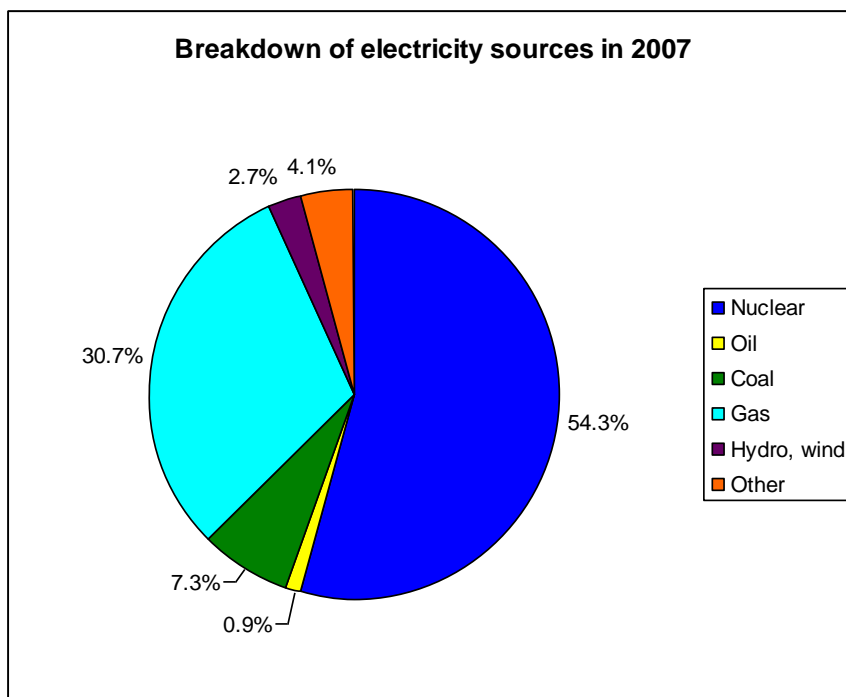


RADIOACTIVE WASTE MANAGEMENT PROGRAMMES IN OECD/NEA MEMBER COUNTRIES

BELGIUM [2010]

NATIONAL NUCLEAR ENERGY CONTEXT

Commercial utilisation of nuclear power in Belgium started in 1974 and by 2009 there were 7 nuclear power units connected to the electricity grid. In 2009 they generated 44 TWh of electricity, about 55 % of the total electricity generated in that year. Unreprocessed spent fuel is currently stored on the sites of the nuclear power plant (pool storage in Tihange and dry storage in Doel). End of April 2008, the dry storage building in Tihange contained 60 containers in which 1.765 spent fuel elements were stored and the wet storage building in Doel contained 1.703 spent fuel elements. On 16 January 2003, the Belgian federal parliament voted a law that requires gradual phase-out of commercial nuclear power plants in Belgium from 2015, after a 40-year lifetime. Using one of the provisions of this law, the Belgian government decided, on 12 October 2009, to postpone by 10 years the shut-down of the three first nuclear reactors (Doel 1, Doel 2 and Tihange 1). According to this decision, the first reactor to be closed-down is Doel 3, on 1st October 2022.



Source: SFP Economie, P.M.E., Classes Moyennes et Energie

SOURCES, TYPES AND QUANTITIES OF WASTE

Sources

About 70% of the radioactive waste produced in Belgium arises from the nuclear industry, the largest producer. Nuclear industry waste is generated during nuclear power plant operation, reprocessing of spent fuel, carried out by Areva (former Cogema) in France, uranium and MOX fuel fabrication and decommissioning.

The remaining 30% of Belgian radioactive waste is generated by nuclear research, production of radioisotopes by the National Institute for Radioisotopes (IRE), the use of such isotopes in medicine, industry and in private laboratories, and the Euratom Institute for Reference Materials and Measurements (IRMM).

Types and quantities

Radioactive wastes are classified by way of three categories:

1. Category A: Low- and medium-level short-lived waste. This waste contains small amounts of mainly beta and gamma emitters with half-lives of under 30 years and trace amounts of longer lived emitters. It arises mainly from the operation of nuclear power plants, but also from reprocessing, research, and from production of radioisotopes and their use in nuclear medicine and industry. 74% of the estimated total volume of category A waste is produced by the dismantling of nuclear facilities.

