



NUCLEAR RESEARCH INSTITUTE

ÚJV Řež provides a wide range of services, including design, and engineering activities in the fields of energy, industry, and health. For more than 65 years we have been among the top technology centers in the Czech Republic and Europe. Using experienced professionals and specialized technical infrastructure, we are able to compete for complex engagements in all areas of our focus on both a national and an international level.

The priority of ÚJV Řež is power engineering, i.e. support of the operating units and preparation of new nuclear units. We also focus on conventional energy, heating, incl. so-called small energy and renewable resources. We cover the entire service chain of radioactive waste management. In the field of nuclear medicine, we deal with the development, production, and distribution of radiopharmaceuticals.



Power Industry

DESIGN AND RELATED ENGINEERING SERVICES

Comprehensive project and pre-project activities, including related engineering and advisory services in investment construction of energy facilities. In the field of design and engineering, we offer a comprehensive set of services to support their activities, from feasibility assessments to the realization of investment projects related to energy equipment.

SAFETY AND RELIABILITY OF NPPs

Comprehensive assessment of whether the plant is operated in accordance with the actual project, with the applicable national safety requirements and with the relevant limits and conditions.

- Safety analyses, support for licensing operated NPPs, PSA analyses
- Radiation safety and emergency preparedness
- Reliability analyses of complex technologies, including I&C systems and human factor reliability
- Verification and validation of analytical tools and models

SUPPORT FOR ECONOMIC OPERATION AND TECHNICAL MAINTENANCE

Complex services – from diagnostics and operational control programmes at power plants, through the qualification of inspection methods and safety analysis to overarching projects to increase performance and lifetime of energy units.

- Comprehensive power uprate projects
- Ecological and modernization projects
- Ageing management and lifetime extension projects

FUEL CYCLE SUPPORT

Support to NPP operators in fuel licensing, during storage and use in the reactor, and during storage of used nuclear fuel in an interim storage place.

- Optimization of fuel reloads: OPTIMAL and LPOpt software
- Design and safety assessment of fuel charges: SW ANDREA and CycleKit
- Thermomechanical and thermohydraulic analyses of fuel and active zone

STRUCTURAL AND MECHANICAL PROPERTIES

Mechanical tests on irradiated and non-irradiated materials, damage analyses, environmental qualification of the equipment, and degradation assessments of the construction materials.





Power Industry

AGEING MANAGEMENT AND PLANT LIFE MANAGEMENT

Implementation of the VVER-type NPP life cycle management programme to ensure long-term operation beyond the original design lifetime. We implement projects for local and foreign operators and ensure the documentation for the power plants according to the appropriate legislation.

- Design and editing of PLiM programmes
- Thermohydraulic analyses and assessment of risks caused by pressure-thermal shocks
- Representing the Czech Republic in the IAEA, NEA – OECD, NUGENIA, SNETP and others

RADIOACTIVE WASTE AND DECOMMISSIONING

Complete range of services in the field of radioactive waste (RAW) management from the detection and identification through the processing and treatment (modification) to preparation for safe storage. The main support centre for project support of the Deep Geological Repository Project in the Czech Republic (managed by the state Radioactive Waste Repository Authority). International transport of spent nuclear fuel from research reactors.

- Concepts and Expertise, Central Analytical Laboratory
- RAW processing (treatment and conditioning)
- RAW and spent nuclear fuel repositories
- Decommissioning
- Shipments of spent nuclear fuel



Radiopharmaceuticals

COMMERCIAL PRODUCTION OF RADIOPHARMACEUTICALS

Production and quality control of diagnostic medicinal substances for nuclear medicine in accordance with valid marketing authorizations.

- Quality control of medicinal products – The defined and set chemical and physical control processes in the GMP mode
- Release of the medicinal products for sale – performing activities of Qualified Person
- Distribution of medicinal products according to the ADR rules
- Production of radiopharmaceuticals for positron emission tomography (PET)
- Supplies for most nuclear medicine workplaces in the Czech Republic

PET CENTRES

Unique experience with the construction and routine operation of three Positron Emission Tomography Centers (Praha, Brno, Řež) in the Czech Republic enables us to provide comprehensive and highly specialized services.

- Ensuring the complete construction of PET centres
- Operating personnel training for PET centres
- Consultancy in the implementation of pharmaceutical production

R&D AND TESTING OF NEW RADIOPHARMACEUTICALS

Focus on modern trends in the development of therapeutic and diagnostic radiopharmaceuticals, including antibody and protein labeling by radionuclides. The state-of-the-art R&D PET Center in Řež works primarily on the development of new radiopharmaceuticals with ultra-short-term PET radionuclides.

