



ONDRAF/NIRAS

Public agency with legal personality

- Responsible for the management of all radioactive waste in Belgium
- Four basic missions:



Inventory



Management system



Decommissioning

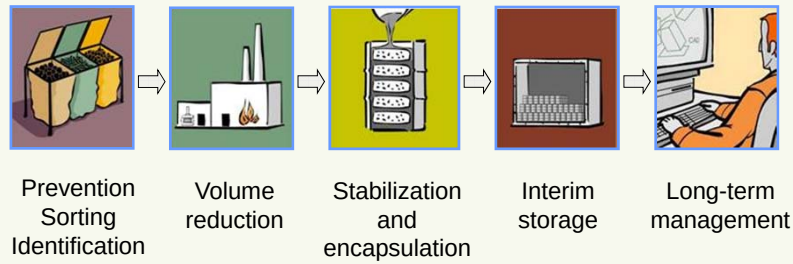


Enriched fissile materials



An integrated project of surface disposal in Dessel for Belgian low-level and medium-level radioactive short-lived waste

ONDRAF/NIRAS Management System



*An integrated project of surface disposal in Dessel
for Belgian low-level and medium-level radioactive short-lived waste*

Disposal of category A waste

	Low level	Medium level	High level
Short half-life (30 years or less)	A	A	C
Long half-life (30 years or more)	B	B	C

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The early days of cat A-waste management

- 1960 - 1982: sea disposal (15 sea burial campaigns under supervision of the NEA)
- 1983: internat. moratorium on sea disposal: LT management of cat A-waste becomes a siting question
- 1980's: immediate action needed, namely to provide interim storage facilities
- 1982: foundation of ONDRAF/NIRAS
- 1993 internat. prohibition on sea disposal: **the search for a final land based solution begins**



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Evolutions in the 1990's

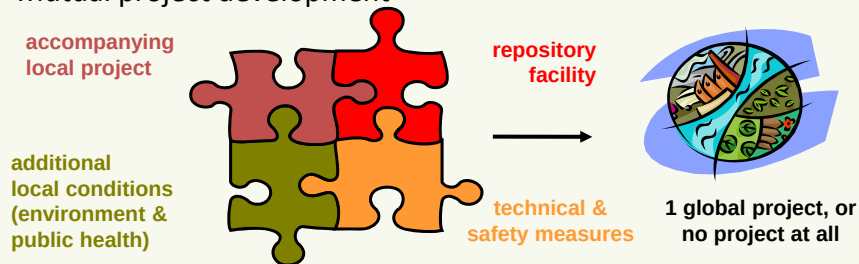
- NIROND 94-04: a technical answer to a technical problem
- 1994 – 1998: design and siting of a cat A-waste repository = a technical question with societal implications
- From 1998 onward: design and siting of a cat A-waste repository = a societal question with technical implications



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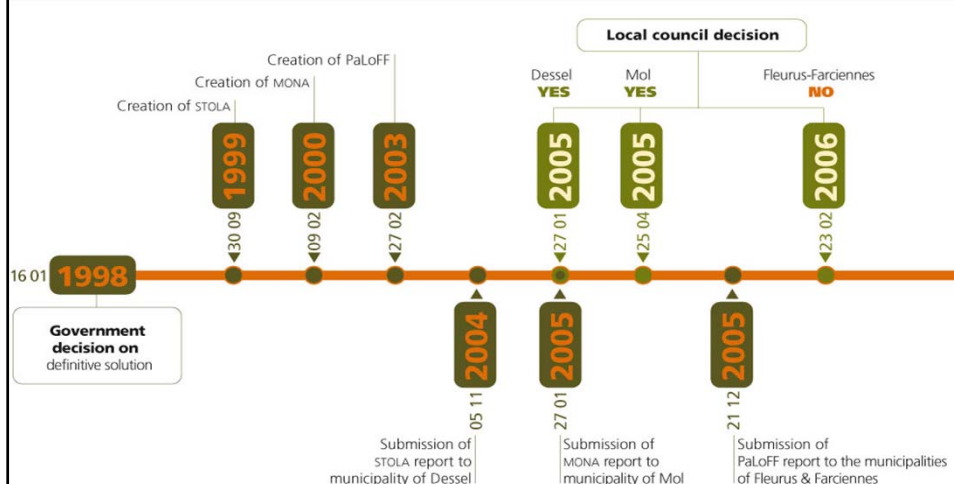
Partnership approach : key elements

- Representativeness
- Democratic and autonomous decision-making
- Location within the community
- Autonomous budget management
- Mutual project development

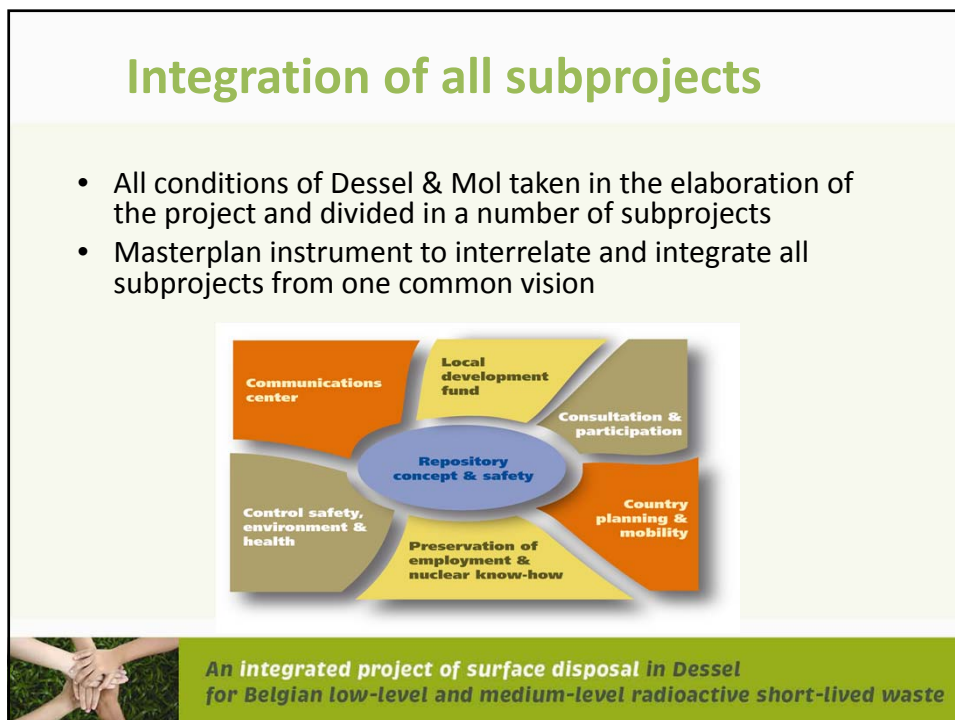
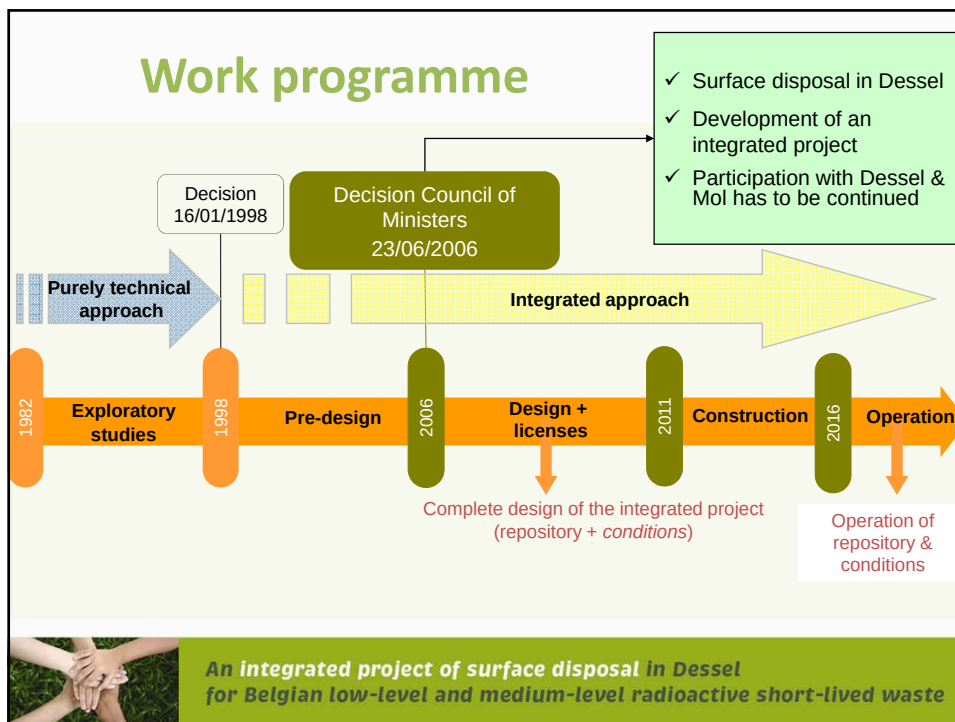


