

IRSN

INSTITUT
DE RADIOPROTECTION
ET DE SÛRETÉ NUCLÉAIRE

INVOLVEMENT OF IRSN IN THE FIELD OF POST URANIUM MINING ISSUES

EMRAS Workshop - Limoges (FRANCE)

September 27, 2010

Presented by Marie-Odile GALLERAND, IRSN (FRANCE)



Système de management
de la qualité IRSN certifié

Content

1. IRSN assignments regarding uranium mining issues
2. Regulatory aspects
3. Stakeholder involvement within an example of a fruitful joint assessment
4. Some recommendations resulting from specific expertises of the AREVA environmental report concerning the Division Minière de la Crouzille sites
5. Expertise of AREVA assessment of the long term impact of tailings repositories
6. The MIMAUSA program

Content

- 1. IRSN assignments regarding uranium mining issues**
2. Regulatory aspects
3. Stakeholder involvement within an example of a fruitful joint assessment
4. Some recommendations resulting from specific expertises of AREVA environmental report concerning the Division Minière de la Crouzille sites
5. Expertise of AREVA assessment of the long term impact of tailings repositories
6. The MIMAUSA program

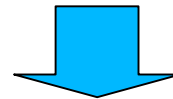
IRSN assignments regarding uranium mining issues

JOINT SUPERVISION



Feb. 22, 2020 decree

Public body of industrial and commercial nature (EPIC)



National expert in nuclear and radiological risks acting as support for the public authorities competent in nuclear safety and radiation protection for civil and defence activities

IRSN assignments regarding uranium mining issues

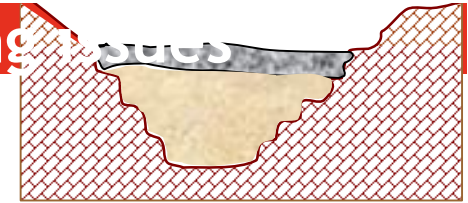
- **Research and public service assignments**
 - National and International Research programs to maintain and develop expertise skills
 - Training in radiation protection
 - Contribution to the monitoring of the national territory and workers exposed to ionising radiation
 - Management of the national database on radioactive sources
 - Contribution to the public information (publications, internet, exhibitions, conferences)
- **Contribution to public policies and technical support to public authorities**
 - Technical support in the field of nuclear and radiological risks (BNI, transport, civilian industrial and medical applications, defence)
 - Emergency situations (emergency response center)
- **Contractual expertise, researches or measurements for public or private organisations**

IRSN remits in the field of uranium mining activities

- **Research and public service assignments**
 - National and International Research programs to maintain and develop expertise skills
 - Training in radiation protection
 - Contribution to the monitoring of the national territory and workers exposed to ionising radiation
 - Management of the national database on radioactive sources
 - Contribution to the public information (publications, internet, exhibitions, conferences)
- **Contribution to public policies and technical support to public authorities**
 - Technical support in the field of nuclear and radiological risks (BNI, transport, civilian industrial and medical applications, defence)
 - Emergency situations (emergency response center)
- **Contractual expertise, researches or measurements for public or private organisations**

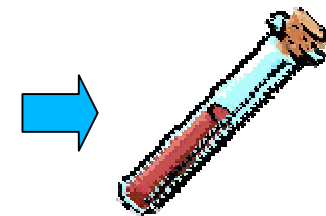
In compliance with the commitment of stakeholder involvement

IRSN assignments regarding uranium mining issues



■ Research and public service assignments

- National and International Research programs to maintain and develop expertise skills



IRSN assignments regarding uranium mining issues



- Research and public purpose remits
 - Contribution to the monitoring of the national territory

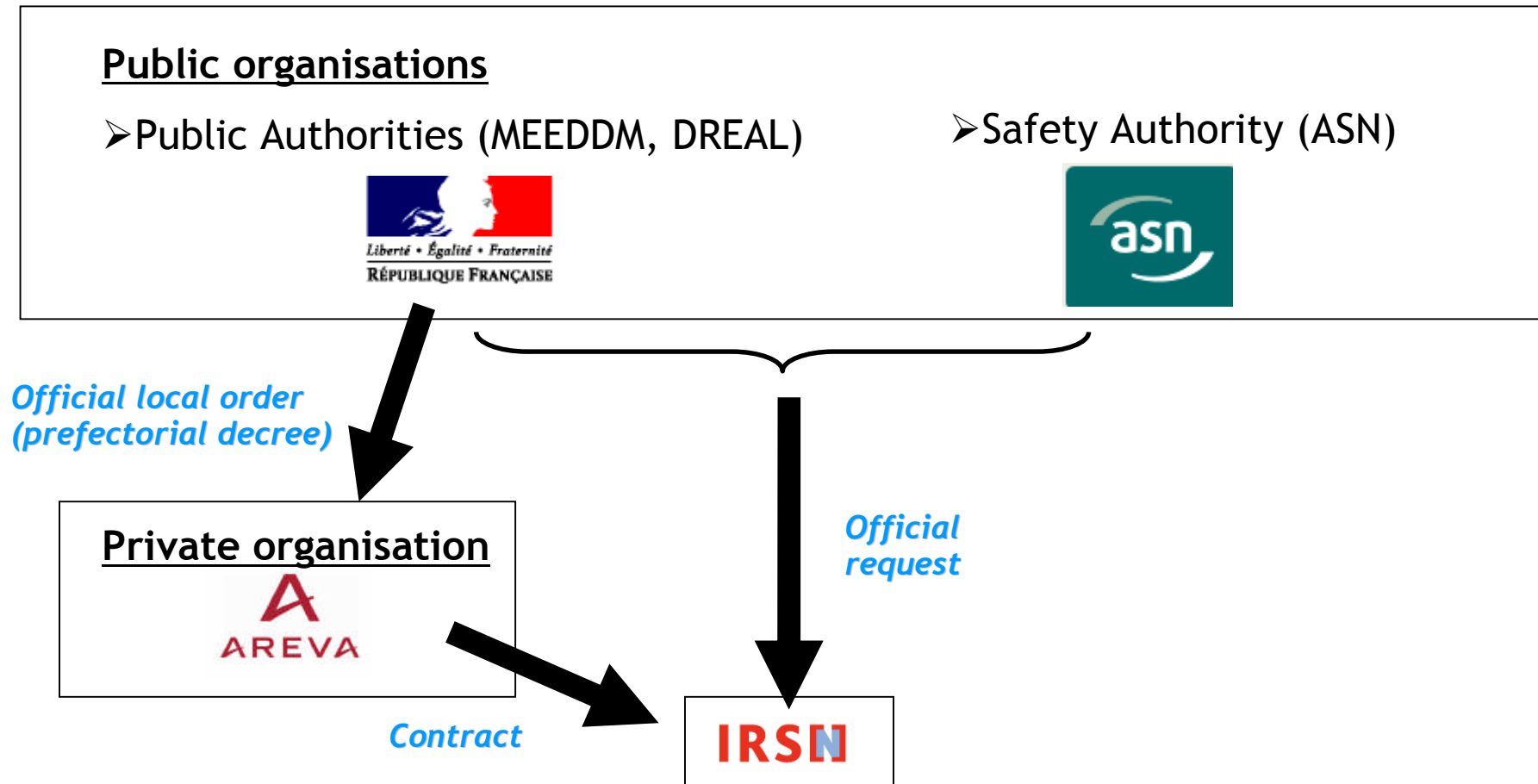
Strategy of surveillance of the former uranium mine sites reviewed in 2010

- regional/local focus
- scale : the watershed/drainage area

1st application scheduled in 2011

IRSN assignments regarding uranium mining issues

Contractual expertise and measurements for public or private organisations



IRSN assignments regarding uranium mining issues

IRSN activities on behalf of the Authorities (National and local government (MEEDM, DREAL, ASN))

- **Assessment of technical reports delivered by AREVA**
 - Site surveillance, site management, current impacts
 - Long term future of the sites and corresponding impacts

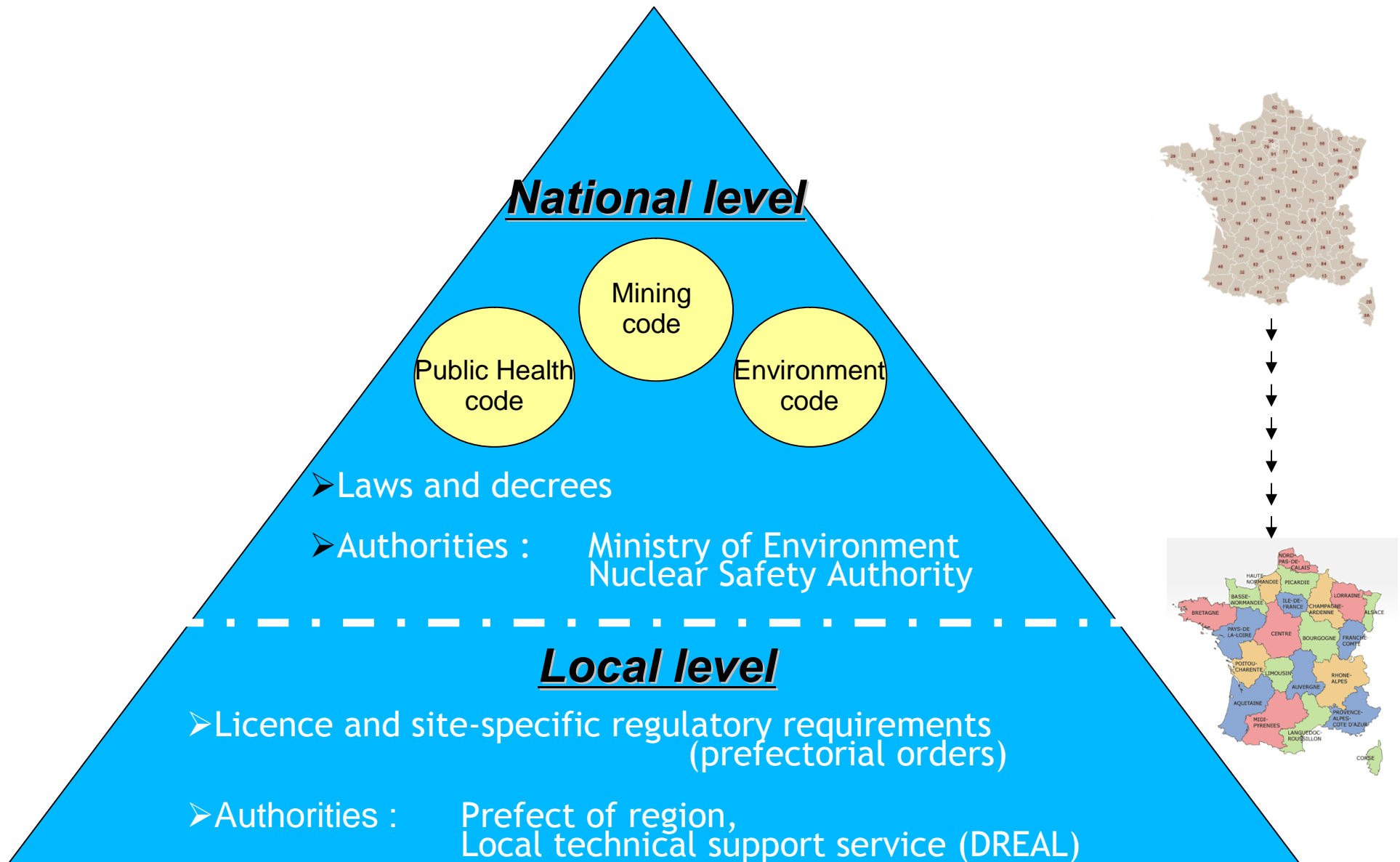
- **Technical assessment of radiological situations in relation with uranium mining activities**
 - Assessment report
 - Participation in technical working groups supporting the Local Information Committee (CLI) set up around the sites → present technical elements and data to help the local Authority and the CLI in decision-making

