



2010 a year with Andra



ACTIVITY
& SUSTAINABLE
DEVELOPMENT
REPORT



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2010, a year of contrasts for Andra



Marie-Claude Dupuis

Chief Executive Officer, Andra

The year 2010 saw substantial signs of trust and recognition for the quality of our work.

Renewed trust on the part of the Government, with the publication of the new PNGMDR (National Radioactive Waste and Materials Management Plan), which confirms and extends Andra's role; with the allocation by the Government of €100 million to service future investments intended to launch studies aiming at limiting the volume and dangerousness of certain forms of radioactive waste; and with the suspension of the employment ceiling by the Prime Minister, which has helped insource operations at the Meuse/Haute-Marne Underground Laboratory.

Renewed trust on the part of experts, Andra evaluators and the scientific community. The IRSN review (French Nuclear Safety and Radioprotection Institute) of the progress report on the design of the CIGEO (Industrial Centre for Geological Disposal) has thus strengthened Andra's approach and has helped identify what topics should receive more focus in the pre-project. A simultaneous study conducted by the InVS (National Sanitary Watch Institute) has confirmed there was no impact on the population's health from the Aube disposal facilities. Lastly, 2010 was the year in which the Perennial Observatory of the Environment was granted the SOERE label (Long-term Observation and Experimentation System for Environmental Research), while the Agency succeeded in securing triple quality/environment/safety certification by the AFNOR (French Standardisation Association).

Renewed trust on the part of elected officials and the general public, which led to the validation of the zone of in-depth exploration (ZIRA) in the Meuse and Haute-Marne districts by our overseeing authorities, and which in the Aube district led to marked progress in the on-site storage/assembly project at the VLLW disposal facility (CSTFA). The public's growing interest in the Agency's work has gained momentum,

as shown by the close to 15,000 visitors that toured our facilities, as well as the thousands of visits on www.dechets-radioactifs.com.

Renewed trust on the part of the international community too, as demonstrated by the nomination of Andra's R&D Director as Chairman of the IGD-TP European research platform, not to mention the many debates about reversibility that took place during the international symposium held by the Nuclear Energy Agency in Reims with support from Andra.

Yet Andra has also experienced challenging moments, in particular through the doubts expressed by producers regarding our ability to mastermind a major industrial project and control its costs. It should not be forgotten that for the past twenty years, Andra has been hard at work ensuring the collection and disposal of radioactive waste. In the Aube district, 33 concrete structures were built during 2010, representing the largest such project since the creation of the LILW disposal facility (CSFMA), while at the same time the VLLW disposal facility (CSTFA) was experiencing its highest ever level of activity with the disposal of over 31,000 cubic metres in waste. In the Manche disposal facility, work has begun on the long-lasting capping. In the Meuse/Haute-Marne Centre, new excavating and ground-support processes have been experimented. Lastly, significant progress has been made in the decontamination of polluted sites throughout the country.

Andra is now fully aware of the concerns expressed by nuclear sector industrialists. Discussions are underway under the aegis of the General Directorate for Energy and Climate in order to determine the terms of their involvement in the reversible deep disposal project. The new organisation that was set up in early 2011 will help the Agency perform its role over the long term as contracting owner and operator for the future reversible deep disposal facility.

All in all, 2010 was a year both rich and difficult for Andra, whose employees have embraced the year 2011 with courage and determination, with pride in their work, and fully prepared to meet all of the challenges that will come their way.

Being Chairman of the Board at Andra is an exhilarating task... yet my initial mandate had left me with a feeling of unfinished business. The Planning Act dated June 28th, 2006 has given the Agency new responsibilities and new governance. There still remain a great number of steps to cross. So I am happy that the Government renewed my mandate as Chairman of the Board for the Agency, for it agreed with my wish to maintain continuity and stability within the Agency's governance given the multiple challenges before us. Those challenges come in three shapes: to prepare for the construction of the CIGEO, the Industrial Centre for Geological Disposal for high-level and intermediate-level long-lived waste, to consolidate Andra's position within the energy sector, and lastly to increase the exposure of the Agency both nationally and internationally.

Preparing for the construction of the CIGEO

In late 2009, Andra suggested a 30-km² zone to the Government in which to pursue its investigations for the siting of underground facilities for reversible deep disposal, defined in accordance with the expectations and requirements of elected officials. In 2015, the Agency will have filed the licence application to create the CIGEO, following a public debate planned for 2013. Issues will include the need to discuss requirements in terms of reversibility and of surface facilities siting. Andra will be playing an active role.

Consolidating Andra's position within the energy sector

Andra is not just the agency that performs radioactive waste disposal. As the key player in radioactive waste management, it enjoys genuine expertise along the entire chain of operational management of this waste, from its packaging to its final disposal. The € 100 million allocated by the Government for future investments will help the Agency reinforce its involvement in the chain prior to the production of radioactive waste, so it can continue to better preserve this rare resource which it manages, namely the disposal capacity in the repositories.

Increasing the exposure of the Agency both nationally and internationally

We are in a way the hidden offspring of the nuclear industry. It is vital that we gain more nationwide exposure soon with all decision-makers and with the public, so that every player may take

appropriate responsibility in the management of radioactive waste. This recognition is truly necessary, and should extend well beyond France's borders. Top Government officials too have asked us to see to it that the Agency's experience and know-how should be acknowledged and exported far and wide. As a highly competent industrialist and a player in R&D, Andra has to be acknowledged in the near future as the French expert able to achieve and implement reversible deep disposal, a major innovative project.

Continuity and new projects



François-Michel Gonnot,
Chairman of the Governing Board, Andra

SUSTAINABLE DEVELOPMENT AT THE HEART OF OUR MISSIONS



Whether they are part of its core business or whether they are part of a more general approach, all of the initiatives conducted by the Agency are to implement its sustainable development strategy.

Ensuring the safety of its facilities through in-depth control of the packages; optimising space to save this rare resource represented by the repository capacity; keeping a close monitoring on the impact of its activities upon health and the environment; making sure that all facility records are duly communicated... Those are just some of the crucial, ongoing tasks, giving the measure of the Agency's societal responsibility.

Andra also takes care to establish a pledge of transparency and a tangible instance of its determination for openness, namely substantial, regular dialogue with all concerned (citizens, elected officials, associations, scientists, institutions), as shown by the many initiatives mentioned in this report. Lastly, by favouring local purchases and actively supporting the social and cultural fabric, Andra contributes in the development of the communities that are hosting it.

ANDRA, the National Radioactive Waste Management Agency



About us

Andra is a public body with industrial and commercial objectives. It is in charge of the sustainable management of all French radioactive waste. It was officially made independent from nuclear waste producers by the Waste Act dated December 30th, 1991.

Andra reports to the Ministries in charge of Energy, the Environment and Research.

It is financed by:

- + contracts with radioactive waste producers (energy sector industrialists, research centres, hospitals, etc);
- + a tax collected from producers by the Nuclear Safety Authority;
- + Government subsidies.

Andra's governance is ensured by a Governing Board, which was renewed in 2010 and is chaired by François-Michel Gonnot. Andra's Chief Executive Officer, Marie-Claude Dupuis, chairs the Executive Committee, made up of nine Directors. This system of governance is completed by two bodies: a Scientific Council, which was renewed in 2010, and a Financial Committee.

Our missions

Andra's mission includes the following:

- + **Taking charge and handling** radioactive waste from small producers (hospitals, research laboratories, universities, etc.), as well as any radioactive items held by private individuals;
- + **Operating** two repositories in the Aube district that accept low- and intermediate-level radioactive waste, and very-low-level radioactive waste;
- + **Monitoring** the Manche disposal facility, the first surface disposal facility in France for low- and intermediate-level radioactive waste, where the operational phase is over;
- + **Studying and designing** sustainable management solutions for waste which does not yet have dedicated repositories: low-level long-lived waste, and high-level and intermediate-level long-lived waste;
- + **Remediating** former sites polluted by radioactivity upon request by private individuals or public authorities;
- + **Informing** all publics about its activities;
- + **Promoting** its know-how in France and abroad;
- + **Listing** all French radioactive waste and publishing the National Inventory of Radioactive Materials and Waste.

...AND CHALLENGES

Those principles are echoed by the nine national strategy sustainable development challenges as determined by the Government for the period from 2010 to 2013:

- 1 - sustainable consumption and production
- 2 - a knowledge-based society
- 3 - appropriate governance
- 4 - climate change and energy
- 5 - sustainable transport and mobility
- 6 - conservation and sustainable management of biodiversity and natural resources
- 7 - public health, prevention and risk management
- 8 - demographics, immigration and social integration
- 9 - international challenges

This annual report features pictograms relating to those various items. They demonstrate Andra's commitment in support of sustainable development with respect to every activity it is involved in.

For further information: www.andra.fr

SUSTAINABLE DEVELOPMENT AT ANDRA:

PRINCIPLES...

Andra has been a signatory of the Public Authorities and Companies Sustainable Development Charter since 2008.

The Charter lays down seven key principles:

- 1 - ongoing dialogue with stakeholders
- 2 - internal motivation
- 3 - staff management
- 4 - responsible management
- 5 - constructive relations with local authorities
- 6 - the production of information and knowledge
- 7 - meetings with peers for information sharing





Our facilities

The Manche waste disposal facility

Located in Digulleville (Manche district), this site was the first radioactive waste repository in France. Its 14-hectare surface has received over 527,000 cubic metres in low- and intermediate-level radioactive waste from 1969 to 1994. At that time, it entered a post-closure monitoring phase due to last for several centuries.

Repositories in the Aube district

+ The low- and intermediate-level waste disposal facility (CSFMA)

Located in the municipalities of Soulaines-Dhuys, Epothémont and La Ville-aux-Bois (Aube district), this facility took over from the Manche disposal facility in 1992. The low- and intermediate-level short-lived waste that is sent there is mostly related to the maintenance (clothing, tools, filters) and operation of nuclear facilities. The waste is disposed of, on surface, inside reinforced concrete cells.

+ The very-low-level waste disposal facility (CSTFA)

Located in the municipalities of Morvilliers and La Chaise (Aube district), this facility has been receiving very-low-level waste since 2003. This waste mostly stems from the dismantling of electronuclear facilities and consists of earth, rubble, plastic, concrete, scrap metal, mud, etc. The radioactivity of such materials is often close to naturally-occurring radioactivity. It is disposed of, at surface, inside vaults excavated in a clay layer.

The Meuse/Haute-Marne Centre

+ The Underground Laboratory

Built in the municipality of Bure (Meuse district) in 2000, in drifts excavated at a depth of 500 metres, that experiments are conducted to design the Industrial Centre for Geological Disposal (CIGEO) for high-level and intermediate-level long-lived waste. On the whole, this waste stems from processed spent fuel and is currently stored at the sites where it is produced.

The 2006 Planning Act has enshrined the deep disposal concept proposed by Andra as the reference solution. Research continues at this time aiming at designing and establishing this future repository, whose commissioning is planned for 2025, subject to the granting of its license 2015.

+ The Technological Exhibition Facility

In 2009, Andra opened a venue in Saudron (Haute-Marne district), located a few hundred metres from the Laboratory and devoted to public information. It features systems and prototypes that have been designed to test and validate the technological concepts to be used at the future reversible deep disposal facility, exhibited across a 3,000-m surface.



Radioactive waste management players in France

Over 1 000 radioactive waste producers

60 % of French radioactive waste is produced by the electronuclear industry. The remaining part comes from a great variety of sectors, such as:

- + some industries that use naturally-radioactive materials (manufacturers of paper paste, fertilisers, caustic soda, etc.);
- + research (nuclear – including the Atomic Energy Commission (CEA), chemicals, biology, geology, archaeology, etc.);
- + medicine (hospitals, medical research, test laboratories, etc.);
- + National Defence.

Local authorities and private individuals may also sometimes have radioactive items (old lightning rods, radium compresses and fountains, old alarm clocks, etc.).

Designated by the Government to ensure the sustainable management of all radioactive waste in France, Andra is called upon to interact with a host of players: producers, transporters, law makers, regulators, etc.



Sorting, processing and conditioning

Once it has been produced, the waste is sorted, processed and conditioned, inside specific industrial facilities.

EDF, Areva and the Atomic Energy Commission process and condition their own waste, in accordance with criteria determined by Andra. The other producers condition their radioactive waste. Andra then collects it and organises its transport to a specific installation where the waste will be sorted, or even processed and reconditioned as well (Socatri, Socodei). Depending on its radioactive level and half-life, French radioactive waste is either disposed of into an Andra repository, or in those cases where there are no existing suitable disposal facilities yet, it is stored.



Caution – exceptional convoy!

Radioactive waste is transported by specialised companies or by the SNCF (French Railways), under the responsibility of producers.

Those exceptional convoys must comply with very strict regulations, established on an international level and based on the sturdiness of the packaging, the reliability of the vehicles and the effectiveness of intervention in the event of an accident. Most producers organise their transport themselves. Some will assign the mission to Andra, which demands a specific set of qualifications on the part of all transporters who convey waste packages to its repositories.



A closely controlled activity

As is the case with all nuclear activity, Andra's work is subjected to control procedures by several bodies, which are there to ensure the safety of the facilities and of the population.

+ Nuclear Safety Authority (ASN)

The Authority controls the activities of all nuclear facility operators and ensures the protection of workers and of the general public. It also provides the Government with opinions on projects and makes sure that legislation is complied with. Lastly, it is responsible for informing the public, especially in the event of an emergency situation, regarding the safety of the facility concerned, any would-be discharge into the environment and the risks for health.

+ The Radioprotection and Nuclear Safety Institute (IRSN)

The Institute acts as a technical expert in radioprotection, often upon request from the ASN. It includes engineers, researchers, physicians, agronomists, veterinarians and technicians, as well as specialists in nuclear safety, in ionising radiation protection, in sensitive materials control and in the protection against malicious acts.

+ The National Assessment Board (CNE)

The Board is in charge of making impartial assessments of all research relating to radioactive materials and waste management. Appointed for a six-year period, its twelve members are prohibited from working for or within the organisations being assessed, or any companies or entities that produce or hold waste. Its annual report is sent to the Government and to Parliament, and then to the Parliamentary Office for the Evaluation of Scientific and Technological Choices (OPESCT).

MANAGEMENT PRINCIPLES DETERMINED BY LAW

The legal framework for French radioactive waste management is determined by Parliament, which then calls on the Government to apply it.

Thus the Waste Act dated December 30th, 1991 (known as the "Bataille" Act) has laid down the foundations of French radioactive waste management policy in France. Fifteen years later, the Planning Act dated June 28th, 2006 came to complete Andra's missions and enshrined the choice of reversible deep disposal as the solution of reference for the sustainable management of high-level and intermediate-level long-lived waste. The Act also sets down the key deadlines and achievements expected from Andra.

