

High level and long-lived radioactive waste management

The French case - The 2006 planning act

Andra

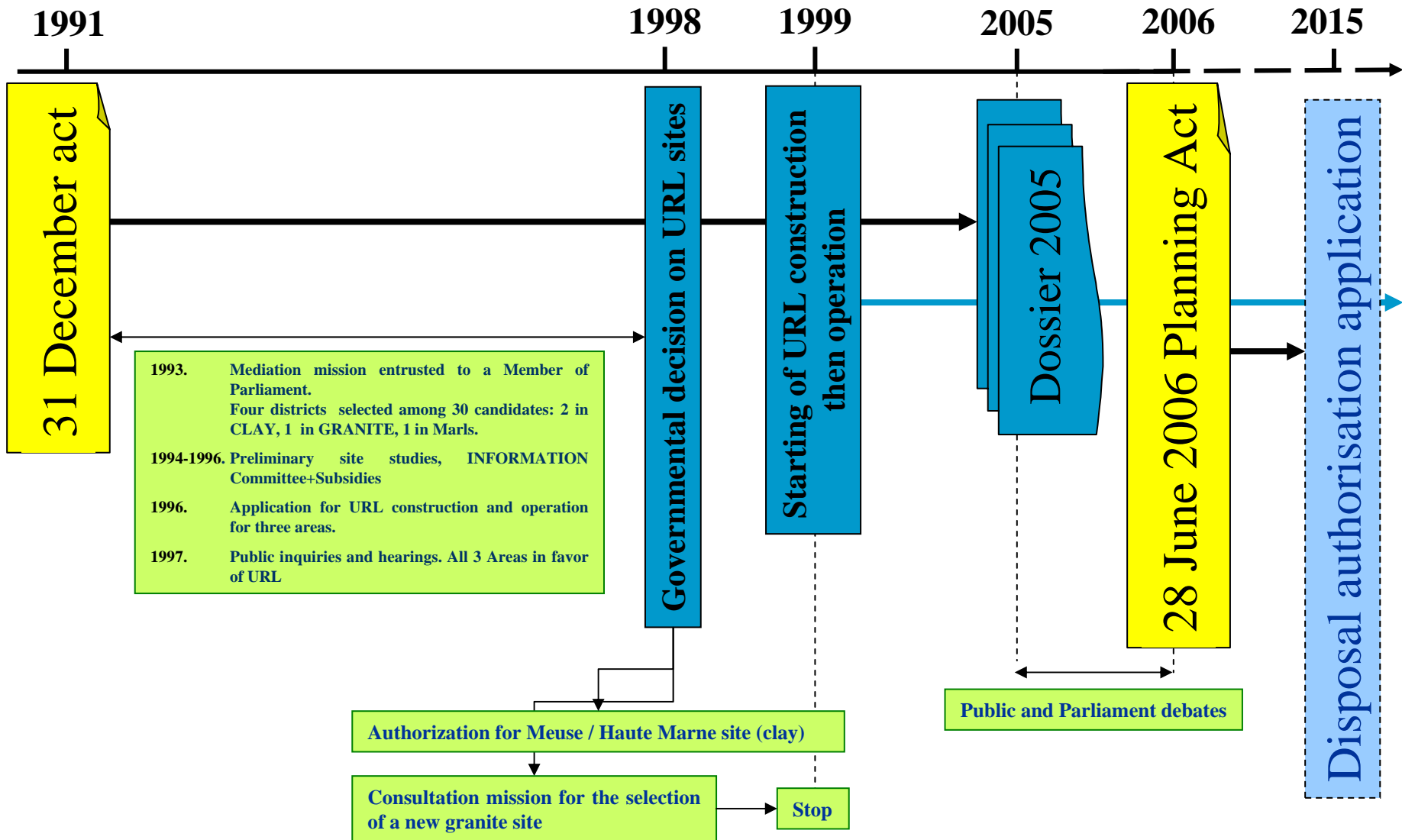
Classification and status of waste management

	Short-lived (half-life < 30y years)	Long-lived (half-life > 30y years)
Very low level (VLL)	VLL Waste Disposal Facility (Aube)	
Low level (LL)	LL/IL Waste Disposal Facility(Aube)	Investigations on repository projects
Intermediate level (IL)		
High level (HL)	Investigations conducted in accordance with the Law of 30 December 1991, and now with the Planning Act of 28 June 2006	