- **Management, improvement and feeding of the national database relative to the former uranium mine site (MIMAUSA program) and the corresponding inventory**

- **Field operations/visits and environmental measurements**
 - Control of the radiological situation of the site and its environment and complete the MIMAUSA database
 - Support to the local Authorities during spot-checks

Content

1. IRSN assignments regarding uranium mining issues
2. **Regulatory aspects**
3. Stakeholder involvement within an example of a fruitful joint assessment
4. Some recommendations resulting from specific expertises of the AREVA environmental report concerning the Division Minière de la Crouzille sites
5. Expertise of AREVA assessment of the long term impact of tailings repositories
6. The MIMAUSA program



Regulatory aspects

Uranium mines

ICPE regulation Framework :

→ Tailings Repositories

Mining code regulation Framework :

→ Mine sites

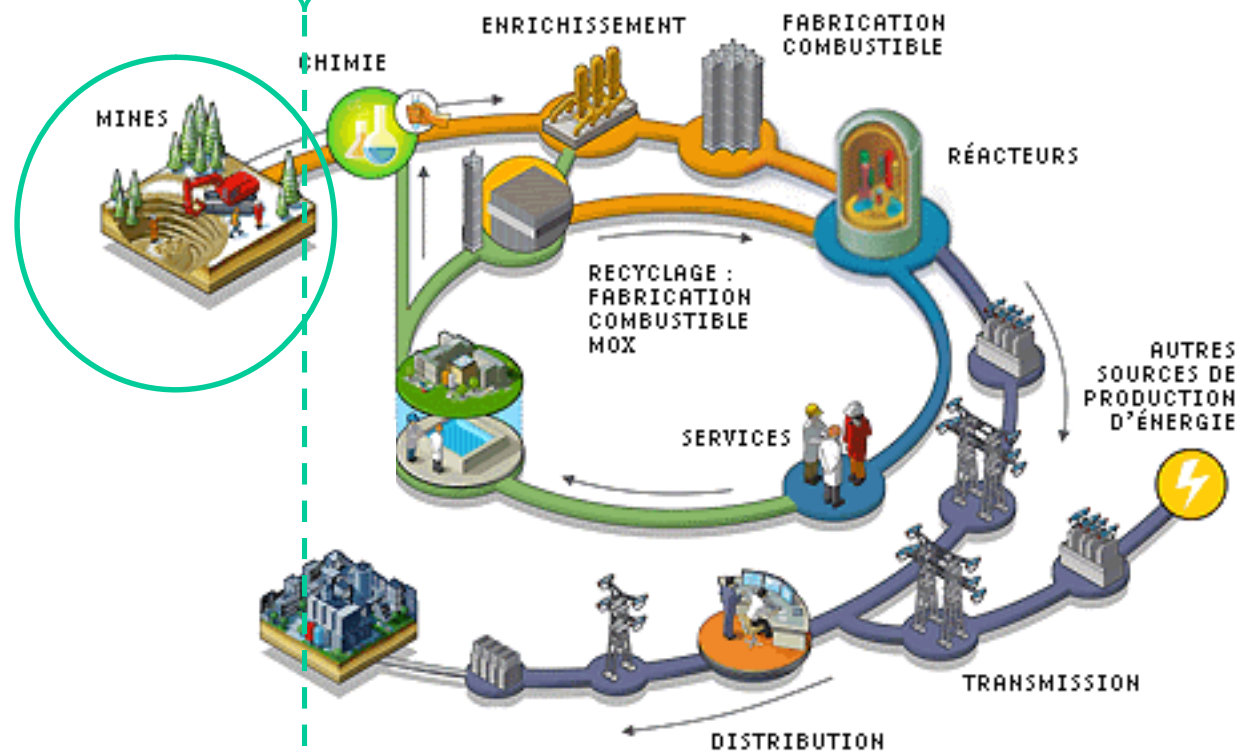
AUTHORITIES : Ministry of environment and ASN

Nuclear installations

BNI regulation Framework :

→ All the installations of the fuel cycle

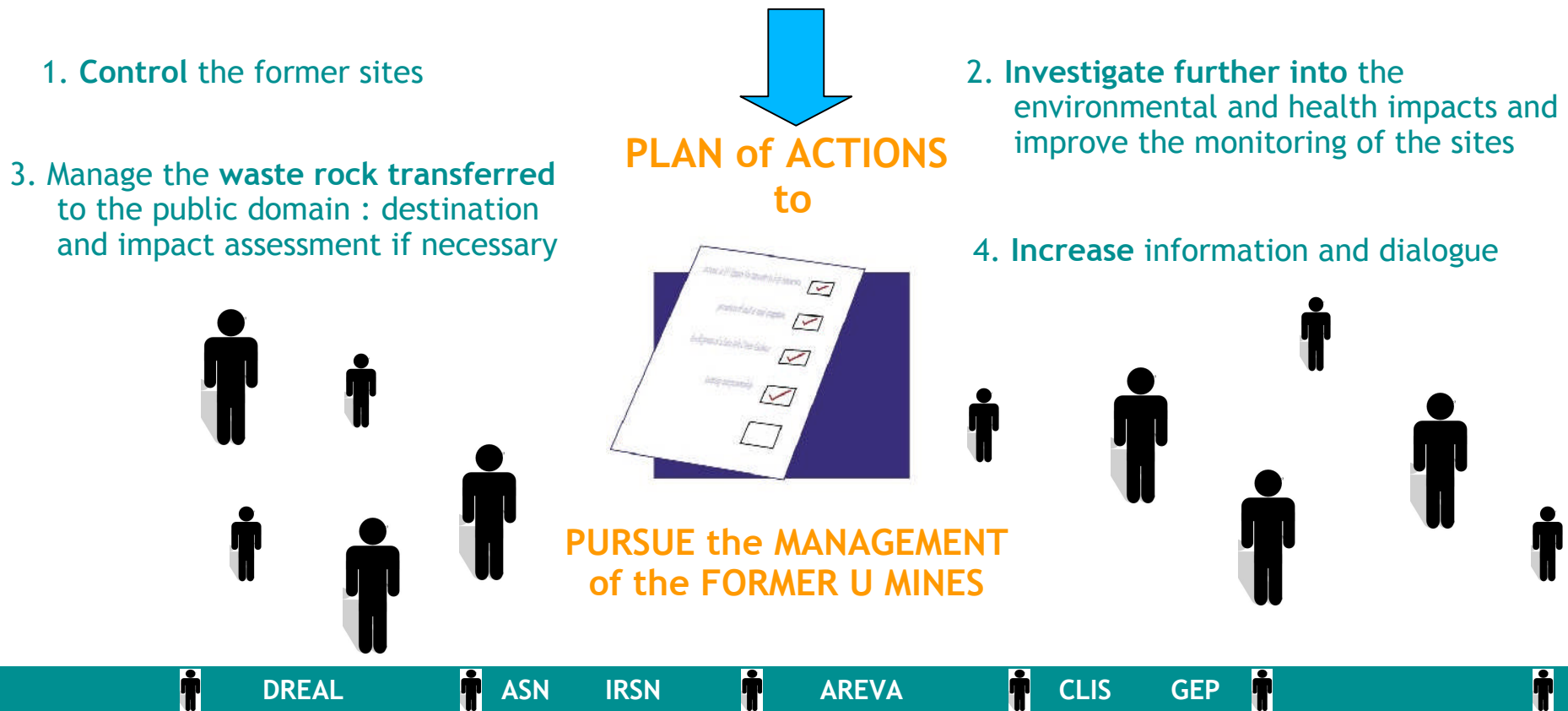
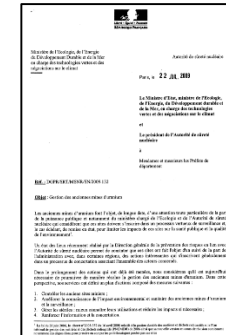
AUTHORITIES : Nuclear safety Authority (ASN)



Regulatory aspects

Circular dated July 22, 2009, signed jointly by ASN and the Ministry of the Environment, **relative to the management of the former uranium mines**

for the attention of the local Authority



Content

1. IRSN assignments regarding uranium mining issues
2. Regulatory aspects
3. **Stakeholder involvement within an example of a fruitful joint assessment**
4. Some recommendations resulting from specific expertises of AREVA environmental report concerning the Division Minière de la Crouzille sites
5. Expertise of AREVA assessment of the long term impact of tailings repositories
6. The MIMAUSA program

Why the involvement of stakeholders in the nuclear safety field?

- Legal national requirement and an **European initiative**
- Need to increase public **confidence**
- Positive feedback from **joint assessments**

Stakeholder involvement

- A legal national requirement

National level: the Law of June 13th, 2006 related to Transparency and Security in the nuclear field (TSN: Nuclear Transparency and Security Act)



Establishment of transparency and public right to information

- For each Basic Nuclear Installation (BNI), establishment of a Local Information Committee (CLI) in charge of all public information on nuclear safety, radiation protection and impact of the nuclear activities on people and environment
- Institution of a Supreme Committee for Transparency and Information on Nuclear Security (HCTISN), in charge of all public information at national level

Stakeholder involvement

- A legal national requirement

The Local Information Committees (CLIs)



Does the TSN act (and hence the CLIs implementation requirement) apply to the French uranium mine situations (former sites, former sites with tailings repositories) ?