Dialogue, consultation and transparency

+ The CLIs and CLISs, grassroots commissions to inform local residents

Local Information Committees (CLI) are mandatory whenever a Basic Nuclear Facility (acronym INB in French) is created. Their mission is to follow up the activity at the facility concerned and to inform elected officials and local residents on a regular basis about its operations. To that end, they may be called upon to commission additional studies and assessments. Andra's Underground Laboratory (through a specific framework) and the VLLW disposal facility (as installation classified for the environmental protection) licences prescribe as well the implementation of such a local committee for the information of and consultation with residents.

+ The High Commission for Transparency and Information about Nuclear Safety (HCTISN)

Established by the Act dated June 13th, 2006 relative to transparency and security in nuclear matters – known as the "TSN Act" – and founded in 2008, the High Commission is an organisation devoted to information, consultation and debate. As such, it may:

- express an opinion about any issue regarding the risks relating to nuclear activity and the impact of such activity upon the environment and upon people's health, as well as about any related controls or information;
- take charge of any issue relating to the access to information about nuclear safety;
- suggest any measure that could guarantee or improve transparency with respect to nuclear matters.

The men and women behind Andra's development

Andra's human resources management policy provides support to the Agency's development by strengthening its cohesion and enhancing its competencies.



Developing talent

In 2010, investment in training continued the trend seen in previous years: 5.63% of total human resources cost were allocated to professional training. Beyond strengthening the technical skills relating to Agency business, the training also touched on people and team management, as well as on risk prevention and awareness-raising in the OHSAS (Occupational Health and Safety Assessment) approach. Other training programmes planned for 2011 will help develop employees' competencies in management skills, customer relation management, and project steering and management.

Promoting talent

As part of a jobs and skills forecasting approach, and while still recognising the importance of external input, the Agency is implementing a determined policy for internal promotions. Accordingly, the organisational shifts that were performed last year led to several people being promoted, which allowed a certain amount of Agency employees to reach positions of wider responsibilities (Project Managers/Department Heads, etc.).

Maintaining ongoing social dialogue

Three agreements were signed with social partners in 2010. The first agreement concerned employee pay. In parallel, the agreement regarding professional equality between men and women was extended, thereby reasserting Andra's commitment to the gender issue. Lastly, an agreement about work organisation at the Meuse/Haute-Marne Underground Laboratory was signed in October 2010 in preparation for the insourcing of operational work at the Laboratory starting in 2011. All of those initiatives show Andra's determination to pay due attention to employee concerns and to maintain a secure, consistent working environment.



Reinforcing talent

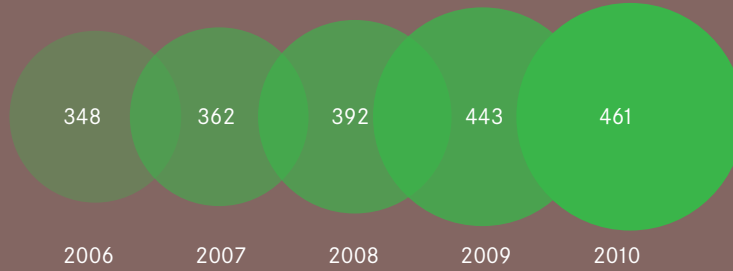
As in the previous year, 2010 saw a sustained hiring drive. 38 people were recruited to strengthen existing teams (32 managers and 6 blue collar, white collar, technicians and supervisors). Among those, 21 went on to join Andra facilities. As of December 31st, 2010, Andra's overall workforce stood at 461 people, as well as 16 PhD candidates and 5 PhD students. Those new arrivals will strengthen the Agency's competencies in the trades relating to the future repositories (design, project management, waste package expertise) and in managing existing facilities (business managers, etc.).



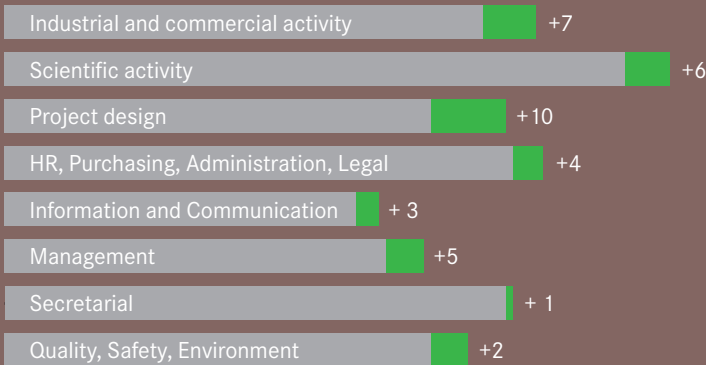
Andra's workforce:

key figures as of December 31st, 2010 (excluding PhD candidates and students)

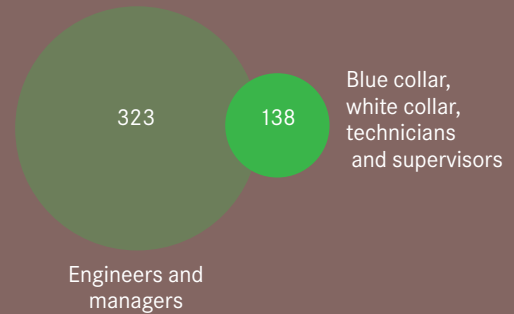
HEADCOUNT



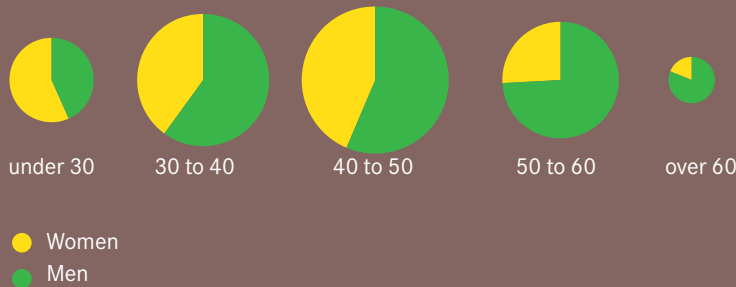
BREAKDOWN OF RECRUITMENTS BY SPECIALITY



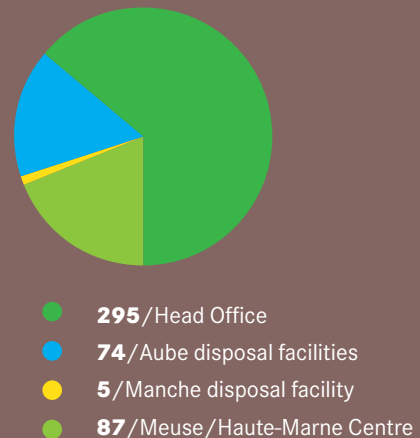
BREAKDOWN BY STATUS



MEN/WOMEN BREAKDOWN BY AGE GROUP



BREAKDOWN BY SITE





winter





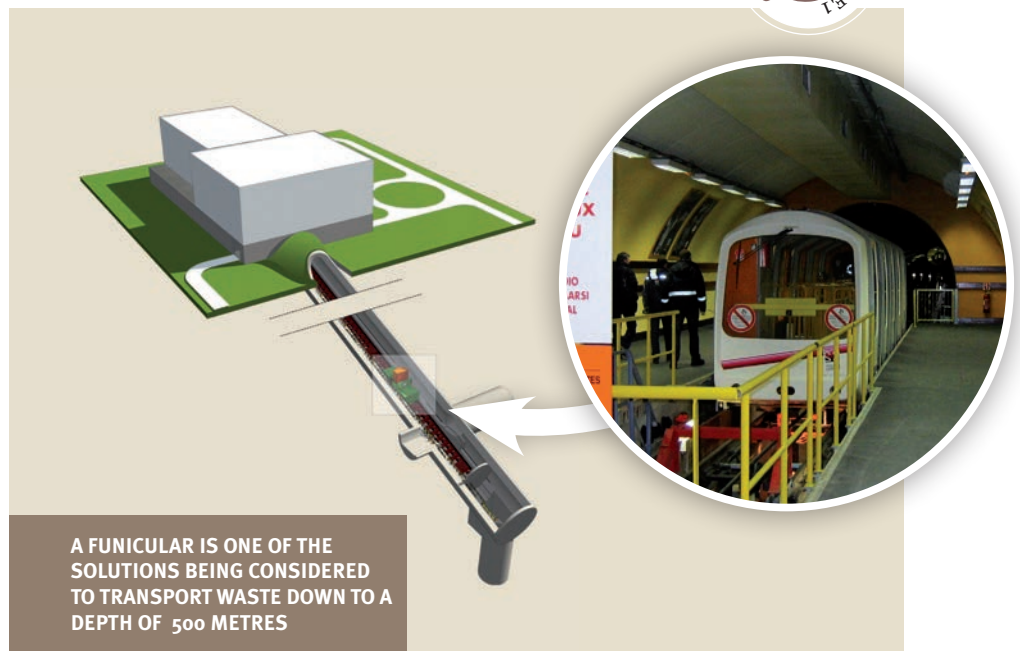
Assessing the reversible deep disposal project

January 19th 2010 **Rock excavation, disposal cells, waste packages... In late 2009, Andra handed the Government a summary of its studies concerning the future reversible deep disposal facility for high-level and intermediate-level long-lived waste. The Nuclear Safety Authority (ASN) took charge of the dossier on January 19th, 2010.**

In 2006, one year after the feasibility of deep disposal was established inside a 250-km² zone around its Underground Laboratory, an Act was passed, reasserting Andra's mission with respect to radioactive waste management mostly stemming from spent fuel: to design and establish a repository for high-level waste (HLW) and intermediate-level long-lived waste (IL-LLW). The Planning Act dated June 28th, 2006 demanded that the facility should be reversible for a period of at least one hundred years, and it also set a schedule for the project, calling for a review of the file application in 2015, and a final commissioning of the facility by 2025.

A meticulous review

After three years spent in further research and in developing its knowledge and methods, Andra handed the Government a progress report in late 2009, in compliance with the requirements of the National Plan on Radioactive Materials and Waste. The report dealt with the location and design of the facilities, as well as safety, the conditions of reversibility and a timeline for implementation. The review of this report began in 2010 and represents a further step in the progress of the reversible deep disposal project. The aim of the evaluation is to confirm the options under consideration by the Agency. On January 19th, 2010, the Nuclear Safety Authority (ASN) asked the Radioprotection and Nuclear Safety Institute (IRSN) to perform a technical assessment of the report. Andra held a preparatory meeting with the IRSN on March 12th, followed by a string of meetings with its engineering and science teams from



AN ASSESSMENT CONDUCTED IN THE FIELD

In order to transport waste packages from the surface down to the 50-metre deep disposal cells, one of the options suggested by Andra is based on the use of a standard funicular. To properly study this solution, IRSN experts accompanied Andra to the 2 Alps ski-resort, which French company Pomagalski and its subsidiary Skirail have equipped with the "Dome Express". Installed in 1989, this new-generation funicular, which can carry up to 2.5 million persons per year under a glacier at an altitude of 3,241 metres, is France's highest. This structure is instructive in several ways: resistance to aging on a sustained incline, its maintenance inside an underground environment, higher safety and security requirements than the transport of goods...

May to July; those meetings focused on a dozen issues like fire, ventilation and waste inventory. On November 29th and 30th, the Standing Waste Group (GPD) and the Standing Factory Group audited the IRSN, which exposed its opinion on the Andra dossier. Made up of national and international experts, those entities provide the ASN with their expertise on safety and its implications with respect to health and

environmental protection. In parallel, the National Assessment Board acknowledged in late 2010 the excellent quality of the scientific work performed by Andra. On the basis of those opinions and recommendations, the ASN shall express its position in 2011.

Optimising radioactive waste handling thanks to Internet

January 2010

In January 2010, Andra put a website online intended for its customers (radioactive waste producers and holders), explaining the procedure to follow in order for their waste to be handled.

How does one deal with the radionuclides used in medical and scientific research? “For each waste producer, there is a specific set of problems”, states Andra as soon as the homepage appears on the website it launched in early 2010. Very much like a set of entry keys, four profiles are listed:

- + Private individuals, schools, local authorities and emergency services: ever since the June 2006 Planning Act, it has been the Agency’s responsibility to collect any radioactive items they may have, ranging from old fluorescent watch models to radium fountains.
- + Professionals and industrialists who are not in the electronuclear sector can also find online information and contacts to arrange for the removal of lightning rods and other radioactive waste stemming from their business.
- + Hospitals, universities and research laboratories, who are reminded the sorting and packing instructions required prior to collection by Andra.



- + Lastly, electronuclear industrialists have password-protected access to their specifications and requests, and they can order barcode labels to be used in identifying their packages.

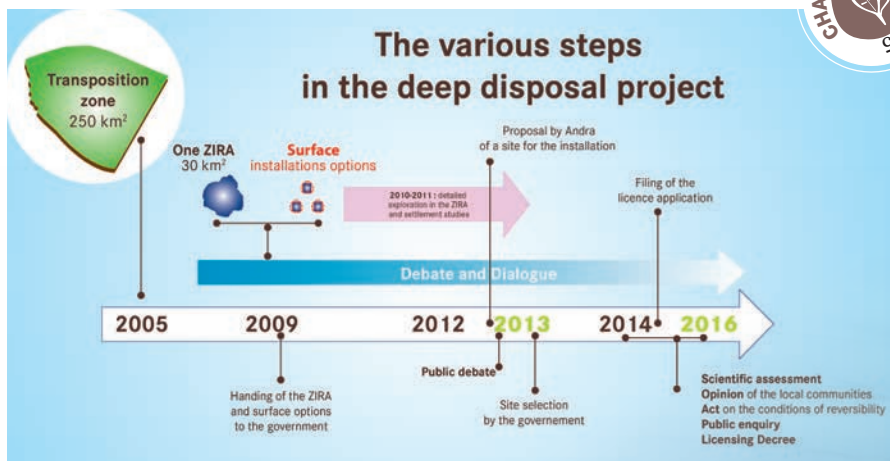
www.andra.fr/producteurs

Government approves the zone suggested by Andra to host French radioactive waste mainly stemming from spent fuel

March 9th 2010

Among the elements in the report handed to the Government by Andra in late 2009, and reviewed by the ASN in 2010 (see opposite), one features the so-called ZIRA zone (zone of interest for detailed exploration). This 30-km² zone, identified as suitable for the installation of reversible deep disposal facilities, was validated by the Government.

Given the approval of the ZIRA zone by the Government, on the basis of favourable reports from the Nuclear Safety Authority (ASN) and from the National Assessment Board (CNE), the deep repository project for French radioactive waste stemming from spent fuel has reached a new stage in determining its final location. On the basis of geological criteria and of dialogue with all local stakeholders, as well as initial observations made by the Underground Laboratory Local Information and Oversight Committee (CLIS), the zone’s 30 km² were therefore duly validated.