**An integrated project of surface disposal in Dessel
for Belgian low-level and medium-level radioactive short-lived waste**

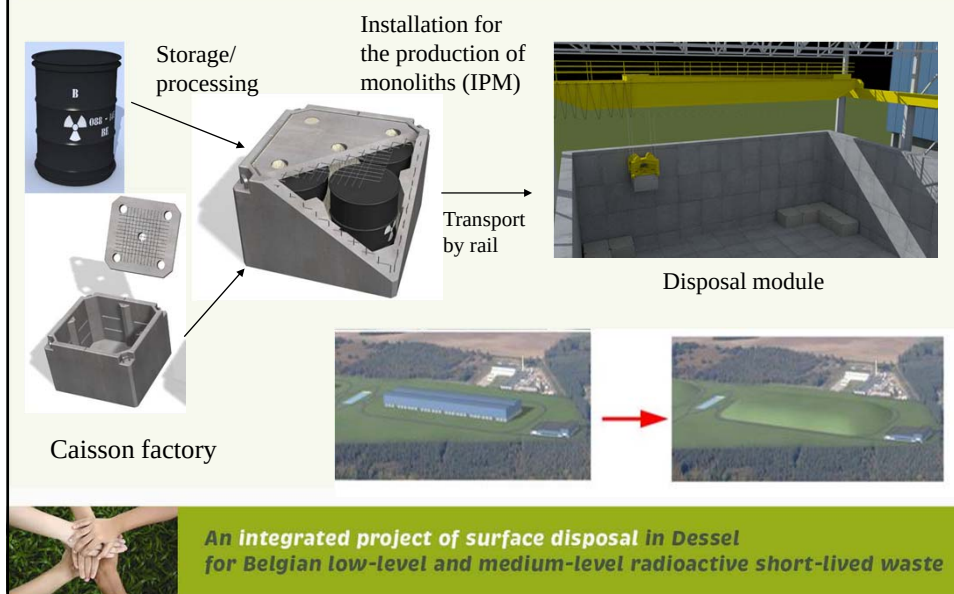
Results of the pre-design phase



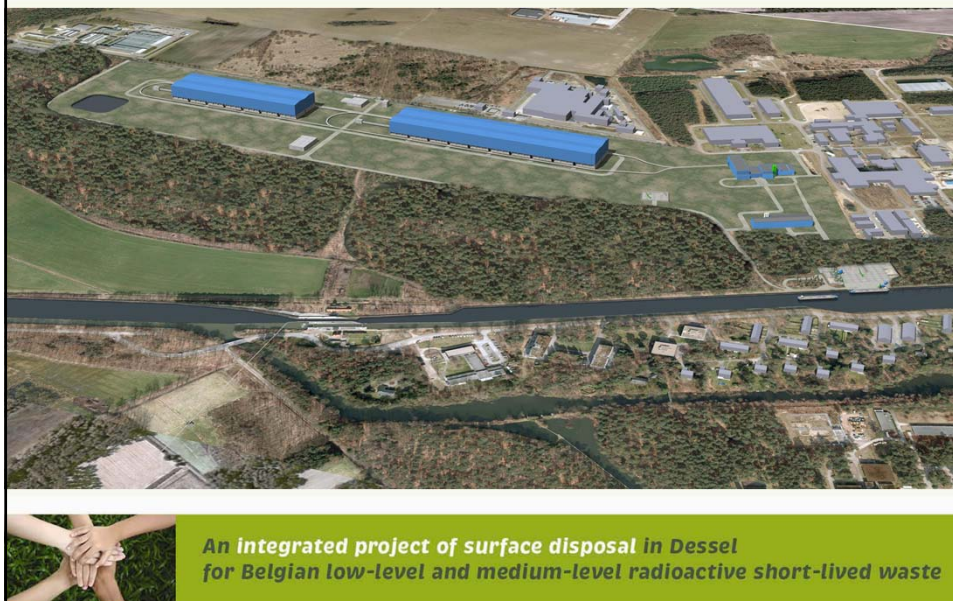
**An integrated project of surface disposal in Dessel
for Belgian low-level and medium-level radioactive short-lived waste**



Repository concept

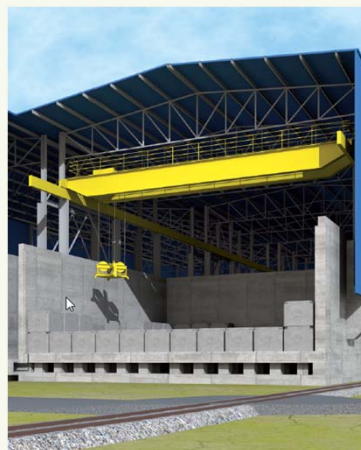


The disposal site



Disposal modules

- 34 disposal modules
- Construction & operation in 2 periods (20 + 14)
- Each module = +/- 900 monoliths
- Inspection space under each module (controlability)
- Fixed roof during exploitation
- Planning
 - Construction 2013 - 2016
 - Operational end 2016



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Quay

- Disposal site located on the Bocholt-Herentals canal
- Quay allows delivery by ship of bulk materials
 - considerable reduction of road transports
- Planning:
 - Construction 2012
 - Operational 2013



An integrated project of surface disposal in Dessel for Belgian low-level and medium-level radioactive short-lived waste

Caisson factory

- Location on site (between quay & IPM)
 - employment
 - logical logistic chain
 - limitation of transports
- Public-private partnership
- Private partner: development of activities unrelated to the disposal
- Planning:
 - Construction 2012-2014
 - Operational 2015



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Installation for the production of monoliths (IPM)

- Installation where the concrete cases will be filled with waste
- Monoliths = key to safety
- Facility comparable to existing conditioning installations
- Planning
 - Construction 2012-2014
 - Operational 2015



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Prototypes

- To test and further substantiate the design process
1. Demonstration test : construction of part of a disposal module (including the inspection area)
 2. Test cover: studying and follow-up of the behaviour of the covering layers (2012-2013)
 3. Subsidence test: monitoring of the subsurface under a weight comparable of a filled module (finished)



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Demonstration test - Observations

- POSITIVE
 - Temperature and compressive strength OK
 - No/few cracks
 - Instrumentation OK
 - Pouring of horizontal plate OK
- NEGATIVE
 - Stiff rigid mixture
 - Pumping difficult
 - Large gravel pockets
 - Low efficiency



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Demonstration test - Causes

- Nature of the mixture
 - Broken aggregates (lime)
 - Short lived plasticizer
- Density of reinforcement



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Demonstration test - Solutions

- Improved curing
- Use of vibrators on casing
- Other type of plasticizer
- Adapted aggregates



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Demonstration test – Follow-up

- Additional sidewalls
 - Height 2.5m and 11m
 - Casing vibration
- Other type of plasticizer
 - Testing of repair methods
 - Non destructive testing techniques