- Tailings repositories

- Not classified as BNI
- Under the system for facilities classified for the protection of the environment (environment code)

- Other sites

- Under the mining code system until the mining claim end (then municipal policy)

→ No, but

CLIs already exist for most of the sites hosting tailings repositories

The recent circular (issued in July 2009) invites the local authorities, to re-assess the opportunity to create CLIs, according to

- technical and environmental challenges and
- expectations from the local population

Stakeholder involvement

- Need to increase public confidence



Stakeholder involvement

■ Need to increase public confidence

Examples of IRSN activities promoting greater openness to the public


■ Progress in the understanding and prevention / reduction of risk

- Associate stakeholders to R&D projects

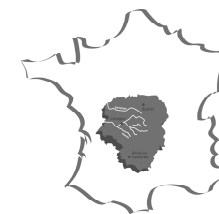
■ Cultural awareness in the public

- Education experimental initiatives
- Open door initiatives
- Mobile exhibition « Nuclear issues: from knowledge to regulation »

■ Transparency and openness

- Framework agreement with ANCLI, the national association of CLIs
 - *IRSN work closely with CLI/CLIS to publish and circulate information on its activities to local stakeholders and to obtain feedback*
 - *IRSN as expert member of a technical working group*
- Public availability of expertise reports (**website**)
 - *The technical publications concerning old mining sites and the MIMAUSA database, along with the related inventory are available online*
- Stakeholders involved in post-incident actions
- Pluralistic expertise groups on sensitive issues
 - 

Groupe d'Expertise Pluraliste



Stakeholder involvement

■ Joint assessments : the GEP-mine example

The way to promote a shared understanding of the situations around the former uranium mine sites

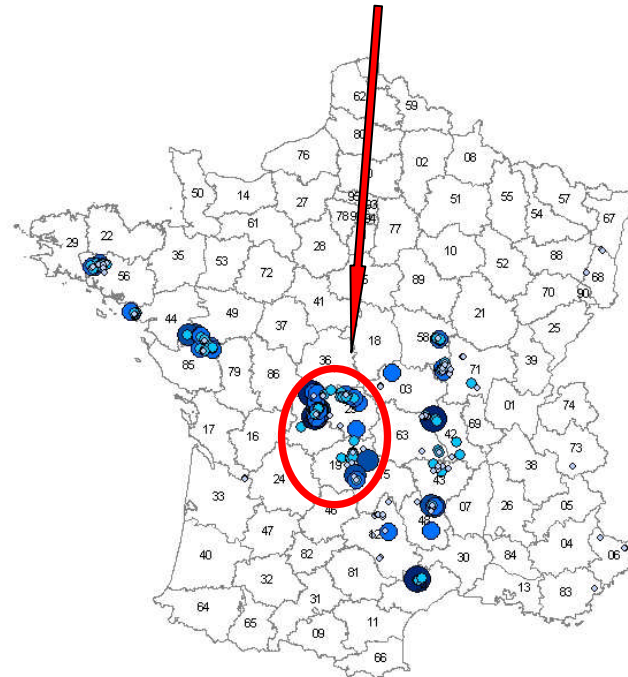
The **expert pluralistic group (GEP)**

Groupe d'Expertise Pluraliste



■ <http://www.gep-nucleaire.org>

- set up in 2005 by the French ministries of health, environment and industry
- work initially focused on the **Limousin** former uranium mine site issues



Stakeholder involvement

■ Joint assessments : the GEP-mine example

The expert pluralistic group (GEP)

Groupe d'Expertise Pluraliste



■ <http://www.gep-nucleaire.org>

- set up in 2005 by the French ministries of health, environment and industry
- work initially focused on the Limousin former uranium mine site issues



Main assignments

- Improve **dialogue between (local) stakeholders**
- Provide **methodological tools** for impact assessments
- Formulate recommendations to improve the risk management and the surveillance network
- Generalise the recommendations to **all sites**, including **long terms** issues

Stakeholder involvement

■ Joint assessments : the GEP-mine example



SETTING UP

Pluralistic Composition

- Composition of the GEP:
 - Around 30 experts gathered
 - Various technical fields:
e.g. earth sciences, metrology of radioactivity, radioecology, radiation protection, nuclear safety...
 - Representatives from IRSN, AREVA, local/national authorities, local/national NGOs, independent experts, foreign experts

Public Institutes and Administration	NGOs and independent	Industry	Foreign experts
- IRSN, InVS - Academics - Authorities	- Independent experts - Local NGOs	- Areva NC	- UK, Switzerland, Belgium, Luxemburg, Israel...
16 experts	5 experts	3 experts	5 experts

Stakeholder involvement

■ Joint assessments : the GEP-mine example



SETTING UP

Organisation and Means

- Means for pluralism
 - Plenary Group + Working Groups open to more members
 - Shared animation of groups: IRSN / independent or academics
 - Public funding, including for independent / foreign experts work
- Integration of expertises
 - Environmental assessment by the operator AREVA
 - Third-part assessment by the public institute IRSN
 - Relevant work from other sources (academics, independent, foreign bodies...)
 - Further studies could be recommended if needed

Stakeholder involvement

■ Joint assessments : the GEP-mine example



ADDRESSING ISSUES

Priorities / Working Groups

- Priority themes
 - Rehabilitation status of disposal sites for tailings
 - Environmental impacts (primarily related to liquid releases) and relevance of the actions taken or planned
 - Broader approach to address:
 - health and environmental monitoring
 - regulatory concerns and long term issues
 - Issues addressed by 3 working groups
 - WG 1: Source term and releases to the natural environment
 - WG 2: Impacts on populations and the environment
 - WG 3: Regulatory framework and long term issues
- ...Plus a working group being set up on measures

Stakeholder involvement

■ Joint assessments : the GEP-mine example

Final report issued Sept. 15, 2010

15 recommendations



Institutional perspective and regulatory body



Knowledge of sites, studies and research



Relevance and field of evaluation of impact, public health.



Systems of surveillance of the sites and the environment



Robustness of remediation works and long term considerations



Information and participation for sustainable management

GEP's 15 recommendations for the sustainable management of the former uranium mining sites:

1. GEP recommends the explicit definition for the conditions stages for the transition towards establishment of a specific organisation dedicated to the affairs of former uranium mine sites.
2. GEP recommends the continuation of the development of a modernized legal framework fully adapted to the current risks.
3. GEP recommends to continue and supplement the work of the census and characterization of the sites in order to have a comprehensive knowledge of the potential sources of pollution.
4. GEP recommends development of a strategic programme of studies and research in order to strengthen the knowledge necessary for the good understanding of the processes concerned and to aid acquisition of a predictive capacity on their development.
5. GEP recommends further development of the method of dosimetric evaluation that has been implemented in order to better understand the land uses would be potentially the most significant, and to enable more reliable estimation of the contribution of the mining sites to the various exposure pathways.
6. GEP recommends strengthening of the evaluation of the chemical impacts on man and to implement, using a graduated approach, an evaluation of the radiological and chemical impacts on ecosystems.
7. GEP recommends development of monitoring tools and health monitoring in the zones of important natural radioactivity such as the uranium-bearing areas and to intensify local implementation of the public health policies with respect to protection of the public against the exposure to the ionizing radiation.
8. GEP recommends development of surveillance systems so as adapt them more to the current knowledge of the impacts and the risks relating to the development of the sites, also optimizing the methods of implementation.
9. GEP recommends implementation of monitoring of the ecosystems and habitats, designed to demonstrate that the effects are weak as well on the environment as on the population.
10. GEP recommends development of a more realistic representation of the long-term evolution of the sites, whilst also broadening the field of the scenarios and sites currently being considered.
11. GEP recommends that a technical and social consideration be undertaken of the solutions likely to reinforce, through short-term actions, the robustness of the existing systems in order to better control the long-term impacts.
12. GEP recommends the preparation and formalization of the decision-making process to support implementation in the short-term of the long term management options.
13. GEP recommends the continuation and supplementation of the collection and the provision of the information relative to the local population and the state of knowledge of the sites, as for the monitoring installations. It also recommends that take special attention be given to the care of data files and records of information on the sites themselves.
14. GEP recommends support for the management of the sites at the local scale, in particular by strengthening the role of the local Commissions of information and feedback mechanisms created around the sites.
15. GEP recommends preservation of the pluralist approach which it developed through this present work. It underlines the need for maintaining a pluralist dialogue at the local and national level to reinforce the spreading of information and the follow-up of actions. Furthermore, consideration should be given to the deepening of certain questions through use of specific pluralist expertise.

Stakeholder involvement

■ Joint assessments : the GEP-mine example

- To renovate and clarify the institutional and legal framework for the management of the former uranium mine sites
 - Question of the transfer of responsibilities (AREVA → Authorities)
 - Revising the mining regulations
- To promote efforts directed at the improvement of knowledge on the sites; to continue the studies and research and to broaden their scope
 - Understanding of the processes
 - Question of developing a predictive capacity in relation to the evolution of key phenomena (hydrogeology, hydrochemistry, exhalation and transfer of radon, accumulation of radioactivity in sediments, aging of milling residues...)
 - Knowledge on the chemical toxicity
- To reinforce the relevance of impact evaluations; in particular extending them to the ecosystems; to replace public exposure in the public health risks
- To develop and make more relevant the surveillance systems
- To extend the effort of remediation in order to put in place systems as robust as possible for the long term
- To continue the implementation of the principles of information and participation

Content

1. IRSN assignments regarding uranium mining issues
2. Regulatory aspects
3. Stakeholder involvement within an example of a fruitful joint assessment
4. **Recommendations resulting from specific expertises of the AREVA environmental report concerning the Division Minière de la Cruzille sites**
5. Expertise of AREVA assessment of the long term impact of tailings repositories
6. The MIMAUSA program

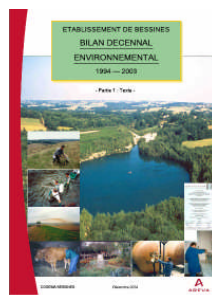
Issues highlighted by IRSN through the expertise of the AREVA 10-year environmental report for the sites of the Limousin Area

- Context
- Lessons regarding the **regulation**
- Lessons regarding **surveillance issues**
- Lessons regarding **long term issues**
- Lessons regarding **impact assessment**
- Lessons regarding the past practice of **re-use of waste rock** in the public domain

Context



Prefectorial regulation (January 2004)

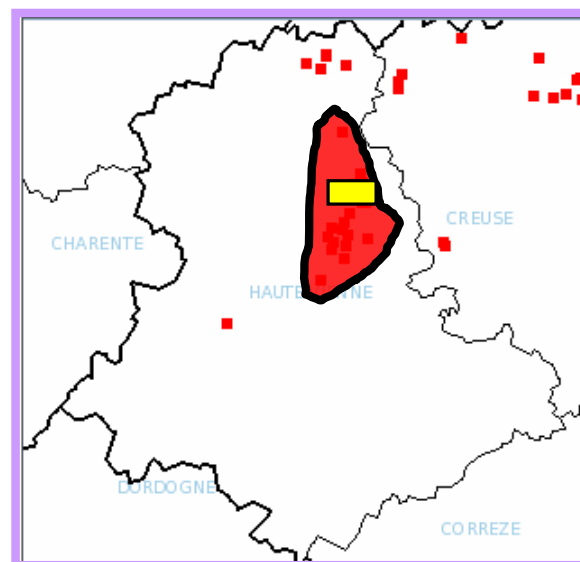


Issued December, 2004

Objectives : the monitoring plan for the follow-up of the overall impact caused by the sites

Crouzille Mine Division :

- 24 sites 
- 4 tailings repositories 



Context

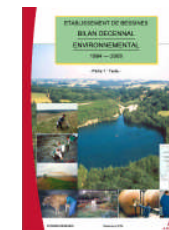


Prefectorial regulation (January 2004)



