BELGOPROCESS N.V.
Gravenstraat 73
B-2480 Dessel
Belgium

INTRODUCTION

Belgoprocess is a private company, founded in 1984 and located in the small town of Dessel, Belgium, in the middle of the Antwerp Campine region. It is a subsidiary of the Belgian National Agency for Radioactive Waste and Irradiated Fissile Materials (known as NIRAS/ONDRAF).

More than 50 % of all electricity in our country is produced by nuclear energy. Radioactivity also plays an important role in health care and in industrial and scientific applications. As the last link in the chain, Belgoprocess carries out an important task. We concentrate our activities on two distinct areas:

- Processing, conditioning and intermediate storage of radioactive wastes;
- Decommissioning of shutdown nuclear facilities and decontamination and cleaning of contaminated buildings, materials and land.

We recognise our social responsibilities and always do our utmost to limit any undesirable side effects of the nuclear option for the general good of men and the environment. We are active on the Belgian market and others.

Our mission is to perform these tasks in a professional manner, safely and with proper regard for our ecological and social environment. We also pay close attention to the best interests of our customers, our employees and the government.

We are proud to contribute to the social and economic development of our region with the intention of making it an example for the rest of Europe.

The development, expansion and implementation of environmental technology is a vital element in our long-term strategy. We intend to demonstrate that radioactive waste may be processed and handled safely and responsibly and obsolete nuclear facilities may be decommissioned correspondingly.

Our employees are the key factors in achieving this mission. It is their collective effort and their respect of our corporate values that enable us to meet our targets.

Quality is an essential factor in the operation of Belgoprocess. Therefore we have implemented a quality management system conform to the ISO-9001 standard, and to the code IAEA Safety Series 50-C/SG-Q. As one of the first companies in the nuclear industry in Belgium, Belgoprocess received the ISO-9001 certificate in 1995 for:

- The reception, the determination of the radioactivity content in the NDA-IPAN/GEA installation and the treatment and conditioning of radioactive wastes in the Central Infrastructure for the Treatment of Low Level Wastes (CILVA).
- The decommissioning of nuclear facilities and the decontamination of contaminated materials.

These certificates were successfully prolonged in December 1998 and December 2001 and enforce our encouragements to continue the process of total quality and continuous improvement at each level of our organisation. Since safety and environmental protection are an absolute precondition for nuclear activities, Belgoprocess is working continuously towards a total integration of quality, safety and environmental protection issues into one management system.

DECOMMISSIONING

The term "decommissioning" comprises the complete set of technical and administrative activities that are required to remove an installation from the list of classified installations, corresponding to the definitions of the General Regulation for the Protection of the Public and the Workers against the Danger of Ionising Radiations.

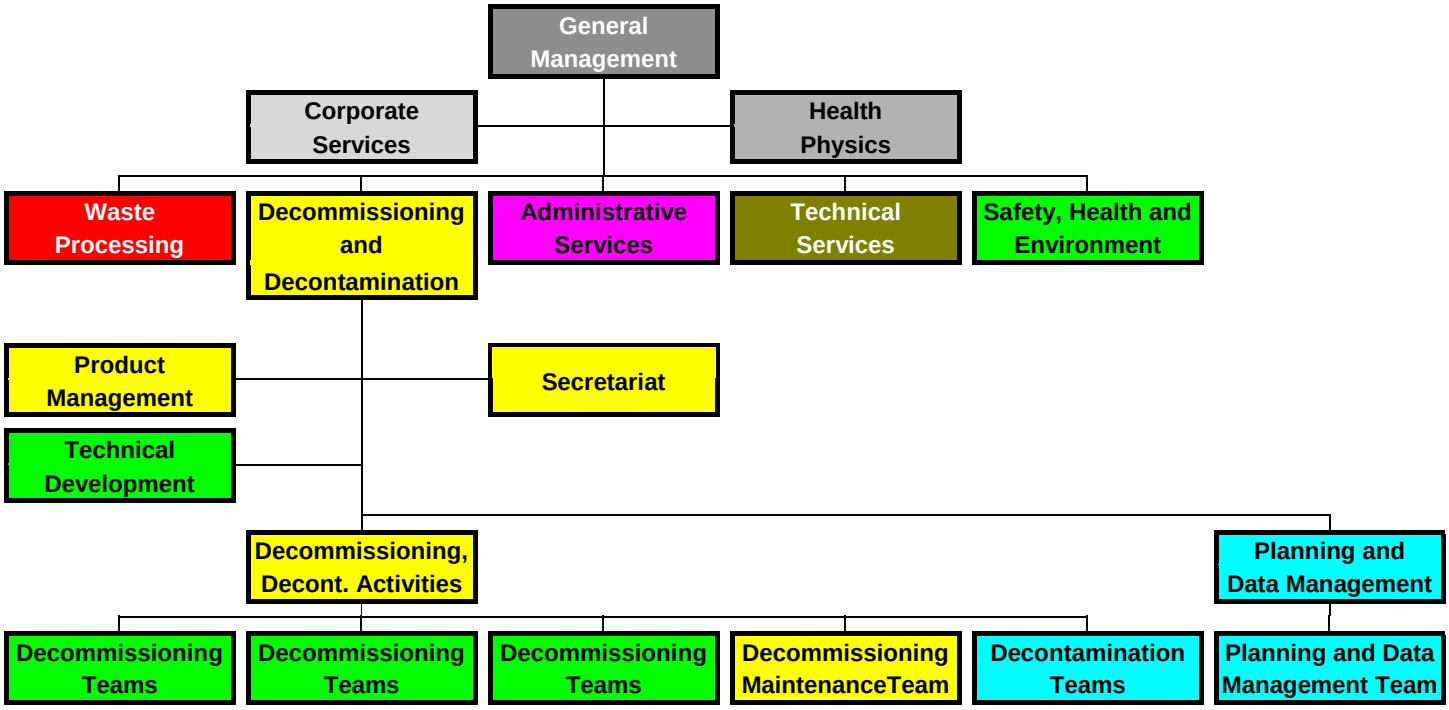
For nuclear facilities, decommissioning is the final phase in the life cycle after siting, design, construction, commissioning and operation. It is part of a general strategy to restore the natural environment of a site after final shutdown of an industrial activity.

