

Designing and building a radioactive waste deep disposal facility with the involvement of the stakeholders directly concerned

Paper 11527

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Track 8 Public Communication, Participation, Education & Training (CE&T) - Topic 8.2 Engaging Citizens - Lessons Learned From Around the World

RADIOACTIVE WASTE MANAGEMENT IN FRANCE

In France, radioactive waste - whether or not it comes from the nuclear power generating industry - is managed by Andra (French national radioactive waste management agency). Andra was created by a 1991 Act¹ and is an independent public agency operating under the authority of the Ministries responsible for the environment, energy and research. To ensure sustainable and responsible management of the radioactive waste it produces, France has also created a specific legislative framework for all activities related to this management: Andra's activities are thus governed by a planning Act dedicated to radioactive waste management² and by the *National radioactive materials and waste management plan* (PNGMDR in french), which organises the implementation of industrial management solutions and the studies required for the planned disposal routes.

Andra is thus responsible for proposing and implementing a range of industrial solutions to guarantee controlled and coherent management of all the radioactive waste produced by France. Over and above the extremely important industrial side of its activities, Andra oversees research and development work into the design of management solutions for waste which at present has no solution, and optimisation of the various solutions already in use.

Today, a management solution is already operational for nearly 90% of French radioactive waste, comprising very low level waste (VLLW), or low and intermediate level, short lived waste (LLW/ILW-SL): The Manche disposal facility (operated from 1969 to 1994), the Low and intermediate level short-lived disposal facility (in operation since 1992), and the Very low level disposal facility (in operation since 2003) in the Aube *département*.

¹ Act 91-1381 of 30 December 1991 concerning research into the management of radioactive waste.

² Act 2006-739 of 28 June 2006 concerning the management of radioactive materials and waste

Management solutions		Waste concerned
Existing final management solution	Surface Very low level disposal facility	VLLW waste
	Surface Low and intermediate level short-lived disposal facility	VLLW-SL waste
Final management solution under study	Cigéo (industrial geological disposal centre)	HLW and ILW-LL waste
	Near-surface disposal	LLW-LL waste
	CEA and Andra projects (interim storage for radioactive decay before disposal in appropriate channels)	Tritiated waste
	Proposed criteria for orientation to an existing or planned disposal solution	Sealed sources

The 2009 edition of Andra's national inventory identified 1,153,000 cu. m of radioactive waste. At the end of 2007, more than 70% of this waste was already disposed of in Andra's industrial installations

For the remaining 10% of the waste without an operational disposal solution, in other words the most highly radioactive and long-lived waste, Andra is coordinating studies and research into the design of innovative industrial solutions. The most emblematic project is Cigéo, the industrial geological disposal centre. If actually built, this disposal facility, located at a depth of about 500 metres, could as of 2025 receive high level (HLW) and intermediate level, long lived (ILW-LL) waste, resulting primarily from the reprocessing of nuclear fuels. The following parts of this article will focus more particularly on the information, communication, and consultation/debate aspects.

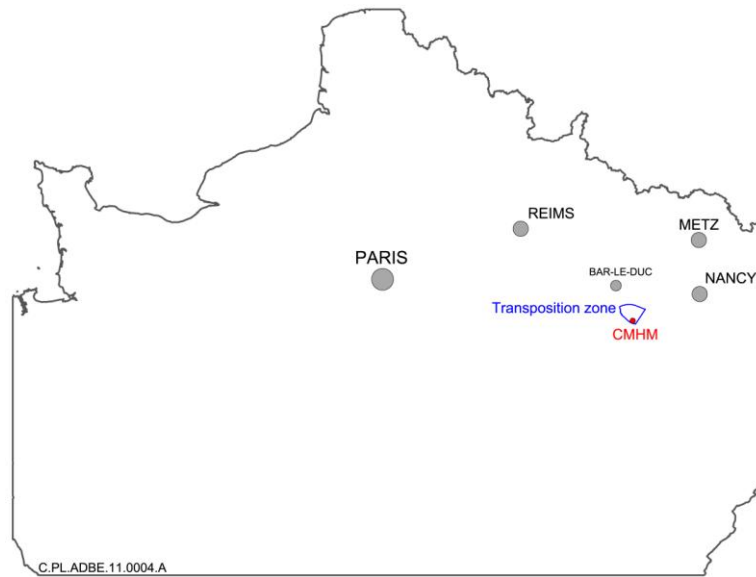
THE CIGÉO INDUSTRIAL GEOLOGICAL DISPOSAL FACILITY

Background

After fifteen years of research carried out pursuant to the 1991 Act, Andra demonstrated the feasibility of deep disposal in the Callovo-Oxfordian argillite layer³, studied in particular by means of its underground research laboratory (URL) and an initial area of 250 km² (the transposition zone), suitable for the underground location of the repository, was defined around the URL and the Meuse/Haute-Marne Centre.