AREVA

Objectives : the monitoring plan for the follow-up of the overall impact caused by the sites

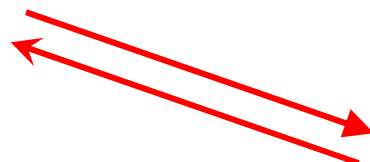


Issued December, 2004

Groupe d'Expertise Pluraliste



Set up in November 2005



Prefectorial regulation (December 2005)



IRSN

Objectives : **assessing**

- the **efficiency of the remediation** (*natural landscaping, waste rock cover, water treatment plants, ...*)
- the relevance of the **monitoring network** including the long term evolution of the mining systems
- the **methodology** of the impact assessment
- the issues of the former use of **waste rock** in the public domain



Review Parts 1, 2 and 3

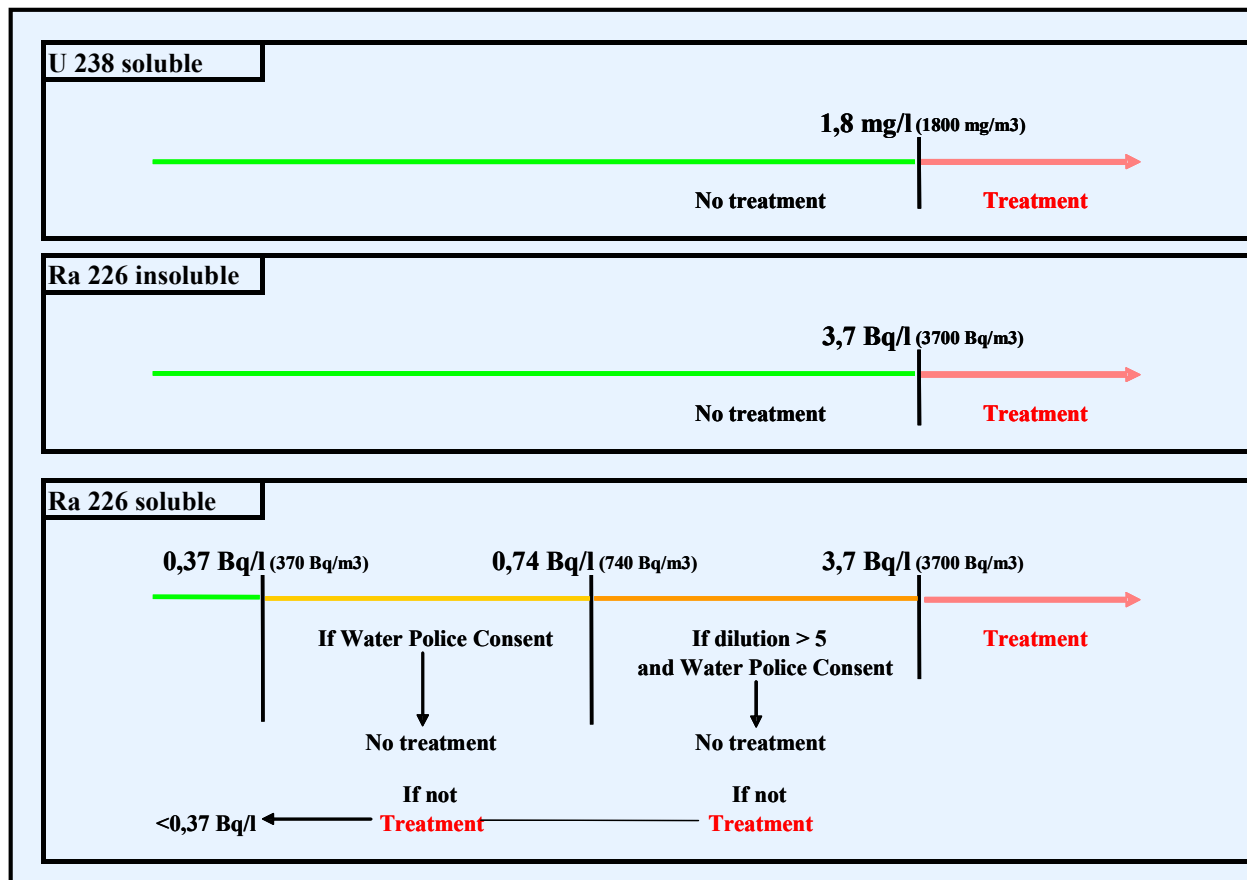
Issued Jan & Dec 2007, Nov 2008

■ Lessons regarding the regulation



Address the controlled water discharges

- Standard values specified in the decree 90-222, in application of the Mining Code
- Potentially more restrictive values specified locally (Ex : $U_{\text{soluble}} = 0,1$ mg/L Augères treatment plant)



Sometimes, concerns the receiving media

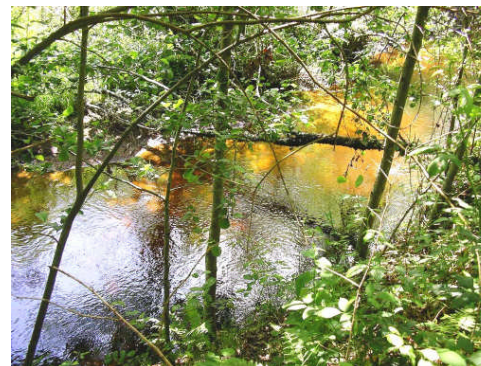
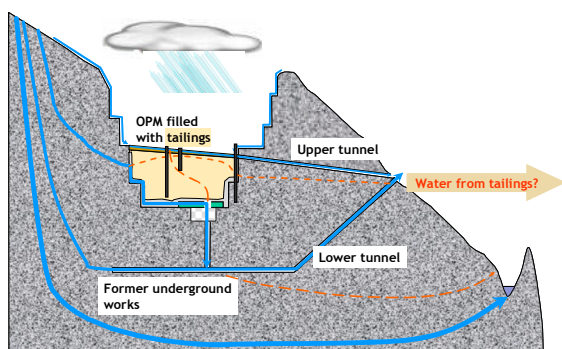
- Ex : 3700 Bq U²³⁸/kg in the sediment of the Saint-Pardoux waterpond

IRSN expertise of AREVA environmental report

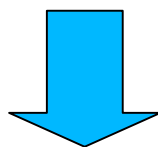
■ Lessons regarding the regulation

➔ Some standard values to be revised

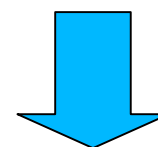
- Should apply to the releases but should also take into account any potential diffuse fluxes



leakage from the mining reservoir, waste rock dump leaching, ...)



Need to



- Improve the understanding of the hydrological behaviour of the mining systems

- Identify the waste rock dumps, in particular those bordering watercourses
- Highlight and quantify the potential imprints
- Canalise and treat the leachate if necessary

■ Lessons regarding the regulation

➔ Some standard values to be revised

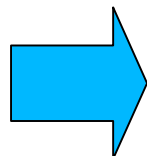
➤ Should

- apply not only to soluble but also to particulate forms (specially for U)
- be lowered (*OMS guide value : 15 µg/L - USA # 85 µg/L - Brazil # 31 µg/L*)

*Accumulation within the sediments
in the downstream waterponds*



Complementary
study



- Optimisation of the water treatment processes through the increase of the settling effectiveness (*additional settling basin?*) The lower the U and Ra water concentrations, the less efficient the treatment processes (chemical + settling)
- Passive treatments ? (*research in progress at AREVA*)

IRSN expertise of AREVA environmental report

■ Lessons regarding surveillance issues

➔ defining a network consistent with the rehabilitated status of the sites and the observed impacts

The main impact on sediments concern the downstream waterponds. The surveillance of the sediments of small watercourse does not permit to conclude about the impact of the former mining site

➔ To focus the surveillance of sediments on **waterponds** through **sediment-trap**



The surveillance of aquatic plants does not permit any interpretation because of the differences in the species sampled from one location to another. No reference media defined. Interpretation only based on upstream/downstream comparison

➔ To put in place an ecological survey based on measurements of **biological indexes**



■ Lessons regarding surveillance issues

- ➔ defining a network consistent with the rehabilitated status of the sites and the observed impacts

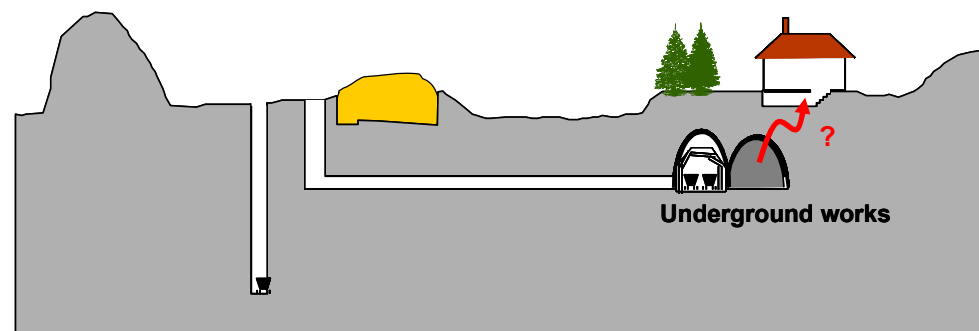
The surveillance of radon and gamma dose rate in the villages located in the vicinity of the former mine sites is not relevant (problem to **discriminate** the natural contribution from the contribution of the former mining rehabilitated sites, influence of many (climatic) parameters, extenuation of the gamma ray)

➔ To suspend the monthly radon and gamma ray surveillance in the villages

➔ To survey the correct functioning of the tailings repositories through photons flux and radon exhalation flux cartographies (*according to a frequency control to be defined*)

Need to

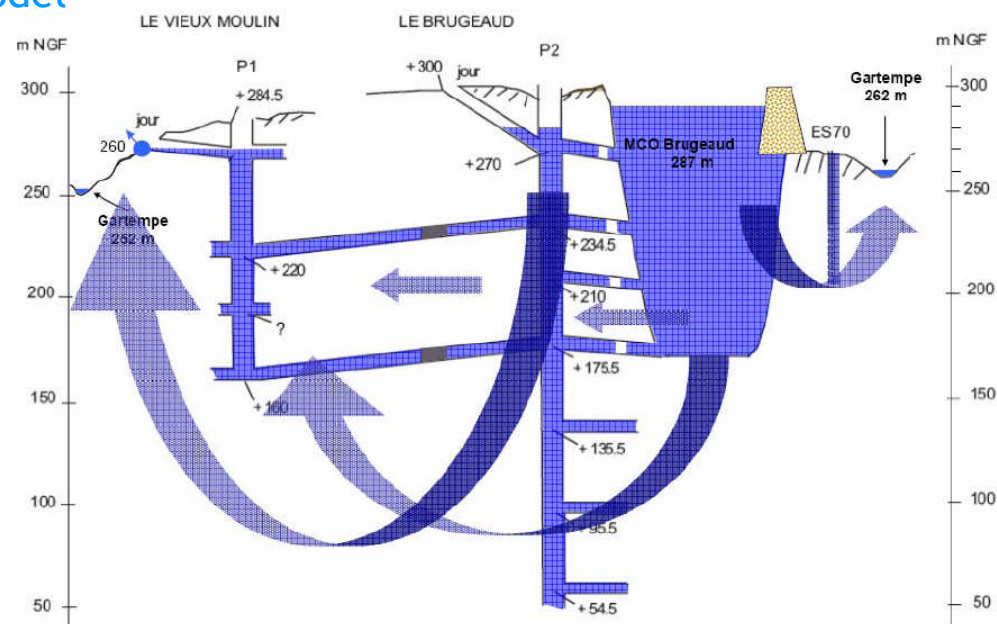
- better understand the transfer of radon from underground holes to dwellings