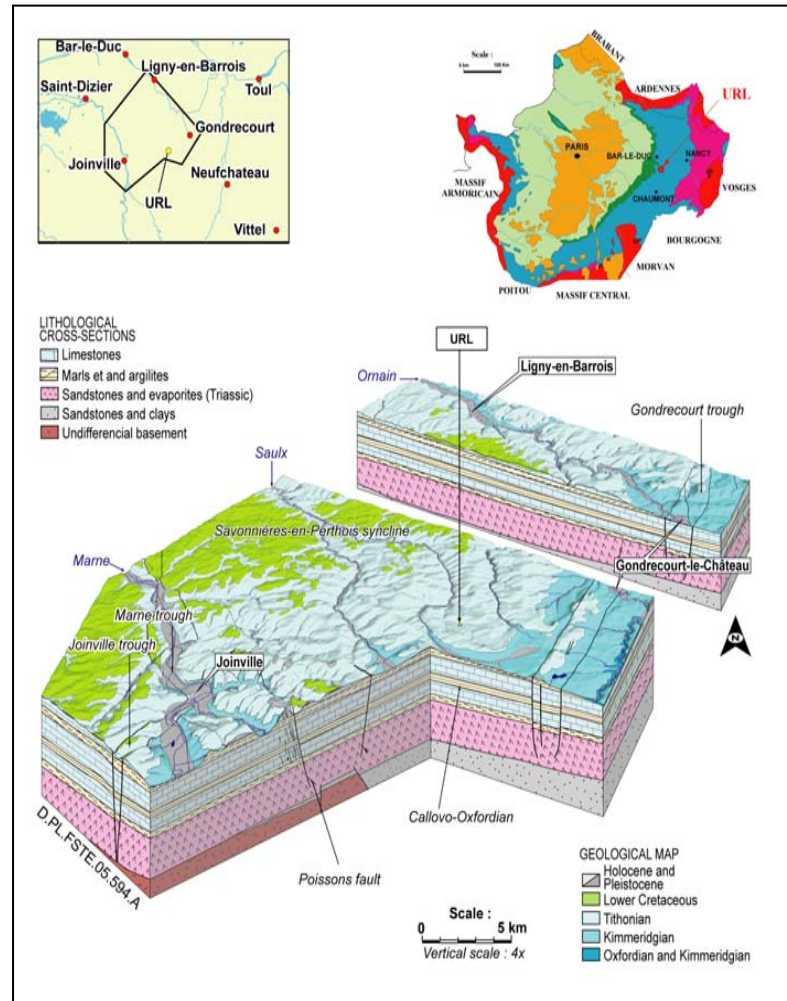
- **ILLW** (French type B) : Resulting from Spent fuel processing, PWR operations, research centres operations - A large variety of waste form (zircaloy, stainless steel, sludges...) and of conditioning (cement, bitumen, compaction...) - typical volume : 80,000 m³
- **HLW** (vitrified waste or French type C) : Resulting from spent fuel processing by the vitrification of non-exploitable radionuclides - typical volume : 3,500 m³

The French step-wise process on ILLW and HLW management



The Meuse / Haute Marne site – localization and Geology

✓ East of Paris Basin, border of Meuse and Haute Marne Departments ⇨ URL at Bure



Well known, simple geology

- 155 million year old sedimentation sequences
- Host rock : an homogeneous, stiff argillaceous rock formation (Callovo-Oxfordian argilites)
- Near horizontal, homogeneous, >130 m thick layer, middle at 500 depth (at Bure URL)
- Well defined structural framework in a stable, sedimentary basin
- Very slight fracture density outside regional faults
- Very low permeability and diffusion
- High retention properties

The 31 December 1991 act

✓ A 15 years research act - **Three avenues of research have been defined:**

1. Partitioning and transmutation (inventory reduction)
2. Reversible or irreversible disposal in deep geological formations
3. Waste conditioning and long-term storage

↳ **Final Reports submitted by Andra on research avenue 2 (Dossier 2005) and CEA on research avenues 1 and 3**

