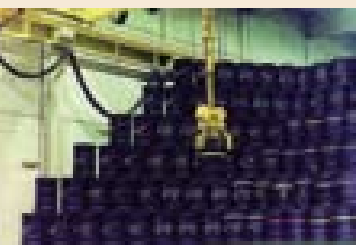


# A **long-term solution**

for Belgian low- and medium-level  
**short-lived waste**

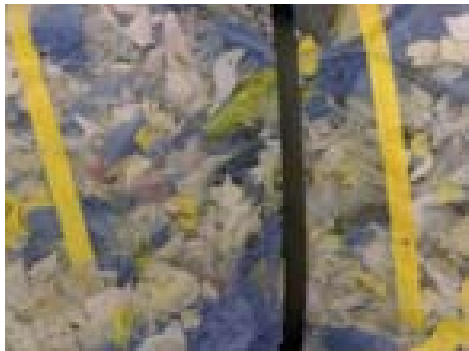
Together we can make it possible



**ONDRAF/NIRAS**

# A long-term solution

## for Belgian low- and medium-level short-lived waste



This brochure is about radioactive waste and safety, about now and the future, about partnerships and commitment, about participation and democracy. Quite an undertaking, albeit an essential one, as the issues at stake here are really important, not only for present-day society, but also for future generations.

### WHAT IS ONDRAF/NIRAS?

ONDRAF/NIRAS is the Belgian Agency for Radioactive Waste and Enriched Fissile Materials. This public agency manages all the radioactive waste located within Belgian borders. To enable it to fulfil its designated task, it has established a safe, coherent and centralized management system. The key objective is to find a safe solution for the long-term management of radioactive waste.

### What is radioactive waste?

Every human activity generates waste. It arises, for instance, from the production of electricity in nuclear power plants, from the decommissioning of nuclear facilities, and from the use of radioactive materials in research, medicine and industry. Some of this waste is radioactive.

Most radioactive waste is very similar to household and industrial waste. It comprises a wide variety of used materials such as protective clothing, tools and debris from decommissioned nuclear facilities.

There is one major difference between radioactive waste and other types of waste: radioactive waste contains substances that emit ionizing radiation. This radiation can be dangerous for people and for the environment.

### What type of radioactive waste are we talking about here?

There are several different types of radioactive waste. This brochure concentrates on the disposal of low- and medium-level short-lived waste. The concept of low- or medium-level refers to the intensity of the radiation emitted. Short-lived indicates the time it takes for the radioactivity in the waste to die away. After 200 to 300 years the radiation in this waste has decreased to a level that no longer constitutes a danger to man or the environment.

### Why do we need a long-term solution?

Radioactivity diminishes over time, but some elements in the waste remain radioactive for a period of time spanning several generations. Hence the need for a solution that offers protection against ionizing radiation during this period.

Disposal involves containing and isolating the waste in such a way that no active intervention by future generations is required to ensure the protection of man and the environment over this timescale.

In 1998 the Belgian government commissioned ONDRAF/NIRAS to continue working towards finding a safe and technically feasible definitive solution, or a solution intended to become definitive, for the long-term management of low- and medium-level short-lived waste (disposal). The solution had to be progressive, flexible and reversible. The government wanted ONDRAF/NIRAS to study two options: surface disposal and deep disposal. The agency had to limit its research to existing nuclear sites and to areas where local authorities expressed an interest. ONDRAF/NIRAS naturally left it to the municipalities concerned to decide whether they wished to take part in further studies.

Since 1998 ONDRAF/NIRAS has actively involved local people in the ongoing studies and, with this aim in mind, it has developed a unique form of collaboration: local partnerships. Within such a partnership the local community works with ONDRAF/NIRAS to develop its own project for the disposal of radioactive waste. This approach has made it possible to implement a progressive, reversible and democratic decision-making process. The creation of these partnerships cleared the way for the successful integration of a project of this nature at local level.

The partnerships STOLA-Dessel (for the municipality of Dessel) and MONA (for the municipality of Mol) have currently each developed two integrated disposal projects that have the support of the local community and meet the government's stipulated requirements. The respective municipal councils have approved the projects.

How is Belgian  
low- and medium-level **short-lived waste** managed  
at the moment?

ONDRAF/NIRAS is responsible for managing all the radioactive waste located within Belgian borders. Safety is always the number one priority.



### Waste management

The management of radioactive waste is based on two principles: containing radioactive substances to prevent their dispersal in the environment and shielding ionizing radiation. Management covers each and every step that the waste goes through from production through to interim storage in specially designed buildings, until such time as a long-term solution is found. The waste must comply with various regulations drawn up by ONDRAF/NIRAS and the agency monitors that these are observed in practice. Nowadays, the day-to-day management of radioactive waste is safe and fully under control.