■ Lessons regarding long term issues

➔ need to improve the understanding the actual hydrogeological functioning of the mining entities, and in particular the tailings repositories entities

- Control of the outlets
- Role of the different barriers (repository waste rock cover, dam, ...)
- Evolution of the quality of the mine water
- Chemical and physical evolution of the tailings
- Define and implement a mathematical model
- Use this model for long term assessments



■ Lessons regarding impact assessment

→ need to re-assess the hypothesis of isotopic equilibrium ($^{210}\text{Pb}/^{210}\text{Po}$) within impact assessment

- ^{210}Po dose factor very high and directly impacts the result of dose calculation
- Data available (from monitoring survey) where $^{210}\text{Po} > ^{210}\text{Pb}$

Measurements of ^{210}Po is needed

→ need to consider the ecosystems within (long terms) impact assessments

To take benefit of the step-wise approach developed within the European research project ERICA which consists in a risk ratio calculation for all the components of the environment (i.e. each ecosystem locally listed)

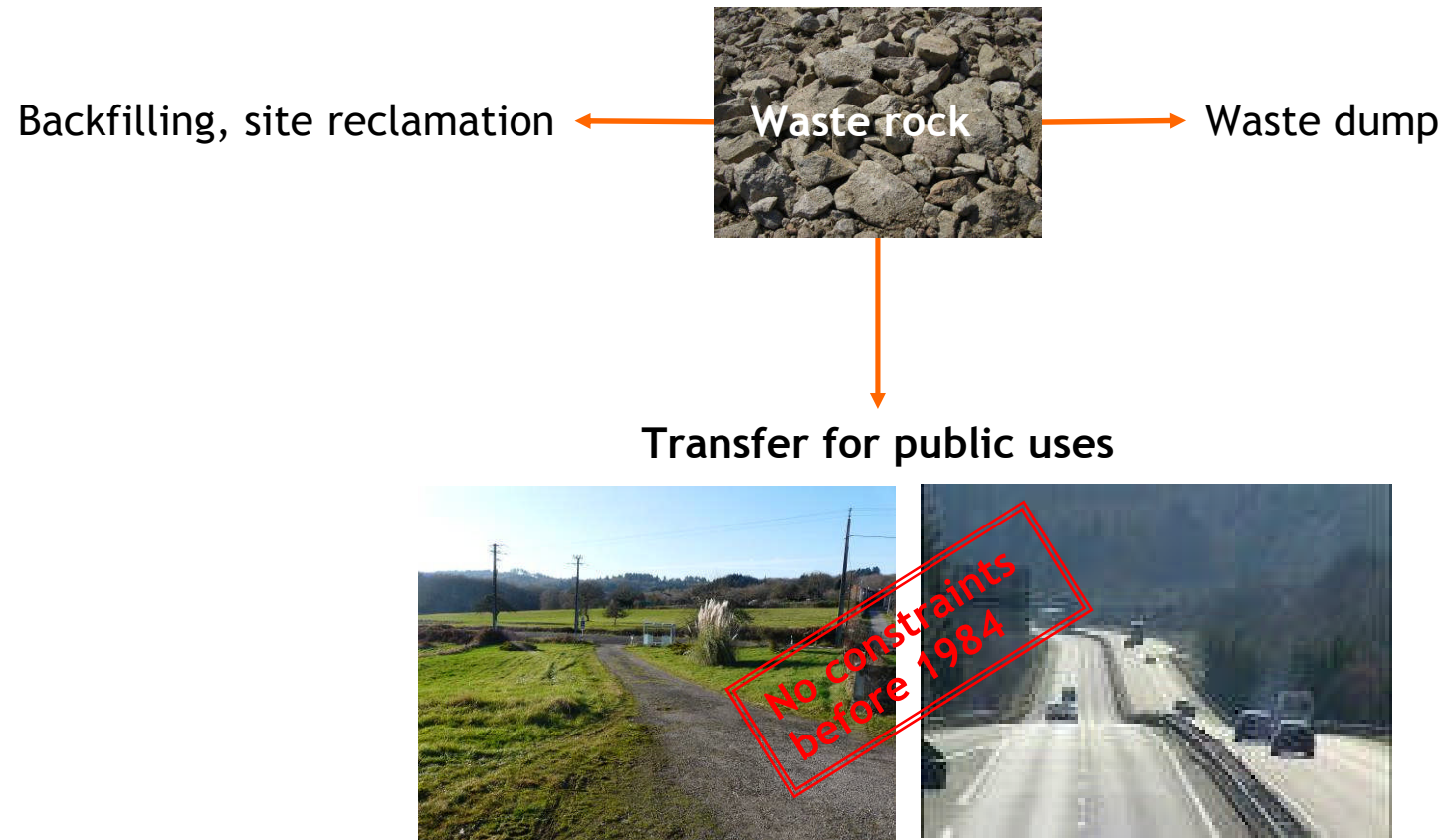


The feasibility of the application of such a methodology to a particular watershed within the Limousin Region has successfully been tested by the members of the GEP (on the basis of the actual measured radionuclide concentrations in the environment)

Methodology relevant for long term impact assessment on ecosystems

IRSN expertise of AREVA environmental report

- Lessons regarding the past re-use of waste rock in the public domain
 - ➔ need to assess the consequences of this practice



IRSN expertise of AREVA environmental report

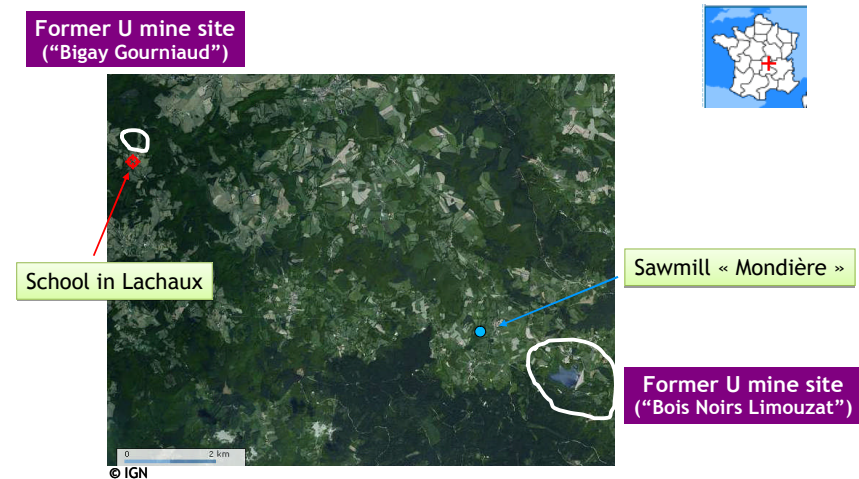
- Lessons regarding the past re-use of waste rock in the public domain
 - ➔ need to assess the consequences of this practice

Potential consequences

- Increase of the **gamma exposure** locally
- Materials could be **ingested** in particular situations (ex : playground)
- **Radon accumulation** when used as foundation materials for dwellings or public places

Existing situations where waste rock were removed

- Waste rock as sawmill foundation materials
- Waste rock used to backfill a playground



IRSN expertise of AREVA environmental report

■ Lessons regarding the past re-use of waste rock in the public domain

➔ need to assess the consequences of this practice

Circular dated July 22, 2009, signed jointly by ASN and the Ministry of the Environment, to pursuit the management of the former uranium mines

Point 3. “Manage the waste rock transferred to the public domain : destination and impact assessment if necessary”



Actions planned by AREVA to Inventory of the areas concerned by the re-use of waste rock (U > 300 ppm) :

➤ Measurements by radiological air detection

- Investigative superficies : (1000 + 2000) km²
- Flying over altitude : 40 m
- Speed : 100 km/h
- Grid cell : 15 m

2009 - 2010



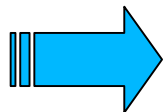
Follow-up :

- *In situ* control of the exposure levels
- Management of the inconsistent situations, in agreement with the authorities

IRSN expertise of AREVA environmental report

Summary of the IRSN recommendations :

- ❑ To be more **restrictive** regarding the **uranium** content of water discharges
- ❑ To put in place a **relevant surveillance network** (*sediment-trap, biological indexes, air quality, ...*)
- ❑ To take into account the surveillance of the **diffuse flux** (waste rock dump leaching, leakage from the mining system, ...)
- ❑ To include the **concern for ecosystems** in the regulations and impact assessments
- ❑ To undertake on site experiments to obtain the data needed :
 - to better understand the **hydrological functioning of the mining reservoir** and to set a **mathematical model** out
 - To better understand the **transfer of radon** from underground holes to dwellings
- ❑ To consider the issues related to the **re-use of waste rock in the public domain**



Recommendations included in the GEP report

Content

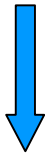
1. IRSN assignments regarding uranium mining issues
2. Regulatory aspects
3. Stakeholder involvement within an example of a fruitful joint assessment
4. Recommendations resulting from specific expertises of the AREVA environmental report concerning the Division Minière de la Crouzille sites
- 5. Expertise of AREVA assessment of the long term impact of tailings repositories**
6. The MIMAUSA program

Long term impact of tailings repositories

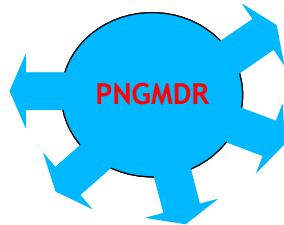
Requirements from the National Plan for the Management of radioactive Materials and Waste (PNGMDR)

Long term impact of tailings repositories

Law n°2006-739 dated 28 June 2006 provides a framework for the sustainable management of radioactive materials and waste (*modifies the environment code*)



Institutes a **NATIONAL PLAN FOR THE MANAGEMENT OF RADIOACTIVE MATERIALS AND WASTE** updated every 3 years [[2007-2009](#)]; [[2010-2012](#)]; ...