According to the recent predictions (2009), the estimated total volume of conditioned waste in this category is 69.900 m³.

2. Category B: Low- and medium-level long-lived waste. This waste contains mainly alpha emitters with half-lives exceeding 30 years, together, in some cases, with intermediate amounts of beta and gamma emitters. It arises mostly from the fabrication of nuclear fuels, from nuclear research and the reprocessing of spent nuclear fuel. 22% of the estimated total volume of category B waste is produced by the dismantling of nuclear facilities.

The estimated total volume of conditioned waste in this category is 11.100 m³ (full reprocessing scenario).

3. Category C: Long-lived high-level waste. This waste contains substantial amounts of beta and gamma emitters with short and medium half-lives, together with longer-lived alpha emitters. It arises mostly from the reprocessing of spent nuclear fuel and from research.

The estimated total volume of conditioned waste in this category is 600 m³ (full reprocessing scenario) or 4.500 m³ (non reprocessing).

The projected total volumes of waste in each of these three categories are estimated on the basis of assumptions about the continuing operation of nuclear power plants (shut down after 40 years operation), reprocessing of all spent fuel, and nuclear facility dismantling by 2050. The decision of the Belgian government on 12 October 2009 to postpone by 10 years the shut-down of the three first nuclear reactors (Doel 1, Doel 2 and Tihange 1) has still to be confirmed by law. Its impact on the quantity assumptions will be examined more in detail after confirmation but seems rather negligible.

RADIOACTIVE WASTE MANAGEMENT POLICIES AND PROGRAMMES

Waste management policies

Operational activities

Radioactive waste generated during routine operation of nuclear facilities in Belgium is processed and conditioned on-site by the operator of the relevant facility or by the National Agency for Radioactive Waste and Enriched Fissile Materials (ONDRAF/ NIRAS) in central processing and conditioning facilities located mainly in Dessel. The Dessel site also accommodates central facilities for storage of all conditioned Belgian waste, of all categories, awaiting disposal. The associated operations are carried out by Belgoprocess, the industrial auxiliary company of ONDRAF/NIRAS, which manages these central processing and interim storage facilities.

Long term management of low-level and short-lived radioactive waste

On 23 June 2006, the Belgian federal government selected the municipality of Dessel for the location of a surface repository for low- and medium-level short-lived radioactive waste. The government also allowed ONDRAF/NIRAS to pass from a pre-project disposal phase to the proper project phase and instructed the agency to continue the development of the technical integrated disposal project in Dessel, to carry on the local partnership participation process, to develop a legal and regulatory framework to guarantee the project's safety and financing and to provide for the financing of the associated socio-economic aspects. More information about the project development can be found under Programmes and projects hereunder.

Waste Plan: towards a decision in principle on the long-term management of medium-, high-level long-lived radioactive waste (also called category B&C waste)

Although an extensive R&D programme assessing the use of Clay formations as potential host rock for the disposal of medium-, high-level and/or long-lived radioactive waste started in 1974, more than 35 years ago, a long term management policy is still missing for those categories of waste. Geological disposal in a poorly indurated Clay is currently the reference solution for ONDRAF/NIRAS.

ONDRAF/NIRAS has the legal obligation to prepare a plan for the long-term management of the radioactive waste under its responsibility. According to the law of 13th February 2006 (that translates into the Belgian legislation the EC Directives 2001/42/EC and 2003/35/EC) this plan has to be accompanied by a strategic environmental assessment (SEA) and submitted to a public consultation.

Therefore, ONDRAF/NIRAS is currently establishing a "Waste Plan" and its accompanying SEA. Considering the above mentioned absence of policy for the long-term management of medium-, high-level and/or long-lived radioactive waste, these documents, together with the societal consultations, are intended to provide the Government, by the end of 2010, with all the necessary elements to be in a position to take a decision in principle regarding the orientation to be given to the long-term management of these wastes. The decision should comprise three complementary aspects:

- The technical option to be further pursued for the long term management of B&C waste;
- The decision-making process that should lead to the stepwise implementation of the chosen option;
- The approach towards the establishment of a sustained societal support.