A stable layer for 140 million years

Initial results from additional in-depth geological investigations performed during the summer of 2010 have confirmed the quality of the zone’s rock layer. Ten years of prior study had already highlighted the assets of this Callovo-Oxfordian argillite, located at a depth of between 420 and 550 metres. After being stable and homogenous for 140 million years and set in a zone of very

low seismicity, it features limited porosity which reduces water circulation and is appropriate to the excavation of a reversible deep disposal facility. Within the perspective of the planned public debate, Andra will pursue the dialogue in order to specify the zones that are favourable for installing the surface facilities of the future repository.



33 disposal structures under construction in the Aube district

February 2010 In operation since 1992, the Aube low- and intermediate-level waste disposal facility (CSFMA) is planned to host one million cubic metres in waste packages inside concrete disposal structures to be built gradually in accordance with flow schedules. In 2010, the CSFMA acquired an eighth batch of structures.

Completing the 101 existing structures, a further 33 have been built at the south-east end of the Aube LILW repository (CSFMA).

Broken down into seven lines, this eighth batch of works is the largest undertaken since the site was commissioned in 1992. Work began in late 2010 with a dozen contracting companies and about sixty people. After laying a draining network to collect and analyse the waters that could make contact with the packages, they poured 40-cm-thick reinforced concrete slabs upon which they raised walls 8 metres high by 25 metres long. Other concrete elements were used to shore up the future rail track used for moving mobile frames, which will protect the structures from bad weather during operations. This wide-scale project has cost

€ 16.5 million. Ultimately, 420 such structures will be required for the disposal of radioactive waste mainly stemming from the maintenance and operation of nuclear facilities. Prior to disposal, the waste is compacted or solidified, and then mixed with concrete prior to being set inside a container, also made of concrete or metal. Such is the package which is then placed inside the

EXTRAORDINARY WASTE DEMANDS EXTRAORDINARY MEASURES

In 1994, EDF decided to change the 55 vessel-heads of its reactors, having detected that one of them was defective. In 2001, the Nuclear Safety Authority (ASN) authorised their disposal at the CSFMA. Two years later, Andra began construction of the first disposal structure intended for such oversized waste, the first consignment of which was expected for July 30th, 2004. Given their 5- to 5.5-metre diameter and weighing 100 to 120 tonnes, they are delivered by road using a wide load vehicle. On average, Andra receives six such deliveries per year. In 2010, the Agency received seven, because a package had been rejected the year before for being defective.

concrete disposal structures, built at surface upon a sand layer and a clay layer. Once a structure is filled, it is sealed with another concrete slab. Lastly, the structures will be covered with a clay layer several metres thick to ensure the waste remains confined over the long-term.



Andra's expertise being exported to Lithuania

February 2010 Andra is approached on a regular basis for institutional cooperation, and thus seizes every available commercial opportunity to promote its know-how. The first major such contract was for designing a repository in Lithuania.

This contract stemmed from a call for tenders initiated by the European Bank For Reconstruction and Development to enable Lithuania to dispose of the waste resulting from the operation and dismantling of two of its nuclear-power plants. Andra was

awarded the contract together with Areva TA and three local companies. Costing €10 million, the work began in February 2010 with geological investigations due to be completed in late 2012. The Agency intends to capitalise on its complementary approach to enhance the

value of its know-how. In this particular case, its experience in the design and operation of disposal facilities grants it a consulting role with its partners, whose technical solutions it reviews and analyses while ensuring the overall consistency of the project.

The ASN greenlights a long-lasting capping for the Manche waste disposal facility

February 15th, 2010

Following a one-year review and analysis, the Nuclear Safety Authority has approved Andra's proposals for a long-lasting cap for the Manche waste disposal facility (CSM). As the keystone for long-term safety at the site, this cap will be developed on a gradual basis.



After the CSM went into its monitoring phase, a 2003 decree demanded that a series of studies should be performed within the coming six years. By late 2008, Andra handed in two such

reports to the Nuclear Safety Authority (ASN), one relative to safety in general and the other focusing on the cap protecting the site. In accordance with procedure, an assessment was then performed by the Radioprotection and Nuclear Safety Institute (IRSN), which was itself reviewed by the Standing Waste Group after it had performed its own field evaluation; experts were particularly reassured regarding the source of tritium found in the water table, caused by an incident that had occurred in the seventies.

In accordance with their recommendations,

the ASN delivered its verdict on February 15th, 2010. Strengthening the embankment, softening the slope, perfecting the watertightness: to make the cap more long-lasting, Andra's staged approach was adopted. The Agency is expected to report to the ASN on those developments by 2015, demonstrating the effectiveness of drainage of the cap and the stability of the embankments. The report should also document other points supporting the safety at the CSM, especially with respect to the monitoring plan for the repository and its environment.

Anticipating global warming impact on waste disposal in the Aube

March 2010

A greenhouse was installed in March 2010 over the experimental covering structure at the low- and intermediate-level waste disposal facility (CSFMA) in order to evaluate the cap's resistance to weather parameters that could affect disposal safety.



What about the effects of an extended heatwave on low- and intermediate-level waste disposal (LILW)? Such was the scenario that Andra began experimenting on *in situ* in 2010 at its disposal facility in the Aube district, intended for such waste. In 1996, an experimental capping structure had been installed there, on the scale of a disposal structure, to conduct full-scale tests of its long-term effectiveness according to weather conditions. An initial testing phase had checked the performance of the multi-layered cover under standard conditions. From 2006 to 2008, simulated heavy rain downpours tested the clay's watertightness. Results were fully compliant with performance objectives as determined by the ASN. While a three-year extreme drought is no more likely, it is just as

legitimate to check its impact on the clay that will be confining the waste's radioactivity. The risk in this case being the drying of the rock, leading to cracks despite the upper layers meant to protect it. So in March 2010, a greenhouse was set upon the experimental capping structure, in order to submit it to temperatures up to 50°C and three winters without the slightest drop of rain. It remains to be seen whether the experimental structure will confirm its ability to protect the clay layer: back in 1999, a digital simulation showed that its upper layers could provide a shield against heat, thus avoiding the evaporation of water contained within the clay.



February 2010

A WEBSITE PUBLISHING THE LEVEL OF RADIOACTIVITY MEASURED IN THE ENVIRONMENT

Developed under the aegis of the ASN in collaboration with the IRSN, a new website, www.mesure-radioactivite.fr provides a map of radioactivity levels in France, based on 15,000 measurements taken within the environment. Those results are directly supplied by a nationwide network combining the ministries for health and for sustainable development, the French Navy, nuclear operators, sanitary agencies (Afssa, InVS), environmental protection associations and Andra. Accordingly, every month the Agency supplies 550 measurements, 220 of which stem from the vicinity of the Manche CSM and 330 from the Aube CSFMA.



spring



Radioactive materials and waste management: a new roadmap

June 4th, 2010

Following a first edition in 2007, the Government has established a new National Radioactive Waste and Materials Management Plan (PNGMDR) that sets priorities until 2012 among the work avenues and research objectives for every player concerned by radioactive waste. Covering ongoing work on future repositories, the optimisation of existing facilities, and participation in discussions about waste processing and packaging, the roadmap has laid down Andra's basic role.

Developed by a multidisciplinary working group gathering environmental protection associations and elected official representatives working with controlling authorities, waste producers and Andra, the PNGMDR aims at ensuring that all categories of radioactive waste produced nowadays have or will have a management solution intended for them, while ensuring that those solutions are consistent and preserve the environment and the health of current and future generations.

High-level and intermediate-level long-lived waste: the deep disposal project stays on course

Today, 10% of radioactive waste does not have a long-lasting solution. This especially includes high-level radioactive waste stemming from the processing of spent fuel, stored at the producers' sites while awaiting the opening of a reversible deep disposal facility. In this perspective, Andra must pursue its detailed geological investigations on the Haute-Marne and Meuse border, inside a zone which has now been scaled down to roughly thirty square kilometres in the vicinity of its Underground Laboratory. The three-year plan reasserts the legitimacy of the studies and asks Andra to suggest an installation site by late 2012, in expectation for the public debate planned for 2013. Within the same timeline, the Agency is expected to hand in a summary of its research in terms of storage, a complementary issue to reversible deep disposal. Moreover, it must bring support to producers, by defining the

packaging mode for intermediate-level, long-lived waste produced prior to 2015, which are themselves concerned by the future deep disposal facility.

A more flexible schedule for low-level long-lived waste

Radium and graphite waste – stemming, among other sources, from radium used in certain industrial sectors or from the dismantling of now decommissioned first-generation nuclear reactors – are also awaiting definitive disposal. Following a call for tenders, about forty municipalities stated they were ready to study the feasibility of such a repository project on their territory in late 2008; two were chosen the following year, but they were forced to withdraw under pressure from opponents even before any studies or dialogue could begin locally. Pending the findings of the work performed by the High Commission for Transparency and Information about Nuclear Safety in establishing some feedback (*see opposite*), the PNGMDR called on Andra to initiate the construction of a storage facility for low-level long-lived waste produced by the medical sector and laboratories, as well as stemming from polluted sites in France or from radioactive items held by private individuals. This temporary solution will involve a 4,500-cubic-metre capacity, a small volume as compared to the 150,000-cubic-metre in LL-LL waste inventoried.



By late 2012, Andra must present scenarios for the definitive disposal of this waste, by continuing the dialogue with interested territories and studying the possibility of separating radium and graphite waste management.

Very-low-level waste: optimising existing repositories

As for very-low-level waste (scrap metal, concrete, ash and mud containing short-lived radionuclides), their volume can only increase considerably following the dismantling of nuclear facilities.

Anticipating the likely saturation of the Aube VLLW disposal facility in Morvilliers (CSTFA) in about twenty years, the PNGMDR has asked Andra and producers to reduce the volume of waste to be disposed of – at source or during packing – and to consider that these could be recycled within the nuclear sector.



The disposal of thorium-bearing material under study

Thorium has neutronic properties which could render its use as a fuel likely in future reactors. Should those reactors not be built, the substances containing thorium would then become radioactive waste and it would be up to Andra to dispose of these. This possibility has been studied by Andra within the framework of the National Radioactive Waste and Materials Management Plan.

Andra began by consolidating the inventory of this material. The current stock held by the Rhodia Company, stemming from rare earth use, consists of 22,000 tonnes raw thorium hydroxide and 1,000 tonnes thorium nitrate. Areva too holds 5,500 tonnes of the latter.

That first step completed, Andra analysed their acceptability for disposal. The study's initial findings indicate that thorium-rich matter could be managed in the same way as low-level long-lived waste, and thus suitable for disposal at a shallow depth.



April 6th, 2010

CHALLENGE 8 PRINCIPLE 4



June 7th, 2010

COLLECTING RADIOACTIVE ITEMS: A PUBLIC SERVICE MISSION

Andra handles the collection of radioactive items found in private homes or in public service premises. Since this kind of waste can be found throughout the country, the Agency has set up a collection scheme to pick them up directly on site. For this kind of mission, it calls on specialised transport companies whose drivers are given special training. On June 7th, 2010, a transporter went to the municipality of Bailly-le-Franc, located in the Chavanges township, in the Aube district. A lightning rod was stored there, which had fallen off the church steeple during the 1999 storms. After reading an article in the local press, the mayor called on Andra. Having determined that the item contained Americium 241, the radiating parts of the lightning rod (the head and points) were cut off, confined inside a double-lined container, and transported to the centralization centre in Saclay (Essonne). They were then sent on to Pierrelatte (Vaucluse), where the Socatri company, a service provider for Andra, is storing this category of waste, pending the availability of a suitable repository.

LOW-LEVEL LONG-LIVED WASTE: DIALOGUE AND TRANSPARENCY TO MOVE THE PROJECT FORWARD

CHALLENGE 8 PRINCIPLE 4

The search for a site for low-level long-lived waste (LL-LLW) was suspended in 2009, after both the preselected candidate municipalities withdrew. During its plenary assembly on October 8th, 2009, the High Commission for Transparency and Information about Nuclear Safety (HCTISN) decided to form a group of experts, assigned with conducting discussions in order to favour the continuation of the search for such a site. Andra took an active part in the discussions throughout 2010.

At the end of the year, the group heard local players concerned by the project—in particular, the mayors of both candidate municipalities, the chairmen of the municipalities' communities and local organisations, etc.—in order to get their opinions and feelings regarding the way the process had been conducted. Those initial hearings were completed in early 2011 with institutional players such as the Nuclear Safety Authority and the Radioprotection and Nuclear Safety Institute. The analysis of all of those hearings will provide useful feedback and will, if required, lead to recommendations.

The three Local Information Committees of the Manche district touring Eastern France

June 1st and 2nd, 2010

These three Local Information Committees (for Andra's Manche waste disposal facility, Areva's NC La Hague reprocessing plant and EDF's Flamanville nuclear power plant) expressed the wish to get information about the disposal of current and future waste. Andra was glad to open its doors to them at its facilities in the Aube and Meuse/Haute-Marne districts.

Given the presence of three historic nuclear players in this district, these Local Information Committees (CLIs) have learnt to instinctively work jointly. So it was together that these information and consultation organisations, made up of elected officials, residents and environmental groups, decided to embark on a field trip to explore French radioactive waste disposal in June 2010.



An on-site tour is worth more than a lengthy report

What happens to low- and intermediate-level short-lived waste? To find out, head for the Aube district, where the low- and intermediate-level waste disposal facility (CSFMA) took over from the Manche one in the early nineties. Touring the neighbouring very-low-level waste disposal facility (CSTFA) provided the three CLIs with an opportunity to watch a cell being excavated. The visitors were also intent on touring Andra's Meuse/Haute-Marne Underground Laboratory. Inside a full-scale mock-up, they were able to picture the Laboratory drifts located 500 metres below, and were in a position to fully appreciate the developments required to transport and dispose of packages of high-level and intermediate-level long-lived waste.

From March 28th to April 1st, 2010

Andra organises a 4th international symposium on clay

Because they represent one of the confinement barriers in deep disposal, clay materials are being subjected to intensive research and many experiments. This has led to the 4th international symposium held by Andra to investigate their properties.

After Reims in 2002, Tours in 2005 and Lille in 2007, Nantes was the chosen venue for this international symposium. With 499 attendees from 22 countries, this fourth edition boasted a record attendance. There were 84 communications and 270 presentations looking at all of the issues involved: geology, geomechanics, radionuclide transfer, materials alteration processes. What is the situation with dating techniques? How does clay react to thermal stress? How does water behave within rock pores? What experiments should be implemented in the Underground Laboratory? The event was thus an opportunity to discuss those issues, essential to gain a better understanding of the behaviour of such materials over the long term.

