

# **The Belgian experience on developing a near surface disposal facility in partnership with the local stakeholders**

**P. De Preter**

NIRAS/ONDRAF, Belgium

## **Abstract**

On June 23, 2006 the Belgian Government decided on the basis of the final reports of the partnerships of Dessel (STOLA) and Mol (MONA), each approved by the municipality council, to choose the file on surface disposal of the partnership of Dessel as the project to develop. This decision implied that ONDRAF/NIRAS, in further interaction with the local stakeholders, could start the preparation of a licence application.

The positive local decision in Dessel to accept a surface disposal facility on the municipality territory was the result of a 5 years long dialogue process with discussions of all aspects of the disposal system and its integration in the municipality. The confidence by the local stakeholders in the safety of the system resulted from an open, structured discussion of all aspects of the design and siting of the facility and of the safety related arguments.

This paper will describe and discuss the process and the main topics that were discussed within the partnership to come to a proposed design and siting that was considered by all stakeholders as an optimal solution. The major issue was the balance to be struck between active safety measures, such as facility monitoring and surveillance over extended timeframes, and passive safety measures that are required to eventually come to a fully passive long-term management. This is still an issue requiring further discussion with all parties involved, including the safety authorities, before a licence application can be made.

## **1 Introduction and context**

With the governmental decision of January 16, 1998, NIRAS/ONDRAF was given the mission to further examine the two options of deep and surface disposal for the low- and intermediate-level short-lived waste (category A waste), in order to prepare a federal decision on the technical option to be developed. NIRAS/ONDRAF was also asked to develop the methods and structures of interaction with the local stakeholders, and to limit its siting activities to nuclear and candidate municipalities. In response to this NIRAS/ONDRAF developed and implemented the concept of local partnerships with interested municipalities. During the phase 1998-2006 NIRAS/ONDRAF created partnerships with the municipalities of Dessel (STOLA-Dessel, 1999), Mol (MONA, 2000) and Fleurus-Farciennes (PaLoFF, 2003) to actively discuss the disposal of the category A waste within the municipality.

On June 23, 2006 the Belgian Government decided that category A waste will be disposed of in a near-surface repository on the territory of the Dessel municipality. This decision was the endpoint of the 1999 – 2005 partnership phase and was based on the final reports of the partnerships of Dessel (STOLA-Dessel, now STORA) and Mol (MONA), approved by their municipality councils, and on NIRAS/ONDRAF' final report, confirming the feasibility of the proposed disposal systems. As the municipality council of Fleurus did not approve the final report of the partnership PaLoFF, NIRAS/ONDRAF did not submit this report to the responsible minister. The 2006 federal decision implies that NIRAS/ONDRAF, in further interaction with the local stakeholders, can start the preparation of a licence application.

The preceding positive local decision in both Dessel (Decision of the Municipality Council of May 2005) and Mol (July 2005), and both on the partnership and municipality council level, to accept, under certain conditions, a disposal facility on their territory was the result of a 5 years long process of

discussions within the partnership of all aspects of the disposal system and its integration in the municipality. During these discussions, both near-surface and deep disposal were studied and developed as potential options. The partnerships of both Dessel and Mol expressed in their final report a "no preference" for one of the two options.

In line with the federal decision of June 2006, this paper focuses on the development of a surface disposal facility in Dessel and on the way the selected design was developed through the 1999 – 2005 phase within the partnership of Dessel. The objective of this paper is to describe and discuss the main issues that were discussed within the partnership to come to a proposed design and siting that was considered by the local stakeholders as an optimal solution.

## **2 The decision making process**

The governmental decision of January 1998 gave NIRAS/ONDRAF the mandate to start a dialogue with interested municipalities to discuss the acceptability of disposal of category A waste on the municipality territory. Finding out if and under what conditions (technical, social, economical and political) a local acceptance of category A waste disposal exists was the main objective of the partnerships in the period 1999 - 2005. The initial idea was a three years phase (1999-2001), but it turned out that more time was required on the local level (1999 - mid 2005).