### Management at the source: prevention, recycling, sorting, identification

The producers of radioactive waste apply a prevention policy. This means that they minimize their waste production, for instance by recycling and recovering materials.

As is the case with the selective collection of household waste, the producers must sort their waste. They also have to clearly indicate its content.

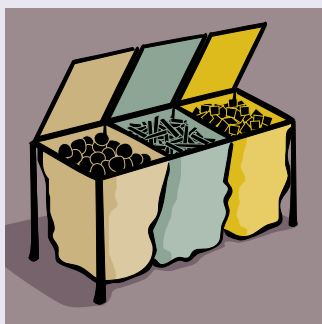
### Processing

The vast majority of radioactive waste is processed in the facilities of Belgoprocess, the industrial subsidiary of ONDRAF/NIRAS, in Dessel. The aim of processing is to concentrate and contain the radioactivity in drums. The result is a stable end product that can be safely stored.

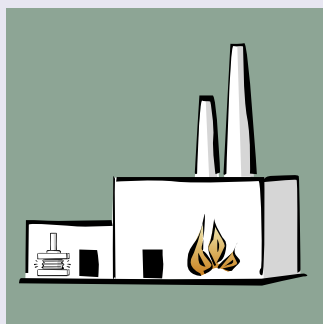
### Interim storage

The drums of processed waste are stored in special buildings on the Belgoprocess site. The buildings are designed to protect people and the environment from the potential harmful effects of radioactive waste.

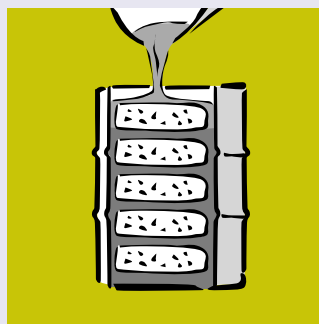
Although interim storage is a safe short-term and medium-term solution for radioactive waste, it remains, nevertheless, a temporary solution.



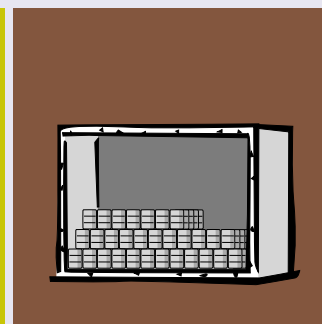
Limit, sort,  
identify



Reduce the volume



Stabilize and contain



Store

# A long-term solution: together we can make it possible

Since it was created in 1980 ONDRAF/NIRAS has investigated the various disposal options for radioactive waste. This was no easy matter, particularly as the public was not inclined to discuss the subject. In 1998 ONDRAF/NIRAS opted for participation by the local community in those municipalities where a repository might be built. This resulted in a unique strategy, one where every aspect would be considered within the framework of an active collaborative structure: local partnerships.

## 1985-1997: exploratory studies

Initially ONDRAF/NIRAS examined the disposal options purely from a scientific and technical viewpoint. Two solutions were considered: deep disposal and surface disposal. Research concentrated on the safety and technical feasibility of a disposal system.

Deep disposal involves containing radioactive waste in an infrastructure deep underground. In Belgium, disposal in deep clay layers is the main focus

of attention. Since there is a clay layer under the Belgian Nuclear Research Centre (SCK•CEN) in Mol at a depth of between 200 and 300 meters, SCK•CEN began investigating the possibility of this disposal option as early as 1974.

Surface disposal involves placing drums of radioactive waste in concrete modules constructed on the surface. Surface repositories already exist in countries such as France, Spain and Japan.