When the Underground Laboratory CLIS takes an interest in deep disposal reversibility

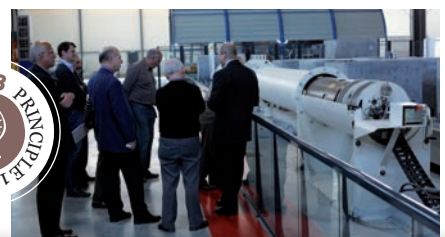
April 21st, 2010

The Reversibility Commission of the Local Information and Oversight Committee (CLIS) visited the Technological Exhibition Facility gain an understanding of the engineering that has been developed to meet this requirement with respect to deep disposal.

Giving future generations the possibility of going back on choices made today in the management of radioactive waste mainly stemming from spent fuel is a key approach underlying the deep disposal project. This is why the Underground Laboratory CLIS set up a Reversibility Commission in mid-2009, completing its working groups on health and environment, the location of the future site and communication.

The twelve-member commission, which includes elected officials and union representatives, met with Andra at its Technological Exhibition Facility (ETe) for the second time in April 2010. Located a few hundred metres from the Laboratory, this showcase presents the engineering that was developed to materialise reversible deep disposal. Side by side with excavation demonstration models, it features prototypes that illustrate how the waste packages

could be placed inside underground cells, and then retrieved if required. The dialogue was most fruitful, and led to 42 written answers on the part of the Agency.



Two surveys confirm the importance of information about radioactive waste

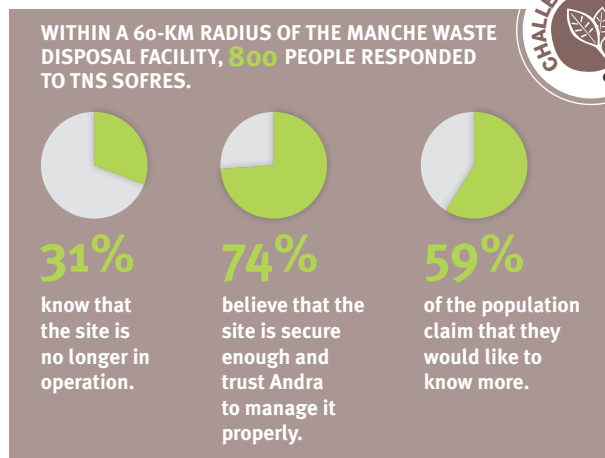
June 2010

“The more one knows, the less afraid one is”, reasserted the eighth opinion survey of the French people on radioactive waste, conducted every year by the Credoc research centre. This finding was correlated by an opinion poll about the Manche waste disposal facility, carried out for the first time by the TNS Sofres Institute upon Andra request.

As part of its annual “Living Conditions and Aspirations of the French people”, survey, the Credoc interviews a representative sample of the population regarding radioactive waste. Findings from the eighth wave conducted in June 2010 indicate that the French people still want more information about this topic. Especially since knowledge remains the best obstacle against fear and preconceived ideas. Indeed, those people who best know about waste and are aware that it is inventoried and managed by a designated organisation are the least guarded.

Poor exposure compensated by definite legitimacy

The survey especially highlighted how little the French people know about the issue. For instance, 66% still believe that used up mobile phones are radioactive, and 15% persist in thinking that French radioactive waste is sent abroad. However, 60% know that France has an agency to manage radioactive waste, yet barely 3% know it by name. And 8 out of 10 French people are convinced, wrongly so, that repositories cannot be visited, although such a possibility would reassure them. Despite its poor exposure, the Agency nevertheless enjoys a positive image: after environmental protection groups, and then scientists, the Agency appears as the third trustworthy source for getting objective information about radioactive waste.



In the Manche district, a good image confirmed by experience

In order to better understand the expectations of local populations, the Agency has taken the initiative of polling residents in the neighbourhood of the Manche CSM, which entered its monitoring phase in 2003. So 800 people answered the survey conducted by TNS Sofres within a radius of 60 km around the facility. While close to three quarters of local residents know about the facility, only 31% are aware that it is no longer in its operational phase. On a more general note, 74% believe that the site is secure enough and trust Andra to manage it properly. This does not mean that they approve the Agency’s efforts in communication: 59% claim that they would like to know more.



CHALLENGE 3 PRINCIPLE 7

March 22nd, 2010

ANDRA’S SUSTAINABLE DEVELOPMENT POLICY SCRUTINISED BY ITS PEERS

As a signatory to the Sustainable Development Charter of Public Authorities and Companies, Andra has presented its strategy on the issue to colleague entities such as representatives of the Château de Versailles, the RATP and the Cité des Sciences Museum. Following the presentation, which took part on March 22nd, the colleagues acknowledged several strong points: the integrated management scheme based on a “quality/security/environment” approach, its work on long-term archiving, found to be very innovative, the professionalism of its dialogue/consultation approach with stakeholders, its eco-library project, part of the Perennial Observatory of the Environment, and last but not least, the cross-functional setting up of a “sustainable development” network linking its various facilities.



The cap on the Manche waste disposal facility under close monitoring

Late March 2010

How does water behave within the cap? To find out, Andra has installed ten moisture and pressure sensors on the site's eastern part.

Installed in late March 2010 above the waterproof membrane, the ten sensors, together with two temperature probes, will help improve our understanding of the interactions between water and the cover, on the basis

of a recording made every fifteen minutes. What is the impact of strong rainfall on the top parts of the cover? Does the water evaporate or does it stagnate? Is the water that infiltrates correctly drained by the sand layer covered by a shale/sandstone layer and then by vegetal soil? Moreover, measurements will indicate whether the landslides observed in the vicinity are caused by the presence of water within the embankments surrounding the facilities. Relating to the improvement and stabilising



works planned to make the cap long-lasting, the above assessments will be performed over a ten-year period.

Andra signs an ownership-assistance contract with Slovenia

24

April 21st, 2010



As Andra's alter ego in Slovenia, Arao requested the Agency's industrial expertise to supervise the design and construction of a repository for low- and intermediate-level waste.

On the strength of its forty years' expertise in radioactive waste management, Andra enjoys an excellent reputation abroad, as demonstrated by a new contract signed in April 2010 with the Arao. Andra has been assigned a mission of industrial assistance to the owner, including the design of technical specifications and of the safety report, and the selection of the engineering teams. The idea is to design, study and build a repository for operational waste from the Krsko reactor.

May 2010

Commissioned in 2003, the Aube very-low-level waste disposal facility (CSTFA) completes its cells on an as-needed basis. In 2010, the eleventh double cell excavated the spring features a new design that optimises disposal capacity, proof of the responsible way in which this rare resource is being managed.

Intended to host 650,000 cubic metres in radioactive waste stemming from the dismantling of French nuclear facilities and standard plants, the CSTFA disposes of this rubble, scrap metal and other inert waste within a layer of clay. Excavated to a depth of 7 to 8.5 metres, disposal cells receive the packages set in horizontal layers, prior to being filled with sand. After six initial cells of 10,000 cubic metres, double cells with a disposal capacity of 25,000 cubic metres have been in use since 2007.

A further step in optimising disposal space

In September 2008, at Andra's request, the Ginger research consultancy elaborated a model for a new cell. Technical specifications for this new kind of cell were approved by Andra in early 2009. The geometric modifications were approved



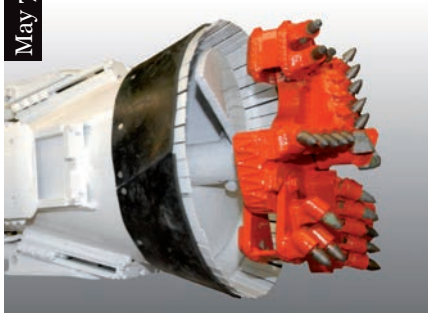
in March 2010 by prefectural order. With a slope at 75% instead of 50%, the cell preserves that rare resource, namely the repository's disposal capacity.



Uncommon cells demand made-to-measure micro-TBMs

May 7th, 2010

Excavating cells of atypical size require innovative methods. The prototype developed by Andra with CSM Bessac is patented.



The cells being considered for the reversible deep disposal of high-level waste are horizontal micro-tunnels about 40 metres in length, with a 70-cm diameter. Boring such tunnels at a depth of 500 metres requires that new tools be invented. Following a call for tenders, a suitable solution was provided by the CSM Bessac company. In addition to its highly specific dimensions, the machine has two special features: boring must be performed without

any fluid being used, and it must be possible to remove the machine through the liner that is put in place. In addition, the prototype has a trajectory control system, which prevents any vertical drift during boring. In fact, this high-precision guarantee has become now a registered patent.

A renewed synergy between France and Sweden

May 19th, 2010

Andra and its Swedish counterpart SKB have signed a new technical collaboration agreement within the framework of deep disposal, reinforcing international governance in radioactive waste.



Back in October 2009, Andra had organised a European working seminar in its Meuse/Haute-Marne Centre, focused on technological issues relating to deep disposal, including underground facilities' architecture, ventilation concepts, and transport means to a depth of 500 metres. Seven months later, the Agency and its Swedish counterpart SKB went on to materialise the collaboration they had considered around ramp transport vehicles. In May, a first meeting took place in Aspö, Sweden. Thanks to the agreement, the dialogue will not only involve techniques to reach the underground installations using a ramp, but also the choices relating to safety.

April 29th, 2010

ANDRA AND INRA JOINING FORCES IN STUDYING ECOSYSTEMS IN THE MEUSE AND THE HAUTE-MARNE DISTRICTS

Both agencies signed a partnership agreement on April 29th, set at the intersection of both their respective missions. Involved in the evolution rate of ecosystems in the Meuse and the Haute-Marne districts, their joint scientific initiatives will work with the Perennial Observatory of the Environment, which was set up by the Agency as part of the reversible deep disposal project. Making full use of those combined means, the idea is mainly to assess and to model the impact of global change, especially climatic and that of human activity on biodiversity, and this over a period of several decades.



A first full-scale test-cell completed at the Underground Laboratory



Following a series of tests, a first full-scale, 40-metre-long test-cell was completed on May 7th, 2010.

To ensure that all designs and methods considered are operational on D-Day, Andra must, right now, work on the construction and operation of the deep disposal centre, without prejudging its licence granting.

In addition to the technological tests and the prototypes completed on the surface, most of which are displayed in the Technological Exhibition Facility (ETe), initial underground tests led to the boring on May 7th, 2010, of a 40-metre-long and 75-cm diameter test-cell in

the Laboratory. This cell is identical to those that may host high-level waste in the future repository. This initial test-cell has helped evaluating the lining technique, which consists in welding steel tubes (20 mm thick for this test) in line with one another to ensure cell ground-support and facilitate package emplacement. By 2012, two other tests will be performed in order to optimise the boring method.

A new experimental drift

June 2010

A new 75-metre drift, n°2 Experimental Drift (GED), was excavated in the Laboratory for the purpose of conducting experiments to complete those already underway. 90 boreholes and 600 additional sensors will help better understand and model the physical and chemical processes relating to the creation of a radioactive waste repository within a clay formation.

Experiments set up in this new drift focus on two major research issues.

The interaction between rock and the materials to be used in the future repository

In addition to clay, there will be three kinds of material to be used in the future reversible deep disposal facility, to contribute in ensuring safety during its operational and post-closure phases:

- + concrete, for the ground-support of drifts and disposal cells used for intermediate-level long-lived waste, or to manufacture waste containers;
- + steel, for the ground-support of drifts and as well for the lining of high-level waste disposal cells and for waste packaging;
- + glass, as matrix of high-level waste.

Some of the experiments taking place in the drift will help gain better understanding of the interactions between clay and concrete and to identify the best concrete formulae to use. Other experiments will study alterations in steel and glass when in contact with the water contained within the rock. Tests are conducted to assess corrosion rate of steel when in contact with clay, and to study the

products stemming from such chemical alterations. Tests are also directly conducted within the rock to measure glass dissolution phenomena under different temperatures in order to simulate disposal conditions.

Disruptions in the rock caused by disposal conditions

Rock may be disrupted by three parameters: the temperature of radioactive waste packages, the ventilation in disposal structures and the presence of microorganisms. High-level waste produces heat for several hundred years. Extending an initial experiment, a new experiment will help continue the study of heat transfer and its consequences on rock and its properties. To do this, three 600-watt probes, a few metres apart, will heat the rock up to 90°C. Meanwhile, 200 sensors will permanently record rock evolution in terms of temperature, pressure and deformation. Moreover, the repository drifts will be ventilated for at least one hundred years.

A section of the drift has been isolated in order to be subjected to ventilation, whose hygrometry will be lowered gradually. The deployed sensors will help monitor consequently the rock's falling water saturation and any deformation. It will also be possible to monitor oxidation reactions following air migration within the rock. Lastly, repository operations will bring about the introduction of microorganisms: their impact on rock and on materials is also being studied.



VOLCANIC ASH UNDER LASER WATCH

June 2010

The Lidar (*Light detection and ranging*) is a little-known measurement device for analysing atmospheric composition through the laser detection of suspended fine particles. At the request of the international network in charge of monitoring the movements of ashes from Icelandic volcano Eyjafjöll, Andra's Lidar in the Meuse/Haute-Marne has joined the sky watch as part of a European system. All data collected has been grouped into the Leonet Community Programme (<http://leo-net.eu/>).

Disposal project: a summary of four years of multidisciplinary research

May 7th 2010

Andra has gathered its partners, counterparts and assessors to present to them the summary of the research it has conducted from 2006 to 2009. Over one hundred guests attended the event on June 25th, at the Palais de la Découverte in Paris.



Ranging from the study of the geological medium and environment in the Meuse/Haute-Marne to waste package physics and chemistry, the published results clearly show that those four years have represented a highly productive and sustained research phase, calling on a host of scientific disciplines.

Remarkable results

A more detailed picture of the geology studied in the Meuse and the Haute-Marne districts, acquired through seismic study and drillings, has helped precisely determine the zone of interest for detailed investigations (ZIRA) validated in early 2010. Unique in France by virtue of its space/time scales, the Perennial Observatory of the Environment should benefit a wide scientific community. The experiments conducted in the Underground Laboratory also include fundamental results in rock chemistry and physics, as well as in the fields of mass and

energy transfer. Lastly, studies in human and social sciences were initiated in 2008 alongside the concerted definition of the reversibility concept, in particular with an international symposium in June 2009. With help from over 70 laboratories, those four years of research conducted by Andra have yielded 242 A-grade international publications and supported 28 PhD theses. Intended for a learned audience, this progress report is available upon request and may be downloaded from Andra's website.