Between the national decisions of 1998 and 2006, the focus and weight of the decisional process completely shifted to the local level. The concept and functioning of the partnerships was the subject of a NEA Forum on Stakeholders Confidence workshop [1]. The importance of a well-defined, transparent, fair and broadly accepted decisional process is crucial for reaching situations of broad acceptance of negatively perceived projects like radioactive waste disposal. Some of the characteristics of the Belgian decisional process, and certainly the "local period 1999 - 2005", have created a situation where a local decision of conditional acceptance became possible.

- The national decision of 1998 created a clear framework for the category A disposal programme, with a clear objective to prepare the elements to enable the federal government to make a choice between surface and deep disposal of category A waste, by limiting the siting activities to nuclear and candidate municipalities.
- After the strategic "national" decision of 1998, the decisional weight shifted totally to the local level, and the empowerment of the local level was instrumented with a veto right; each partnership could unilaterally decide to withdraw from the process of dialogue with NIRAS/ONDRAF.
- The partnerships were created by the municipality council and NIRAS/ONDRAF, giving them a firm local political basis.
- The concept of the partnerships as an instrument of direct democratic participation in decision making was developed on behalf of NIRAS/ONDRAF by academic consultants in sociology (University of Antwerp, University of Luxembourg) and the first preparatory discussions with the local decision makers on the possible creation of a partnership were conducted by the university experts.
- The decision of local acceptance was from the beginning (1999) seen at two distinct levels, the partnership itself and the municipality council. Both levels had to be positive before a signal of acceptance could be transmitted to the national level. This created some degree of political neutrality or independence for the partnership; also, a confirmation of the partnership decision by the municipality council gave the required political weight to the local decision.
- The partnerships were created and structured as a non-profit organisation, with a firm legal basis and internal rules of decision-making.
- The main local groups (political, economical, cultural, social, ...) were represented in the partnership. Each of these representatives had a relatively broad network in the local community.

- Every local citizen could become an independent member of the partnership; he could decide to what themes of discussion he wanted to contribute (siting and design, safety, environmental and health matters, local integration). The possibility of direct participation in a decision process was for some of the independent members an important reason to step in.
- The themes and issues discussed in the four working groups (see below) were chosen to a large extent by the working group members.
- Each partnership produced its own final report. After approval by the municipality council, NIRAS/ONDRAF submitted this report to the responsible minister, together with its own final report attesting the safety and the feasibility of the proposed repository.
- The partnerships made considerable efforts to reach out for the wider community by networking of its members and by a wide variety of interaction and communication initiatives (including polls and open door days).
- Flexibility of timing was allowed to come to an informed decision on the local level, leading to an extension of the partnership lifetime from 2 to 5 years.

### **3 Process and organisation of information exchange, knowledge building and final reporting**

The main objective of each partnership was to address the question if and under what conditions a disposal facility of category A waste on its territory were acceptable. The three sub-questions structuring the work within the partnerships were the questions of safety and protection, of feasibility (technical and siting feasibility) and of local integration of the disposal project.

Three technical working groups "Siting and design", "Safety" and "Environmental and health matters" were created to discuss the related technical matters. A fourth working group ("Local development") discussed the issues of local integration of the repository. Each working group had typically 10 to 15 local members and one NIRAS/ONDRAF representative, and met once every one or two months. The most active working group (Siting and design) met about 40 times in the period 2000 - 2004.

To deal with the challenges of knowledge build up, of discussion and integration of information, and of a reporting that correctly reflected the discussions and elements of consensus, each of the working groups went at its own pace through three periods of functioning.

#### **1. Information acquirement period**

There is clearly a tension between a broad participation process and the complexity and multidisciplinary nature of the subject of radioactive waste disposal (mass of information, different fields of science and technology, the challenge of the unusually long time scales and difficult to grasp physical and biological entities, such as activity and dose). Most members of the working groups had no or little familiarity with the issue of radioactive waste disposal.