The Waste Plan will be accompanied by a SEA (Strategic Environmental Impact Assessment) in which alternative long-term management options to disposal in Clay will be assessed. The assessment will not

only cover environmental impacts but also the scientific and technical bases of the various options, the economic aspects and ethical and societal considerations.

In view of the legally required public consultation process that must precede the presentation of the Waste Plan to the authorities, ONDRAF/NIRAS has organized, on its own initiative, a voluntary public consultation and information process through public dialogues and a citizen's forum.

Inventory of Nuclear Liabilities

ONDRAF/NIRAS' missions were extended by law on 12th December 1997. Under this new legislation, the agency is entrusted with the task of drawing up an inventory of all nuclear facilities and sites containing radioactive substances on Belgian territory. The Inventory of Nuclear Liabilities is a public interest undertaking aiming at guaranteeing the availability of the necessary financial means for the safe management of radioactive substances and facilities and sites containing radioactive substances. The Inventory of Nuclear Liabilities involves:

- drawing up a register specifying the location and condition of all nuclear facilities and all sites containing radioactive substances on the Belgian territory;
- estimating the cost of decommissioning and cleaning up these facilities and sites;
- evaluating the availability of sufficient funds to carry out these future or ongoing operations.

A first Inventory of Nuclear Liabilities covering the period 1998-2002 was published in January 2003. The second inventory covering the period 2003-2007 was published in January 2008. ONDRAF/NIRAS is now preparing the third inventory (period 2008-2012) with the intention to publish it in January 2013.

Before submission to the competent federal authorities, Inventories of Nuclear Liabilities are evaluated by an international assessment committee namely composed of experts from IAEA, OCDE/NEA, European waste agencies and Belgian safety authorities. The recommendations of the committee are joined to the final report.

Due to the periodic revision of the Inventory of Nuclear Liabilities, the major concern expressed in the recommendations is not so much the challenge of estimating realistic costs on rather long periods of time but the problem of the practical availability of the provisions made by the producers in their books when needed. By letter dated 9th January 2009, the two responsible ministers of ONDRAF/NIRAS entrusted the agency with a new mission to propose changes in the Belgian legislation in order to improve the robustness and availability of the nuclear provisions.

Those inventories allow the Belgian government to better understand the existing situation and define future policy.

Policy convention for orphan sources

On 19 October 2007, ONDRAF/NIRAS and the Federal Agency for Nuclear Control (FANC) signed a convention with the professional confederations of the non nuclear sector defining the policy to be implemented for the management of so-called orphan sources. Orphan sources can be described as radioactive substances and objects the owner or holder of which can not be traced. The convention allows appealing to ONDRAF/NIRAS for the collection and management of such sources once they have been declared radioactive waste by the Federal Agency for Nuclear Control. The costs for the collection and management of these sources can be recovered by ONDRAF/NIRAS from the legally founded "insolvency fund" to which the various radioactive waste producers contribute.

Programmes and projects

Details of existing plants for waste treatment and conditioning

Low-level solid waste is either incinerated or compressed in a facility named CILVA, which began industrial operation in 1994. Low-level liquid waste is treated chemically by flocculation and precipitation. After processing, the waste is encapsulated in cement or bitumen in 400-litre drums and then stored in a building designed specifically for the purpose. The last bituminization campaign took place in 2004 and no further use of bitumen is foreseen. The CILVA facility cost 57 million euro, and its operation was certified to the ISO 9001 quality management standard in 1995. On 31th December 2009, the total volume of conditioned waste treated by CILVA reached 4.719 m³.

Medium-level and long-lived alpha-bearing waste as well as Pu-contaminated glove-boxes are since 2007 encapsulated in cement in 400-litre drums in the PAMELA-installation. About 420 m³ was treated and about 200 m³ of conditioned waste has been produced till the end of 2009.

Reprocessing of Belgian spent fuel, by Areva (former Cogema) in France, generates both medium-level waste (hulls and end fittings) and high-level waste. Medium-level waste is compacted and high-level waste is vitrified. It should be pointed out that the existing contracts for the reprocessing 631,5 tU Belgian spent fuel provide that vitrified medium-level waste (process sludge) will have to be returned to Belgium.

The interim storages facilities for conditioned waste of all categories are centralised on the Dessel site operated by Belgoprocess.