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Safety

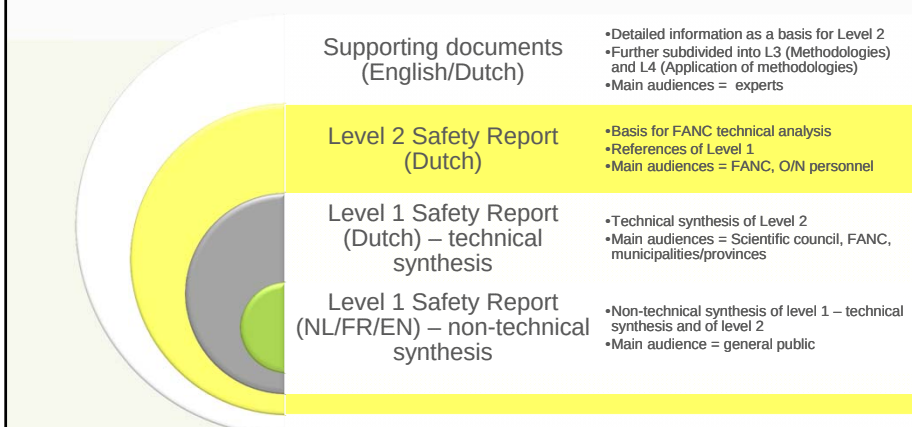
Safety management: 3 key elements

- Safety strategy
 - Guidelines for design
- Safety evaluations
 - Evaluation of design
 - Defining of safety conditions (radiological capacity)
- Monitoring of safety
 - Continuous verification of safety of implemented design



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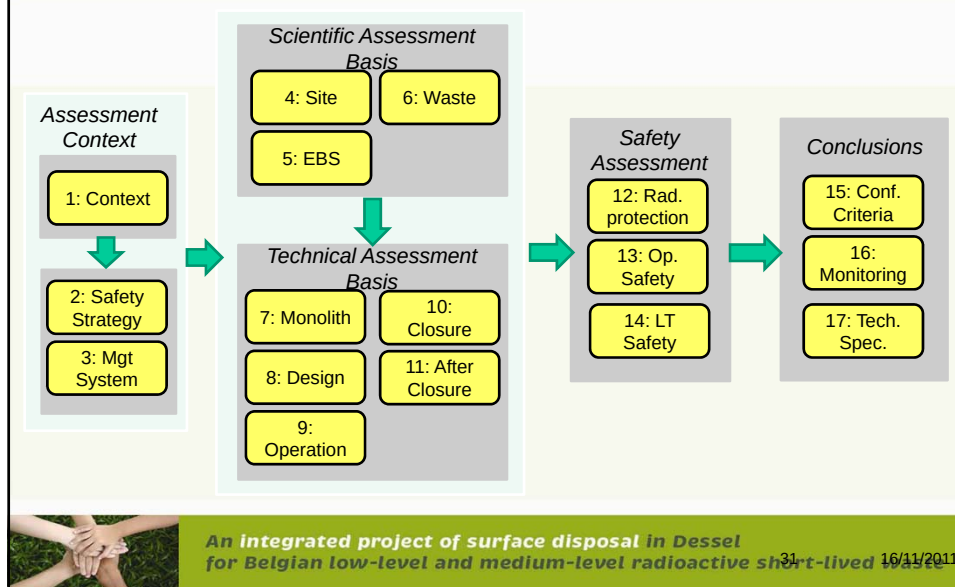
Safety case - Structure



An integrated project of surface disposal in Dessel for Belgian low-level and medium-level radioactive short-lived waste

16/11/2011

Safety case - Contents



Safety case - Planning

- License application by NIRAS at FANC
 - Peer Review of Long Term Safety by NEA (dec 2011-june 2012)
 - Final safety case and safety report will be submitted at FANC in august 2012
- License ?? 2014 ??



An integrated project of surface disposal in Dessel for Belgian low-level and medium-level radioactive short-lived waste

Communications center

- Three complementary and physically integrated components:
 - **Contact and reception centre** : central contact point for information on the cAt-project and nuclear facilities in the region
 - **Digital & interactive network** : information from a distance via IDTV and website + community television. Trial project DIGICAT started in 2010 www.digicat.be
 - **Theme park** : a tourist & educational activity centre on the management of radioactive waste and its context



**Reference point and intersection for all nuclear information
Tourism**

Meeting place for the local population



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Local fund

- Added values included in all building blocks of the cAt-project
- Furthermore a local fund will be created for additional added value :
 - Support of projects and activities that will improve quality of life for the local residents and create sustainable opportunities for the region
 - The local fund is a suitable instrument to create a continuum of socio-economic values and provide continuous financial resources over many generations
 - Allows for the anticipation of changing societal needs
- The local fund will be managed by STORA and MONA (a sub fund for Dessel and a sub fund for Mol)
- Between 90 and 110 MEUR (scientifically determined and reasonable)

**Public support as large as possible
Current & future generations
Catering to the changing needs of society**



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Continuation of consultation & participation

- Participation an essential part of the cAt-project
- Partnerships monitoring & sharing decisions in the development of the integrated project
- Partnerships active in follow up of all nuclear matters
- Functions of the partnerships and their operational shape may evolve in time (depending on the project phase and social developments which will occur over the coming decades)

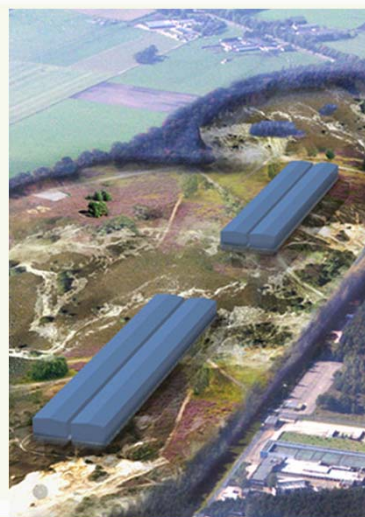
**Consultation & participation central,
also in the implementation & operation phase**



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Image quality plan

- Vision of the future: landscape can develop into valuable heath- and marshland
 - Vision described in the image quality plan, including guidelines for buildings, materials, roads, etc.
- Disposal site receives its own identity



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Country planning & mobility

- Restructuring of the Northern Mol-Dessel nuclear zone
 - Requires redrawing the entire regional plan
 - Implications for the licensing process for parts of the integrated project (communications centre, caisson factory)
- Providing Dessel with housing and working expansion opportunities
- Limited impact on traffic intensity
 - Use of Bocholt – Herentals canal as supply route

**Country planning: living & working
Openness & accessibility of the site**



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Employment & preservation of nuclear know-how

- Maximizing local employment impact
- Retaining regional nuclear know-how
 - Development of a fully fledged knowledge centre & network for radioactive waste in the broadest sense
 - Essential: the long term presence in the area of a unique combination of research centres, agencies and government covering different aspects of all types of waste

Employment & know-how thread through all subprojects



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Safety, environment and health control

- Set-up of a monitoring & supervisory programme for the repository
- Investigation on the best methods to continuously monitor the local population's health – pilot project 3XG
 - Biomonitoring of 200 baby's and their mothers (presence of environmental pollutants) with a longer term follow-up
 - Inventory of deaths and illnesses
- Emergency planning

Main concern : safety, health & environment



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Financing of the project

- Ensuring the financing of the complete integrated project
- Funding of parts of project that are a service for waste producers : Long Term Fund – 750 880 Mio Euro
- Funding of parts of project that are a service to local community : Medium term fund (law of 24 december 2010)
 - 130 Mio EURO

Comprehensive financing



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Planning cAt-project

- 2006-2013: design stage
 - License applications
 - Finding agreement with all stakeholders
- 2011-2017: construction stage
 - Realization of all technical and societal parts of the project



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More information about cAt-project



**Visit our website: www.niras-cat.be
or DIGICAT on RTV and www.digicat.be**



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The Waste Plan for the Long-Term Management of HLW and/of Long-Lived Waste: Objectives, Process and Conclusions



Philippe Lalieux, ONDRAF/NIRAS

Euridice Exchange Meeting, 7th December 2011

Structure of the presentation

1. Scope and objectives
2. Legal SEA procedure
3. The proposed global solution
4. Adoption and presentation to the supervising authority
5. A project involving the whole of ONDRAF/NIRAS
6. Link with Directive 2011/70/EURATOM
7. Implications for ONDRAF/NIRAS

1. Scope and objectives

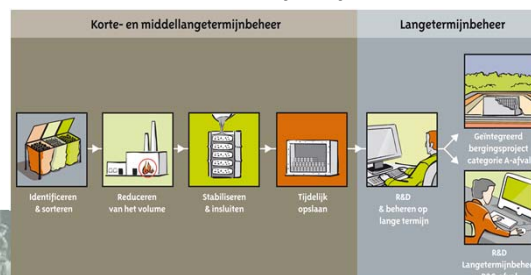
- Situation relating to the long-term management of high-level and/of long-lived waste (B&C)
 - Thirty years of research, development and demonstration (RD&D)
 - Initiated by SCK•CEN in 1974
 - Underground laboratory as an unique RD&D tool
 - Performed according to international recommendations and in co-operation with foreign countries, notably within the scope of the EU Framework Programmes
 - Encouraging and internationally acknowledged results
 - **But... absence of an institutional decision in Belgium in favour of a specific management option**