Hydrogen Technologies

ÚJV Řež maintains a privileged position in the field of Czech hydrogen innovations, offering commercial and research services focused on emission-free energy and transport. It is a founding member of the Czech Hydrogen Technology Platform (HYTEP).

SERVICES FOR HYDROGEN IN ENERGY

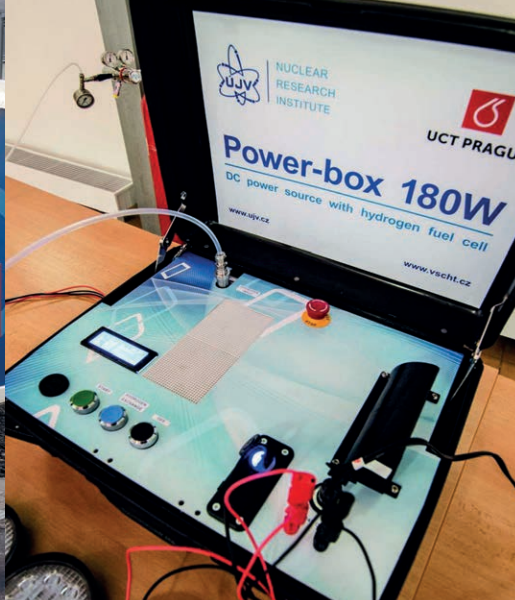
- Design activities and delivery of turnkey systems, comprehensive consultancy
- Case studies for integration of hydrogen technologies in existing operation
- Energy storage systems that can serve as a backup or stabilization power source in island mode in operations
- Energy storage systems that help create energy efficient facilities / buildings

SERVICES FOR HYDROGEN IN TRANSPORT

- Consultancy on hydrogen cars and buses inclusion in the fleet
- Support for the development of filling stations infrastructure in the Czech Republic
- Design activities and implementation of turnkey systems
- Drafting projects co-financed from grants

PILOT PROJECTS

- TriHyBus and first filling station in Neratovice
- Hydrogen filling station for small vehicles in Řež
- Energy surplus storage system from photovoltaic panels into hydrogen
- POWER-BOX 180W – portable DC power source with a hydrogen fuel cell
- Hydrogen range extender for battery vehicles
- Hydrogen truck on Tatra chassis
- Study for regional hydrogen trains in the Czech Republic
- Development of a reversible alkaline fuel cell
- Optimization of micro-cogeneration using fuel cells



Research and Development

GENERATION IV NUCLEAR REACTORS AND SMALL NUCLEAR REACTORS

Research and development activities for nuclear reactors and for new generation nuclear reactors (GEN IV), namely the Gas Cooled Fast Reactor demonstrator unit ALLEGRO, and also for small nuclear reactors (SMR).

SAFETY AND RELIABILITY OF NUCLEAR INSTALLATIONS

Development of safety methodologies in the field of thermohydraulic analyses, reactor fuel behavior, calculations for simulation of severe accident solutions, probabilistic risk assessment, modeling, and visualization.

FUEL CYCLE

Research related to the reactor core and fuel charges. Support of the back end of the nuclear fuel and preparation for its closure.