Following an initial public debate and assessment of Andra's results by independent experts, the 2006 Act selected deep disposal as the final solution for management of LLW and ILW-LL waste. This Act gave Andra the task of continuing studies with a view to selecting a site and designing the repository, so that the creation authorisation application could be reviewed in 2015 and, subject to granting of this authorisation, the facility could be commissioned in 2025.

³ This layer is at least 130 metres thick, is 160 million years old and has been stable for the past 140 million years.



Situation map of the Meuse / Haute-Marne Centre (CMHM) and the study area for siting of Cigéo (transposition zone)

In late 2009, Andra sent the French Government a proposal to scale down the study area to 30 sq. km, for siting of the Cigéo underground facilities on the basis of scientific, technical and socio-economic criteria.

Andra is today launching the industrialisation phase of the *Cigéo project*. This involves preparing for the various milestones determined by the 2006 Act: a public debate about the project (2nd half of 2012), review of the authorisation application (2015), voting of an Act on the reversibility of disposal and its implementation conditions (2016/2017).

ANDRA'S CONSENSUS-BASED APPROACH

Cigéo is an exceptional project which cannot follow a conventional information process. In order to ensure that the repository is integrated into its host environment as satisfactorily as possible, Andra sought as of 2006 to adopt an innovative process of debate and dialogue with the local stakeholders. This approach is based on the policy of communication Andra has applied to its installations for many years, as well as on the flexibility it proposes for the project (siting, reversibility, etc.). Through this approach, Andra aims to involve the local stakeholders in the project as early as possible, to enable them to play a full role in the running of the project.

Extensive and appropriate Information

When it comes to information, Andra aims to offer the public every possible means of understanding what its activities actually are, to become involved and to ask questions, in order to initiate true dialogue.

Over and above the usual communication media (publications, periodicals, websites, etc.), Andra has developed a number of tools designed to make its project more accessible. For example, Andra recently launched an educational website devoted to the issue of radioactive waste (www.dechets-radioactifs.com, site in French) and is preparing an exhibition on the subject of radioactivity to mark the centenary of Marie Curie's Nobel Prize.

Installation visits

Visits to all Andra sites are open to everyone. This is without doubt the best way of really showing the work actually done by Andra, covering the scientific and technical aspects alike. These visits concern the URL (surface and underground installations) and the Technological Exhibition Facility opened by Andra in 2009, so that the public could view prototypes and demonstrators (of disposal packages, etc.) and machines (HLW waste disposal package handling robot for example). The Meuse/Haute-Marne Centre receives about 7,000 visitors per year, some 2,000 of whom visit the underground drifts, 500 metres down.

To shed light on the more complex scientific and technical issues, which are harder for non-specialists to comprehend, Andra regularly arranges thematic exhibitions in its public visitor centres. These exhibitions, whether or not actually produced by Andra, deal with a variety of topics, such as clays, the study of paleo-environments, earthquakes, etc.

Once a year, on a Sunday, an open day is an occasion for direct discussions between the public and Andra's engineers and scientists. It is always a real opportunity for all sides to understand the other's points of view.

Meeting and dialogue

Andra does more than allow the public to visit its sites. It also sets out to meet those living in the vicinity of its installations. For example, it proposes a travelling exhibition which it sets up and runs at the request of mayors in the towns and villages around the Meuse/Haute-Marne Centre.

At the same time, Andra is developing its contacts with the local authorities concerned, in particular the *Département* Councils, mayors and chambers of commerce. The French Government is closely involved in this process. Andra also regularly presents the progress of its research to the local information and monitoring committee (CLIS) set up for the URL.

All these exchanges provide opportunities to present the project and provide the various stakeholders with the technical information they need for their own consideration of the local issues of the project, the choices to be made at the various milestones, the public information needs, and so on.