Cassandra, a digital simulation platform

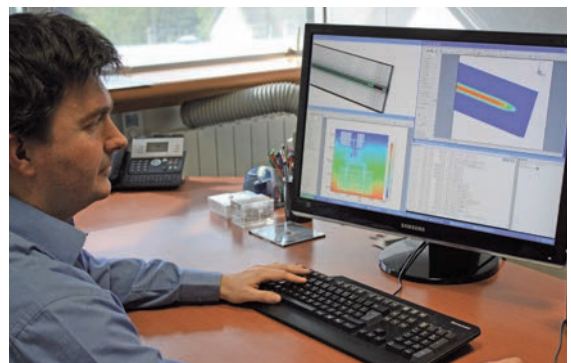
Late March 2010

Because experiments are not enough to model phenomena across vast scales in space and time, Andra has obtained a digital simulation platform. Following a collaboration that began in 2002 with EDF and the CEA, the Agency has been directly managing this powerful tool since the spring of 2010.

Cassandra (Code Applied to Andra Disposal Simulation) is a digital simulation platform which the Agency set up operationally in late March 2010, and which is meant to help multiply calculations in all applied fields that touch on disposal: chemistry, thermodynamics, migration, etc. Given that processes that occur in a geological medium are usually slow, the collection of data and their analysis using calculation codes and computerised tools will make it possible to extrapolate the models over the very long term.

A unique interface

One of Cassandra's advantages is the single interface for managing all data, aiming at a virtual representation of the repository's performance and at forecasting how it will progress in time. In addition, software coupling can cross-reference the physical phenomena under study. Configured according to Agency needs, this digital simulation platform is also



able to compare different calculation codes: if the results obtained agree regardless of the method used, the forecast being sought is further corroborated.



summer



The future deep disposal zone scrutinised in three dimensions



When the Government validated the zone of detailed exploration (ZIRA) intended for the future deep disposal back in early March, it gave the green light for additional geological surveys. Two months later, Andra launched a seismic campaign over a surface area of about 30 km². The objective was to obtain a detailed volumetric picture of the clay layer expected to host French highly radioactive waste.

A month ahead of schedule, the ZIRA zone has now been successfully scrutinised in three dimensions. Collected during the autumn of 2010, initial results from this new seismic campaign initiated on May 17th have further confirmed that the choice of those 30 km² in the townships of Montiers-sur-Saulx and Gondrecourt-le-Château (in the Meuse district) was appropriate.

A faultless exploration

It took some 15,000 “shots” from vibrator trucks to obtain this volumetric picture of excellent quality. Waves were sent into the ground, prior to being reflected on the surface following the echo principle. Emitted signals were then recorded by geophones which were gridding the zone under study. From May 17th to July 29th, the system was moved gradually, until it had covered close to 37 km². Prior to this acquisition phase, performed by German

company DMT, the ground had been prepared by the PND-Géophysique company who had initiated land deal negotiations with landowners and farmers as of January 18th. Apart from farmed lots, the French National Forestry Office had besides drawn the course of footpaths in order to preserve the trees. Thus everything was ready for the vibrator trucks to start criss-crossing the ZIRA and its vicinity, which were also investigated through about twenty shallow boreholes.

Back to square one

Two drilling platforms, representing the last remaining signs left over from the geological exploration campaign conducted by Andra in 2007-2008, were rehabilitated in the late summer of 2010.
The land? Back to square one.

Hard to imagine that there were once well drillers and geologists working here round the clock to investigate the subsoil. Nowadays the platforms have been dismantled, the wells have been backfilled, the rubble removed, the ground softened and loam has been brought in: in Narcy and Soulaincourt, respectively

located 20 km and 5 km from the Underground Laboratory, crops have reclaimed their rights over the underground exploration initiated by Andra in 2007. This preliminary campaign had been expected to be completed the following year, but it was exceptionally extended on both those sites, while the four other sites had been restored by 2009. In both cases, farmers expressed their satisfaction with the conditions of this temporary occupation of their lots: bound by the terms of an agreement with Andra, they were duly compensated in compliance with a scale set by the Chamber of Agriculture, prior to their land being restored to its original condition.



Andra studying the forest ecosystem around its Underground Laboratory

From June to August 2010

Since 2007, the Perennial Observatory of the Environment has been involved in a host of watch initiatives at the Meuse/Haute-Marne site. A new system was deployed in the summer of 2010 to scrutinise the forest and the air in order to monitor their progress before, during and after the installation of the reversible deep repository.

Together with the prairie and major crops, the forest is one of the three main ecosystems covering the 900-km² area being studied by Andra since 2007 as part of the work of the Perennial Observatory of the Environment. What are the nutrient flows between different species of trees? How do water and carbon move through the flora and fauna hosted by the forest, the ground and the surrounding air? In order to understand and evaluate all those interactions, Andra has deployed a whole array of sensors throughout the woods at Montiers-sur-Saulx, which stretch 3 km north-west of the area intended to host the future underground facilities of the reversible deep repository. One

can see a flow-measuring tower rising above the treetops to a height of 45 metres. This metal structure is used to record atmospheric data such as temperature, pressure, wind, humidity, airborne particles and UV rays, as well as CO₂ and methane concentrations.

Shared scientific work

The system which Andra has set up consists of three experimental stations, each one located on a different kind of soil. The data collected aim at getting a comprehensive rundown of all exchanges between all parts of the forest ecosystem (air, fauna, flora and soil). The findings will be compared with those obtained in other

wooded, grassy and farmed sectors. Meanwhile, “climate accidents”—excessive heat, very heavy rainfall, extended drought or extremely severe winter—will be simulated in order to assess their impact. Andra has succeeded in attracting the scientific community to the Perennial Observatory’s experimental sites, including the French National Forestry Office (ONF) who has provided the use of the site’s 45 hectares, the French National Agronomic Research Institute (INRA) who operates the measuring instruments, and others. Indeed, the measuring instruments are an integral part of the ICOS and Fluxnet networks, which centralise all data relative to the flows of greenhouse gases in Europe and worldwide.



July 21st, 2010

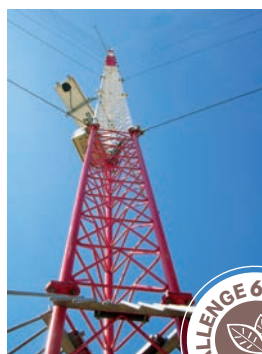
WHEN ANDRA ENSURES THE DISPOSAL OF ITS OWN WASTE

While Andra may be in charge of the sustainable management of all French radioactive waste, it is itself subjected to the same rules as everyone else. Having used radioactive tracers in order to study their diffusion within its Underground Laboratory, on July 21st, 2010, Andra removed the radioactive waste stemming from that experiment and sent it to its very-low-level disposal facility in the Aube district. This included gloves, overshoes, paper overalls and vinyl protective films; even though their level of radioactivity ranked as very low, the content of the four drums was not suitable for conventional disposal. The same applied to the four big bags containing dust and rubble from the clay rock face.

CONCERNING THE ATMOSPHERE

Located two kilometres from Houdelaincourt, sensors laid by Andra atop a 120-metre high pylon are focused on measuring the air quality, recording local and regional atmospheric parameters. Completed on August 25th, 2010, this station has joined the Lorraine

air monitoring network and is part of the ICOS international network, devoted to the study of greenhouse gases. Moreover, in collaboration with *Météo-France*, a weather-monitoring station is expected to complete this infrastructure, which is part of Andra’s Perennial Observatory of the Environment.



Investments for the future: € 100 million allocated to Andra

August 3rd, 2010

Launched by the Government in late 2009, the “Investments for the Future” programme has set five national priorities where research is in foremost position. Accordingly, Andra was allocated €100 million to develop two innovative solutions relating to waste processing and waste disposal. Listed as part of the National Radioactive Materials and Waste Management Plan 2010-2012, both of those projects confirm Andra’s role in sustainably managing all French radioactive waste, by reducing the volume of the waste to be disposed of in order to preserve that rare resource, namely disposal capacity.

In the report on strategic investment priorities which it handed to the President of the Republic on October 19th, 2009, the Commission co-chaired by Alain Juppé and Michel Rocard – known at the time as the “Major Loan Commission” – had suggested putting aside €100 million for Andra. Two projects were at stake which aimed at saving on the “rare resource” of radioactive waste disposal capacity in France: on the one hand, there was the recycling within the nuclear sector of very-low-level radioactive metal stemming from the dismantling of nuclear facilities; on the other, it was improvements in the processing and conditioning of certain kinds of organic radioactive waste, or waste containing chemically-reactive components. Signed on August 3rd, 2010 within the framework of the “Investments for the Future” programme, the

agreement between Andra and the Government formally acknowledged the benefit of those innovative solutions. For the funds to be made available, Andra is required to bring funding of its own with other industrial partners and to file a relevant business case application for the projects under consideration.

A public investment to act at a very early stage in the disposal process

This agreement highlights the Agency’s ambition “with respect to its core business, to extend the part it plays in the national priority to develop channels of excellence and patentable, exportable technology”. Funding promising assets, including innovative infrastructures, such indeed is the aim of the Major Loan. Accordingly, one billion Euros was allocated

to “the nuclear industry of the future”: 90% of the amount were earmarked for the Atomic and Alternative Energy Commission, and 10% to Andra, which gains in capacity so it may act at a very early stage in the disposal process. As a result, the Agency will be in a position to speed up work in partnership with industrialists and to extend their participation in the research conducted towards optimising the processing of radioactive waste.

AN AMOUNT USED UNDER GOVERNMENT CONTROL



The use made of that €100 million will be staggered over several years. According to the scheme that the Government has put in place, the consistency with national policy will be assured by the General Investment Commission, headed by René Ricol. As for the actual execution of the scheme, it will be set under the responsibility of a Monitoring Committee appointed by the Prime Minister in October 2010. With Alain Juppé and Michel Rocard chairing, the eight members of Parliament and eight key-figures who make up the Committee will conduct regular assessments of the credits and results obtained, prior to sending an annual progress report to Parliament. There is also a Steering Committee devoted to the funds and appointed to the Agency.





Innovating to handle chemically-complex waste

August 3rd, 2010

Because it is in liquid form, because it produces gas, etc., some radioactive waste is difficult to manage in terms of conditioning and disposal. Thanks to the “Investments for the Future” programme, Andra has entered into industrial partnerships to handle this problem.

While the objective is to reduce the volume of waste to be disposed of, chemically-reactive waste confronts Andra to a whole new set of problems: for some waste, the issue simply consists in setting up an industrial solution that does not yet exist. Although the volume of waste requiring such processing is still limited at this time, significant production is expected in the coming years.

+ Intermediate-level waste

Among the intermediate-level long-lived waste (IL-LLW) to be hosted in the future reversible deep repository in the Meuse/Haute-Marne, Andra is especially intent on making high-organic-content waste, contaminated by alpha emitters, more inert. With a high carbon content, such waste often blends plastics and other polymers with metal, a particularly delicate combination given its level of radioactivity.

+ Plasma torches, a study priority

In partnership with Areva NC and the CEA, Andra is exploring thermal processes, namely plasma torches; they could help mineralise organic matter, and then to mix in ashes produced inside a vitreous matrix. What with gloves, seals, belts, ventilation filters and various implements, the range of waste is extensive. It also includes technological waste stemming from French factories manufacturing mixed oxide fuel – the notorious MOX – and from reprocessing plants at La Hague. Already used in the incineration of conventional waste, plasma torches stand as a promising technology, enjoying marked interest on the part of Andra and its partners. To date, Switzerland is the only country to have developed this kind of installation.

Recycling metal waste to optimise disposal and preserve natural resources

August 3rd, 2010

Improving the recycling rate of metal waste in the nuclear sector used to be no more than a budding issue, until a budget was allocated as part of the “Investments for the Future” programme.

According to National Inventory forecasts, the metal waste expected to be delivered to Andra in the next twenty years will mostly be steel and, to a smaller extent, lead, copper and aluminium. What can be done to reduce the volume of these 350,000 tonnes of very-low-level waste (VLW) stemming from the dismantling of nuclear facilities, so as to save on that rare resource, namely disposal capacity? In partnership with the producers, Andra is considering recycling this metal as raw material for use within the industry. The first avenue concerns using the waste in the manufacture of containers, made of cast iron and/or steel, and suitable for the Agency’s repositories. Why not, also, use this waste in building the very disposal structures themselves? Beyond the basic technical feasibility of both alternatives, other recycling uses will be studied so as not to miss the slightest potential idea for reuse. The stakes are substantial: this could save up to 130,000 cubic metres in disposal capacity, making all that much more space available at Andra’s CSFTA in the Aube.



350 000 t
SUCH IS THE QUANTITY OF FINAL WASTE THAT ANDRA WILL HAVE TO MANAGE FROM NOW UNTIL 2030.

Work started on the cap on the Manche waste disposal facility

From mid-June to late August 2010

In the summer of 2010, Andra launched works aiming at extending the life of the cap on the Manche waste disposal facility for the long term. The works are part of gradual developments suggested by Andra and approved by the Nuclear Safety Authority early this year.



the cap. They began in mid-June on the facility's eastern part. The 1.60-metre-high buttressing wall, acting as a wedge, was moved, while the low part of the embankment, supported by the wall, was filled in with material coming from quarries in Cherbourg. This first phase of works was completed before the summer's end, it will be duplicated in other parts of the site.

its watertightness. Other developments too are planned for several decades to come: the slopes of all embankments will be softened, and a mineral layer will be laid down to strengthen the natural materials that currently make up most of the cap. The idea is to gradually make up the Manche facility's definitive cap. What is at stake is to end up with a long-lasting cap that will not need recurrent interventions. A progress report on the various works performed will be produced in five years' time.

After taking in over 527,000 cubic metres of low- and intermediate-level radioactive waste, the Manche waste disposal facility entered its monitoring phase in 2003. The works initiated in the summer of 2010 consisted in reinforcing the embankments and softening the slopes on

A progress report five years from now Scheduled over a three-year period, the project will be analysed for feedback. In order to optimise the existing cap over the long term, laboratory and field studies will be conducting treatment experiments in parallel to improve

Access conditions eased at the CSFMA waste disposal facility

September 13th

As a precautionary measure, the low- and intermediate-level waste disposal facility (CSFMA) in the Aube district had been over-protecting its workers and visitors: after eighteen years' operation, access to some premises has been eased.

While protective gear and dosimeters remain compulsory in regulated zones for employees and visitors, this change will make it easier to get around the facility. Not to mention that areas that were formerly overrated will now be accessible to local businesses who do not have people who are familiar with radioprotection. By better targeting risks, you avoid trivialising them: since those new measures have been in place, areas that do present a radiological hazard are all the better identified.



July 6th, 2010

DISPOSAL RECORDS FILED AT THE NATIONAL ARCHIVES

On July 6th, 2010, Andra filed a second batch of documents at the National Archives: five years of documentation about the operation of both its low- and intermediate-level waste repositories. The detailed records from the Manche facility concern the cap, the safety elements and the monitoring of the environment. In addition to those 245 reports, there are 1,567 files from the CSFMA in the Aube district, concerning the phase 4 structures, from their construction to their closure.