So, there was a need for a first period (of about 1 year) of information acquirement through presentations by NIRAS/ONDRAF staff or external experts, through technical visits or participation at workshops, symposia and conferences. In this way the heterogeneous group in terms of professional back ground, familiarity with the subject evolved into a more homogeneously informed group. The members of the groups largely determined the themes requiring specific attention during this period.

#### **2. Study and evaluation period**

The various elements of importance for each working group were discussed during this second phase taking several years.

In the "siting and design" working group the discussions were structured around the main components of the repository, as well as the main phases of repository development (construction, operation, closure, institutional control), leading to a well structured and organised approach.

In the two evaluation groups less structuring elements were available, and the subjects of discussion were most often decided on an ad hoc basis. In the "safety" group the main elements of the long-term safety assessments provided some structure (general safety approach for disposal, safety criteria, characteristics of the waste that are of importance for long-term safety, FEPs (features, events and processes important for the safety of the system) and scenarios, results of assessment calculations, treatment of specific scenarios of interest, e.g. airplane crash).

At the end of this period the main results of the "siting and design" group were presented to the "safety" and "environmental and health matters" groups for discussion and assessment. As the two evaluation groups had not been involved in the process of the detailed discussions of the "siting and design" group, they were not really able to have an in depth assessment and judgement of this groups outcome (i.e. a reference design and a site).

### **3. Conclusive discussions and reporting period**

At the end of the 1999 – 2005 phase a long time was taken (approximately 1 year) within each of the working groups to report on the work conducted. Here also the "siting and design" working group took the lead, and its final working group report was the central report around which the other technical working groups formulated their results.

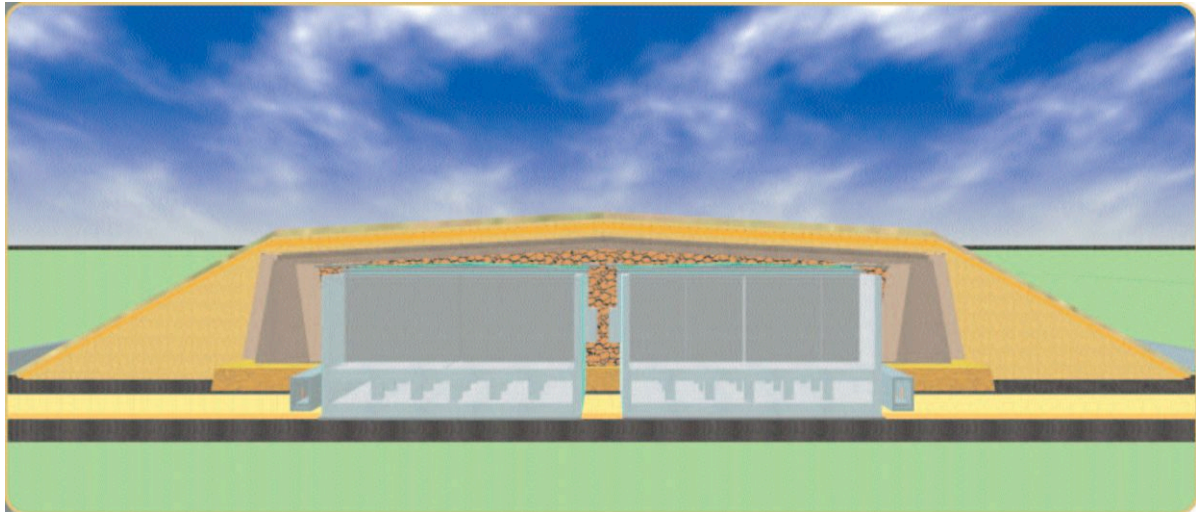
## **4 The proposed site and design for surface disposal**

The discussions and dialogue in the partnership of Dessel led to a selection of a proposed site for the disposal facility and to a detailed description of the various elements of the repository design.