Storage of low-level waste

Building 150: was commissioned in 1986 after Belgium joined the international moratorium on sea disposal of conditioned low-level waste. With a capacity of 1.929 m³, it has been almost completely full since the end of the 80's (1.914 m³ of conditioned waste stored or 3.317 packages at the end of 2009).

Building 151: commissioned in 1988, is a modular building. It initially had two storage halls. Two more halls were built in 1993, increasing the total capacity from 6.300 m³ to 14.700 m³. The drums are stored using a remotely controlled roller bridge. By the end of 2009, building 151 housed 12.644 m³ of conditioned waste (31.858 packages). According to the most recent predictions, its total capacity should be enough to accommodate Belgium's conditioned low-level waste until around 2016.

Storage of medium-level waste

Building 127 was commissioned in 1978. It has undergone two phases of extension and adaptation, the last of which was in 1988. Since then its capacity has been 4.650 m³, split between 4 bunkers of the same size with reinforced concrete walls 80 cm thick. The drums are stored using a remotely controlled roller bridge. At the end of 2009, 3.925 m³ of conditioned waste (16.009 packages) were housed in building 127.

Building 155 is a storage facility specially designed to store, after processing/conditioning, low-level radium and plutonium-bearing waste. Commissioned in 2005, it consists of two separate storage rooms each; one will house radium-bearing waste and the other plutonium-bearing waste. Although it would be possible to extend the storage rooms, building 155's capacity should be adequate for all the drums of radium and plutonium-bearing waste currently in existence and for those whose production is forecast. At the end of 2009, building 155 housed 502 m³ of conditioned waste (1.254 packages).

Building 270: this is a simple buffer storage on site 2 of Belgoprocess which is used to temporarily store conditioned waste waiting for its transfer to the appropriate storage facilities on site 1 of Belgoprocess. At the end of 2009, 733 conditioned waste packages (284 m³) were stored.

Storage of high-level and very high-level waste

Building 129, which was commissioned in 1985, has a capacity of 250 m³, split between two shielded bunkers with reinforced concrete walls, 1,2 m thick. The containers, which are handled remotely from a shielded control room, are placed in vertical steel shafts. The building contains the 195 m³ conditioned high-level waste from the vitrification in the Pamela facility of liquid waste from the reprocessing of spent fuel in the former Eurochemic reprocessing plant. Since 1995, it has also housed medium-level and high-level cemented waste from SCK•CEN's BR2 and BR3 reactors and from the operating and partial dismantling of Pamela. Ever since, building 129 contains 215 m³ of conditioned waste (2.335 packages). Although heat emitted by waste stored in building 129 is rather low, the storage shafts are ventilated to release the heat produced.

Building 136: the construction of building 136 started in 1990. Five years later, the building was given its operating license. It is designed for the storage of medium-level and high-level waste resulting from the reprocessing, by the French company Areva (former COGEMA), of spent fuel from Belgian nuclear power plants. Medium-level waste arising from the reprocessing in Dounreay of the SCK•CEN research reactor BR2 spent fuel will also be stored in building 136. Building 136 is able to accommodate 600 containers of high-level vitrified waste and about 1.000 m³ of medium-level cemented or compacted waste (additional modules may, if necessary, increase its capacity). The containers, which are handled remotely from a shielded control room, are placed in vertical steel shafts equipped with a constant ventilation system designed to release the heat produced. At the end of 2009, 390 containers (70 m³) of very high-level vitrified waste repatriated from France were stored in this building . This building is designed to withstand extreme external conditions, such as earthquakes, explosions or the crashing of military aircraft. The very high-level waste will be stored in the building for at least 60 years. The amount of heat initially released by this waste is such that it has to be left to cool down sufficiently before deep final disposal can take place, to prevent the risk of altering the properties of the surrounding geological environment.

Inspection programme for the drums stored on the Belgoprocess site

In 2003, ONDRAF/NIRAS started an inspection programme for the conditioned waste drums stored on the Belgoprocess site. This programme runs until 2012. The drums are inspected one by one by means of a semi-automatic control system. By 31 December 2009, 37.818 drums were individually inspected, of which 1.578 show defects. Most of the defective drums are old drums dating from the eighties and represent no danger, neither for Belgoprocess workers nor for residents.