Those archives make up thirty boxes in all, representing three metres of shelving. This filing is done on a five-year basis, so the next one will occur in 2015. Intended for future generations and printed on permanent paper that is meant to last from 600 to 1,000 years, the safeguarding of the sites' records meets a twofold objective: to optimise any would-be technical intervention that may prove necessary in the future, but also to make it possible to reassign the sites if our descendants were to wish it.



The facilities' environment placed under close monitoring

June 2010 The very nature of Andra's industrial activities leads its disposal facilities to add radioactivity to that which occurs naturally in the vicinity. Andra takes great care to not only check that its discharges are below regulatory thresholds and the limits it has set itself, but it also aims at limiting its radioactive discharges into the environment to the lowest possible levels. Its site activity reports, known as "TSN Reports", were issued in June 2010; those documents give a predominant place to monitoring the environment. Here is a brief overview for each of Andra's facilities.



In 2010, the low- and intermediate-level waste disposal facility (CSFMA) has performed some 11,000 radiological measurements and about 2,000 physical/chemical analyses on over 2,000 collected samples. Whether they were gaseous or liquid, all discharges proved to be well below the limits authorised for the public. As for trace

elements of tritium found beneath the facility, which were minimal and in declining amounts, Andra decided on extreme vigilance by launching a radio-ecological study, by including carbon 14 within the same reinforced monitoring process. Radiological analyses were also performed at the very-low-level waste disposal facility (CSFTA).

Minor impact on the environment

Similarly to what happened in the Aube district, the 10,000 measurements performed at the Manche waste disposal facility confirmed the very low impact it had on the environment in 2010, including out at sea. While the cap's overall performance indicator was found to comply with expectations, traces of tritium in the underlying table continued declining. In addition to this physical/chemical and radiological monitoring, two campaigns of biological

MANAGEMENT SYSTEM GRANTED TRIPLE CERTIFICATION

June 2010

Since June 2010, Andra has been in a position to append no less than three international standards to its management system. Incorporating national sustainable development strategy requirements established by the Government, they are: ISO 9001 for quality, OHSAS 18001 for health and safety in the workplace, and ISO 14001 for the environment. Prior to certification, the French Standards Association (Afnor) conducted its audit in early May, covering the Agency's many activities: research and development, industrial activities, the national radioactive materials and waste inventory, information and communication about their management and, lastly, the international promotion and enhancement of scientific and technical know-how. This triple certification, renewable every three years, is subject to annual monitoring and applies to all Agency facilities.



follow-up have demonstrated that the streams were healthy (Sainte-Hélène and Grand Bel). Lastly, in the Meuse/Haute-Marne Centre, 2,700 analyses were performed on various environmental components. Open in June 2009, the Technological Exhibition Facility set up an environmental monitoring plan, while details of an impact assessment of the Underground Laboratory were presented to local residents as part of the public inquiry relating to the extension of its operating life.

Andra's expertise earns it a market in Ukraine

September 2010 Andra was awarded a new market in Ukraine in a European call for tenders.

How to modernise the Buryakura site, where the waste from the Chernobyl accident is disposed of? The contract, awarded to Andra in September 2010, brings together

its German counterpart DBE and local company REC, which stems from the Ukrainian Science Academy. For an amount of about €100,000, it concerns three avenues of operation: improving safety conditions; optimising confinement by adding a mobile roof on cells that are in the process of being filled, very much along the lines of the system in place at the Aube faci-

ties; and thirdly, improving the qualification of waste disposed of at this site, while taking care to monitor any impact on the environment. The Agency should have completed the list of specifications by late 2012, at which point a new call for tenders will seek out the project managers.

The Meuse/Haute-Marne Centre opens its underground drifts to the public

September 18th, 2010

Since construction began in 2000, close to 60,000 visitors have enjoyed Andra's Underground Laboratory. This keen interest has been further boosted by the opening of the Technological Exhibition Facility in 2009, and the repeat in September and in October 2010 of "open drifts" days at a depth of 500 metres.

Although the depths of the Underground Laboratory had long been the exclusive preserve of professionals, in 2009 Andra decided to open its drifts to the general public. The operation was repeated on two occasions in 2010, in September and October, much to the satisfaction of 245 local residents who were then in a position to better understand the reversible deep disposal project. In addition, combined tours of the Technological Exhibition facility and Underground Laboratory surface

installations are also offered year round. As soon as one enters the public information building at the Laboratory, one can see a full-scale drift model that gives the full measure of the geological investigations and experiments taking place 500 metres below. In the neighbouring town of Saudron, the Technological Exhibition facility displays

waste handling prototypes, containers and other technological applications. As for Andra geologists, chemists and biologists, they are delighted to take on the role of lecturers.



The "Green Odyssey" exhibition: a journey into the heart of the jungle

June 30th, 2010

Exploring tropical forests in Caen... such was the adventure experienced by a dozen Manche elected officials thanks to an itinerant exhibition supported by Andra.



After Falaise and Alençon, the "Green Odyssey" exhibition has settled down in Caen for the entire summer of 2010. This fully modular immersion into the world of tropical forests is intended as both a learning and an entertaining experience. Elected officials from the counties of Beaumont-Hague and Les Pieux, and the Cherbourg community were given to realise this as they walked through

lianas and insects on June 30th, 2010 in Caen. They especially appreciated the interactivity created by a tactile table: linked to a giant screen, the table allows anyone to follow their own trail across the jungle, virtually so but with a host of thrills! This exhibition was the brainchild of the Relais d'sciences Basse-Normandie association, which is the Caen's scientific, technical and industrial cultural centre, and partner with Andra since 1998.



September 2010

ARCHIVING FOR FUTURE GENERATIONS

How does one transmit the full memory of disposal over the long term? Such is the issue behind the "Archiving for Future Generations" project initiated by Andra in 2010. There are eighteen people at Andra working part-time on the project, which explores a great variety of ways to hand over the information. The first pillar in the project consists in looking into the construction of buildings in which to preserve the documents, the history and the technology, as well as fauna, flora and sub-soil. Meanwhile, engineering studies are conducted on the persistence of languages and symbols, the longevity of writing and recording media, the perception of lengthy periods of time, and online social networks. Lastly, Andra also wishes to enrol the local population to convey this memory about radioactive waste disposal in France: indeed, whether youths, working adults or pensioners, the residents are in the best position of all to relay this information over the coming decades.

Andra open door day in the Aube district: a success yet again

September 12th, 2010

Every year, close to 4,000 people visit Andra's two repositories in the Aube district, by prior appointment as well as during a much-appreciated "open door" day. The event's 2010 edition was entitled "A ticket for the environment and for technology".

This sixteenth edition was a success yet again: close to 900 people travelled to Soulaïnes that day. Since most of them were from the Aube district, it did not come as a surprise that 65% of them stated having known about Andra before that day; 45% had even already visited the CSFMA. Nevertheless, the trip by small train was a first for everyone, and

was all the more appreciated that it helped to gain a better understanding of the construction of new disposal structures. Visitors were handed a questionnaire so that their motivations could be better

identified. Among the reasons they gave for their visit was the desire to get information about radioactive waste management, of course, but also to tour an industrial site – free of charge, what's more – or to take a look at the place a relative works in.

Disposal and the environment
Ranging from waste package control to the works planned for phase 8, from



Since June 2010

THE "FOSSILS, THE FOOTPRINTS OF TIME" EXHIBITION GETS AN EXTENDED RUN



The exhibition presented by Andra at the Underground Laboratory in Bure continues attracting crowds. Produced by the Agency in collaboration with the CNRS via the Forpro Research Group, the G2R Laboratory at Nancy University and the Biogeosciences Laboratory at the University of Burgundy, "Fossils, the Footprints of Time" tells the history of the site that may one day host the future reversible deep repository. Inside a recreated drift, fossils take on the role of little white pebbles, helping visitors discover the rocks being crossed during excavation, and the approach used by palaeontologists in piecing together past events. Recreated landscapes, archaeological digs workshop, treasure hunt, lab bench observations and a film round off this immersion into the Lorraine and Champagne-Ardenne regions as they were some 150 million years ago. The exhibition has been extended to June 2011, in order to continue welcoming the schoolchildren from the Meuse and the Haute-Marne districts and other budding palaeontologists.

environmental monitoring to designing the final cap, this opportunity of discussing such issues with professionals provided the day with added interest. As for the younger ones, they had specifically-tailored side events interspersing the trail, and the "By my Tree" exhibit providing them with a break that was as entertaining as it was educational.



The Manche waste disposal facility, a cultural and scientific heritage

July and August 2010

For the fifth year running, the Cherbourg-Cotentin Tourist Office is including the Manche waste disposal facility in two of its summer package tours.

Accordingly, the Manche waste disposal facility (CSM) has extended the scope of the "La Hague Heritage" circuit on Tuesday afternoons, adding its own industrial history to the region's natural and cultural assets. Thursdays are for the "From Atoms to Stars" tour, where a tour of the CSM serves as an introduction to a beginners' workshop on radioactivity held at the Ludiver Planetarium. Shuttles depart at 1:30 pm, returning at 6:00 pm, for groups of 5 or less: those "two-in-one", "surprising and instructive" tours have delighted holidaymakers and local residents alike, whatever their age.



2010 a year with Andra



autumn



The Underground Laboratory: a public enquiry to extend the mission

From October 26th to November 30th 2010

As Andra was granted the licence to operate the Laboratory until December 31st, 2011, the Agency filed an application in late 2009 for the renewal of the licensing Decree (DAIE) in order to pursue investigations through to 2030. The public enquiry regarding the new decree was conducted during the fall of 2010.

The first licensing Decree to Install and Operate (DAIE) the Laboratory was granted in 1999. It allowed Andra to perform the preliminary investigations into the geological layer likely to host a deep geological repository for high-level and intermediate-level long-lived waste.

A procedure on two levels

The new decree shall be decided upon by the State Council, following the review of the application file by the Ministry in charge of ecology, working closely with the Ministry in charge of energy, with support from the Nuclear Safety Authority (ASN) and the Radioprotection and Nuclear Safety Institute (IRSN). Locally, the Prefects have been asked to organise the consultation of residents within the framework of a

public enquiry. The inhabitants of the areas concerned by this public enquiry were thus able to express themselves during the period from October 26th to November 30th, 2010. In all, about sixty questions were asked by post or recorded in the registers that were made available at 35 municipalities around the Meuse/Haute-Marne Centre, as well as in both Prefectures – in Bar-le-Duc and Chaumont – and both Sub-Prefectures – in Saint-Dizier and Commercy. The Enquiry Commission send its comments to Andra, which provided a response. The Commission then filed its report on January 27th, 2011, containing a favourable opinion together with three recommendations relating to reversibility, information and memory.



If accepted, the renewal of the licence will allow Andra to pursue its studies and experiments beyond December 31st, 2011.

FELLING THREE BIRDS WITH ONE STONE!

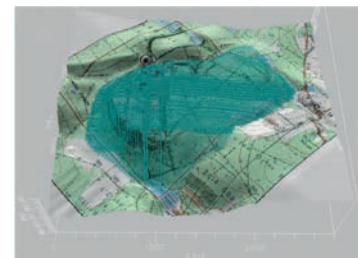
In addition to the request for the renewal of the licensing Decree of the Laboratory, two other files were examined during the same period. The three public enquiries were jointly-organised to obtain more comprehensive and consistent information. The first file was about “Installations Classified for Environmental Protection” (ICPE), and the second concerned “Installations, Structures, Works and Activities concerned by the Water Act” (IOTA).

Hydrogeological modelling goes 3D in the Aube district

Late december 2010

In order to understand how water flows and behaves beneath the disposal structures at the low- and intermediate-level waste disposal facility in the Aube district, Andra makes use of a hydrogeological model. Now available in three dimensions, this digital instrument helps make finer estimates.

Back in the late eighties, Andra has performed its first hydrogeological model in two dimensions. Based on the representation of 2.3 km² segmented into squares 25 metres a side, the instrument estimated the water’s pathways and flow-rate beneath the disposal structures, all the way to its surface outlet. Yet its performance was such that it could not reproduce situations observed within the water table, such as a sudden rise in water levels following heavy rainfall. Nowadays however that technological limitation has been fixed thanks to the new hydrogeological model acquired by Andra. Now in three dimensions, the first part of the model was delivered in late December and can show the water flow around the disposal structures (where low- and intermediate-level short-lived waste is disposed of), both on the surface and underground. A second part that concerns at the radionuclide migration will be completed in 2011.



Laboratory drift ground-support under study

November 2010

How to build the future deep disposal repository while preserving the characteristics of the clay rock layers? To find out, Andra is conducting numerous ground-support tests inside its Underground Laboratory.

When excavating an underground structure, ground loosening causes cracks in the surrounding perimeter. These may act as favoured zones for the flow of water, and so too for migration of radioactive elements stemming from the waste. Eventually, and because nature abhors a vacuum – including at depths of 500 metres – the convergence phenomenon may lead to maintain this damage.

Flexible or rigid ground-support?

This is why, in an attempt to limit the damage, even possibly to restore the rock's initial conditions, Andra has been testing several kinds of



ground-supports. In November 2010, a section of roughly forty metres was lined with concrete, and crammed with sensors that will record the ground's reactions for several years. This data will be compared with results of ground-support tests performed back in 2005 using metal sliding arches. Another possibility consisting

in combining metal's rigidity and concrete's flexibility has been under study since the first half of 2010. All of those tests will help better understand rock behaviour and they are setting up the industrialisation phase for the future reversible deep repository.

Communicating underground... sure, but how?

November 2010

Remote-controlling machines, transmitting and receiving video signals, all this inside a hard-to-access 500-metre-deep tunnel. Such is the purpose behind the wireless transmission experiments conducted by Andra in the low-noise underground laboratory at Rustrel in the Vaucluse.

Considering that certain cells devoted to intermediate-level long-lived waste in the reversible deep repository are planned to be 400 m long, 6 m wide and 5.5 m high,

the handling of radioactive waste packages will have to be operational within a setting that is not only underground, but also with an odd geometry. Since this will be done through remote-control, it represents yet a further challenge! The remote-controlled machines will have to be able to transmit information and to receive manoeuvring commands, all this monitored remotely via video. Additional

difficulty will come from signal loss and interference, caused by the configuration in space and the materials that make up the drift and do hamper radio waves. How to set up actual wireless transmission? How to incorporate it into the package-transport vehicle? Such was the twofold objective pursued by an Andra team on October 14th and 15th, 2010 at the low-noise underground laboratory at Rustrel in the Vaucluse. Conducted together with the "Comex Nucléaire" Company, those tests and the initial settings made have led to validating the feasibility of using wireless transmission to handle the packages inside the cells.