The decommissioning of nuclear facilities is a process involving operations such as decontamination, dismantling of plant equipment and facilities, demolition of buildings and structures and management of resulting materials. All these activities take into account requirements of health and safety of operating personnel and the general public, and any implications for the environment. Until the final phase of the decommissioning activities, the installation remains a nuclear facility submitted to all obligations and controls as required by the classified status of the original installation.

Belgoprocess started its decommissioning activities in 1987 with a pilot project. Two small storage buildings for final products from reprocessing in the Eurochemic installations were dismantled to verify the assumptions made in a previous paper study on decommissioning, to demonstrate and develop dismantling techniques and to train personnel. Both buildings were emptied and decontaminated to background levels. They were demolished and the remaining concrete debris was disposed of as industrial waste and green field conditions restored.

The decommissioning of the main process building of the former Eurochemic reprocessing plant was launched with a limited crew that was enlarged to 24 operators in 1992. Today, 43 operators are involved in the decommissioning activities, while 8 operators take care of the decontamination work. All activities are assisted, supervised and managed by 13 supervising and management people. An overview of the organisation of the decommissioning and decontamination division within Belgoprocess is given in figure 1.

Figure 1. Decommissioning and Decontamination within Belgoprocess.



Currently, the decommissioning operations carried out by Belgoprocess at the sites of the former Eurochemic Reprocessing Plant and the former Waste Treatment Department of the Belgian Nuclear Research Centre, have made substantial progress. They are carried out an industrial scale with specific emphasis on all aspects of "responsible care" for man and environment.

To implement these activities Belgoprocess has definitely chosen for a number of fundamental principles that are continuously included in all programmes:

- Much effort in decontamination and unconditional release (clearance) of metal components, including melting and corresponding characterisation if the material cannot be measured due to its shape;
- Increased effort in unconditional release (clearance) of concrete material, developing adapted techniques for concrete measurement using adequate concrete crushing, milling, and sampling techniques;

- The use of adapted systems reducing the physical load on the operators during the work carried out in plastic ventilated suits, and from the use of tools/equipment that cause important hand-arm vibrations;
- Working under the certified quality assurance programme, continuing to increase the work efficiency by introducing adapted automated techniques and acceptable working circumstances, as mentioned.

The present experience shows a definite trend to reduce the physical load on the operators, to have the work done in comfortable working conditions, and to enhance the efficiency of hands-on operations in order to limit the required exposure time. This is mostly achieved by developing dedicated remotely controlled tooling and enhanced tool automation. The experience shows that more emphasis on the optimisation of commonly used and proven industrial techniques offers adequate solutions to most of the problems involved in the decommissioning activities.

The information package in the following sections gives an overview of the decommissioning and decontamination activities carried out by Belgoprocess at the nuclear sites of Mol-Dessel, in Belgium. It is summarised in the following overview and illustrated in a specific picture gallery.

For more information you may contact our representatives as indicated in the appropriate area. They will discuss matters with you in the name of the entire decommissioning team as indicated in the next picture.

A closer look at the company may be obtained if you link directly to our website at the Internet address www.belgoprocess.be.

DECOMMISSIONING STRATEGY

- Decommissioning activities on an industrial scale
- Waste minimisation
  - Source reduction, prevention, recycle/reuse
  - Waste management optimisation
- Minimisation of costs
- Commitment to results within overall planning
- Use of state of the art technology

BELGOPROCESS

Dessel, Belgium

Belgoprocess

HEALTH AND SAFETY

- Minimisation of occupational doses
- Reduced physical work load
- Limited hand-arm vibrations
- Working in ventilated suits
- Integrated personal protection system
- Communication/video systems
- Quality assurance programme

BELGOPROCESS DECOMMISSIONING

1988-90 Pilot decommissioning project
- Demonstrate feasibility
- Manage costs
- Develop/optimise dismantling techniques
  - Automation of concrete decontamination
  - Decontamination of metal components

1990- Industrial decommissioning

CONCRETE SURFACE DECONTAMINATION

- Floor shaving, wall shaving
  - Smooth surface finish
  - Reduced concrete waste production
- Hand held shavers
  - Low weight, easy to use
  - Low hand-arm vibrations
  - Adapted dust extraction
- Unconditional release of material

DISMANTLING TECHNIQUES

- Plasma arc cutting of metal components
- Radio controlled hydraulic shears
- Hydraulically controlled blade saws
  - Dry cutting of cast iron shielding blocks
  - Wet and dry cutting of concrete structures
- Pneumatic manipulators
- Working platforms, lifting platforms

CONCRETE CUTTING

- Pneumatic or hydraulic hammers
- Concrete splitters
- Electro-hydraulic rock breakers
- Mini electro-hydraulic hammering units
- Diamond cable saws
- Hydraulically controlled circular blade saws (wet and dry concrete cutting)

DECONTAMINATION OF METAL

- Dry abrasive blasting
  - High efficiency
  - No intrusion of contamination into the metal
  - Recycling of abrasive material
  - Low secondary waste production
  - Low decontamination cost
  - Unconditional release of material (after monitoring or controlled melting)