They also give Andra the chance to improve its information tools, by subjecting them to widespread scrutiny, in order to enhance the clarity and pertinence of the information the Agency makes available to the public.

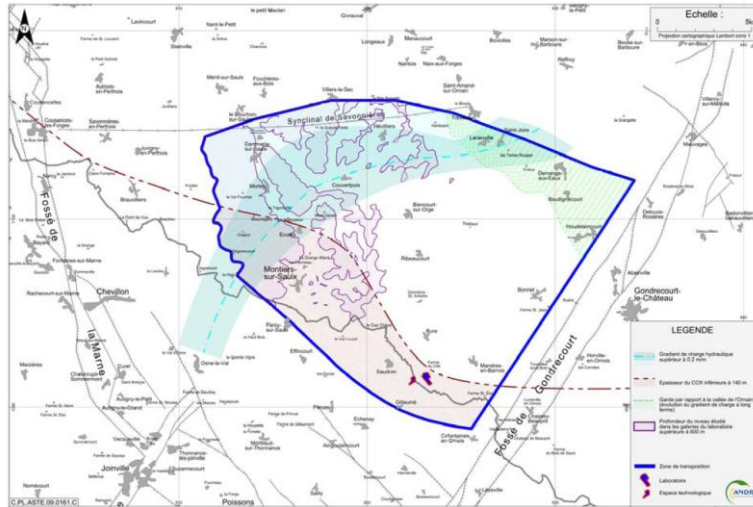
Finally and above all, they are an essential step in the consultation process enabling the project to be handled in a more tangible way with all the local stakeholders.

DEFINITION OF A ZONE FOR THE UNDERGROUND FACILITIES: A CONCRETE EXAMPLE OF CONSULTATION

A concrete example of the approach adopted by Andra is the reduction in 2009 of the study perimeter from 250 sq. km to the restricted area of 30 sq. km: Andra involved the local stakeholders in the choice of this area. This approach aimed in particular to consolidate the list of criteria to be considered when identifying the most propitious area for the underground disposal installations. The objective for Andra was therefore to enable the local stakeholders to express their preferences (opting for a particular type of area for a particular reason, avoiding siting the underground installations at such or such a place, etc.).

Initial meetings organised with the local stakeholders were devoted to presenting the scientific and technical criteria to be considered when siting the repository. They took place from January to April 2009 and consisted primarily of plenary sessions, the purpose of which was to explain the geological aspects (role of the thickness of the argillite layer, aspects concerning pressure gradients in geological layers, and so on) and

the technical aspects (influence of depth on technical feasibility, etc.). These meetings were coordinated by the communication department, and they involved Andra scientists and engineers.

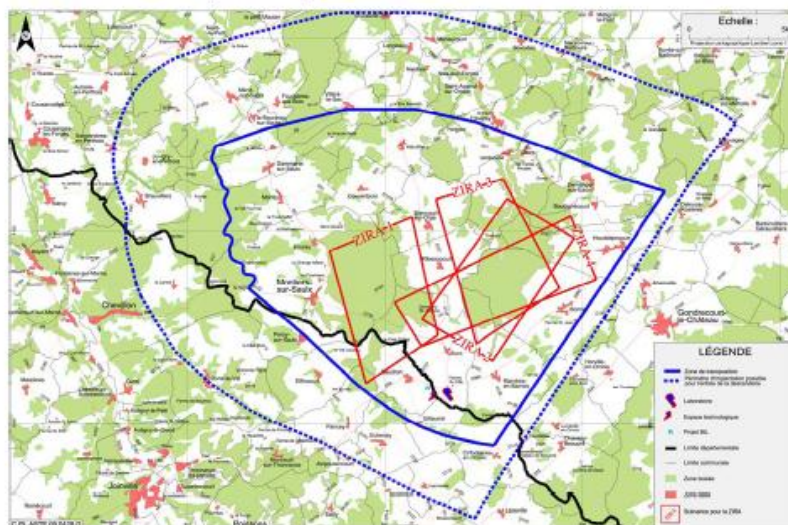


Map of the optimum zone for siting the repository based on scientific and technical criteria (white part inside the transposition zone)