Assessment of the long term issues related to uranium tailings repositories

→ *assessment expected by the end of 2008, to be delivered by AREVA*

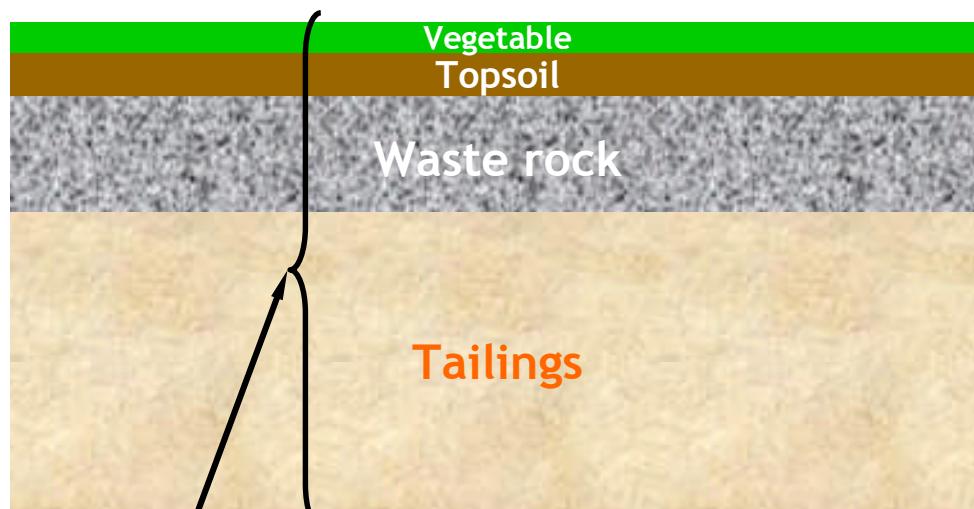
- mechanical and geochemical behaviour of the tailings (*within the repository*)
- long term stability of the dams
- long term impact of the uranium mill tailings repositories

Long term impact of tailings repositories

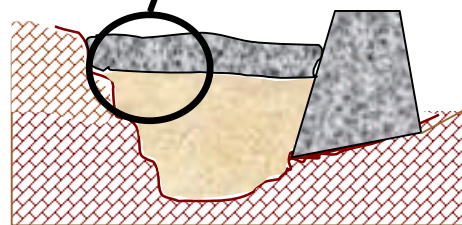
The different types of tailings repositories



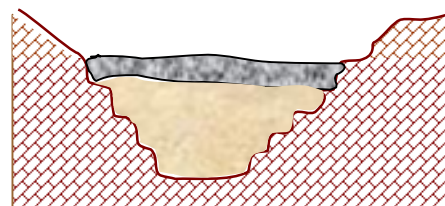
Repository cover structure



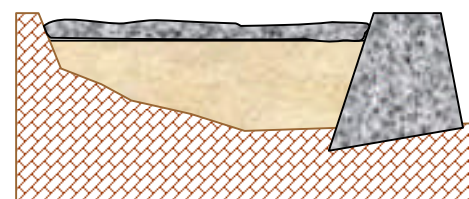
- 17 repositories, of which 11 enclosed with dams
- Facilities classified for the Protection of Environment Regulation (ICPE)
- Control exerted by the local Authority (DRIRE/DREAL), on behalf of the Environment Ministry (MEEDDM)



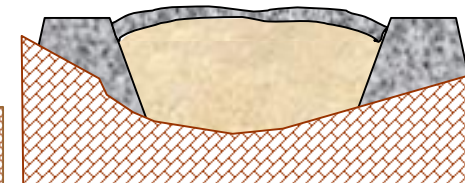
OP + dam



Backfilled OP

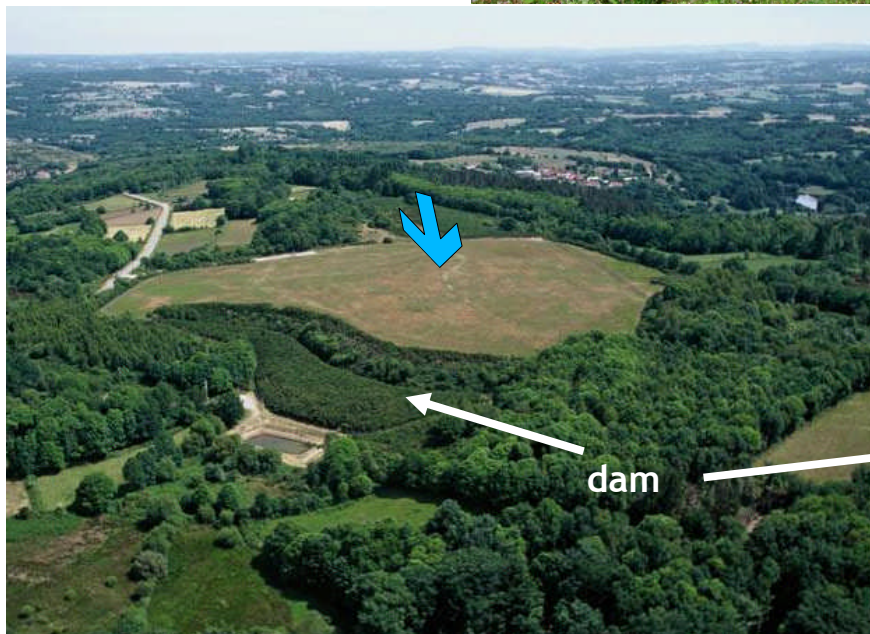


Thalweg + dam



Depression + ring dam

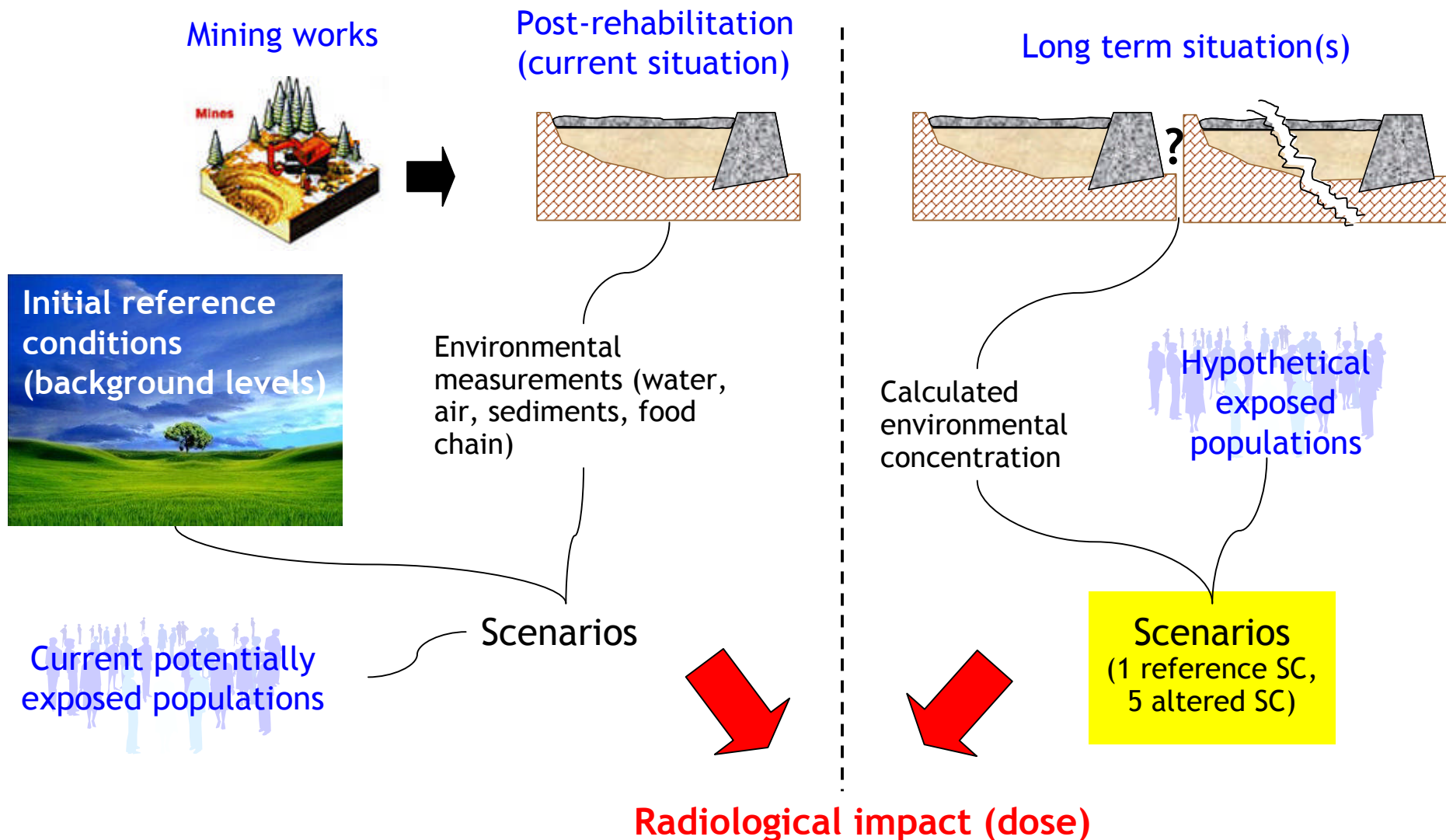
Long term impact of tailings repositories



Long term impact of tailings repositories

Methodology of the impact assessment

based on a national doctrine, formalised in 1999 in a ministerial circular



Long term impact of tailings repositories

■ Methodology of the impact assessment

SC1 : standard conditions



Normal evolution scenario

SC2 : Integrity failure of the cover

SC3 : Integrity failure of the dams

SC4 : Residence building over the repository with the cover

SC5 : Digging works within the repository (road yard)