✓ Four principles **enshrined:**

- Protection of nature, environment and health
- Consideration of the rights of future generations
- Parliamentary examination prior to any decision
- Transparent debates and clear information (National Review board, Local public debate and information committee, Parliamentary Office for Assessment of Scientific and Technological Options, External Reviews)

↳ **Government decision to call a public debate in September 2005 organised by the National Commission for Public Debate (CNDP) on radioactive waste management orientations**

The Dossier 2005

✓ One of the key elements in the debate

– Aims at establishing the basic feasibility of the geological disposal in a clay formation

– Three independent reviews :

- National Review Board as prescribed by the act,
- French Nuclear Safety Authority in accordance with its prerogatives
- International Review Team (IRT) under the aegis of the OECD/NEA at the request of the French government

⇒ *Positive and very encouraging comments*

⇒ *Recommendations for further R&D*

The Public Debate

- ✓ **Different attitudes noticed:** stop the production of RW, support the nuclear industry and the geological disposal, go ahead without hurry, assess, be able to stop if necessary
- ✓ **Need for a consistent management policy for all radioactive waste**
- ✓ **Improve governance:** waste management plan, financial scheme, independent expertise
- ✓ **Progressive decision process:** 10 to 15 years more for research, long term storage to be considered as an alternative, sustained efforts on reversibility
- ✓ **A strong backing for a regional development plan around the selected site**
- ✓ **The debate provided the evidence that an open discussion is possible**

The 2006 Planning Act

National management policy

- ✓ **Scope of the draft law:** all radioactive materials and waste

- ✓ **2 Principles:**
 - **for the protection of human beings and the environment**

 - **responsibility of current generations with regard to future generations**

- ✓ **A national management plan for radioactive materials and waste,** defined by a decree, updated every three years, and tabled before Parliament.

The 2006 Planning Act

- ✓ *Principles of the national management plan for radioactive materials and waste (defined by a decree, updated every three years, and tabled before Parliament).*
- ✓ the **quantity and toxicity of waste must be reduced**, notably by processing or conditioning spent fuel and radioactive waste
- ✓ radioactive materials and waste pending storage or disposal must be **stored in dedicated facilities**
- ✓ **after storage**, any ultimate radioactive waste that is unsuitable for disposal in surface or shallow facilities for nuclear-safety or radiation-protection reasons must be disposed of in a **deep geological repository**

- ✓ *Foreign radioactive materials and waste*
- ✓ prohibited **disposal of foreign radioactive waste in France**;
- ✓ **importation of spent fuel and radioactive waste strictly limited to processing and research, or to transfers between foreign countries**;
- ✓ **processing of foreign radioactive materials in France subject to published intergovernmental agreements and the return of radioactive waste to foreign producers**

The 2006 Planning Act

Strategic orientations for investigations and studies

- ✓ **Storage:** to perform investigations and studies needed to create new facilities or to backfit existing facilities by **2015**

- ✓ **Disposal:** to prepare an authorisation application in 2015 for a scheduled commissioning in **2025**

- ✓ **Advanced partitioning/transmutation:** investigations to be furthered within the framework of the **Generation-IV Programme**; commissioning of a prototype in **2020**

The 2006 Planning Act

Assessment and information

- ✓ **Research assessment by an independent commission**
 - broadened membership (international, human sciences);
 - annual report to be tabled before Parliament and made public.

- ✓ **Local Information and Oversight Committee (CLIS)**
 - overall follow-up, information and consultation mission concerning research on the management of radioactive waste, and especially on deep geological disposal
 - headed by an official appointed by the Presidents of the General Councils of the relevant departments
 - possibility to hold hearings and counter-assessments