With respect to the siting of the facility the partnership of Dessel mainly discussed the predictability of the local hydrogeology in order to be able to monitor the environment of the repository. The main concern was the capacity to rapidly detect any unexpected release of activity in the environment. This concern was not taken away by the results of the safety assessments clearly indicating no impact on the environment during the first centuries.

The standard 400 L waste drum is the unit of waste conditioning. Four such waste drums are placed in a concrete box, which is the unit of waste disposal. The design is based on disposal of these concrete boxes (monoliths) in concrete vaults (see Figure 1 below). After waste emplacement and closure of the waste modules with a concrete roof, a double row of two times 10 modules will be covered with a multilayer cover.

The estimated volume of category A waste to be disposed of is about 70 000 m<sup>3</sup>, with as a main boundary condition a operational lifetime of the nuclear power plants limited to 40 years by the nuclear phase-out law.



*Figure 1: cross-section through two rows of disposal modules with multi-layer cover.*

After waste emplacement operations are terminated, the surface repository will be closed (emplacement of concrete roof and subsequently emplacement of the multi-layer cover). After closure the facility will remain under surveillance and control. In the safety assessments the assumption of a 200 to 300 years surveillance and control period is made to assess the impact of human intrusion scenarios.

In order to reinforce the capacities to monitor and control the facility before any unexpected radionuclide release could reach the environment the partnership working group on siting and design developed the concept of an accessible inspection room under each disposal module. So, inspection can be performed during the surveillance and control period. The partnership expressed in its final report (2006) the requirement of open, accessible inspection rooms during the complete surveillance and control period (200 to 300 years).

This means that the complete closure of the facility is only planned at the end of the surveillance and control period, when the inspections rooms underneath the disposal modules will be backfilled and sealed off. The backfilling of the inspection rooms is a final step to bring the facility in its complete state of passive safety.

On the one hand there was in the partnerships a general understanding and acceptance that disposal systems are designed and developed to become passive systems. This includes the requirement that its long-term safety should not depend on continued future actions, such as surveillance and maintenance. The partnership of Dessel, however, has put a clear emphasis on specific actions of extended monitoring and surveillance in the accessible inspection rooms. This emphasis was not the result of detailed analysis of the results of safety assessments (dose calculations) but a more general emphasis on the importance of active elements of safety.

## **5 The role and point of view of the safety authorities**

Since the decision of 1998 NIRAS/ONDRAF has worked in close interaction with the safety authorities (the Federal Agency for Nuclear Control - FANC). The FAZNC was informed on regular occasions of the developed design of the surface disposal facility and of the results of the safety assessments. In its comments the FANC indicated that the design and the implementation of the surface disposal facility should be guided by the objective to bring the facility in its passive state as soon as possible. Postponing the backfilling of the inspection rooms till the end of the surveillance and control period was seen by the FANC as an element that could potentially undermine the passive safety of the facility. If the backfilling operation is planned at the end of the surveillance and control

period, the FANC requires that in the safety assessments the assumption is made that the backfilling will actually not be performed, and, as such, can lead to a weakening of the passive safety.

The diverging positions of the FANC and of the partnership of Dessel on the timing of the complete closure of the facility are still an issue to be resolved by NIRAS/ONDRAF in the current phase of licence application preparation.

## **6 Conclusion**

The impact of the process of dialogue with the local stakeholders on the proposed design of the surface facility is mainly on the level of the strengthening of design measures to control and monitor the facility during an extended period of time (centuries). This means that the complete closure of the facility (backfilling of the inspection rooms) is situated at the surveillance and control period, and that only then the facility will be in its full passive state. The safety authorities (FANC) are of the opinion that the facility should be brought in its passive state as soon as possible. It is NIRAS/ONDRAF's task to prepare before mid 2010 a licence application that is accepted by all stakeholders as an optimal solution.

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[1] NEA, Dealing with Interests, Values and Knowledge in Managing Risk. Workshop Proceedings, Brussels, Belgium, 18-21 November 2003.