SC6 : Residence building over the repository without the cover

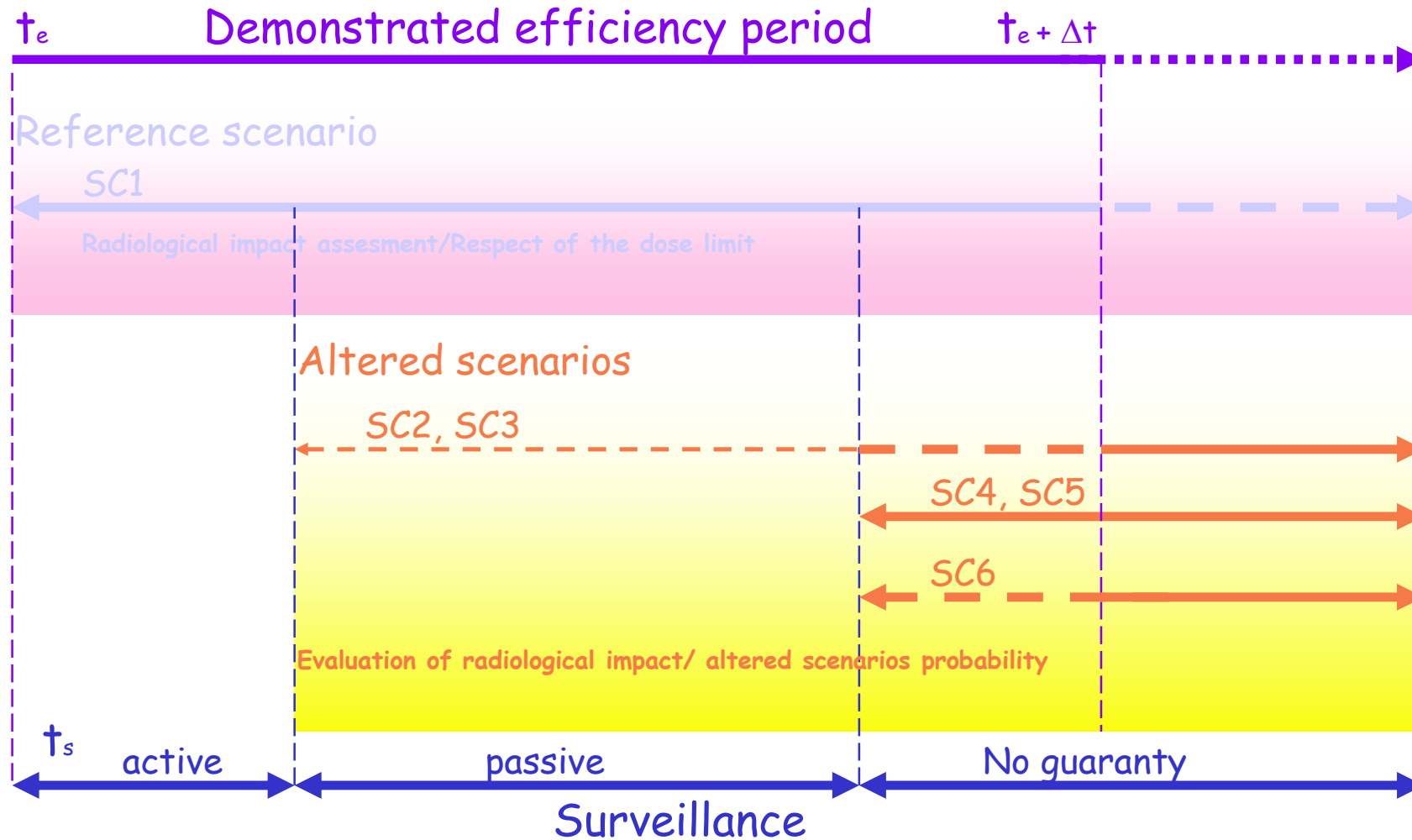


Altered evolution scenarios

Long term impact of tailings repositories

■ Methodology of the impact assessment

Timescale, occurrence and scenarios - Doctrine



Long term impact of tailings repositories

■ Requirements from the PNGMDR

➤ Main outcomes of the long term assessment

■ Tailings : Are supposed to evolve naturally into a chemical and mineralogical form limiting the U and Ra mobility, whatever the scenario may be

No sufficient demonstrative data

- continue the characterisation studies
- implement geochemical models
- demonstrate the validity of the models for all the repositories

■ Repository dams : robust structures, the stability of which is guaranteed, even in case of extreme climatic events or large earthquake occurrences

- **Middle to long term stability** not demonstrated
- Absence of assessment of the radiological impact which could follow a suspension of surveillance and/or maintenance process

■ Radiological impacts : < 1 mSv/y for the reference situation during the active surveillance phase and < a few ten mSv/y for highly altered situations

- Computed radiological exposure values to be compared with surveillance results, particularly, indoor radon concentration (in the “residence building over a covered repository” scenario, indoor Rn concentration largely underestimated compared to observed values in real dwellings)
- **Assessment to be revised** over the long term period
- Study the **relevance and feasibility of a reinforcement** of the cover

Content


1. IRSN assignments regarding uranium mining issues
2. Regulatory aspects
3. Stakeholder involvement within an example of a fruitful joint assessment
4. Recommendations resulting from specific expertises of the AREVA environmental report concerning the Division Minière de la Crouzille sites
5. Expertise of AREVA assessment of the long term impact of tailings repositories
6. **The MIMAUSA program**

The MIMAUSA program

Memory and Impact of former Uranium Mine Sites : Synthesis and Archiving

Elaborating, updating and making available to all stakeholders the inventory of the uranium mine sites



Réalisé dans le cadre du programme  **MIMAUSA**
Mémoire et Impact des Mines d'urAniUm : Synthèse et Archives

The MIMAUSA program

Memory and Impact of former Uranium Mine Sites : Synthesis and Archiving

Elaborating, updating and making available to all stakeholder the inventory of the uranium mine sites

- In order to keep the memory, the Ministry of Ecology requested IRSN to develop a program of investigations



The MIMAUSA program

Memory and Impact of former Uranium Mine Sites : Synthesis and Archiving

- **Step 1**, the aim of "**knowledge assessment**" is to make an inventory of all former uranium mine sites (210) and to collect basic data for each site:
 - Localisation
 - Administrative status
 - Nature of work (exploration, extraction, treatment)

- **Step 2**, the aim of "**specific studies**" is to validate and complete the data collected during the first step by implementing site control visits

- **Publication of a first version of the inventory in 2004; updated in 2007**
- **DATABASE on line (www.mimausa.fr) since early 2009**

The MIMAUSA program

■ The inventory issued in 2007



210 sites miniers

- Localisation
- Administrative situation
- Nature of Works (underground mine, open pit, quantity of ore mined, treatments, remediation works, ...)

As of today, more than 230 sites!

The MIMAUSA program

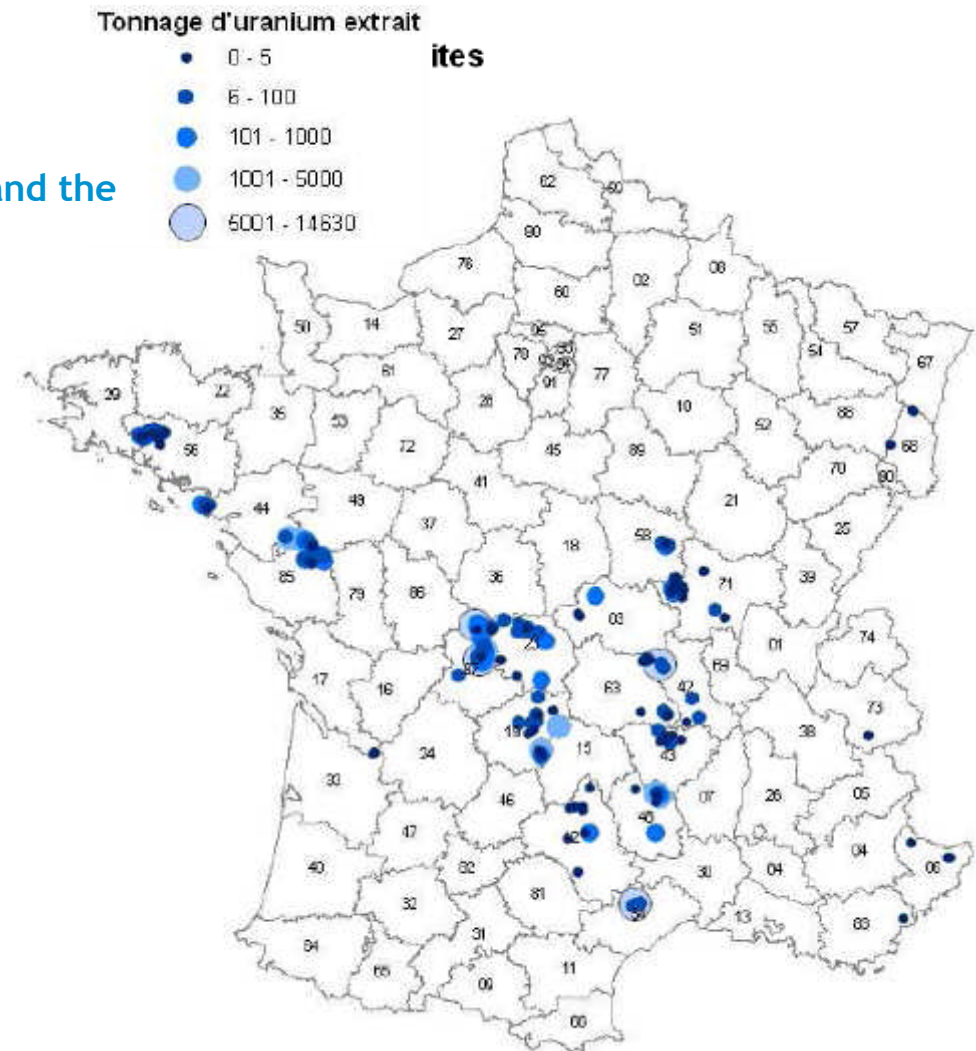
- 2009 : an interactive map made available on line

The screenshot displays the IRSN website interface in a Microsoft Internet Explorer browser. The main heading is "La surveillance des anciennes mines d'uranium". The page includes a search bar, a navigation menu, and a sidebar with categories like "Installations nucléaires", "Environnement", "Radiation et santé", "Liberté", and "FAQ". The central content area features a map of France with various mining sites marked, accompanied by text describing the MIMAUSA program and its objectives. The text mentions the development of uranium mining in France after the second world war and the role of IRSN in monitoring and assessing the environmental and health impacts of these sites.

The MIMAUSA program

Exploitation of the data

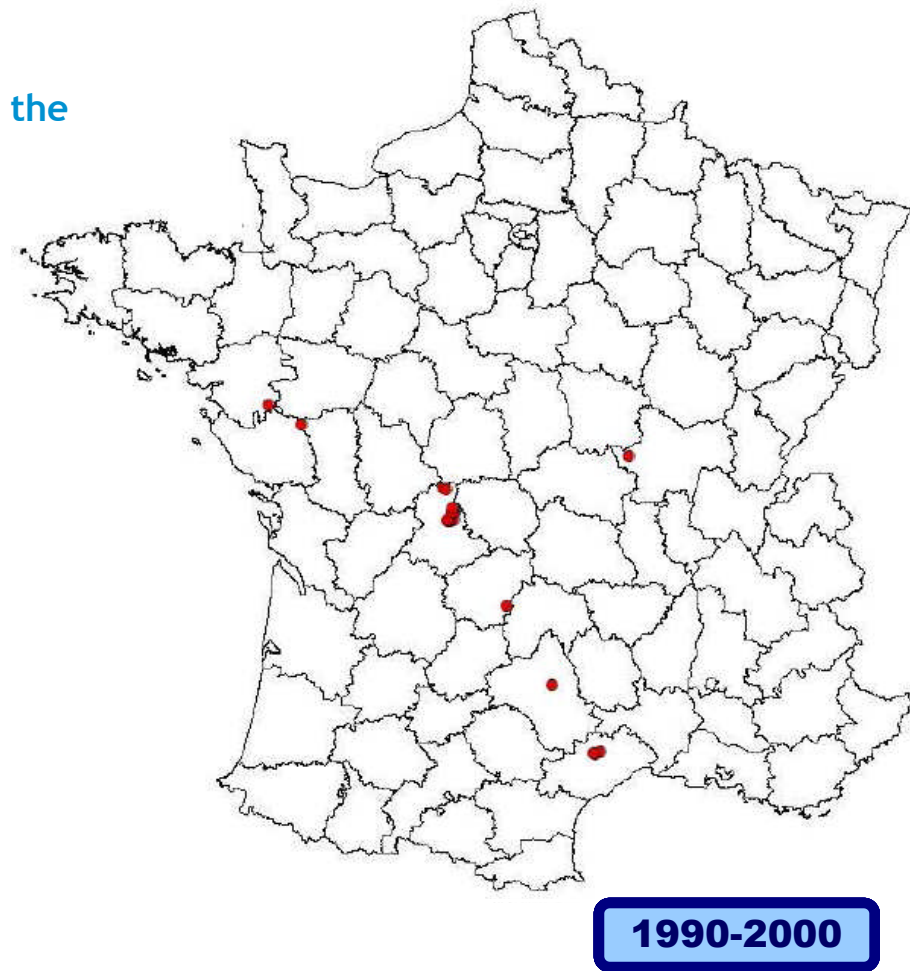
- Geographical distribution of the sites and the U production



