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Newsletter

A UNIQUE ARRAY OF SKILLS AND SERVICES

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Best wishes for 2016 from everyone at
Andra International

Edito

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In the previous issue of the Andra international Newsletter, we considered reversibility and retrievability, and we saw how flexibility and adaptability were introduced in the Cigéo, the French deep geological disposal planned facility. The governance of the reversibility entails regular input from the interested parties.

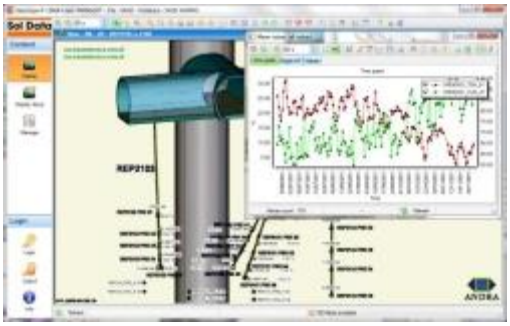
To that end, the "Master plan for operations" or Plan Directeur d'Exploitation (PDE) will be issued in Q1/2016. This document will present the inventory for the different waste types, will describe the life of the facility (design, construction, pilot phase, operations, and partial closure.) and the regular decision milestones. This first version of the PDE will be discussed in 2016 and 2017 with the regulatory body, the ASN, and representatives from the various stakeholders. A final document will then be compiled, taking the different inputs into consideration.
Of course, this document will remain flexible, in line with the principles of reversibility and can be modified in accordance with the decisions that will be taken by future generations. The objective of the PDE is to provide assistance in the decision making process on the operations of Cigéo, now and in the future, offering a range of options that is similar or larger than our current one.
Simultaneously, the technical options for retrievability of the disposed waste packages will be presented in a separate document, named DOREC for Dossier d'Options de RECupérabilité. The PDE and the DOREC establish the latest position of Andra in terms of reversibility.
The proposed safety options will be detailed in a document called DOS for Dosssier d'Options de Sureté. This document is more specifically focused on the safety aspects and is written for the Safety Authority. We will come back to the safety options selected for the Cigéo project in the next issues of the Andra International Newsletter.
Happy new year to all our readers !

New Andra Chairman of the Board

Andra's new Governing Board met for the first time on 6 November. Its members proposed Christophe Bouillon, French parliamentary member for Seine-Maritime, as Chairman of the Board. This proposal must is now ratified by decree of the French President.

Born in 1969, Christophe Bouillon is currently Vice-Chairman of the French National Assembly's Committee for Sustainable Development and Planning. He has been Member of Parliament since 2007. In 2013, together with fellow parliamentary member Julien Aubert, he co-wrote a report on the management of the radioactive waste and materials.

In his candidacy speech, Christophe Bouillon said "My action as Chairman of the Board will be based on the principle of transparency, to ensure the progressive, dialogue-based approach introduced by the 1991 Act, and carried forward in the 2006 Act, continues. In practice this will mean a personal commitment towards the State, particularly as regards the forthcoming decisions on reversibility, but also a commitment to the public to contribute to a transparent, informed and dispassionate debate on a difficult issue for our society in terms of ethics and accountability."



HLW

Geoscientific data acquisition and management system

Andra is directly responsible for all scientific data acquired in real time and wireline at the Meuse Haute-Marne underground research laboratory. To fulfil the needs for the acquisition, storage and display of real-time data, Andra decided to develop and install a data acquisition and management system called SAGD (Système d'Acquisition et de Gestion des Données). With this view, a system was designed to:

• Determine the acquisition tools and methods so that technical failures would not result in the loss of data or the acquisition of erroneous data,
• Store (conservation) in the long-term all data in a single place in a single form,
• Allow the diffusion and free access of data to the large community of ANDRA researchers, partners and service contractors in a single fluid way whatever the source of the data.
• Help external communication through a user friendly and easy to understand presentation of the recorded data.

SAGD fulfils these objectives by:

• Making available in real time, and through a single system, all experimental data under acquisition at the MHM Center and Mont Terri laboratory, where andra performs experimentations,
• Displaying the recorded data on temporal windows and specific time step,
• Allowing remote control of the experimentations,
• Ensuring the traceability of all recorded information,
• Ensuring data storage in a data base. SAGD has been deployed in the first experimental drift at -445 m in November 2004. It was subsequently extended to the underground Mont Terri laboratory in Switzerland in 2005, to the entire surface logging network of the Meuse / Haute-Marne Center in 2008 and to the environmental network in 2011.

The SAGD computer network is an autonomous network consisting of optical fiber links which transmits experimentation data to the servers and computers in the control room, whether they originate from the bottom of a borehole or surface level. A high speed link between Mont Terri and Bure allows weather and environmental data acquired on remote sites are transmitted using GSM modems, and control of experiments and centralization of all from a remote site is achieved with high speed transmission link.

Today, SAGD enables the scientists of the Research and Development Division to view in real time, from their office or from any other computer with an Internet connection, the evolution of the various experiments parameters acquired in drifts and at surface level through a userfriendly graphic interface. All information is acquired, stored and manage by a software called Geoscope made by a company called SolData. This software, fruit of a continuous computer development over the past ten years, has a very large storage capacity.