RADIOACTIVE WASTE REPOSITORIES

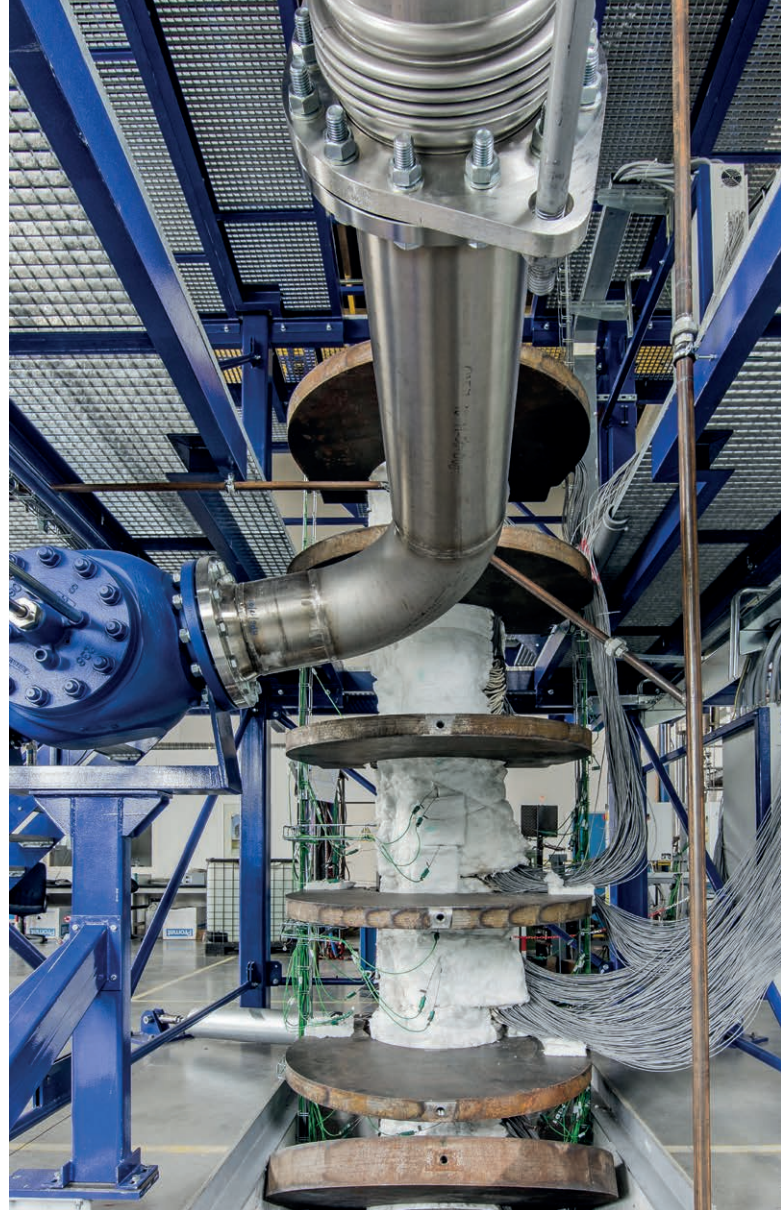
For many years we have been the main workplace for the engineering and research support team of the Deep Geological Repository Project in the Czech Republic. We also provide development and technical support for the operation and modernization of near-shallow repositories.

MATERIALS

Research and development of special materials for nuclear and non-nuclear applications. Application of nanotechnologies in the field of radioactive waste management.

LOW EMISSION COAL ENERGY

Projects aimed at capture and storage of carbon (CCS) emerging from the combustion or gasification of fossil fuels.



Accredited Laboratories

Accredited laboratories are active in the five areas of mechanical, physicochemical, electrical, radiation and radiochemical (radioactivity) material properties, as well as in accredited measurements, tests, and analyses. The laboratories are awarded accreditation certificates according to ISO/IEC 17025.

CENTRAL ANALYTICAL TESTING LABORATORY

- Accredited determination of radionuclide content in different materials and media
- Detection and determination of the content of nuclear materials
- Determining the biomass content (share) of fuels
- Radiation monitoring of workplaces and the environment
- Determination of toxic metal content in different materials and media
- Measurement of the effectiveness of air-conditioning, aerosol and iodine filters
- Accredited chemical analyses of water

TESTING LABORATORY TO EVALUATE MATERIAL PROPERTIES

- Autoclaves for evaluation of materials under operating conditions
- Light scanning electron microscopes
- Hot and semi-hot cells for the evaluation of the properties of irradiated / radioactive materials

TESTING LABORATORY FOR ENVIRONMENTAL EQUIPMENT QUALIFICATION

- For environmental qualification
- Cobalt irradiators
- Monitoring properties and characteristics of equipment materials

TESTING LABORATORY OF MECHANICAL PROPERTIES

- Instron universal blasting machines
- Shuttle hammers
- Instrument hardness tests
- Measurement of dimensions
- Microscopic analysis of broken bodies.



Small Modular Reactors

Research at ÚJV Řež focuses on small-scale nuclear reactors of the pressurized type, heavy-metal fast reactors, and also gas-cooled high-temperature reactors.

HEFASTO

PROJECT OF THE ADVANCED MODULAR REACTOR FOR INDUSTRIAL HEAT PRODUCTION AND FUEL RECYCLING

- 900 °C core outlet temperature and fast neutron spectrum
- No new nuclear waste produced during the lifetime
- Process heat for hydrogen production or coal gasification
- Modularity on all levels ensures flexibility and cost effectiveness