3



Necessity of a long-term management policy... today (1/4)

- **Necessity of defining a final destination for B&C waste in order to 'close' the management system**
 - Optimization of all the management phases
 - **Determination of the management costs (provisions) in order to optimally apply, as of today, the 'polluter pays principle'**
 - Orientation of RD&D by way of confirmation



4



Necessity of a long-term management policy... today (2/4)

- ONDRAF/NIRAS considers the dossier mature enough to be the object of a political decision
 - Based on the results of SAFIR 2
- Considerable implementation deadlines
 - Responsibility of current generation and current producers
- Necessity of ensuring the continuity of knowledge and RD&D
- There is, however, no urgency as far as safety is concerned (temporary storage is safe)

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Necessity of a long-term management policy... today (3/4)

- Institutional requirement
 - OECD/NEA Peer Review of the SAFIR 2 report (2003), carried out at the government's request:
 - *"The Belgian programme should have a long-term management policy for B&C waste"*
 - Letter from ONDRAF/NIRAS' supervising authority (2004), asking
 - *"to compare various management options for high-level and long-lived waste (SEA) in order to enable decision-making on the management solution to be carried out"*
 - Joint Convention on the Safety of Radioactive Waste
 - Ratified by Belgium (law of 2nd August 2002)
 - Letter from FANC to its supervising authority after the 3rd meeting of the contracting parties (IAEA, June 2009)
 - *"ONDRAF/NIRAS is still waiting for a decision in principle on the management of high-level waste and spent fuel"*

6



Necessity of a long-term management policy... today (4/4)

- “Best practice”: countries that are in the forefront with regard to geological disposal (CA, FR, UK, FI, SE, CH,...) do rely on policy decisions and a legal framework comprising
 - the chosen management policy
 - a stepwise implementation roadmap: milestones, decisions + possibly planning of operations
 - the respective responsibilities
 - if necessary, the organization of an independent follow-up (i.e. aside from regulators) of the implementation, e.g.
 - CNE/OPECTS (FR)
 - CoRWM (UK)
 - KASAM (SE)

7



ONDRAF/NIRAS' Waste Plan – Legal framework

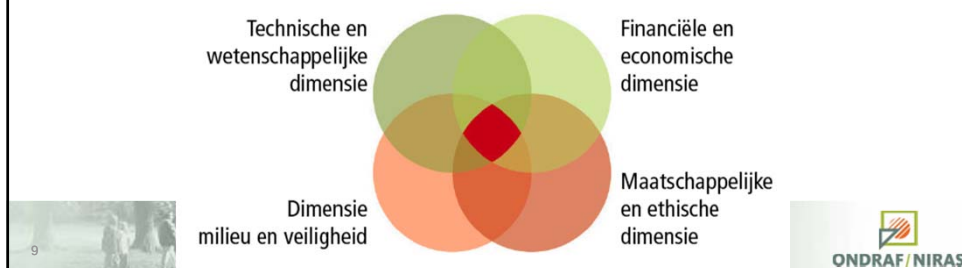
- Legal obligation for ONDRAF/NIRAS to have a *general programme for long-term radioactive waste management*
 - Art. 2, § 3, Royal Decree of 30th March 1981, as modified
- This programme requires an environmental impact assessment AND public participation
 - Law of 13th February 2006 (Art. 6, § 1) – Law *Strategic Environmental Assessment or SEA*
 - Transposing the 2001/42/EC and 2003/35/EC directives

8

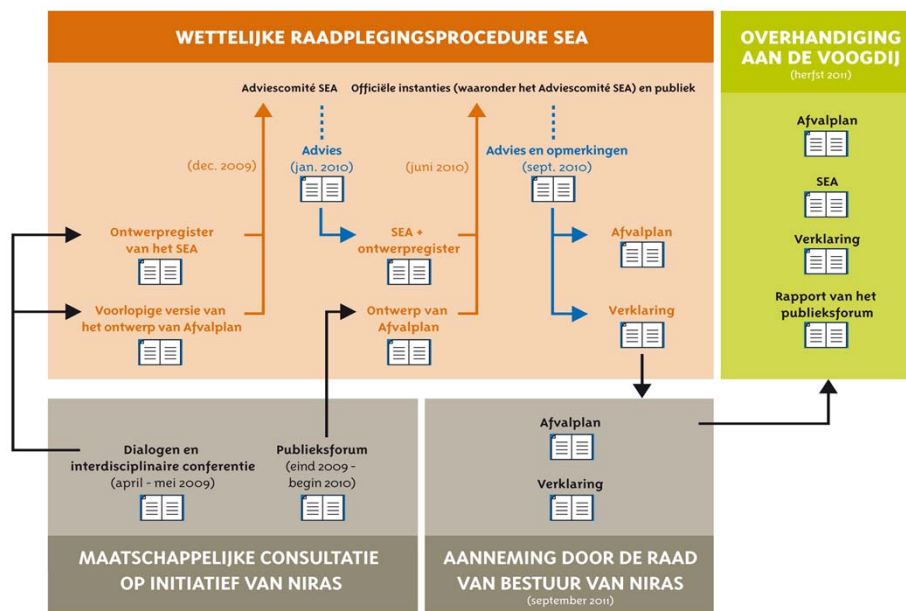


ONDRAF/NIRAS' Waste Plan – Objective

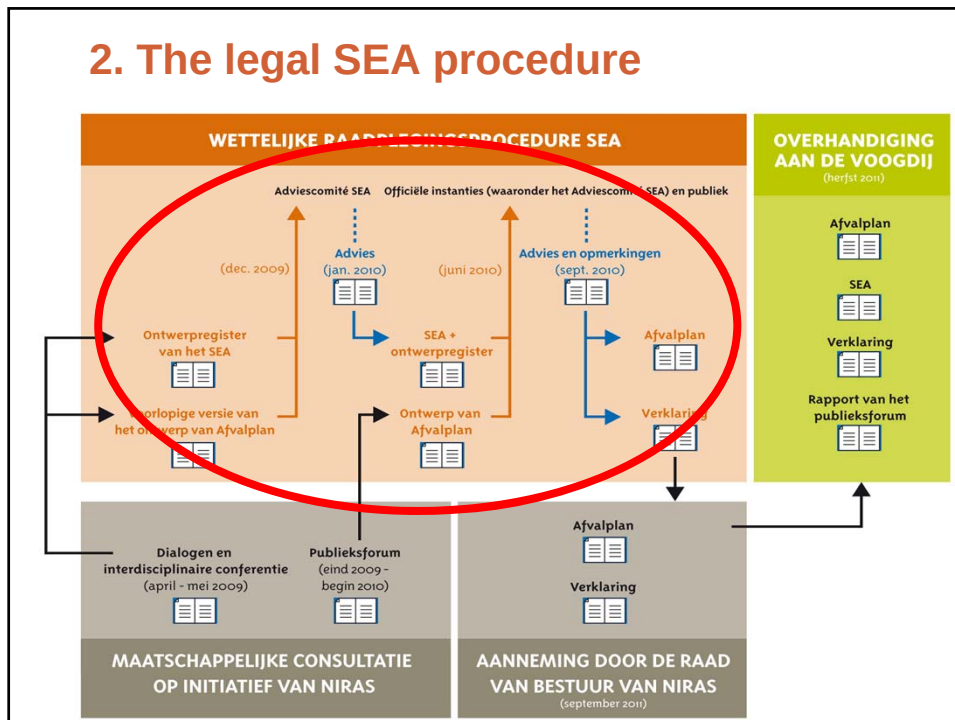
- The Waste Plan must provide all elements to enable the government to define **the direction to be followed regarding long-term high-level and long-lived waste management.**
- According to the view that a sustainable solution integrates the following aspects