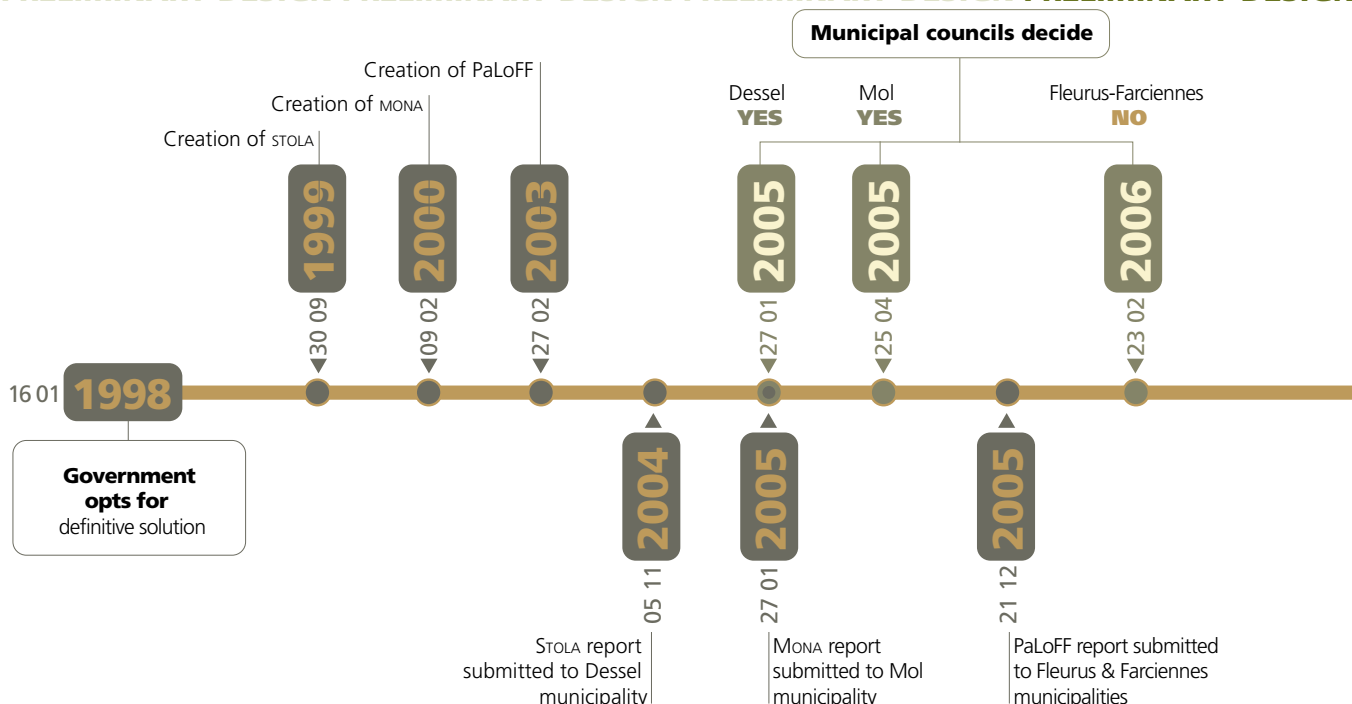
By 1997 ONDRAF/NIRAS had developed two safe and technically feasible disposal concepts. However, the level of opposition encountered was such that there was no prospect of ever building the repository anywhere in Belgium.

## 1998-2006: societal approach

In 1998 the Belgian government commissioned ONDRAF/NIRAS to continue working towards finding a definitive solution, or a solution intended to become definitive, for the long-term management of low- and medium-level waste (disposal). ONDRAF/NIRAS had to limit its research to existing nuclear sites and to areas where local authorities expressed an interest. The agency also had to develop the necessary consultative structures for integrating a project of this nature at local level.

The time had come for ONDRAF/NIRAS to reconsider its strategy. It abandoned the traditional engineer approach it had favoured until then and adopted a more participatory approach. Concerns about safety, health and the environment and the wishes of the local community became top priority.

## PRELIMINARY DESIGN PRELIMINARY DESIGN PRELIMINARY DESIGN PRELIMINARY DESIGN



### Three partnerships

This led to the creation of three local partnerships: STOLA-Dessel in Dessel, MONA in Mol and PaLoFF in Fleurus-Farciennes. Each partnership was given the task of developing an integrated preliminary design for a disposal facility: a repository subject to a host of inextricably linked conditions relating to safety, the environment, health, monitoring, quality of life and permanent local involvement, for both present and future generations.

### Key elements of a local partnership

The three partnerships were organized in a way that enabled them to operate as open, independent discussion and work forums.

### Representativeness

The partnerships were representative of the community in which they were based. Great care was taken to ensure that all local stakeholders in a broad spectrum of fields were represented: political, socio-cultural, environmental and economic. Ordinary members of the public and representatives from outside the municipality could also participate. Some 70 to 80 people were involved in each partnership, all on a voluntary and unpaid basis. Two paid employees were responsible for coordinating activities.

### Democratic and autonomous working practices

Each partnership had a general assembly, a management board, two staff and several working groups. Each working group was assisted by a representative from ONDRAF/NIRAS. Advice on methodology was provided by a specialist from the University of Antwerp (MONA and STOLA) or the University of Liège (PaLoFF). If it was considered necessary, each working group could also call on independent experts.

