the operators and manufacturers.

CONSULTANCY COMPRISSES SUPPORT IN
- Design of new-build and modernisation projects
- Project implementation including commissioning
- Tendering
- Damage analysis and insurance issues
- Development and execution of optimisation measures for O&M

THIS ALSO INCLUDES ASSESSMENT OF THE
- Dimensioning
- Specification
- Workmanship at site

The consultancy is practically oriented and solution-driven. The results from the work of the Technical Services team are considered directly in the Association’s work on defining the state of the art and on standards (VGB-Standards).

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