The MIMAUSA program

Exploitation of the data

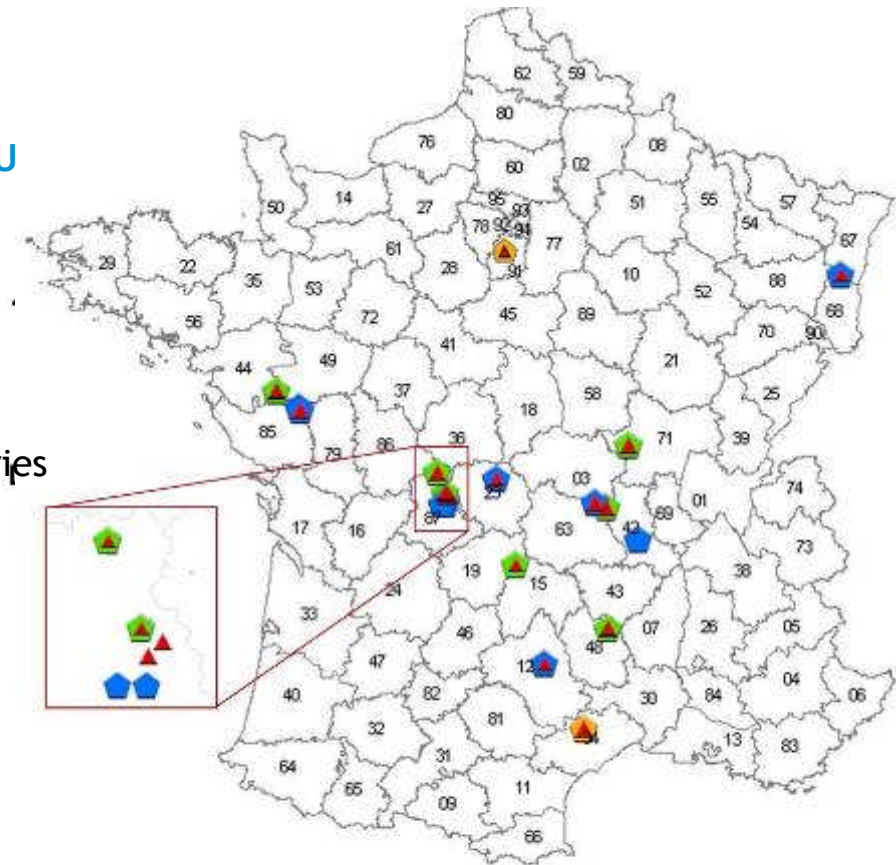
- Geographical distribution of the sites and the U production
- Time variation of the production



The MIMAUSA program

Exploitation of the data

- Geographical distribution of the sites and the U production
- Time variation of the production
- Localisation of the sites :
 - mined by others
 - where tailings are disposed of in repositories
 - ...



Traitement de minerai	
	dynamique (usine) et statique
	dynamique (usine)
	statique
	Stockage de résidus

Thank you for your attention!

Stakeholder involvement

- A legal national requirement and an European initiative

The Local Information Committees (CLIs) in relation with BNIs



- The TSN Act consolidates the already since 1981 existing CLIs and provides also a **legal framework** for the National Association of CLIs (ANCLI)
- The CLIs are **formed by representatives** coming from local councillors, environmental protection associations, BNIs, professionals in the public health sector...
- The CLIs may **commission**
 - Expert assessments
 - Epidemiological studies
 - Measurements/analyses in the environment
- **CLI funding**
 - State
 - Local authorities

Stakeholder involvement

- A legal national requirement and an European initiative

The Supreme Committee for Transparency and Information on Nuclear Security (HCTISN)

- The HCTISN is a **consultation and discussion body** formed by 35 members appointed by decree (28/02/2008) for a period of 6 years
 - Parliamentarians
 - Representatives of CLIs and environmental protection associations
 - Representatives of licensees and employee trade unions
 - Representatives well-known for their extensive expertise in this area
 - Representatives of ASN (Nuclear Safety Authority) and IRSN
- The HCTISN
 - Commissions expert assessments
 - Issues opinions, which are made public
- The HCTISN draws up an **annual report** which is published
- **HCTISN funding**
 - State

Stakeholder involvement

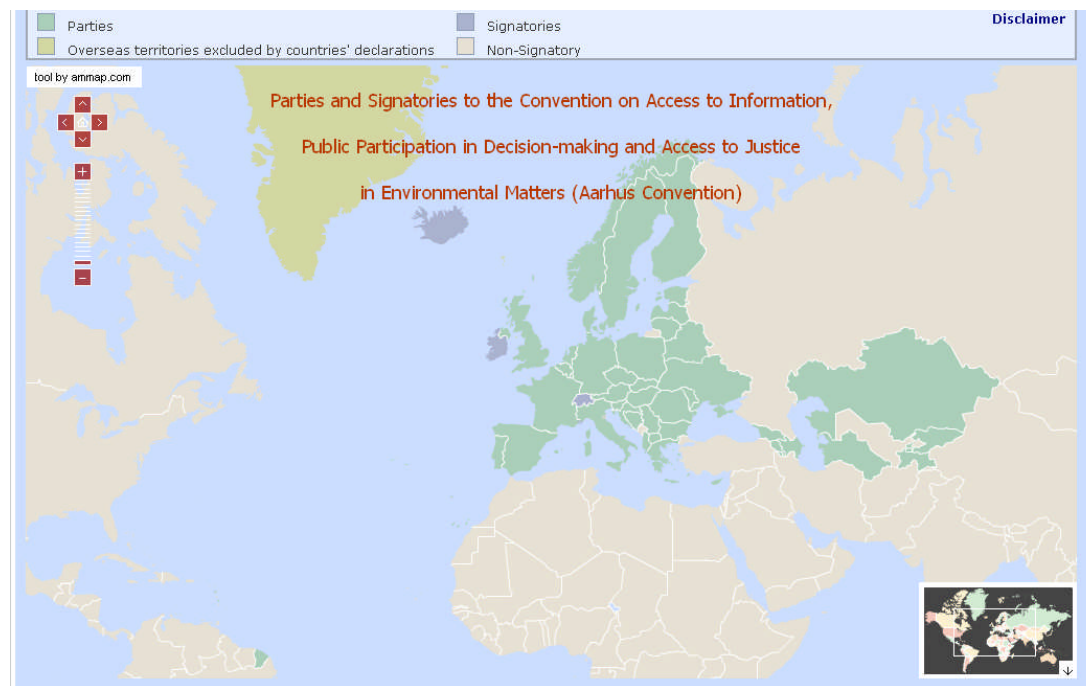
- A legal national requirement and an European initiative

European level: the Aarhus convention on access to information, public participation in decision-making and access to justice in environmental matters, signed in Aarhus (Denmark), June 25, 1998.



CONVENTION ON ACCESS TO INFORMATION, PUBLIC PARTICIPATION IN DECISION MAKING AND ACCESS TO JUSTICE IN ENVIRONMENTAL MATTERS

done at Aarhus, Denmark,
on 25 June 1998



Stakeholder involvement

- A legal national requirement and an European initiative

The Supreme Committee for Transparency and Information on Nuclear Security (HCTISN)

Does the HCTISN address uranium mine issues ?



Haut comité pour la transparence et l'information sur la sécurité nucléaire

Le 9 février 2009 : Le Haut comité pour la transparence et l'information sur la sécurité nucléaire décide d'examiner la qualité de l'information des populations autour des mines d'uranium et de ses conditions de diffusion

Bien que les anciennes mines d'uranium et leurs annexes (sites de traitement...) fassent, de longue date, l'objet d'actions de remise en état, de suivi et d'information dans un cadre généralement pluraliste (i.e. Commissions locales d'information, Groupes d'Expertise Pluraliste du Limousin...), le Haut-comité constate que l'information relative à l'impact environnemental et sanitaire des anciennes mines d'uranium est actuellement l'objet de certaines interrogations.

Sur la proposition de son bureau, le Haut-comité, présidé par le Sénateur honoraire Henri SEVOL, examinera de manière approfondie cette question à partir de sa prochaine réunion ordinaire qui se tiendra le 17 mars 2009.

Contact :

Monsieur Stéphane NOËL - ☎ 06.74.16.37.26

Haut comité pour la transparence et l'information sur la sécurité nucléaire

C/o GDRS - Immeuble ATRELUM

5, place des Vins de France

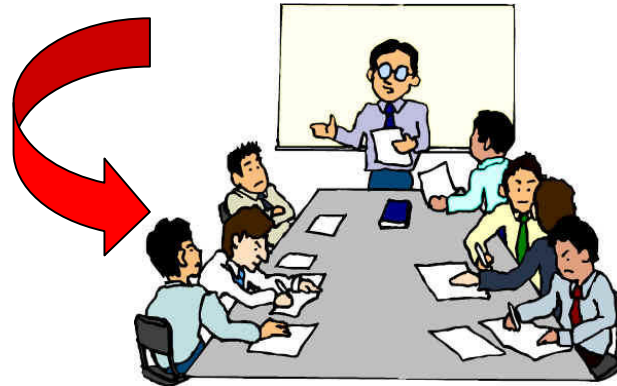
75273 Paris cedex 12

E-mail : hctisn@arsen.fr

Web : www.hctisn.fr

Communiqué de presse

Further to the broadcast of a controversial TV program on uranium mining in France, a press release was issued to inform that **HCTISN planned to examine the quality of the information given to the population in the vicinity of the uranium mine sites and the conditions of diffusion**



The French regulation

- Regulation in effect concerning uranium mining and post-mining activities
 - Uranium mining and milling regulatory framework

At national level

□ The mining code

- Set the rules for Uranium ore mining works and facilities
- Is complemented by two decrees
 - 1980 General Rules applicable to mining and quarrying industries (RGIE)
 - 1990 Specifies technical rules relative to environmental protection : management of radioactive materials ; discharge authorisation ; environment monitoring and control

□ completed by additional requirements :

- the Environment Code (for ICPE)
- the Public Health Code (protection of the population)
 - based on EURATOM directive and include the (ICRP) principles

At local level

- National regulations give rise to compliant local regulations taken by the local authorities (Prefect)