The Waste Plan process



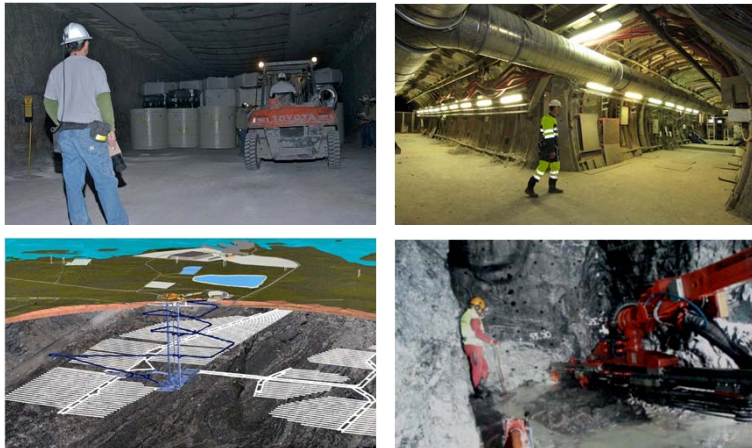
2. The legal SEA procedure



Options evaluated in the Waste Plan and the SEA

- Wide spectrum of options
 - Sea dumping, seabed disposal, space, subduction zones...
 - Disposal in deep boreholes
 - Perpetual storage ("*eternal stewardship*")
 - Common, multinational repositories
 - Advanced nuclear technologies
 - Geological disposal
 - ...
- **As far as long-term management (many thousands of years) is concerned, there is no alternative for geological disposal**
 - Only a passive system can ensure long-term safety (geological formation)
 - There are, however, differences:
 - timing of geological disposal
 - disposal conditions (surveillance, retrievability,...)
 - priority given to a national solution or waiting for a multinational solution

Internationally recommended solution



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Public consultation



Raadpleging van de bevolking

Ontwerp van het Afvalplan en milieueffectenrapport voor het beheer op lange termijn van hoogradioactief en/of langlevend afval

Van 7 juni tot en met 6 september 2010 kunnen het Ontwerp van het Afvalplan van NIRAS en het milieueffectenrapport voor het beheer op lange termijn van hoogradioactief en/of langlevend afval worden geraadpleegd door de bevolking, krachtens de wet van 13 februari 2006.

Tijdens deze raadpleging kan iedereen zijn opmerkingen kenbaar maken. Deze zullen in aanmerking worden genomen bij het opstellen van de definitieve versie van het Afvalplan dat NIRAS vóór het einde van het jaar aan de overheid zal voorleggen.

U kunt reageren:

- Online: www.niras-afvalplan.be
- Per e-mail: afvalplan@nirond.be
- Schriftelijk: NIRAS Afvalplan, Kunstlaan 14, 1210 Brussel

Voor meer informatie en om de documenten te downloaden: **www.niras-afvalplan.be**

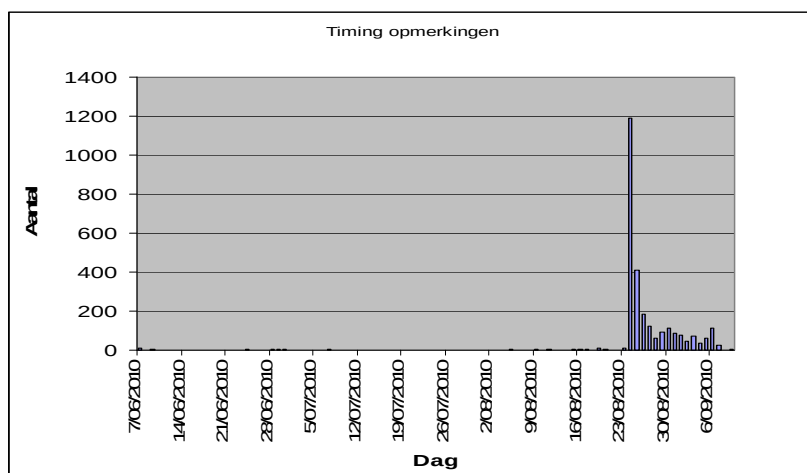
Een gedrukt exemplaar van de bovenvermelde documenten kan schriftelijk aangevraagd worden (NIRAS Afvalplan, Kunstlaan 14, 1210 Brussel of afvalplan@nirond.be).

NIRAS is de Nationale instelling voor radioactief afval en verrijkte splijtstoffen, die door de overheid belast is met het beheer van het Belgische radioactieve afval. De opdracht van de instelling bestaat erin het radioactieve afval veilig te beheren op korte en op lange termijn. De bescherming van het milieu en de veiligheid van de bevolking staan hierbij centraal.

16



2700 reactions to the legal consultation



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Analysis of the opinions and comments received during the SEA consultation

- Opinions from three official bodies (SEA Advisory Committee, Flemish Region, FANC) + public at large
- Systematically analysed according to 40 themes in order to be taken into account during final drafting of the Waste Plan
- Results
 - Transboundary effects need not be analysed at this stage (SEA Advisory Committee)
 - Surface storage unacceptable, from the point of view of safety, as long-term management solution (AFCN/FANC)
 - Procedure duly observed (SEA Advisory Committee)
 - Clear and recurrent demands: **retrievability, controlability and knowledge continuity**
 - Necessity of a management policy for all types of potential waste

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3. Global solution for the long-term management of existing and planned B&C waste (1/2)

■ Technical solution

- geological disposal on a single site on Belgian territory, in poorly indurated clay (Ypresian clays or Boom Clay)
- development in accordance with scientific, technical and societal progress

■ Within the scope of a decision-making process

- gradual
- adaptable
- participative
- transparent
- ensuring continuity
- ensuring integration of the technical and societal aspects

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Global solution for the long-term management of existing and planned B&C waste (2/2)

■ The development and implementation of which are accompanied by conditions expressed during the public consultations

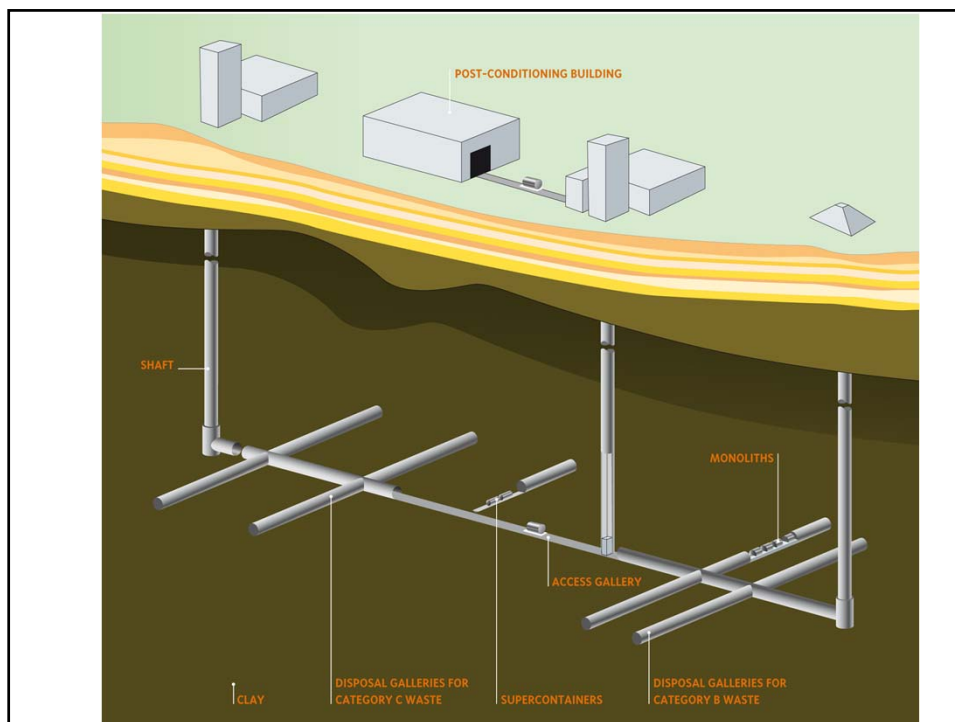
- Retrievability
- Controllability
- Knowledge maintenance and transfer

(the scope of these conditions must be clarified in consultation with the stakeholders)

- Follow-up of the developments regarding the management options that were examined in the Waste Plan but were discarded
- Independent follow-up of the decision-making process ("guardian")