Disposal of category A waste

In accordance with the conditions of the decision of the Belgian government of 23 June 2006 to build a surface disposal infrastructure of the waste concerned on the territory of the municipality Dessel (north-east Belgium), ONDRAF/NIRAS pursues its activities and efforts to realize the project in close cooperation with the local partnerships. The disposal project is integrated in a broader project that offers an added value for the region, taking into account the concerns and values of the local community.

The local partnerships STORA (the original name STOLA has been changed into STORA) in Dessel and MONA in Mol have been prolonged and participate in the further steps of the decision-making process and in the development of all aspects of the integrated disposal project. This integrated project includes the

disposal project itself (IPM facility for the conditioning of category A waste into concrete boxes to produce the disposal packages called “monolith”, surface disposal concrete infrastructures, control and drainage systems, auxiliary buildings) and the associated socio-economic aspects (prior importance to be placed on safety, health and the environment, communication center, local fund to achieve a social, economic and cultural added value for the municipalities concerned, ...). Negotiations with all the parties concerned (radioactive waste producers, the federal, regional and local authorities) in view of financing the socio-economic aspects by creating a special dedicated fund are in progress.

A project team established in Dessel elaborates the various constituents of the global integrated disposal project. During the detailed studies phase, which covers the period 2007-2011, all the components of the disposal project will have to be elaborated and settled in view of the project’s implementation and realization phase which is planned to start in 2012. ONDRAF/NIRAS is preparing the necessary applications and authorizations since the agency will act as nuclear operator of the disposal site. It is planned to put the disposal site into operation by the year 2016.

Long-term management of category B&C waste

In the 1970s, an inventory of potential deep geological formations for the disposal of conditioned high level and alpha-bearing waste was performed by SCK•CEN and the Belgian Geological Survey. One of the promising potential host rocks was the Boom Clay, also present at the SCK-CEN site at a depth of about 200 m. More detailed investigations on that site started in 1974. Geophysical investigations led to the decision to build an underground research laboratory, called the High Activity Disposal Experimental Site (HADES), in the Boom Clay layer of the Mol-Dessel area. It is located on the SCK•CEN site, at a depth of 220 m, and comprises an access shaft and two galleries in which numerous measurements and in situ experiments have taken place since 1984 when experiments in the laboratory started.

The principal areas of research include: the geology and hydrogeology of the Clay formation, the definition of the deep underground repository concept, the backfilling material, the interaction between the waste, the engineered barriers (EBS) and the host rock and, in particular, the retention of radionuclides by Clay minerals; the assessment of spent fuel disposal techniques; the improvement and definition of the various disposal scenarios; and the safety and performance assessment of a potential repository in the deep Clay. Several of these experiments are conducted in co-operation with other research organisations and universities, both national and international. An important experiment, conducted in close collaboration with the French waste disposal organisation, ANDRA, deals with the lining of the galleries of a future repository.

In 1999, as part of the PRACLAY project (a preliminary demonstration test of high-level radioactive waste disposal in Clay) a second access shaft to the Boom Clay was built. This was followed, in 2002, by the excavation of an 80 m-long gallery connecting the new shaft to the HADES underground research laboratory. For the excavation, the so-called Wedge Block System was used. This is a tunneling technique that uses a drilling machine equipped with a segment erector and which allowed important data on Clay convergence to be gathered. It was an innovative experiment, since it was the first time anywhere that the technique had been used at a depth of 225 m in poorly indurated Clay like the Boom Clay at Mol. It was very successful, with an excavation rate of 2 to 3 m/day.

In July 2002, the SAFIR 2 report (Safety Assessment and Feasibility Interim Report), was published. It presents the results of R&D on disposal of high-level and long-lived waste performed in the period 1989-2000. The three main objectives of the report are: (1) To provide a structured synthesis of the technical and scientific studies carried out on the disposal of category B and C waste in a poorly indurated argillaceous formation. (2) To promote interaction with the nuclear safety authorities in order to reach closer agreement

on the outstanding requirements for R&D on the principles of safety assessment. (3) To offer a technical and scientific base for dialogue with all stakeholders in the long-term management of radioactive waste.