### Autonomous decision-making

Each partnership was free to terminate its activities at any time. It also decided autonomously what recommendations to make to the municipal council regarding a potential project. The fact that a partnership existed in no way committed the municipality concerned to accept that a repository would actually be built within its borders.

### Location within the community

For both practical and symbolic reasons, the headquarters of each partnership were located in the heart of the community concerned.

### Autonomous budget management

The partnerships each had a budget that they managed autonomously.

### An integrated approach tailored to the needs of the local community

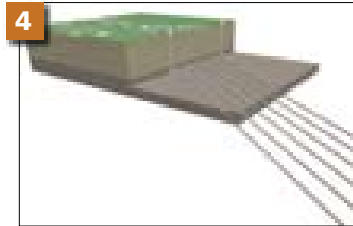
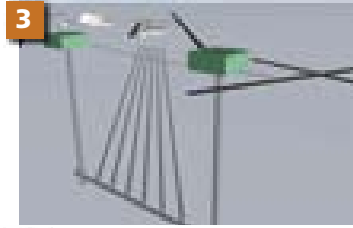
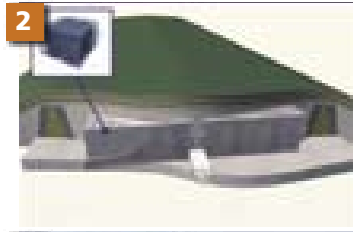
With the partnership system, ONDRAF/NIRAS changed the methodology used to select a disposal site. Originally it assumed that first the repository would be designed and then an appropriate location would have to be found. In 1998 the agency began exploring the possibility of designing a repository that was specifically adapted to the characteristics of the terrain in which it would be built. At the same time the conditions stipulated by the local community had to be met and the repository had to be part of an overall project that could provide added value for the whole region.





# Four proposals

for an **integrated**  
preliminary design



## **STOLA-Dessel**

On 5 November 2004 STOLA-Dessel submitted two proposals for an integrated preliminary design for a disposal facility to Dessel council. These were subsequently approved on 27 January 2005, making Dessel the first Belgian municipality to put itself forward – subject to well-defined conditions – to host a repository.

## **MONA**

On 27 January 2005 MONA submitted its own two proposals for an integrated preliminary design for a disposal facility to Mol council, which approved them on 25 April 2005. In effect this means that the municipality of Mol is also prepared to host a repository, subject to well-defined conditions.

## **Surface disposal**

A surface or subsurface repository can be designed to isolate low- and medium-level short-lived waste from man and the environment at a location where it is possible to construct facilities that would maintain sufficient integrity for the duration of the 200 to 300-year monitoring period at least.

## **Deep disposal**

The general concept of deep disposal takes the form of a network of underground galleries excavated in a clay layer in which the waste is buried. These galleries are linked together by a central main gallery accessible by shafts.

1 The concept of surface disposal developed by STOLA-Dessel

2 The concept of surface disposal developed by MONA (Mol)

3 The concept of deep disposal developed by STOLA-Dessel

4 The concept of deep disposal developed by MONA (Mol)

### Conditions

The activities of the local partnerships have culminated in the development of integrated disposal projects. Each of these projects comprises a preliminary design for a repository subject to a host of inextricably linked conditions.

The preliminary designs for the repositories took into account the characteristics of the terrain and the subsoil of the proposed site. The concerns and values of the local community are reflected in the conditions. These range from the priority importance attached to safety, health and the environment, to conditions that aim to benefit the municipality concerned in social, economic and cultural terms. Satisfying some of these conditions could also generate added value beyond the municipality's borders.

### Continuing the participatory process

In keeping with the wishes of STOLA-Dessel and MONA and of the two municipalities concerned, the participatory process is being continued in the form of partnerships in Dessel and Mol, and extended to cover radioactive waste management in general.

The STORA partnership, the successor to STOLA-Dessel, was set up on 27 April 2005. The statutes of the MONA partnership were modified on 24 November 2005 and the name of this non-profit association was changed from Mols Overleg Nucleair Afval Categorie A to Mols Overleg Nucleair Afval.

The Dessel and Mol partnerships and municipalities take the view that, even after one integrated disposal project has been selected for construction on the territory of one of the municipalities concerned, the other municipality and its partnership should be able to continue participating in the decision-making process.