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■ Taking into account all types of potential waste

- Demands expressed during consultation
- Wish of ONDRAF/NIRAS to prepare, through specific plans, the long-term management of other types of radioactive waste it might have to take over
 - next plan: plan on the long-term management of radium-bearing waste in general and of important volumes of radium-bearing waste originating from former activities on the Umicore site in Olen in particular
 - In the future: NORM and TNORM waste



Interim storage facility
for Ra sources (Olen)



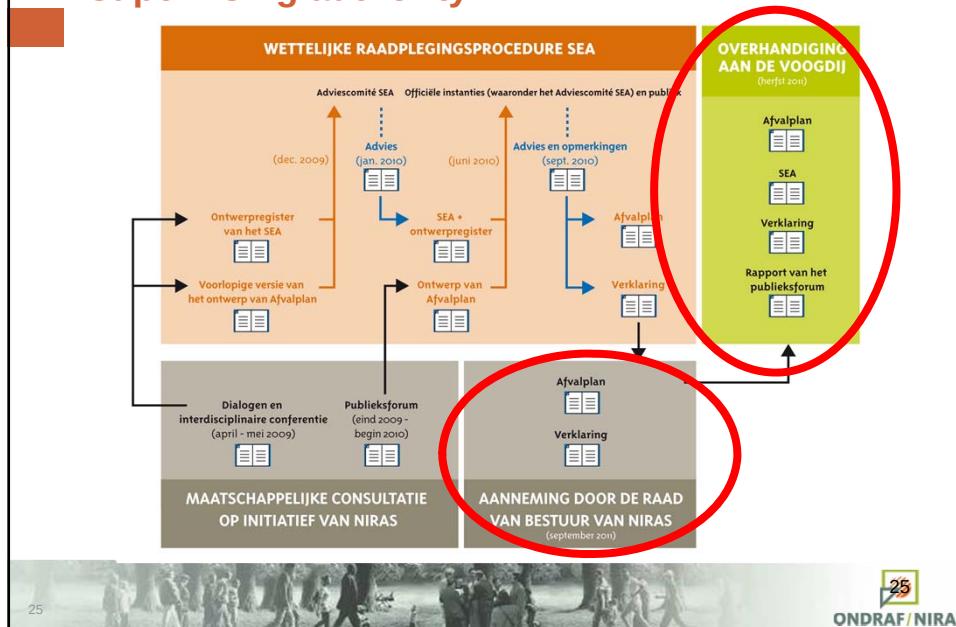
23

(Non-exhaustive) list of contracting parties

- Technical Writers/Support
 - Brigitte Cornélis
 - Véronique Piro
 - Expert@Business
- Societal initiatives
 - Greenfacts
 - iVOX
 - Dialogue Learning Center
 - King Baudouin Foundation
 - Participant, Atanor, Kessel & Smits
 - Rapporteurs,...
 - Club of Rome EU Chapter
 - Accompanying Committees
 - > 50 invited experts
- SEA
 - Technum/Resources Analysis, Tractebel
 - SCK•CEN
- Illustrations
 - Brigitte Cornélis
 - Bailleul
 - Ann De Wolf
- Web
 - Tabeoka
 - Indigov
- Translation
 - Bureau Oneliner
 - Manfred Fickers
 - Sonia Sala (SCK•CEN)
 - ...
- Logistics
 - Printers
 - Catering
 - ...

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4. Adoption and presentation to ONDRAF/NIRAS supervising authority



Respective responsibilities

■ Adoption

- The ONDRAF/NIRAS Board of Directors is empowered to adopt the Waste Plan, in accordance with the agency's functioning regulations

■ Decision in principle

- By analogy with and for the sake of coherence with the decisions relating to category A waste, it is up to the government to take a decision in principle on the policy to be pursued regarding the long-term management of B&C waste (notification)

➔ The adoption of the Waste Plan by the Board of Directors concludes the SEA procedure but prejudices neither the decision that must be taken on the policy for the long-term management of B&C waste in Belgium nor the contents of this decision

Products

■ **Waste Plan** as adopted by the ONDRAF/NIRAS Board of Directors of 23/09/2011

■ **SEA**

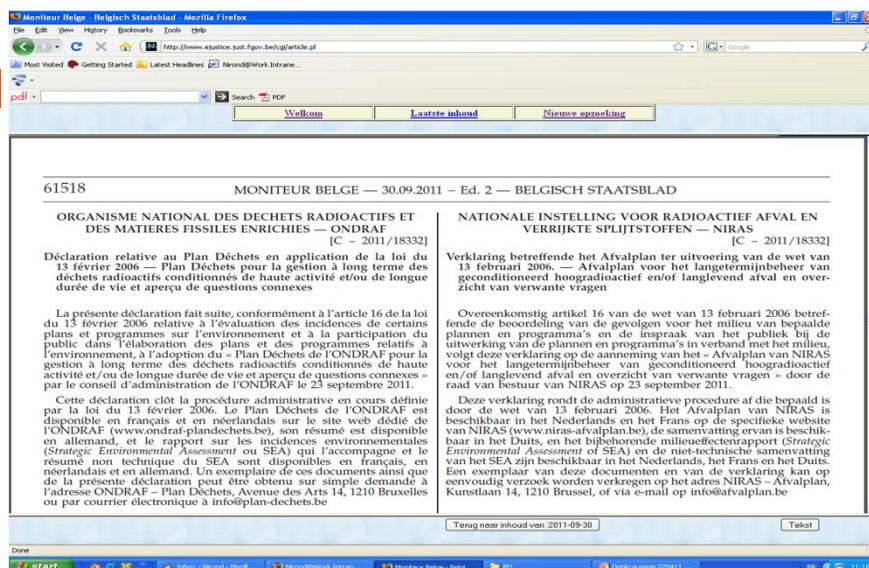
■ **Declaration**

- required by article 16 of the Law of 13th February 2006
- summarises the results of the analysis of the opinions and comments received during the legal consultation

In accordance with the legal provisions (article 16 of the above-mentioned Law), the declaration and the plan as adopted were

- published in extracts in the Belgian Official Journal (30th September 2011)
- published on the federal portal site
- sent to the consulted bodies

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Response of the supervising authority to the presentation of the Waste Plan and the relating documents (1/2)

- Response of 3rd October 2011
- Decision in principle must be taken by a fully empowered government
- In the absence of a decision in principle, ONDRAF/NIRAS must implement the following recommendations in order to ensure the continuity of its public service tasks:
 1. **carry on RD&D on disposal in poorly indurated clay** in order to confirm and refine the scientific and technical bases of this solution and ensure its financing, at the required level, by the producers
 2. **further define the decision-making process** that will take place in parallel with the development and implementation of the management solution

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Response of the supervising authority to the presentation of the Waste Plan and the relating documents(2/2)

3. **draft an proposal for a normative system framing the implementation of the Waste Plan** and including the creation of an independent body in charge of monitoring the decision-making process
4. **develop the societal component** of the B&C programme (and ensure the corresponding financing)
5. **clarify, in consultation with all stakeholders, the demands expressed during the consultations regarding retrievability, surveillance, knowledge transfer**
6. **follow the developments** regarding the management options that were examined in the Waste Plan but were discarded
 - (e.g. disposal in deep boreholes, international repository, advanced nuclear technologies,...)

These recommendations prejudge neither the decision to be taken on the policy for the long-term management of B&C waste in Belgium nor the contents of this decision.

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6. Link with the new 2011/70/Euratom Directive dated 19th July 2011 (1/3)

- The Waste Directive establishes a Community framework for the responsible and safe management of spent fuel and radioactive waste
 - To be transposed into Belgian law by 23rd August 2013
 - Makes it mandatory to establish
 - A national policy
 - A national framework
 - Responsibilities
 - Regulations
 - Financing schemes (including availability of resources, when needed)
 - Competences
 - Transparency policy
 - Safety-driven Integrated management system
 - Public participation
 - ...

