



SCK•CEN is one of the largest research centres in Belgium. Today more than 650 employees advance the peaceful industrial and medical applications of nuclear science.

The Belgian Nuclear Research Centre was created in 1952. Since 1991, the statutory mission gives priority to research on issues of societal concern such as safety of nuclear installations, radiation protection and safe treatment and disposal of radioactive waste.

SCK•CEN develops, gathers and spreads its knowledge through education and communication. The available know-how and facilities are also used for services to the nuclear industry, the medical sector and the government.

SCK•CEN's fields of expertise go - literally - from the deep underground to outer space. Our research activities are concentrated into the following main tracks:

Nuclear Materials Science

The Institute for Nuclear Materials Science (NMS) carries out research on materials and fuels used in present and future reactor systems. NMS makes numerical simulations and predictions of the behaviour of materials under irradiation. This knowledge is essential to guarantee the safe and efficient operation of nuclear installations. NMS also produces radioisotopes for the medical sector and doped silicon for the microelectronics industry.

Advanced Nuclear Systems

The Institute for Advanced Nuclear Systems (ANS) strives to extend the Belgian expertise in the study of innovative fourth-generation reactors and the fusion test reactor ITER in France. These new technologies will be safer and more efficient. With the MYRRHA project, ANS develops a multifunctional experimental irradiation facility for the production of radioisotopes and doped silicon for renewable energy applications, the transmutation of radioactive waste and the study of materials for innovative fission reactors and for fusion technology.

Environment, Health and Safety

The Institute for Environment, Health and Safety (EHS) studies the behaviour of radioactive substances in air, water and soil and evaluates the effects of radiation on man and environment. Based on this knowledge, EHS makes practical recommendations on radiation protection and safety to the government, the industrial and the medical world. The institute also examines the possibilities for surface and deep disposal of radioactive waste and the decommissioning of nuclear installations. Moreover EHS pays attention to societal and ethical aspects of nuclear technologies such as sustainable development, safety and legal issues.

Corporate Services and Administration

The Institute for Corporate Services and Administration (CSA) comprises the financial, administrative, logistic and central technical services. It also manages human resources and ICT issues. In addition, this institute deals with knowledge management and it coordinates all education and training activities.

Main research facilities



BR2

Belgian Reactor 2 or BR2 is a materials test reactor. Since the start in 1962, it has been one of the most powerful research reactors in the world. It functions using high-enriched uranium and is moderated and cooled with water. BR2 tests nuclear fuels and materials for several reactor types and for the European nuclear fusion programme. It contributes to guaranteeing the safety of current and future nuclear installations.

BR2 is also an important instrument for the production of radioisotopes for medical and industrial applications, and for the irradiation (doping) of silicon destined for the microelectronics industry.



BR1

Belgian Reactor 1 or BR1, operational since 1956, is the oldest research reactor in Belgium. It is an air-cooled, graphite-moderated reactor. BR1 offers flexible irradiation and calibration services. The reactor is available to other research centres, universities and the industry, and plays an important role in the education of scientists.



VENUS-GUINEVERE

The VENUS reactor was used to test the validity of reactor calculations, which prove their usefulness during the exploitation of nuclear installations in order to use the nuclear fuel in a more efficient manner. In 2008, the conversion of VENUS initiated in preparation of the GUINEVERE project that will support MYRRHA. Both projects contribute to the development of fourth generation reactors (Gen IV).



BR3

Belgian Reactor 3 or BR3 was a prototype of a pressurised water reactor. It was selected as European pilot project to demonstrate the feasibility of a reactor decommissioning and to guarantee its safety. SCK•CEN developed new techniques to limit the amount of radioactive waste and elaborated procedures to minimise the radiation load for the employees. All data were collected in a database in order to predict the economical costs and the radiological impact of new similar projects.



HADES

The HADES laboratory lies at a depth of 225 meters under the domain of SCK•CEN and allows the study of deep clay as an option for the disposal of long-lived and high-active nuclear waste. EIG EURIDICE, the Economic Interest Grouping between NIRAS/ONDRAF and SCK•CEN, exploits this lab and executes scientific research. At the beginning of this century, the infrastructure was expanded with an additional gallery in order to execute experiments at large scale regarding the feasibility and the safety of storage of heat-emitting nuclear waste.

LHMA

The Laboratory for High and Medium level Activity evaluates the effects of irradiation on materials used in actual and future nuclear installations. A wide variety of mechanical, physico-chemical and microstructure research tools are available in and out of remotely-operated hot cells. The laboratory is involved in applied and fundamental research supported by mathematical modelling to verify and predict the behaviour of the nuclear materials during service life.

Nuclear analysis and chemical laboratories

SCK•CEN measures and evaluates the internal contamination in employees of the nuclear sector and verifies the radiation doses. Laboratories also control the contamination of the environment and the food chain. The results are important for the nuclear emergency plan, among others, to which SCK•CEN considerably contributes at Belgian and European level. The laboratory for radiochemical analyses uses shielded installations and separation methods for the analysis of nuclear fuels and other nuclear materials. The lab for reactor and nuclear measurements provides services in the domains of gamma ray spectrometry and reactor dosimetry. The laboratories also support the research reactors and other labs for destructive and non-destructive research on radioactive materials.

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