Continuous improvements at the Centre de l'Aube

VLLW LLW

Treatment and sorting of waste from research, medicine and industry

Andra is currently finishing the construction of a new facility dedicated to Low- or Very-Low level waste originating from outside of NPPs and power generation industry. A large variety of waste types is collected at hospitals, research centers, laboratories, from other industries, or collected from the general public (lightning rods, smoke detectors). The new 436 sq.m facility will be used for the sorting and the treatment of waste. Waste will be sorted, then temporarily stored according to its physical and chemical characteristics, until sufficient quantities are reached, then waste is conditionned and sent for disposal at the CIRES or the CSA, or temporary storage until disposal route is open (Low- Level - Long Lived waste is an example). When compared with the previous situation when this activity was contracted, significant costs optimization is expected from the mutualization of infrastructures on the CIRES and reduced transport costs.

VLLW

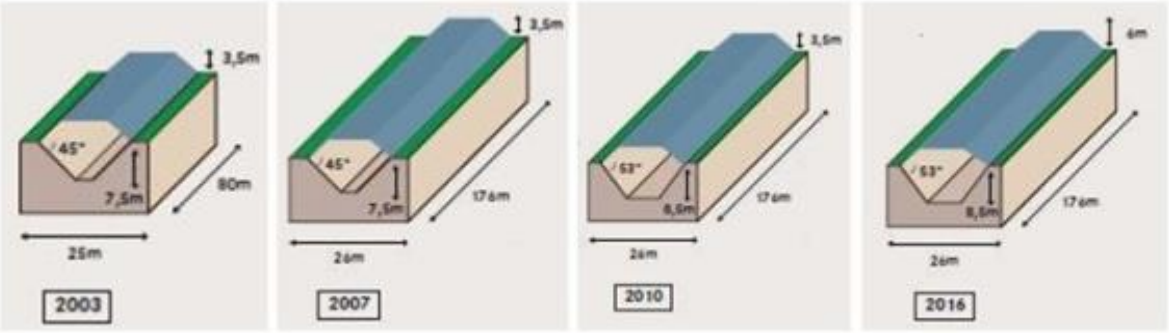
CIRES: new mobile roof moves on rails

To protect the new disposal cell, a new mobile roof, called Prémorail®, has been developed internally by Andra engineers.

With Prémorail® come many innovations and advantages over the previous sytem, which required a crane for transfer operations:

- Easier and faster operations during transfer between disposal cells
- No work at height, as no crane is required to lift roof elements
- Lowers transfer time and costs
- Reduces meteorogical constraints allowing transfer of mobile roof for an increased flexibility in operations.

Prémorail® was patented in 2016.



VLLW

Optimization of the disposal volume of the VLLW disposal facility

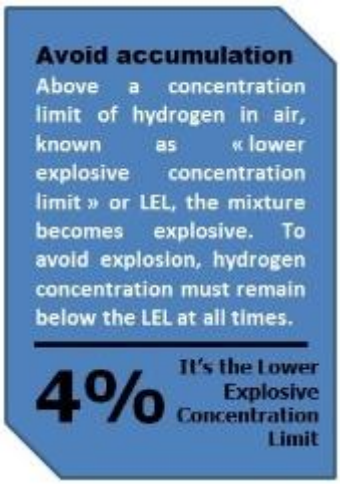
CIRES Disposal volume is a scarce resource, and Andra has continuously strived to optimize the efficiency in its disposal trenches at the CIRES facility. The facility has been operating since 2003, with a planned capacity of 650,000 cu.m To improve the efficiency of the disposal facility, reduce disposal costs and make the best use of the site, Andra has made successive changes in the geometry of the cells, resulting in a dramatic increase of the Very-Low Level Waste volume (see fig. on the left) which from 10,000 cu.m in 2003, to 20,00 cu.m when 2 adjacent cells were merged in one, then to 30,00cu.m by deepening the trench and making the walls steeper, and now a record 34,000 cu.m, with an heightened waste pile, keeping the same high level of safety.

ILW-LL

How to reduce and manage hydrogen release in Cigéo ?

Hydrogen release from a small fraction of the waste packages is a matter of attention in the design of Cigéo, the French deep geological disposal facility. Above a given ratio of hydrogen in air, there is a risk of explosion, if triggered by an activating energy, such as static electricity, ultrasounds, shock... Of course, Andra has taken a number of actions to prevent occurrence of this risk in the future disposal facility.

How is hydrogen released? Radiolysis, or destruction of water molecules by ionizing radiations of water molecules present in some Intermediate Level- Long-Lived Waste, is responsible for the release of hydrogen.



Managing the risk. Several measures are contemplated to limit the risk of explosion due to hydrogen release. First, a threshold for hydrogen release will be included in the waste acceptance criteria, and gas releases from package will be measured. The ventilation system will prevent hydrogen accumulation, and ventilation will be monitored continuously to detect any malfunction.

But if electric power is lost? If power is lost, then the ventilation will stop. What happens then? Simulation reveal that dangerous hydrogen levels would not happen before 10 days without ventilation. Back-up power, present on site, would have been used to restore ventilation, and other safety related systems during that period. And if prevention fails ? If, in spite of preventive measures, an explosion actually happens, it can be demonstrated that the waste packages would only marginally suffer, and that the containment function would not be breached, and that it would not cause any harmful consequences for man or the environment.

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