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Link with the new 2011/70/Euratom Directive dated 19th July 2011 (2/3)

- A **national programme** covering all steps of radioactive waste management must be presented to the EC for the 1st time by 23th August 2015
 - Proposed management solutions for the various waste streams of the national inventory
 - RD&D activities needed to foster implementation
 - Cost assessments and financing schemes
 - Responsibilities
 - Implementation timeframes
 - Decision-making processes and their documentation
 - Transparency policy toward the public

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Link with the new 2011/70/Euratom Directive dated 19th July 2011(3/3)

- The solution recommended in the Waste Plan will contribute to fulfilling several requirements of this directive:
 - Coherence with the directive's principles
 - national responsibility
 - the fact that the long-term safety of management rests on a system that passively ensures safety
 - polluter pays principle
 - principle of intergenerational equity
 - elaboration of a documented and participative decision-making process
 - It corresponds to the solution considered in the directive as *"the safest and most sustainable option as the end point of the management of high-level waste"*
 - *"The storage of radioactive waste, including long-term storage, is an interim solution, but not an alternative to disposal"*
- **The Waste Plan thus constitutes a preparatory act for the first national programme of Belgium**

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7. Implications for ONDRAF/NIRAS

- Continuation of B&C programme is ensured, according to the 4 dimensions of a sustainable waste management solution, in particular
 - RD&D incl. environmental issues
 - Further building of the societal support for the B&C long-term management solution including also
 - Pursuit of participative initiatives
 - Transboundary aspects (esp. Netherlands)
 - Decision-making process
 - External follow up committee
- Development of an appropriate normative framework
 - EC Directive as an opportunity to foster "decision in principle" regarding long-term management for B&C waste
 - Transition between SEA Law and AFCN/FANC licensing procedure
- Management policies for all types of waste
 - Radium-bearing waste, NORM and TNORM
 - Other 'Waste Plans'
- Progressive implementation of an **Integrated Waste Management System**

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Thank you for your attention

All documents are available on

www.ondraf-plandechets.be

www.niras-afvalplan.be

or upon request at the ONDRAF/NIRAS
communication department

Increasing the societal process for the programme for B&C waste

Sigrid Eeckhout

ONDRAF/NIRAS



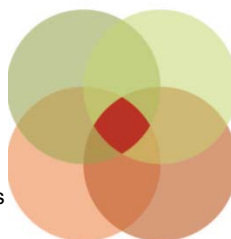
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Objective of the Waste Plan

- The Waste Plan must provide all necessary elements for the government to take a decision in principle concerning the future direction with respect to the long-term management of highly active and long-lived waste
- The Waste Plan adopts the vision that a durable solution incorporates these four dimensions

Technical and scientific aspects

Security and environmental aspects



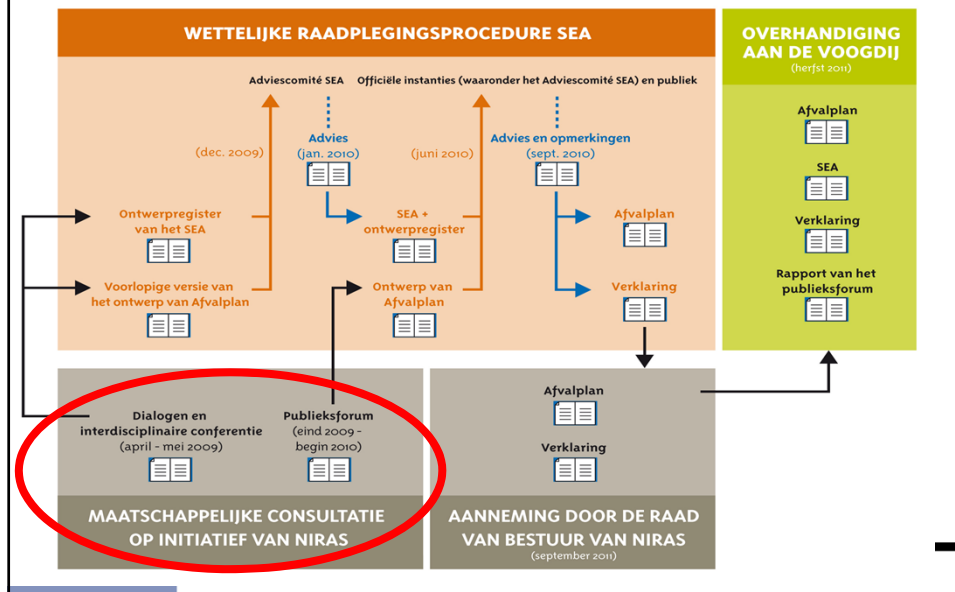
Financial and economic aspects

Societal and ethical aspects



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Societal consultations initiated by ONDRAF/NIRAS



Why ONDRAF/NIRAS organised societal consultations?

- To involve the population proactively in the decision-making process
 - the population can exert influence
 - on the direction in which must be worked in the future and
 - how this must happen
- To complete the Waste Plan and SEA with recommendations and conditions of the population



Step by step, participative process



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The societal consultations

- www.niras-afvalplan.be (2009-2011)
 - clear information on all aspects on the Internet site
 - population
- ONDRAF/NIRAS-Dialogues (April-May 2009)
 - involve population proactively
 - acquire insight in the questions and the concerns that live within society
- Interdisciplinary Conference (April 2009)
 - professional experts from several scientific and industrial disciplines
 - in-depth discussion of criteria so as to be able to assess the different management options



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The societal consultations cont'd

- Citizens' Conference organised by the King Baudouin Foundation (2009-2010)
 - entirely independent process
 - external evaluation
 - focus on
 - decision-making process
 - conditions to enable a decision in principle
 - recommendations for a decision process for the step by step implementation of a long-term management option
 - group of participants that was representative for the diversity in society
 - three weekends



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Citizens' Conference: methodology

- Method of participatory technology assessment
- Danish Board of Technology, applied in many countries
- 32 randomly selected citizens, representing the diversity of the population
- Deliberations during 3 weekends (November 2009 – January 2010)
- Strictly formatted, but open-ended
- Citizens in the driving seat: selection of topics to discuss, experts to be invited, recommendations
- Consensus driven, but allowing minority views



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Topic

"Which values, standards, arguments and considerations do you feel are important when taking a policy decision on the long-term management of high-level and long-lived radioactive waste?"



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Citizens' Conference: conclusions

- The Citizens' Conference provided tangible and substantial results
- The citizens integrated the ethical, technological, economic and environment aspects
→ support for geological disposal in clay
- ONDRAF/NIRAS has taken into account the recommendations expressed by the citizens as to a need for
 - retrievability
 - control mechanism
 - transfer of knowledge
 - ...
- Geological disposal: very sensitive topic. retrievability required for acceptance by public?
- Societal consultation necessary
→ Report handed over to our ministers

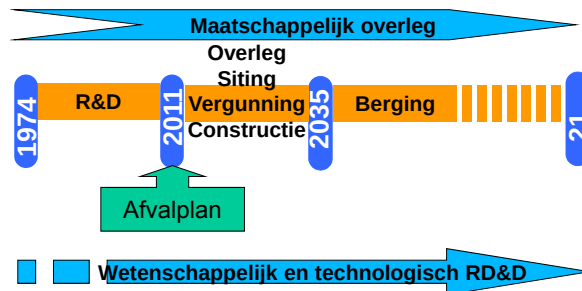


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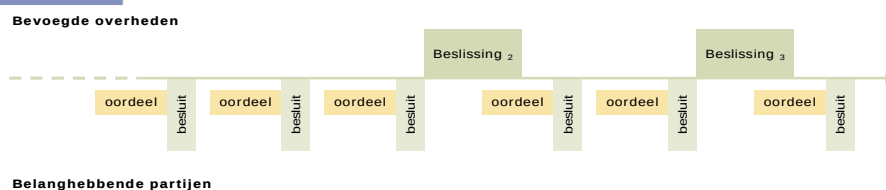
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Technical timeframe for reference solution



What is the timeline necessary for societal decision-making process?