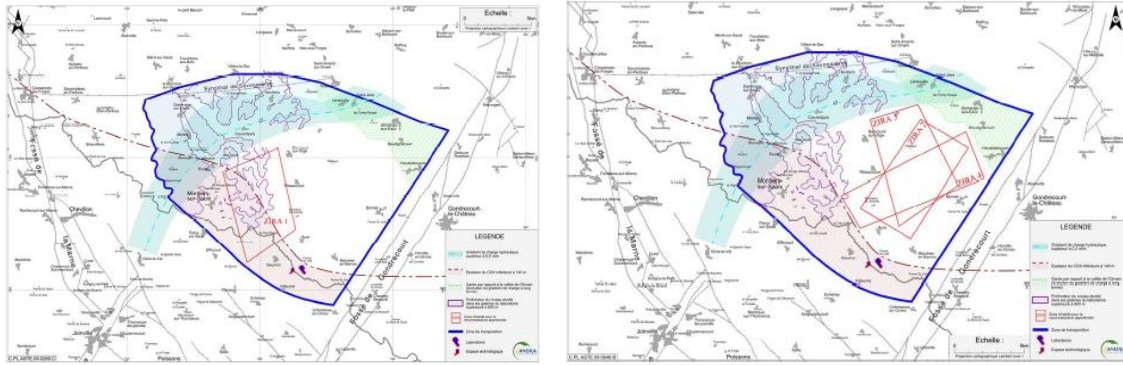
The feedback received identified a certain number of local integration criteria that needed to be taken into account:

- Avoiding a site underneath the urbanised village areas;
- Preferably siting under the forests;
- Examining the possibility of rail access.

On this basis, Andra defined initial proposals for zones which took account of these criteria as much as possible. 4 zones were therefore proposed in May 2009 and were used as the basis for continued discussions. They were presented by means of a surface cartographic base, so that these zones could be compared with the criteria highlighted by the local stakeholders, as well as the "scientific and technical" cartographic base explained in the first phase of the discussions.



Projection of the 4 zones proposed: a site under the forest is preferred, as the villages are all outside the perimeters and the two départements associated with the project remain involved.



Although zones 2, 3 and 4 are completely within the zone identified as the most favourable with respect to the criteria, zone 1 is not: more than half of zone 1 is outside this perimeter.

This second phase of the dialogue (May - October 2009) provided an opportunity for the local stakeholders to give their opinion. To Andra's great surprise, most stakeholders expressed an opinion in writing. Of the various scenarios proposed by Andra, none was unanimously approved. However, areas of consensus were identified with regard to the choice of zone and requests concerning land use planning and integration of the repository project.

The areas of consensus are as follows:

- Technical criteria relating to safety and geology must be determining factors in the choice of the area;
- The various local authorities wish to continue to be involved in the rest of the project.

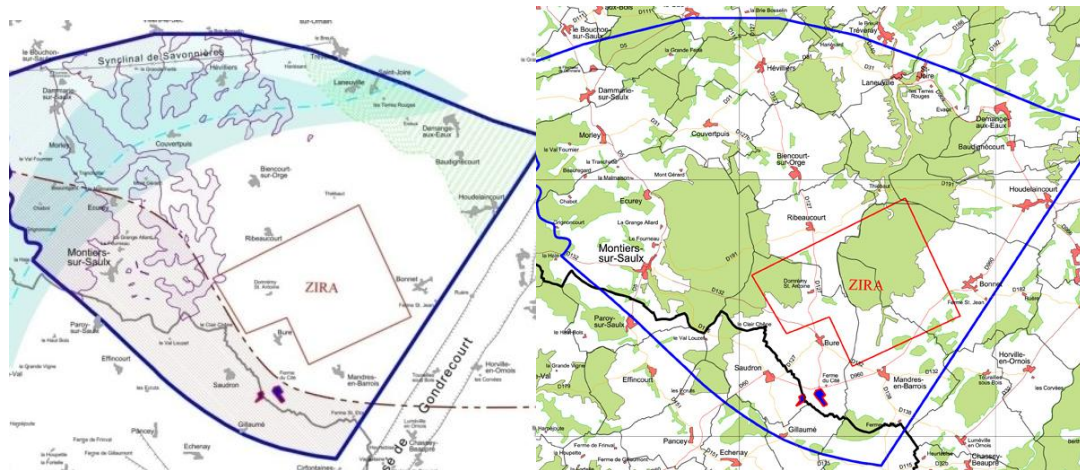
The particularly insistent requests concerned planning aspects:

- Situating the entrance to the "package" ramp at the boundary between the Meuse/Haute-Marne *départements*;
- Promoting the deployment of equipment and services necessary for hosting the project;
- Promoting the potential of the existing transport infrastructures;
- Ensuring that the economic spin-offs are evenly and fairly distributed.