FOCUS ON SIMPLIFICATION OF CONSTRUCTION, IN-SERVICE INSPECTIONS AND TRANSPORT

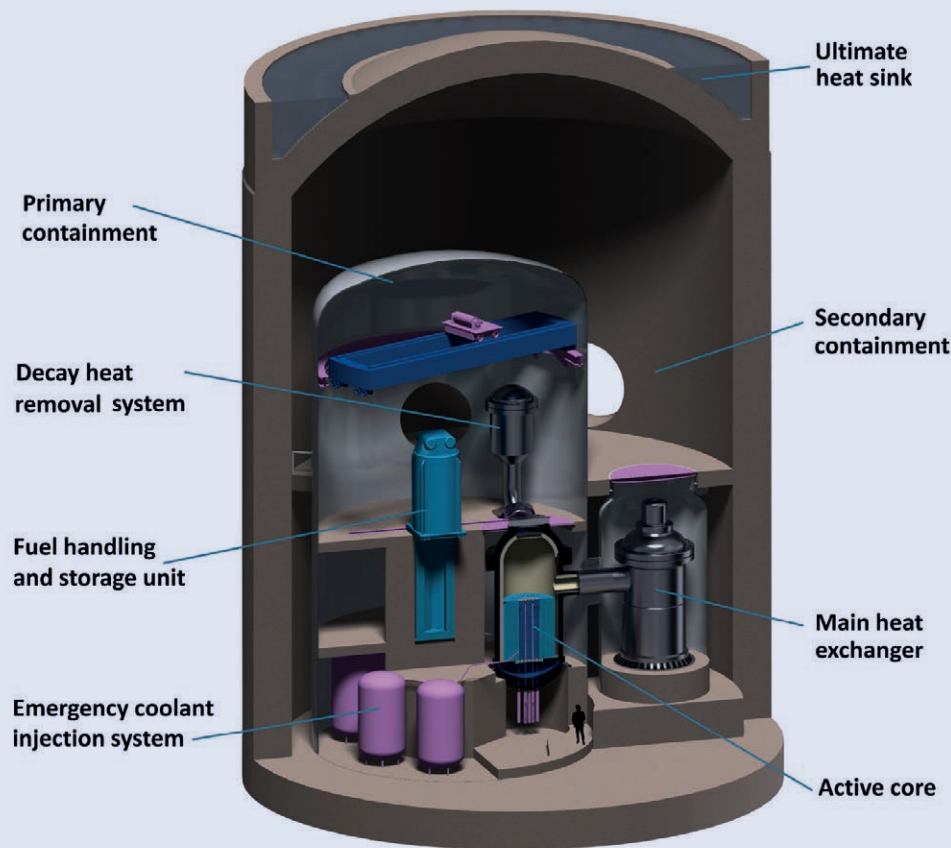
- Minimization of welds done on the construction site
- Diameters of all main modules suitable for transport via railway or road
- Emphasis on easy maintenance and replicability of main components

HEAT UTILIZATION

- Options for combination of up to three different power conversion modules:
- Hydrogen production module using high-temperature electrolysis
- Electricity production module reaching over 40 % net efficiency
- Direct heat supply module for chemical industry use with 850 °C at the side of the customer guaranteed
- More info at www.ujv.cz/hefasto

ENERGY WELL

- Energy Well is a patented small modular reactor developed by the Research Center Řež
- Fluoride High temperature micro-Reactor of 20 MW thermal power
- Seven-year long fuel cycle, a low power density and high focus on passive safety and simplicity
- Designed to be transportable with fresh or spent fuel so that no refuelling on site is required
- More info at www.energywell.cz





The subsidiary companies specialize in research and development, design and engineering services, technical engineering and the manufacture of special products and equipment. They also carry out expert operations in the areas of energy, industry, and healthcare, and therefore, complement the portfolio of services provided by the parent company. UJV Group is part of CEZ Group.

The subsidiaries are:

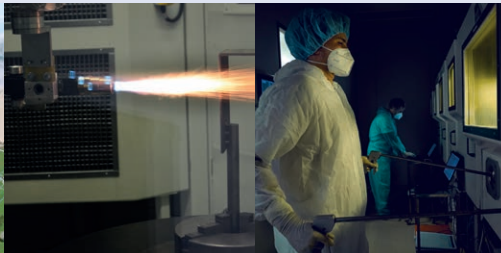
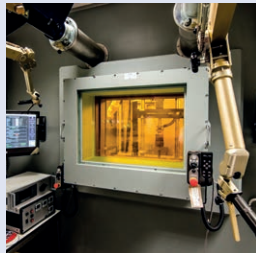
Research Centre Řež (www.cvrez.cz)

RadioMedic (www.radiomedic.cz)

ŠKODA PRAHA (www.skodapraha.cz)

Research and Testing Institute Plzeň (www.vzuplzen.cz)

More information at www.ujvgroup.cz



Contacts:

ÚJV Řež, a. s.
Hlavní 130, Řež,
250 68 Husinec
Czech Republic

Phone: +420 266 172 000
Fax: +420 220 940 840
E-mail: ujv@ujv.cz
www.ujv.cz

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