Further development of the societal decision-making process



Information, opinion and decision

- concerned/interested parties
- competent authorities

Learning curve

- Lessons learnt from cAt-project:
 - No long-term management solution without societal acceptance
 - Partnerships are limited in time
- Waste Plan
 - Legal obligation of ONDRAF/NIRAS
 - Long timeframe
 - Need for continuity during a period of several decades
 - Political
 - Societal acceptance
 - Technical and safety requirements
 - Necessity of balanced decision-making



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Further development of the societal decision-making process

- Inventory of the main decisions to be taken
- Definition of the respective tasks, roles and responsibilities
- Identification of the interested parties in the different phases of the decision-making process
 - Who will decide about what?
 - When?
 - Based on what?
 - How?
- Desktop study UAntwerpen – ULiège
 - Management of relationships at and between distinct levels: federal → local
- Complemented by other studies



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Further development of the societal decision-making process

- Sounding board
- Independent follow-up commission
- Clarify conditions voiced in societal consultation
 - retrievability
 - control mechanism
 - transfer of knowledge



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Where to go from here?

- Three concrete conditions from Waste Plan & Citizens' Conference
 - retrievability
 - Control mechanism
 - Transfer of knowledge



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Where to go from here? Cont'd

- Mapping of existing studies, research, results, conclusion. Completion with benchmark data.
- Identification of challenges and opportunities.
- Identification and installation of the sounding board, follow-up commission.
- Definition of roles and responsibilities.
- Requirements for societal acceptance of research and technical interventions in the future siting process
- Methodologies and assessment parameters
- Consultancy and discussion platforms and processes
- Planning, timelines, milestones for assessment
- Communication requirements at all levels
- Roles and responsibilities of ONDRAF/NIRAS, of the stakeholders.



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Conclusions

- No long-term management solution without societal acceptance
- Challenge of the long-term timeframe: need for continuity
- Need for balanced decision-making both long-term and short-term
- Need for periodical assessment, reporting of argumentation for transfer of knowledge
- Need for attention to transboundary conditions and interaction
- Need for national and international peer review



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Impact of the Waste Plan on the RD&D programme for B&C waste

Maarten Van Geet

NIRAS/ONDRAF

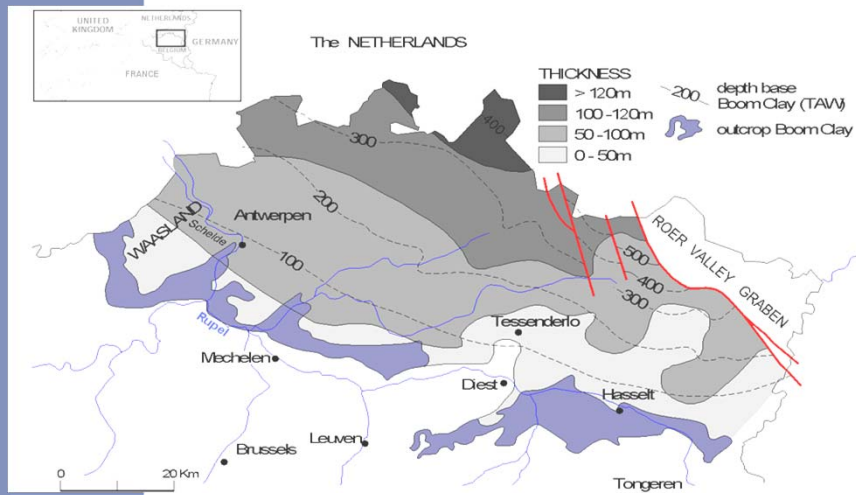


Continuity of RD&D

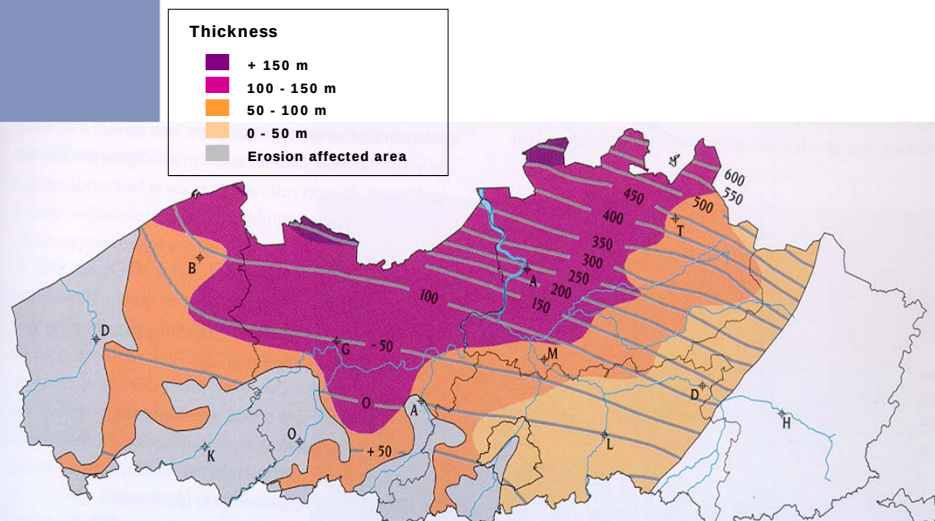
- RD&D will continue and financing is guaranteed
 - Letter of the supervising ministers supports this
 - Focus on confirmation of the feasibility of safe geological disposal in poorly indurated clays - Boom Clay and Ypresian Clay and increasing societal aspects



Presence of Boom Clay



Presence of Ypresian Clay



Modification of planning

- Original planning based on technical-scientific aspects
 - 1990: SAFIR 1
 - 2001: SAFIR 2
 - ~2013: SFC1 → go for siting
 - ~2020: SFC2 → go for licensing
- Current status
 - Still no Decision in Principle
 - Increase of the societal involvement, which can lead to specific questions that are not yet underbuild with broad RD&D knowledge



Modification of planning

- Future
 - Timing and content of the Decision in Principle and the continuous societal involvement will allow us to identify the planning and objectives of SFC1
 - Societal consultation of the Waste Plan is used as an opportunity to register already the societal concerns with an impact on RD&D
 - To keep pace with having about every 10 years an overview report, O/N develops currently an **RD&D Plan** – geological disposal
 - Short overview of current knowledge with focus on the evolution since SAFIR2
 - Most important open questions and priorities for SFC1
 - Integration of the societal concerns expressed in the frame of the consultation of the Waste Plan



First overview of RD&D aspects resulting from the Waste Plan

- Increase of visibility and RD&D on Ypresian Clay
 - Enlargement of the research on Ypresian Clay to come at a « comparable » level of knowledge as for Boom Clay
- Increase visibility and knowledge on environmental impact
 - Chemo-toxic impact
 - Impact of temperature on groundwater
 - Quality of drinking water (temperature, chemo-toxic, ...)
 - Thermal expansion and possible uplift of soil



First overview of RD&D aspects resulting from the consultation during Waste Plan

- Societal concerns
 - Retrievability and controllability
 - Can have an important impact on feasibility (layout/design, technical aspects and operational safety), timing of activities and long term safety
 - Necessity to develop or extent phenomenological basis to set up a grounded discussion during the societal dialogue → One should be able to dialogue also about the limits of such requirements
 - Transfer of knowledge
 - At international level a first project has started



First overview of RD&D aspects resulting from the consultation during Waste Plan

- Vigilance on (scientific) evolution of non-retained options
 - P&T
 - Deep boreholes
 - Schistes
 - International repository
- Moreover NIRAS/ONDRAF wishes to maximise the synergy between the different RD&D aspects
 - E.g. Maximise synergy between continued RD&D for cAt and RD&D for B&C



The role of the underground laboratory HADES in future RD&D

- Next decades: shift towards confirmation-RD&D
 - Large scale and long term experiments
 - Continuity of long running experiments
 - Input towards monitoring programme (testing new techniques and description of limits based on 'lessons learned')
 - Transferability to larger zone and Ypresian Clay based on surface experiments and drillings
 - Currently, O/N does not think it is necessary to have a dedicated URL within the Ypresian Clays. If needed a rock characterisation laboratory can be build at the start of the repository construction (like in Finland)
- During operational phase of repository system the continuation of confirmation RD&D and testing with respect to optimisation will be performed



The role of the underground laboratory HADES in the societal dialogue

- Good starting point for stakeholder participation
 - This must be continued
 - URL might help with respect to knowledge management and memory keeping
 - Continue the interest within the scientific / academic world
 - International collaboration
 - Attraction pool for communication with a larger public



Conclusions

RD&D on geological disposal in poorly indurated clays (Boom Clay and Ypresian Clay) will:

- Be pursued
- Be increased
- Be enlarged to societal aspects
- Take the opportunity for synergy with cAt