The report concludes that there are no fundamental problems that put the safety and feasibility of disposal of high-level waste in the Boom Clay into question. It reinforces confidence in the concept studied and confirms that, for the waste considered, disposal in poorly indurated Clay remains a viable option. By establishing an inter-disciplinary R&D programme that incorporates aspects of social sciences, it will be possible to further enhance confidence in the concept studied. In particular, considering management alternatives, developing repository designs, allowing for non-radiological environmental effects and considering societal aspects, will increase confidence. The SAFIR 2 report was evaluated by an NEA peer review during October 2002, the results of which were published in March 2003 (“SAFIR 2: Belgian R&D Programme on the Deep Disposal of High-level and Long-lived Radioactive Waste - An International Peer Review by NEA”).

The underground and surface facilities of HADES and PRACLAY, and the research performed in them, are now managed by the European Underground Research Infrastructure for Disposal of Radioactive Waste in a Clay Environment (EURIDICE), a European economic interest group of which ONDRAF/NIRAS and SCK•CEN are the founding members.

The underground laboratory was extended in 2007 to include a representative-scale disposal gallery (45 m long), the so-called PRACLAY-gallery. The basic objective of PRACLAY experience remains the study of the response of the Clay formation to heat, but the original PRACLAY experience has been redefined and reorganized into 5 in-situ experiences including the large-scale heater-test and 3 on-surface experiences aiming to test the feasibility to build important elements of the EBS (buffer, overpack, plug, backfill, ...) and to verify and confirm the behaviour and interactions of these elements. ESV EURIDICE is now preparing the installation of the heater-test device. Commissioning of heating test is planned to start in 2011.

The on surface preliminary backfilling test of a disposal gallery within the scope of the European project ESDRED, has been a success. The EIG EURIDICE, SCK•CEN and ONDRAF/NIRAS were and are also involved in many other European projects and international collaborations in order to increase the scientific knowledge and allow collaboration with different experts worldwide.

The R&D team is preparing a first Safety and Feasibility Case, the SFC-1, integrating all existing scientific and technical arguments in order to increase the confidence of all stakeholders in the possibility to build, operate and close safely a geological disposal in Clay for category B and C waste that will remain safe during hundred thousands of years after closure. If the on going Waste Plan exercise (see above in Waste management policies) leads to the confirmation of the deep disposal option for the long-term management of category B&C waste, the SFC-1 report will support the decision of the government to start with the siting phase.

Whatever the government decision based on the Waste Plan may be, the implementation of the chosen technical solution will be a long stepwise process. This process will probably last some more decades before the selected solution will become operational.

RESEARCH AND DEVELOPMENT

Functions

ONDRAF/NIRAS has the main responsibility for research and development on radioactive waste management and on disposal in particular. The research is performed by the Nuclear Research Centre (SCK•CEN) in Mol, universities and other research institutes, as well as at engineering companies.

Contents of R&D plans

As the disposal of category A waste has reached the project phase, most of the R&D work is now related to the geological disposal of category B and C waste in Clay, considered as the reference solution for more than 30 years (see more description above under Programmes and projects).

DECOMMISSIONING AND DISMANTLING POLICIES AND PROJECTS

Programmes regarding decommissioning of nuclear facilities have been in progress in Belgium since 1987. They started with R&D and small pilot projects on dismantling and decontamination, with the aim of defining and developing suitable techniques, and providing information on their performance and costs.

The first main project involved extensive preparatory work for decommissioning of the former Eurochemic spent fuel reprocessing plant. The plant was jointly operated by a consortium of 13 European countries but after final shutdown, responsibility for its decommissioning, and the largest part of the associated financing, passed solely to the Belgian State. The waste management and decommissioning company Belgoprocess, the subsidiary company of ONDRAF/NIRAS, started by developing dismantling and decontamination techniques that could be used effectively by operators working in protective clothing under severe conditions, which led to performance under real industrial conditions.

Decommissioning of the BR3 nuclear reactor on the SCK•CEN site at Mol, started in 1989. The BR3 reactor was the first pressurised water reactor installed in Western Europe. It was commissioned in 1962 and finally shut down in 1987. In 1989, the European Commission selected it as a pilot dismantling project in the framework of the third European Union five-year research programme on decommissioning of nuclear installations. In addition, several other buildings on the SCK•CEN site, in which physical, chemical and biological nuclear R&D had been carried out, were decontaminated and released from radiological surveillance in 1995-96. They are now used for conventional technological research by the Flemish research institute VITO. Finally, in 1991, remediation and decommissioning of the former waste management site of the SCK•CEN started with the cleanup of historic waste. This site had become the property of ONDRAF/NIRAS who subcontracted the work to its subsidiary Belgoprocess. The industrial scale decommissioning of redundant process and storage facilities began in 1998 and some facilities have now been returned to green field status.