The 2006 Planning Act

Applicable legal system

✓ Statute of an underground disposal facility

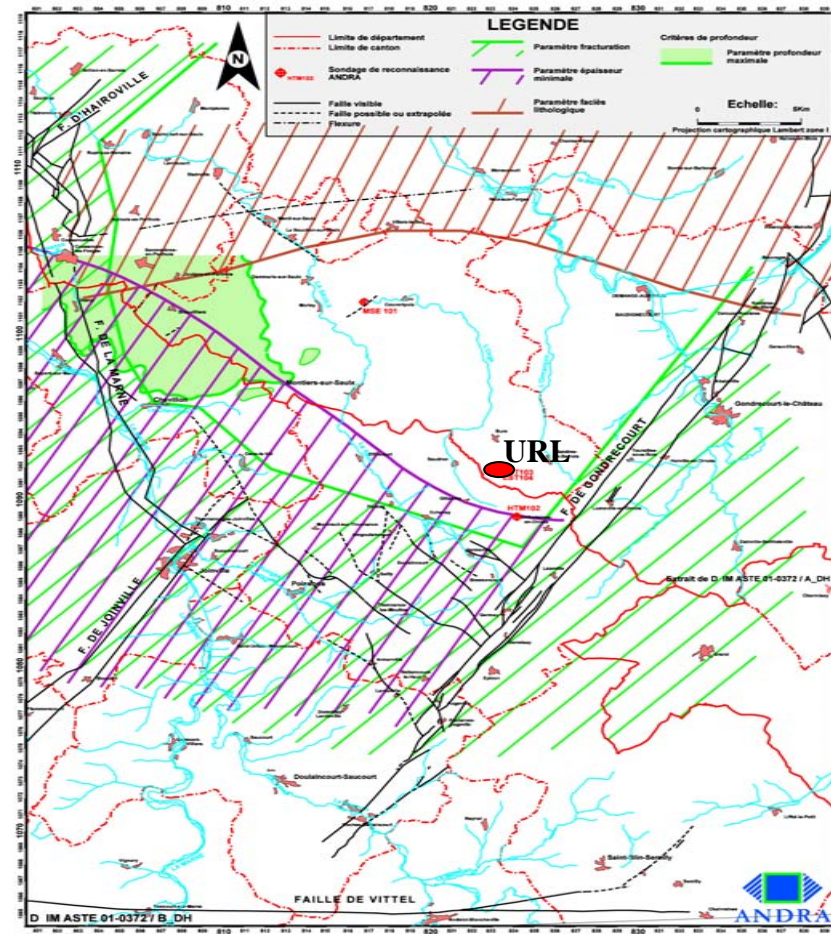
- basic nuclear installation (*installation nucléaire de base* – INB).

✓ Implementation authorisation

- refers to a geological formation that has already been investigated through an underground laboratory;
- must be preceded by a public debate.

The Transposition zone

- Definition of a zone about 200 km² around URL (applicability of data obtained at URL)
- Zone for the implementation of a repository



To the implementation of a repository

A step-wise process under French Parliament control

- ✓ **A public debate** organized by the National Commission on Public Debate
- ✓ **Authorisation application** by Andra
- ✓ **Report by the National Review Board**, a notice by the **Nuclear Safety Authority**, a notice by territorial communities located close to the facility (zone described by decree)
- ✓ Submission of the authorization application and related reports to the **Parliamentary Office for Scientific and Technological Assessment (OPECST)**, which reports to the relevant committees of the National Assembly and of the Senate
- ✓ **Draft law presented by the government** to set **reversibility conditions** valid for at least 100 years
- ✓ **Public inquiry**
- ✓ **Authorisation by decree of the State Council**
- ✓ **Law to authorise the closure of the repository**

The 2006 Planning Act

- ✓ *Economic development of relevant territories*
- ✓ **Public interest group** (*groupement d'intérêt public* – **GIP**) in each of both departments, Meuse and Haute-Marne, to manage supporting funds
- ✓ **Proximity area** prescribed by decree
- ✓ **GIP resources to be constituted by two additional taxes** (supporting and technological diffusion) to the existing INB tax, with a portion reserved to a 10-km area around the main access shaft to the installations
- ✓ *Funding and control*
- ✓ **Funding of disposal and storage**
 - research through an additional tax to the INB tax in order to supply a dedicated fund within Andra (up to 100 M€year)
 - construction of new storage and disposal facilities: paid pursuant to agreements with waste producers.
- ✓ **Supervision of the assessment and of the coverage of nuclear charges**
 - conservative assessment of nuclear charges controlled by relevant administrative authorities and Parliament on the basis of a detailed report submitted by nuclear operators;
 - producers: constitution of provisions as dedicated assets and locking of assets
 - control and sanction modalities