### PaLoFF

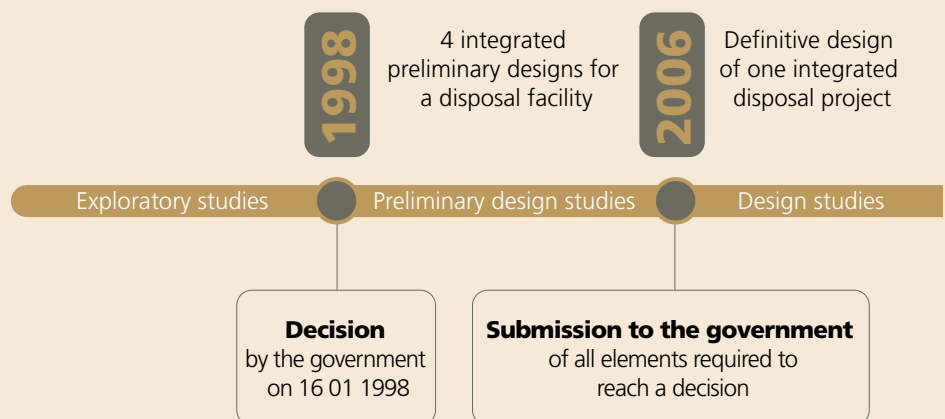
On 23 February 2006 the municipal councils of Fleurus and Farciennes decided not to continue with the studies. The partnership's integrated preliminary design for a disposal facility is therefore no longer being considered. As a result of this decision the PaLoFF partnership has been dissolved.

# How do things stand today?

ONDRAF/NIRAS has now submitted the dossiers containing the partnerships' integrated preliminary designs for a disposal facility to its supervising minister. Each dossier includes the report by the partnership, the decision of the municipal council and a report by ONDRAF/NIRAS confirming that the preliminary designs are in accordance with the requirements formulated by the federal government. To round off its present work programme, ONDRAF/NIRAS has drawn up a concluding report.

In submitting this report, ONDRAF/NIRAS has accomplished the task formally entrusted to it by the Cabinet on 16 January 1998. The government now has all the information it needs to reach a decision concerning the best way forward for the long-term management of low- and medium-level short-lived waste.

The decision by Fleurus and Farciennes to withdraw from the running puts the integrated disposal project in a new light. Whereas until recently there were several possible locations for a repository, the options are now limited to just two neighbouring municipalities: Dessel and Mol. Public support must be as broad as possible. This means that the details of the integrated project must be discussed with all interested stakeholders, in both Dessel and Mol, regardless of where the repository is eventually built.



# Who's who in radioactive waste management in Belgium?

## ONDRAF/NIRAS

The Belgian Agency for Radioactive Waste and Enriched Fissile Materials, known by its French/Dutch acronym ONDRAF/NIRAS, manages all the radioactive waste located within Belgian borders.  
[www.nirond.be](http://www.nirond.be)



## MONA

Mols Overleg Nucleair Afval (consultative group on radioactive waste), formerly known as Mols Overleg Nucleair Afval Categorie A (consultative group on category A radioactive waste). This partnership has developed two integrated projects for disposal, within the municipality of Mol, of Belgian low- and medium-level short-lived waste.  
[www.monavzw.be](http://www.monavzw.be)



## STOLA-DESSEL / STORA

STOLA-Dessel, Studie- en Overleggroep Laagactief Afval (study and consultative group on low-level waste). This partnership has developed two integrated projects for disposal facility, within the municipality of Dessel, of Belgian low- and medium-level short-lived waste. Having recently changed its name to STORA, Studie en Overleg Radioactief Afval (study and consultative group on radioactive waste), this group continues and expands the work of the STOLA-Dessel partnership.  
[www.stora.org](http://www.stora.org)



## PaLOFF

Partenariat Local Fleurus-Farciennes (Fleurus-Farciennes local partnership). This partnership has developed one integrated project for disposal, within the municipalities of Fleurus-Farciennes, of Belgian low- and medium-level short-lived waste. On 23 February 2006 the municipal councils of Fleurus and Farciennes decided not to continue with the studies. The partnership's integrated preliminary design for a disposal facility is therefore no longer being considered. As a result of this decision the PaLoFF partnership has been dissolved.



## FANC/AFCN

The Federal Agency for Nuclear Control, which has the task of ensuring that the public and the environment are protected against the potential hazards of ionizing radiation.  
[www.fanc.fgov.be](http://www.fanc.fgov.be)



## BELGOPROCESS

The industrial subsidiary of ONDRAF/NIRAS in Dessel. Its tasks currently include the processing and interim storage of Belgian low- and medium-level short-lived waste.  
[www.belgoprocess.be](http://www.belgoprocess.be)



## SCK•CEN

Belgian Nuclear Research Centre in Mol. One of its tasks is to conduct studies on the possibility of disposing of radioactive waste in deep clay layers.  
[www.sckcen.be](http://www.sckcen.be)





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