Four decommissioning projects are currently in progress in Belgium. They involve decommissioning and dismantling of the Eurochemic pilot reprocessing plant, the facilities of the former Waste Department of the SCK•CEN, some other installations of the SCK•CEN including the BR3 reactor and, more recently, the Belgonucleaire plant in Dessel. Belgonucleaire produced MOX fuel during more than 20 year for the nuclear reactors. In 2005, Belgonucleaire decided to close down its facility in Dessel. The last production campaign ended on 15 August 2006. Decommissioning activities of the Belgonucleaire Plant started in 2009 and are expected to be completed begin 2014.

Waste arising from these decommissioning projects is processed and conditioned in the same way as wastes arising from routine operation of nuclear facilities. During decommissioning, particular importance goes to minimising the amount of radioactive waste produced. This involves techniques such as decontamination of concrete by removal of the contaminated surface layer and abrasive or chemical decontamination of metal items, so that the bulk of the residual materials may be released from regulatory control and does not have to be treated as radioactive waste.

TRANSPORT

Transport of radioactive substances in Belgium is governed by the Royal Decree of 20 July 2001 which sets out general regulations for the protection of the public, workers and the environment against the hazards of ionizing radiation. All shipments, by whatever means, must be authorised in advance by the Federal Agency for Nuclear Control, under the supervision of the federal Minister of the Interior. In general, these regulations follow the technical requirements of the IAEA Regulations for the Safe Transport of Radioactive Substances but, for certain types of shipment, the transport license may specify special conditions, such as provision of escorts.

Radioactive waste in non conditioned form, awaiting processing and conditioning, or in conditioned form, awaiting interim storage, is generally removed from the site where it was generated. Non conditioned waste is transported to the central processing and conditioning facilities and conditioned waste to the central storage facilities, both on the Belgoprocess site in Dessel. These transport operations are mostly performed by Transnubel and Transrad who act as subcontractors for ONDRAF/NIRAS. This type of transport is carried out exclusively by road. The type of transport container and vehicle used depends on the nature and radiation level of the radioactive waste. Specially shielded transport containers have been designed for the safe transport of waste packages. In 2009, 265 shipments of unconditioned waste and 18 shipments of conditioned radioactive waste were carried out.

Spent nuclear fuel was transported by road and rail from the Belgian nuclear power plants to the Areva reprocessing plant at La Hague in France. The waste resulting from existing reprocessing contracts is shipped back to Belgium by road and rail using specially designed, shielded transport canisters. On 13 January and 3 April 2007, the two last transports returning the vitrified high-level waste resulting from the reprocessing of 631,5 tU Belgian spent fuel by Areva (La Hague-France) to Belgium (Belgoprocess-Dessel) took place without any problem.

During the period 2010-2030, waste from the reprocessing of Belgian spent fuel from Synatom and SCK•CEN by Areva (La Hague/France) and DSRL (Dounreay/UK) will be returned to Belgium. Vitrified medium-level waste (process sludge) and compacted hulls and ends (CSD-C) resulting from the 631,5 tU Belgian spent fuel reprocessing from Areva and cemented waste from reprocessing of SCK•CEN spent fuel in Dounreay will be returned in the coming years. In view of these return transports, Synatom (in charge of the Belgian fuel cycle), ONDRAF and Belgoprocess are taking the necessary preparations to obtain the required authorizations, prepare the shipment equipment and conditions and adapt the interim storage building 136 on the site of Belgoprocess where these wastes will be stored. The first return transport is planned by 2010.

COMPETENT AUTHORITIES

The organisation of radioactive waste management in Belgium is the responsibility of ONDRAF/NIRAS, a public body set up by law enacted in 1980. The Royal Decree of 30 March 1981 defined its missions and duties, and it operates under supervision of the federal Minister in charge of energy policy. Its mission was extended by way of a law enacted on 11 January 1991 to include certain

aspects of the management of enriched fissile materials and the decommissioning of nuclear facilities other than nuclear power plants, the procedures of which were defined in the Royal Decree of 16 October 1991.