Expectations concerning local integration of the project:

- Contributing to local economic and social development;
- Preserving the local quality of life and emphasise environmental integration;
- Minimising disruption and disturbance of the population and encourage the development of rail and river transport;
- Protecting surface and ground waters;
- Preventing spoil tips from becoming eyesores.

To avoid proposing a zone which could privilege one set of local stakeholders over the others, Andra decided to assume full responsibility for defining a new zone. The Andra proposal submitted to the French Government in October 2009 was thus based on scientific and technical criteria and also on criteria identified throughout the discussion and debating phase. This proposal was approved by the Minister with responsibility for Andra, who also gave the Agency a green light to continue with its work.



Map of the zone proposed by Andra. It meets scientific and technical criteria (left) and local requirements (right)

Andra is today preparing to continue its approach so that it can identify sites for surface installations. The aim this time is to prepare and present a siting proposal for the public debate scheduled for late 2012. This should be based on scientific aspects (environment, etc.), technical aspects (terrain, etc.) and on the demands and expectations of the local stakeholders.

INITIAL FEEDBACK AND AREAS OF PROGRESS FOR ANDRA

Involving the stakeholders is necessary in a radioactive waste repository siting project, but the task is a complex one. Waste generally has a highly negative image and the fact that it is radioactive simply compounds the problem and exacerbates concerns. Moreover, siting a repository – especially in a region unfamiliar with the nuclear industry – is something of a gamble: the *Not in my back yard* (NIMBY) syndrome is omnipresent ...

Andra thus opted for a conciliatory approach. The first step was to co-opt specialists in general and scientific communication, a local integration manager and a researcher in human and social sciences onto the Andra teams. This led to the construction and implementation of real dialogue, first of all within the Agency itself and then with the stakeholders. In order to help it with this approach, Andra also set up a monitoring committee, under the supervision of its Science Council. The "Coesdic", for information and consultation appraisal and monitoring committee, issues opinions on the information, dialogue and debates concerning Andra's repository projects. It has expertise in civic participation in industrial and technological decisions and comprises personalities who have held positions of operational responsibility in the field of radioactive waste management, plus internationally renowned scientists. The "Coesdic" meets several times a year and publishes an annual report which is available from the Andra website (www.andra.fr).

In addition to these in-house measures, Andra has also changed the way it deals with the public as a whole. As well as a policy of greater openness, based on public access to its sites, it also had to develop meetings with the public. To do this, Andra has increased the opportunities for discussion and debate and has invested heavily in disseminating more educational information tailored to the various audiences concerned. This is a pre-condition for any discussion and is essential if everyone is to "speak the same language".

This approach has been followed for nearly five years now and has proven to be highly satisfactory. New communication media offer a greater diversity of information that is more regularly updated. It has been

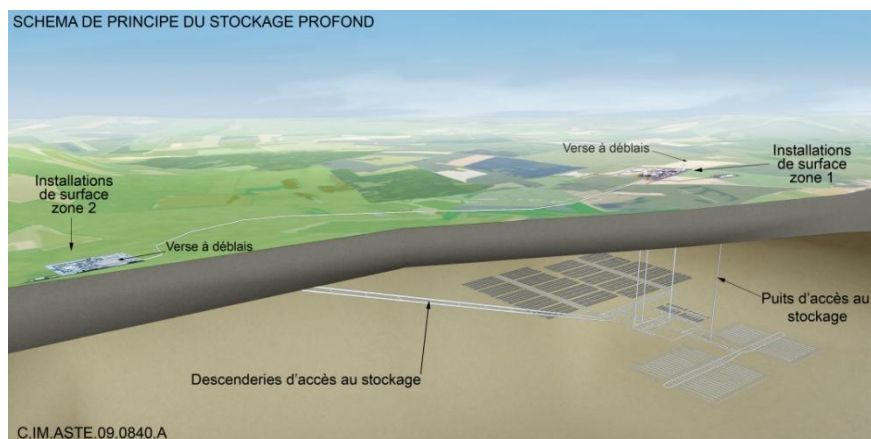
possible to create true dialogue with a number of local stakeholders such as elected officials, associations and groups of companies. In concrete terms, this led to the proposal of a 30 km² zone (see above) for which the definition criteria were shared and discussed. Finally, ideas have begun to emerge on the construction of a regional development project, in which *Cigéo* would only be a part. Under the supervision of the Government representatives in the region, these ideas are now beginning to take shape.