Andra heading the IGD-TP for one year

September 29th, 2010

Andra Research & Development Director Patrick Landais was appointed on September 29th, 2010 for one year as Chairman of the Executive Group for the Technical Platform devoted to Implementing Geological Disposal of radioactive waste (the IGD-TP). Aiming at commissioning the first geological disposal facilities in Europe by 2025, this European platform is a lever to coordinate research & development policies regarding radioactive waste disposal, in the same way as the association of laboratories set up by Andra.

Founded by the European Union in 2009, the Technical Platform devoted to Implementing Geological Disposal of radioactive waste is steered by an Executive Committee bringing together various national agencies in charge of radioactive waste management. It includes about sixty members that are for the most part research bodies. Once it had established its strategy, the Committee agreed on an agenda in late 2010 that would help it direct the European Union's research priorities concerning high- and intermediate-level long-lived waste. Its mission is also to run a forum for dialogue, a privileged venue for sharing experience, combining skills and debating on scientific matters, which held its first meeting in Paris in February 2011. Among the priorities that were highlighted by the platform, one notes the monitoring of repositories, a necessity that is actively supported by Andra, which consists in ensuring that the means are there to take their pulse in real time so that safety can be assured and that reversible management can be performed. This agenda also underscores the need to develop full-scale tests: transport-drifts, disposal cells, zone-specific as well as cell-specific sealing means should all be tested at full-scale, both in terms of their size and of their functionalities.

Close to a dozen Andra programmes subsidised by Europe

These are all signs of progress which, while remaining consistent with the objectives set by Andra, especially with respect to the National Radioactive Materials and Waste Management Plan, will need to be expressed tangibly

in the European Union's R&D Framework Programmes, particularly FP7 which runs until late 2013. Accordingly, the Agency is taking part in about a dozen scientific programmes. For instance, there is "Modern", steered by Andra and which concerns disposal observation methods strategy. For its part, "Carbowaste" focuses on the study and possible recycling of graphite waste. As for "Forge", its objective is to study the production and transfer of hydrogen that deep disposal will generate during and after the operational phase.



LABORATORY ASSOCIATIONS: STRENGTH THROUGH UNITY

Partnerships, contractual initiatives, jointly-headed theses, etc. Through the laboratory associations, Andra is mobilising teams and organising original cross-functional interactions in research & development around a major issue as listed in a shared, targeted and perennial (often lasting 5 years) programme. Started over ten years ago, this joint science management scheme shared between the Agency and university contacts stemming from research bodies or as well nuclear facility operators has widely demonstrated its effectiveness. For instance, in 2010 the "geomechanical association" moved towards a microscopic approach to rock so as to better understand how it reacted. Regarding glass, the disposal matrix used for waste stemming from spent fuel processing, the approach is clearly interdisciplinary. In all, there are close to 100 laboratories working out of eight associations. The most recent one looks at humanities and social sciences, including both ethics and economics. Following its steering committee's first meeting in late 2010, this association promises to deliver a substantial contribution to work and discussions about reversibility, in direct line with the book published by Andra in French and English: *Making Radioactive Waste Governable – Deep Underground Disposal and the Challenge of Reversibility*.

Reversibility, an issue that is becoming international

From December 14th to 17th, 2010

With Andra's support, the OECD's Nuclear Energy Agency (NEA) has set reversibility as the core issue in an international symposium held in late 2010 in Reims. The event gathered elected officials, operators, ONGs, safety authorities, etc. In all, 180 participants from all walks of life came to discuss this fundamental concept in radioactive waste management policy.

"Giving citizens the guarantee that it will indeed be up to our successors to decide whether there will be a definitive sealing of repositories." This was how Parliamentary Office for the Evaluation of Scientific and Technological Choices (OPECST) Chairman Claude Birraux had expressed a reminder of the legally-binding idea behind the Planning Act dated June 28th, 2006 relative to radioactive waste management, on the occa-

sion of the first interdisciplinary symposium on reversibility held by Andra in 2009. This time, in 2010, he encouraged participants who had come to debate the issue in Reims to pursue their discussions. The concepts of reversibility and retrievability were at the core of the dialogue between the roughly fifteen nationalities represented. The former determines the ability to reverse or modify any decisions taken in the course of gradual disposal



operations. The second one concerns the ability to retrieve the waste packages after they have been disposed of. Those are the parameters which Andra incorporates when implementing its mission in the Meuse/Haute-Marne, as it has demonstrated that reversibility is possible for at least one hundred years.

GeoVisionary providing depth to Underground Laboratory experiments

Décembre 2010

Drilling from surface, sampling water from rivers, deep coring, atmospheric measurements and more... Thanks to the use of three-dimensional visualisation software, all measurements acquired within the framework of the reversible deep disposal project will be observable and workable from a geo-referenced panorama.

Developed by the British Geological Survey (BGS) as a means to assemble and analyse diverse, scattered data that had been collected over a fifty-year period throughout Great Britain, GeoVisionary software was also used to provide real-time information to the general public during the 1997 British flooding episode.

As part of its partnership with the BGS, Andra has decided to make use of this instrument in order to represent, within a single environment, all of the measurements documenting its deep disposal project. An initial database groups information about the measurement spots, solid and fluid samples and photographs, as well



as logs and other in situ measurement files. In addition to this database, there is a specific information system managing some 400 million data stemming from all the sensors positioned throughout the Underground Laboratory as well as those inside its Swiss alter ego at Mont Terri. GeoVisionary software will provide a flowing, accurate three-dimensional visualisation of all this information. Initiated in 2009, the technical collaboration with the BGS has led to regular consultations in order to optimise the software's functionalities according to everyone's needs, the last of which was a meeting in Nottingham in late 2010.



October 18th, 2010

THE PERENNIAL OBSERVATORY OF THE ENVIRONMENT REWARDED FOR MONITORING ECOSYSTEMS ON A CENTENNIAL TIMESCALE

Granted to thirteen French projects, the Research Alliance for the Environment's (AllEnvi) SOERE label (Long-term Observation and Experiments for Research and the Environment), which has brought together twelve players including Andra since 2010, was awarded to Andra's Perennial Observatory of the Environment on October 18th, 2010. The Observatory, set up in 2007 around the Meuse/Haute-Marne Centre in order to monitor the evolution within the natural environment, has proven quite remarkable in the diversity of its soils and landscapes. Indeed, there are no less than three ecosystems under study there, namely forests, prairies and farmland. Its timescale is just as ambitious, including in particular an eco-library which, starting in 2013, will retain the environment's archival memory by storing all samples collected.

Deep geological disposal: heading for the industrial phase

November 2010

Following twenty years of research, the reversible deep disposal project for high-level and intermediate-level long-lived waste is entering a new phase in its development. Since the autumn of 2010, the project has been industrialising, becoming the future Industrial Centre for Geological Disposal (CIGEO).

As it reaches its 20th anniversary, Andra will recall 2010 as being a turning point for the reversible deep disposal project. Once approved by the Government on March 9th, 2010, the zone where the underground installations could be sited was explored in three dimensions, during the summer of 2010, using seismic surveys. In the Underground Laboratory, a further 162 metres of drifts have been excavated, and an initial 40-metre-long test-cell has been completed. Assessors' recommendations will be directing follow-up studies with respect to the licence application for the reversible deep repository. On the strength of this progress, the project is fast approaching operational feasibility, thus legitimately calling for a new name: CIGEO, for Industrial Centre for Geological Disposal.

Underground and surface installations

Following a public debate in 2013, the review of the licence application for the deep repository around 2015, and the passing of an Act to set its conditions for reversibility, it will be the time for the Government to give the green light for the construction of the repository, which could begin around 2017/2018. Located at a depth of about 500 metres in clay rock, CIGEO's underground installations would be build on a gradual basis simultaneously with its operation, ultimately stretching across a 15-km² area; the drifts would be excavated gradually for a period of roughly one century. Two installations would also be built on the surface. The first one, intended for the excavation work, would be set just above the underground disposal zone, over an area of about 200 hectares. It would include administrative buildings, workshops, shafts to

ventilate the underground structures and an area to store extracted muck. A second surface installation would be devoted to the acceptance and preparation of waste packages; stretching about a hundred hectares, it would be linked to the underground drifts via a ramp for conveying the packages.



A long-standing collaboration with Japan

November 2010

As it has been doing for the past ten years and longer, Andra handed in its technical activity report to the Radioactive Waste Management and Funding Center in November 2010. This is an opportunity to look back upon the close collaboration that exists between Andra and its Japanese counterparts.

Equipped with 54 light-water generators and a fast-breeder reactor, Japan has a low-level waste repository and is building two underground laboratories. Every November since the late nineties, Andra has been sending a technical report, summarising its operational and applied research activity concerning all types of waste, to its Japanese counterpart, the Radioactive Waste Management and Funding Center (RWMC). Using a hot line, the Agency

also answers in real time any questions relating to waste management in France, asked by this semi-public agency in charge of the funds devoted to nuclear waste management. Lastly, and in collaboration with the RWMC, Andra hosts a Japanese engineer assigned to the teams working on CIGEO, who stays with Andra for about two years. In addition, the Agency has had a cooperative



agreement since 2001 with NUMO (Nuclear Waste Management Organization of Japan), a Japanese organisation in charge of high- and intermediate-level long-lived waste disposal.

A new five-year contract committing Andra and producers

October 22nd, 2010

Areva, EDF and the CEA are three radioactive waste producers that make use of Andra's low- and intermediate-level waste disposal facility (CSFMA) in the Aube district for their radioactive waste. A new contract signed on October 22nd, 2010 defines the duties and obligations of all signing parties through to 2014.

In effect for a period of five years, the contract signed by Andra and by Areva, EDF and the CEA respectively, specifies the conditions under which the radioactive waste packages will be accepted at this facility: type of package, radiological charac-

teristics, quantities, delivery times and prices. The contract grants potential access to disposal in exchange of payment, yet does not guarantee the systematic acceptance of packages: it takes into account long-term safety and environmental protection requirements, while providing funding for the repository.

A budget that boosts local growth

The overall CSFMA budget stands at €40 million per annum. 35% is devoted to internal resources, outsourced services – maintenance, security, catering, green spaces – and environmental monitoring. In 2010, over €4 million's worth of orders were made to local businesses. 25% of



the overall budget pays for land tax, the territorial economic contribution as well as the Basic Nuclear Facilities (INB) tax, which partly funds the Nuclear Safety Authority, and the disposal tax created in 2010. Operational costs relating to processing, conditioning and disposal represent 22.5% of the budget. Lastly, 10% of the budget is assigned to package quality monitoring and a further 7.5% to studies and investments meant to optimise security at the CFSMA (fire watch system, disposal automaton).

Nuclear Safety Authority inspection tours

From May to December 2010

Every year, the Nuclear Safety Authority (ASN) conducts unexpected, scheduled or response-motivated inspections of nuclear facilities. In 2010, four inspection tours were carried out at the low- and intermediate-level waste disposal facility. In all, only one single deviation was observed.

Inspections conducted by the Nuclear Safety Authority at the CSFMA in 2010 were all scheduled, and they focused on compliance with the commitments made by Andra to the ASN during previous inspection tours, on the transport of radioactive substances, command control at the facilities and the general issue of confinement. During the last inspection, the ASN observed and noted one case of failure to fully incorporate one of the emergency instructions.

SATISFACTORY INSPECTIONS IN 2010

As with the low- and intermediate-level waste disposal facility (CSFMA), the Manche waste disposal facility (CSM) and the Meuse/ Haute-Marne Centre (CMHM) were both inspected by the Nuclear Safety Authority in 2010. At the CSM, inspections focused on the overall operation, the way in which controls were organised, and the periodic checks performed on monitoring equipment. At the CMHM, the ASN audited the organisational and human factors as well as quality management. Andra's head office was also inspected with respect to the management of polluted soils and sites, to the development of the CIGEO project (the future reversible deep repository), the monitoring of packages intended for the CSFMA, as well as the update of their technical acceptance specifications. Lastly, two sites polluted by radioactivity were inspected while Andra was performing decontamination operations. Of those nine inspection tours, none yielded any observations.



October 20th, 2010

THE IMPACT OF THE LILW DISPOSAL FACILITY CSFMA: SCRUTINISING THE HEALTH OF LOCAL RESIDENTS

Is the incidence of fatalities and hospitalisation caused by cancer around the low- and intermediate-level waste disposal facility (CSFMA) higher there than for the Aube and Haute-Marne districts? The answer is no, according to findings by the Sanitary Watch Institute (InVS), who was commissioned by a local group called "Les Citoyens du Coin" (The Citizens Down the Road), joined by 15 county elected officials. Looking at the period from 1993 to 2007, the study took into account an area within a 15-km radius around the CSFMA, grouping close to 90 municipalities and 16,000 people. Described as "reassuring overall" by the InVS Managing Director, results show a slightly higher incidence of lung cancer in men, without establishing what is causing it. The findings were presented to the CSFMA's Local Information Committee (CLI) on October 20th, 2010. They will be confirmed by further monitoring over a two-year period.

Polluted sites: decontamination proceeding apace

From January to December 2010

A legacy from our past, and more specifically from the 1920s which associated radium with cutting-edge technology, there are still remaining sites that are contaminated by radioactive elements. Factories, industrial wastelands, communities' facilities, shops and housing have been marshalling Andra's energy, in accordance with its public interest mission, as defined by the Planning Act dated June 28th, 2006 (see insert opposite).

Launched several years ago, major decontamination works are being conducted by Andra at sites that are, sometimes falling into decay, sometimes used by communities or private individuals. Here is an overview of initiatives that have been underway throughout 2010.

Orflam Plast, a former lighter manufacturing plant

Located in the municipality of Pargny-sur-Saulx in the Marne district, this factory closed down in 1997, leaving behind a contaminated industrial wasteland stretching from the buildings to the banks of the Saulx river. 2.7 tonnes of waste were cleared from 1997 to 2005, while the radioactivity of the contaminated banks was confined where it stood. Later research uncovered the presence of thorium 232 in neighbouring areas. From mid June to mid October, Andra decontaminated the Gravière pond, excavating the land around the waters. Consequently, 200 cubic metres of very-low-level waste were stored at the site of the former factory to await definitive confinement using a clay cover. 100 cubic metres of additional radioactive waste will be cleared from the site in 2011. Other works remain to be performed before the site (building and outside lots) can claim a full bill of health.

Isotopchim, a business dealing in local chemistry

Located at a place called "Le Belvédère de Ganagobie" in the Alpes-de-Haute-Provence district, this facility may well have been classified for environmental protection, yet it produced molecules marked with carbon 14 in a manner that was not always quite by the book... From 2004 to 2008, Andra conducted an initial study and went on to clear 850 bottles

containing radioactive chemical products, sending them towards appropriate channels for processing. On January 21st, 2010, the new decontamination work phase was introduced at a public presentation by the Prefecture and the Town Hall, in association with Andra and its supervising authorities, as well as with the Regional Directorate for Environment, Territo-

rial Planning and Housing (DREAL). 40 cubic metres of very-low-level waste including furniture and home appliances were cleared in mid 2010. Samples collected from the remaining bottles were sent to the CEA for analysis, a first step prior to their being taken charge of by the appropriate channels.