All nuclear activities in Belgium are subject to the general regulations for the protection of the public, workers and the environment against the hazards of the ionising radiation. This includes the technical activities associated with processing, conditioning and interim storage of radioactive waste, and with decommissioning the nuclear facilities at the former Eurochemic pilot reprocessing plant in Dessel and the former Waste Department of SCK•CEN in Mol. Licensing, control and surveillance under these regulations is the duty of the Federal Agency for Nuclear Control (FANC), which was created in 1994 and is supervised by the federal Minister of the Interior. The interface between the responsibilities of FANC and of ONDRAF/NIRAS is controlled by way of a formal protocol agreement. FANC is now preparing new regulations specific for the disposal of radioactive waste.

FINANCING

The law under which ONDRAF/NIRAS was created requires the costs associated with radioactive waste management to be paid by those who produce it. This law also specifies that the costs of all ONDRAF/NIRAS activities, including applied research and investment, have to be estimated at cost price and financed by the radioactive waste producers in proportion to their share of the overall volume of radioactive waste generated. Long-term operations, mainly those associated with future radioactive waste disposal, will be financed by way of a special fund to which waste producers contribute annually according to the volume and type of radioactive waste they produce.

The same law provides for the creation of an “insolvency fund” aimed to guarantee the necessary financial means for ONDRAF/NIRAS to take over responsibility for radioactive waste management from any waste producer who becomes bankrupt or insolvent. The radioactive waste producers also finance this fund.

ONDRAF/NIRAS activities related to establishing and updating the inventory of nuclear facilities and sites in Belgium are financed by way of license fees, paid by the owners or operators of these facilities or sites and imposed by Royal Decree of 31 May 2000. Its activities associated with decommissioning the nuclear facilities of the former Eurochemic pilot reprocessing plant in Dessel and the former Waste Department of SCK•CEN in Mol are financed by way of a federal charge on electricity supply, imposed by Royal Decree of 24 March 2003. R&D works on radioactive waste disposal are also financed by the waste producers, mainly Electrabel, the owner and operator of the nuclear power plants of Doel and Tihange, and Synatom, the organisation in charge of the nuclear fuel cycle in Belgium. These funding arrangements are agreed with ONDRAF/NIRAS by way of contracts running over several years.

Decommissioning activities of SCK•CEN are financed by a special liability fund supplied by the federal government. Decommissioning activities of site 1 (former EUROCHEMIC plant) and site 2 (former Waste department of SCK•CEN) of Belgoprocess are financed by a federal allowance levied by the government on the electricity price for consumers.

PUBLIC INFORMATION

The website of ONDRAF/NIRAS contains a new sub-site dedicated to the Waste Plan and another one dealing with category A disposal project. Technical publications deal more specifically with R&D regarding long-term management. ONDRAF/NIRAS also has a radioactive waste information centre, called “Isotopolis”, on the Belgoprocess site in Dessel. This centre is open to the public and is intended primarily for secondary school students.

Belgoprocess organises visits to its processing, conditioning and interim storage facilities for the press, professional visitors and occasionally for the public. It also publishes an annual report and information leaflets on its activities.

EURIDICE has his own communication space within the demonstration hall and organises visits of both the demonstration hall and the underground laboratory.

Government

Public federal Service Economie, P.M.E., Classes Moyennes et Energie Brussels

Website: <http://economie.fgov.be>

E-mail: info.eco@economie.fgov.be

Federal Agency for Nuclear Control (FANC) Brussels

Website: <http://www.fanc.fgov.be>

E-mail: info@fanc.fgov.be

Industry

ONDRAF/NIRAS Brussels

Website : <http://www.nirond.be>

E-mail: webmaster@nirond.be

Belgoprocess Dessel

Website : <http://www.belgoprocess.be>

E-mail: info@belgoprocess.be

EIG Euridice Mol

Website:<http://www.euridice.be>

E-mail:euridice@sckcen.be

Communication

Isotopolis Dessel

Website:<http://www.isotopolis.be>

E-mail:isotopolis@belgoprocess.be