However, there are many areas for progress. With regard to information, efforts are required in-house to ensure that all the personnel, who are the main sources of information, fully assimilate the project as a whole and the stakes associated with it. Andra will also need to reach out further to the local populations, who do not always have the time, the means or the desire to seek out information for themselves. Finally and above all, the issue of radioactive waste management has to be rationalised so that it can be dealt with calmly and logically.

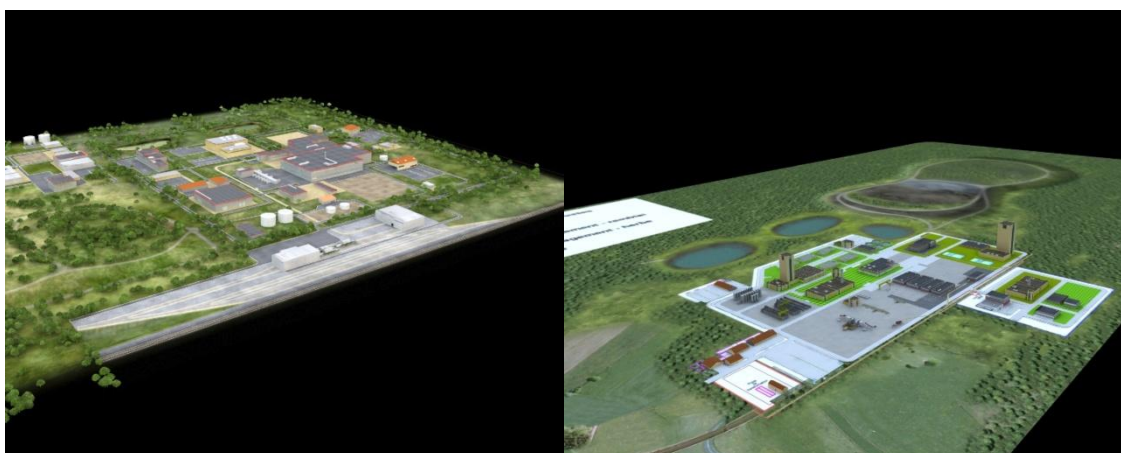
Box 1

The *Cigéo* facilities

Cigéo comprises surface installations split into two zones, underground installations at a depth of about 500 metres, and a number of connections between surface and underground facilities (shafts and ramps).



Cigéo schematic diagram after a century of operation



General view of the surface installations

The underground installations will be expanded as operation of the repository continues and after about a hundred years will reach about fifteen square kilometres. They comprise disposal areas for HLW and ILW-LL, connecting drifts and technical facilities.

The surface installations are divided into two zones: the first for the reception and preparation of the waste packages (about 100 hectares by the end of operations), the second dedicated to excavation of the underground installations (about 200 hectares by the end of operations, primarily occupied by spoil).

Infrastructures (shafts and/or ramps) connecting the surface and underground installations are necessary for transfer of the disposal containers, for transfer of personnel, equipment, materials, networks and for ventilation.

Box 2

The Cigéo siting steps:

- 1. Identification in 2005 of an initial 250 km² zone suitable for siting of the repository,*
- 2. Choice in 2009 of a 30 km² zone for the underground installations and definition of study zones for the surface installations;*
- 3. Preparation of a siting proposal for the public debate scheduled for late 2012,*
- 4. Final choice of the site, following the public debate.*

Box 3

The role of the CLIS

So that the local stakeholders have a local and neutral structure for information about Andra's activities, the 1991 Act created a Local Monitoring and Information Committee, the CLIS. The CLIS was first of all set up to focus on the activities of Andra's underground laboratory but was renewed by the 2006 Act, which also expanded its role to cover all issues concerning radioactive waste management. The CLIS has about a hundred members (local elected officials, qualified persons, representatives of associations, trade unions, etc.) and is given an information and debating role by the Act (more details are available on the CLIS website in French, www.clis-bure.com). It is naturally one of Andra's primary local points of contact.