September 2010

PUBLIC SERVICE MISSION: DECONTAMINATION UNDERWAY AT GIF-SUR-YVETTE

Turned into a housing area back in 1959, the Coudraies neighbourhood at Gif-sur-Yvette in the Essonne district still bears a few signs of its industrial past. This was where the New Radium Society (SNR) used to prepare needles impregnated with radium. Using diagnoses and decontamination campaigns, Andra acted in several housing units featuring a level of radioactivity higher than that accepted by health authorities. Four houses have necessitated more substantial interventions. Two were decontaminated from 2005 to 2009 before they could be lived in again. The third, owned by the Government since 2006, was demolished in September 2010. The fourth was purchased by Andra 2010 to be demolished, and the former owners were rehoused. Once the site is decontaminated, it will be retroceded.

The Charvet factory and the Marie Curie school – radium, again and again

At the Charvet factory located on Saint-Denis Island (Seine-Saint-Denis district), they had no idea that the land upon which they stood had once been the site, from 1913 to 1927, of a chemical plant which extracted radium salt, operated by the University of Paris' Radium Institute. Once this radiological past had been uncovered, a Prefectural order passed in 2006 required that the land be secured and that the radiological pollution be managed. Following the demolition of the building in 2010, Andra began sorting contaminated rubble from clean

rubble. In Nogent-sur-Marne (Val-de-Marne district), it was the Marie Curie school that was built upon the site of a former radium-extracting plant. After it was closed down in 1988, the site could at last potentially be cleaned up. In the role of contracting owner support, Andra began work in October 2010 and cleared 60 cubic metres of radium-bearing waste, sending it for storage in 2011. Both sites came under the Government's Economic Boosting Plan. Specifically, this scheme was mobilized to fund the decontamination of a site whenever it is required for a territorial planning project.



A MISSION IN THE PUBLIC INTEREST WITHIN A LEGAL FRAMEWORK

Within the framework of its mission in the public interest, as determined by the Planning Act dated June 28th, 2006, Andra is expected to clean up certain sites contaminated with radioactive substances. The Government provides all or part of the funding required for the various decontamination operations. To that end, it is advised by the National Aid Commission on Radioactive Matters (CNAR), which hands down its opinion on the terms of the decontamination and on the granting of public subsidies.



“Radium Diagnosis”: a large decontamination campaign has begun

October 2010

In October 2010, the Government launched the “Radium Diagnosis” operation, intended to perform a diagnosis of any sites likely to be contaminated with radium. Within the framework of its mission in the public interest, Andra is in charge of decontaminating those sites. Since the operation began, 84 diagnoses have been performed.



The “Radium Diagnosis” operation concerns 18 French Districts. It is steered by the Nuclear Safety Authority, under the supervision of Regional Prefects and with the support of the National

Aid Commission on Radioactive Matters (*see box above*). The Radioprotection and Nuclear Safety Institute began its diagnoses in October 2010. In the event of proven contamination,

Andra will intervene to decontaminate the sites concerned, in accordance with its mission in the public interest as determined by the Planning Act dated June 28th, 2006.

www.dechets-radioactifs.com: all questions about the issue only a click away

October 2010

Although radioactive waste management is one of the major current debates between science and society, it remains plagued by ignorance and untruths. In order to shed some light on the issue, especially for the benefit of the youngest, Andra has launched a website combining teaching and transparency.

Whether one chooses a linear guided tour or a more intuitive navigation using the many contextual links and informative balloons, interactive sections, timelines, quizzes or pictures, the information is set up for all audiences. Launched in partnership with the Palais de la Découverte, the Ministry for Ecology

and the Ministry for Research, the website is structured around four sections. While “In the Depths of Radioactivity” introduces the discovery and successive uses of radioactivity, “Waste under the Microscope” and “An Overview of Solutions” look at the various categories of waste and the appropriate means of disposal that exist in France. Listing an inventory of research currently underway, “The Challenges of Science” is devoted to projects that will help manage radioactive waste for which no solution has yet been implemented. Sharing Andra’s conviction that this societal issue concerns above all the young generation, the Actu daily newspaper has given coverage to the www.dechets-radioactifs.com website, in a special issue also published in October.



PARISCIENCE: SCIENCE CULTURE ON THE SILVER SCREEN

In 2010, Andra inaugurated a partnership with Pariscience, the International Science Film Festival which was confirming its reputation for the sixth year running. From October 7th to 12th, 2010, young and old were given the opportunity to attend free of charge at the Natural History Museum a series of forty screenings, three special debating sessions and six days of meetings, involving all disciplines. Find out about the next edition on www.pariscience.fr

October 7th to October 12th, 2010



Andra celebrating science and its researchers

October 21st to 24th, 2010

As it does every year, Andra has associated with the Science Festival, which in 2010 was held from October 21st to 24th, around the issue of biodiversity. The keynote of the event was given three days earlier at the Pantheon, where one thousand portraits of researchers, including four Andra scientists, were projected on to the façade.

As it does every year, Andra took part in the “Montier en Science” operation, initiated in 2006 in the Pays du Der (Aube district). The programme for the 2010 edition included encounters and a photo and exhibitions workshop about biodiversity. Meanwhile, the low- and intermediate-level waste disposal facility (CSFMA) in Soulaines-Dhuys opened its doors to school pupils for two days. At the Meuse/Haute-Marne Centre, 450 people came to discover the Underground Laboratory, the Technological Exhibition Facility and the Perennial Observatory of the Environment, taking advantage of the side events

held around the “Fossils, the Footprints of Time” exhibition. In the Manche district, a science village was organised in Caen, where Andra provided three workshops about iron as well as a conference about metal meteorites known as siderites. Lastly, in Paris, the portraits of four Agency scientists were projected on to the facade of the Pantheon during the night from October 18th to 24th. This original exhibition by photographer Pierre Maraval also gave everyone an opportunity to express their perspective on science.



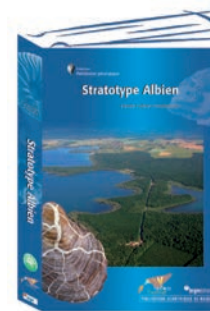
September 17th, 2010

NUCLEOPOLIS, A CORE FACILITY TO PROMOTE NUCLEAR KNOW-HOW IN BASSE-NORMANDIE REGION

What with Areva, EDF, Andra, renowned research centres like the Heavy Ion Accelerator (GANIL), a wealth of SMEs and numerous learning infrastructures, Basse-Normandie’s know-how and potential in the nuclear field is without equivalent anywhere in France. This has forged the ambition of Nucleopolis, the code name for Normandy’s nuclear sciences and applications cluster, namely to make the region the European leader. As one of the Association’s 44 members, Andra took part in the constitutive assembly held on September 17th, 2010. From learning, to research and to innovation, there are many initiatives in such sectors as matter, energy and health enjoying support from the Government, the Regional Council, the District Councils of the Calvados and the Manche, as well as the town communities of Caen and Cherbourg.



Rundown on sponsorship initiatives



From January to December 2010

Andra is an active organisation that is fully involved in developing the areas that host it. Every year, the Agency sponsors a host of local and regional initiatives in favour of science culture, heritage preservation and sustainable development. Here is a little rundown on those sponsorship initiatives.

2010 was declared the International Year of Biodiversity. Andra has provided special support to projects relating to the issue. In the Aube district, the Agency sponsored the installation in Hampigny of a new birdhouse tower for swallows, as well as the Regional Environment and Sustainable Development Day organised by the Troyes Chamber of Commerce and Industry. In Meuse/Haute-

Marne, in addition to an exhibition on biodiversity held in Euville, the Agency sponsored two associations for fishing and the protection of wetlands, in Gondrecourt-le-Château and Ligny-en-Barrois. Numerous other operations also got support from Andra. Among them, the publication of a book entitled "*Stratotype de l'Albien*" (Stratotypes in the Albian stage), written by the Aube Geological Association and published with the help of the

Natural History Museum, the Geological Survey and the District Council of the Aube; also, offering to host an exhibition by the North Cotentin Photo Club about the region's architectural heritage inside the information centre of the Manche facility. A comprehensive listing of 2010 sponsorships is available on www.andra.fr.

International cooperation: enhancing know-how and sharing it with peers



From January to December 2010

Given its reputation, Andra is regularly called upon to export its know-how through presentations at international conferences, training in collaboration with major nuclear sector institutions, consulting and expertise assignments and more. This worldwide renown is nurtured by formal dialogue within the framework of cooperation agreements.

Throughout the year 2010, Andra entered into new cooperation agreements. Several of the Agency's alter egos, like KRMC in Korea, Nagra in Switzerland and Sogin in Italy expressed great interest in the administrative, organisational, technical and financial aspects relating to disposal. Discussions were also initiated with the Atomic Energy of Canada, with a view to collaborating on the rehabilitation of polluted sites.

Agence France Nucléaire Internationale, a cooperation between nations

Andra also provides support to the Agence France Nucléaire Internationale (AFNI). Founded in 2008 as part of the French Atomic and Alternative Energy Commission (CEA), this inter-ministerial body is part of the approach wanted by the President of the Republic in terms of international cooperation in the field of civilian nuclear energy.

Indeed, there is a sine qua non condition for any country to receive support in setting up an institutional framework: full compliance with safety, security, non-proliferation and environmental protection standards. Only then can an inter-governmental agreement be signed. In 2010, Andra signed such an agreement with its Indian counterpart, the BARC, as a logical follow-up to the 2009 French/Indian cooperation agreement.



49

November 30th, 2010

DEVELOPING LOCAL JOBS: GETTING TO KNOW EACH OTHER BETTER TO WORK TOGETHER BETTER

Over 70 businesses from the Aube, Meuse, Haute-Marne and Manche districts came to meet with Andra buyers and purchasing advisors. The objective was to help them respond in the best possible way to the calls for tenders and other consultations stemming from the Agency, whether from the CIGEO (the future deep repository), the eco-library, the storage and assembly buildings, or from existing repository operations. For its part, it was beneficial to the Agency to get to know its contacts, in order to properly target its outsourcing requests. Organised in collaboration with the Energic 52/55 association and three district branches of the French Building Federation (FFB 10/52/55), this day of dialogue was held close to Region, near Andra's head office. Following a brief presentation by each of the four co-organisers of their respective activities and operations, a series of round tables then led to a great number of individual meetings.

2010 - the year in figures

43,561
cubic metres

in radioactive waste were disposed of in 2010 inside both the facilities that Andra operates in the Aube district.

- + 12,179 cubic metres in the low- and intermediate-level waste disposal facility (CSFMA);
- + 31,382 cubic metres in the very-low-level waste disposal facility (CSTFA).

291 local businesses

of all sizes and from all business sectors worked with Andra this year to meet its needs.

From the Aube to the Manche, from the Meuse/Haute-Marne to the Hauts-de-Seine, the Agency is invariably a player in local development. The Agency's purchasing policy is always conducted on the basis of three fundamental principles: full access for all to publicly-funded orders, full transparency in procedures and equal treatment for all applicant businesses. In 2010, out of the €106 million in services purchased by Andra, €18.7 million were spent on businesses located in the Aube, Manche, Meuse and Haute-Marne districts.

Close to
15 000 visitors

toured Andra facilities in 2010.

The Meuse/Haute-Marne Centre saw many people come to explore the Underground Laboratory and the adjoining Technological Exhibition Facility, while 2,123 of them toured the experimental drifts 500 metres down. While the open door days in the Aube district and the operations conducted in the Manche district with the Cherbourg-Cotentin Tourism Office attracted large numbers, the various Andra facilities overall attract many professionals, decision-makers, elected officials and experts, both French and foreign. There is also a large contingent of foreign visitors from Korea, Germany, the United States and even South Africa, who are interested in the conditions of radioactive waste management implemented in France.



€8 millions

was the amount allocated to Andra in 2010 with respect to the Grenelle de l'Environnement agreement.

This subsidy is part of the "Programme 181" framework, devoted to risk prevention. It has helped fund several major projects:

- + the environmental observation and monitoring scheme relating to the CIGEO deep disposal project, including the Perennial Observatory of the Environment;
- + the "Radium Diagnosis" operation, initiated in late 2010 in Île-de-France;
- + the "Archiving for Future Generations" project, which has sparked off a host of avenues of discussion to ensure the perpetuation of the memory of the repositories over period of several centuries.

This public subsidy also takes into account initiatives of lesser financial scope: an "environmental health" programme developed by Andra as part of its disposal projects, the compilation of an inventory of technically-enhanced natural radioactive waste that does not stem from the electronuclear industry, the restoration of hydraulic structures in the vicinity of the Orflam Plast site which the Agency is decontaminating at Pargny-sur-Saulx in the Marne district.

162 metres

metres in experimental drifts were excavated at the Underground Laboratory in 2010.

82 scientists

Geologists, geophysicists, hydrogeologists, chemists, mathematicians and other scientists work at Andra in collaboration with over 100 laboratories.



IN EVERY FACILITY, ECO-RESPONSIBLE INITIATIVES ON A DAILY BASIS

Numerous initiatives large and small can contribute in reducing businesses' environmental footprint and energy use. Here is an overview of the initiatives taken by Andra in 2010 at each of its facilities.

At the Meuse/Haute-Marne Centre (CMHM), green waste is given to a landscaping contractor to be composted, carpooling is promoted and energy use is monitored; trials involving outdoor low-energy lighting packs adjusted according to attendance times were performed in 2010. As for the future eco-library, planned for 2012, its construction is underlined by a twofold sustainable approach: High Environmental Quality (HQE[®]) certification and the Low Energy Building (LEB) energy standard.

In the Aube district, the low- and intermediate-level waste disposal facility (CSFMA) has also optimised lighting, replacing outdoor projectors and halogen or sulphur vapour streetlights with low-energy lighting fixtures; at the very-low-level waste disposal facility (CSTFA), areas of passage have been equipped with motion-detector switches.

At the Manche waste disposal facility (CSM), all incandescent light bulbs have been replaced with low-energy light bulbs. A timer switch was also tested on lighting in areas of passage.

At the head office in Châtenay-Malabry (Hauts-de-Seine district), Andra has replaced the electric convector heaters with radiant radiators programmed to stay below 19°C in all of the offices. Two reprographic copiers were swapped for a single, more efficient unit; the supplier, a WWF partner, is ISO 14001-certified and has been following a determined sustainable development policy since 1988. In another approach, bicycle parking have been installed in order to encourage soft transport.



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