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)

Content

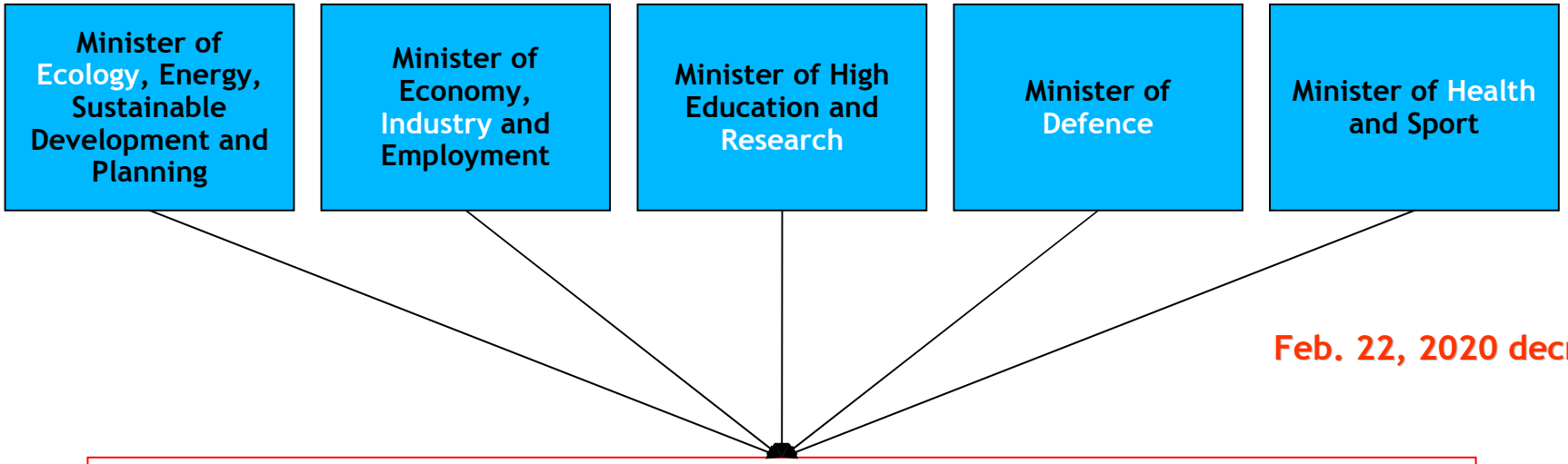
1. IRSN assignments regarding uranium mining issues
2. Regulatory aspects
3. Stakeholder involvement within an example of a fruitful joint assessment
4. Some recommendations resulting from specific expertises of the AREVA environmental report concerning the Division Minière de la Crouzille sites
5. Expertise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

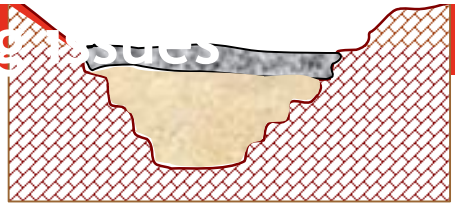
- **Research and public service assignments**
  - National and International Research programs to maintain and develop expertise skills
  - Training in radiation protection
  - Contribution to the monitoring of the national territory and workers exposed to ionising radiation
  - Management of the national 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

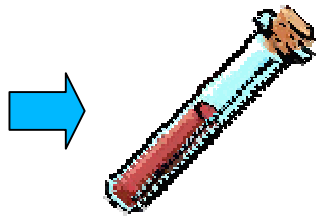
- **Research and public service assignments**
  - National and International Research programs to maintain and develop expertise skills
  - Training in radiation protection
  - Contribution to the monitoring of the national territory and workers exposed to ionising radiation
  - Management of the national 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

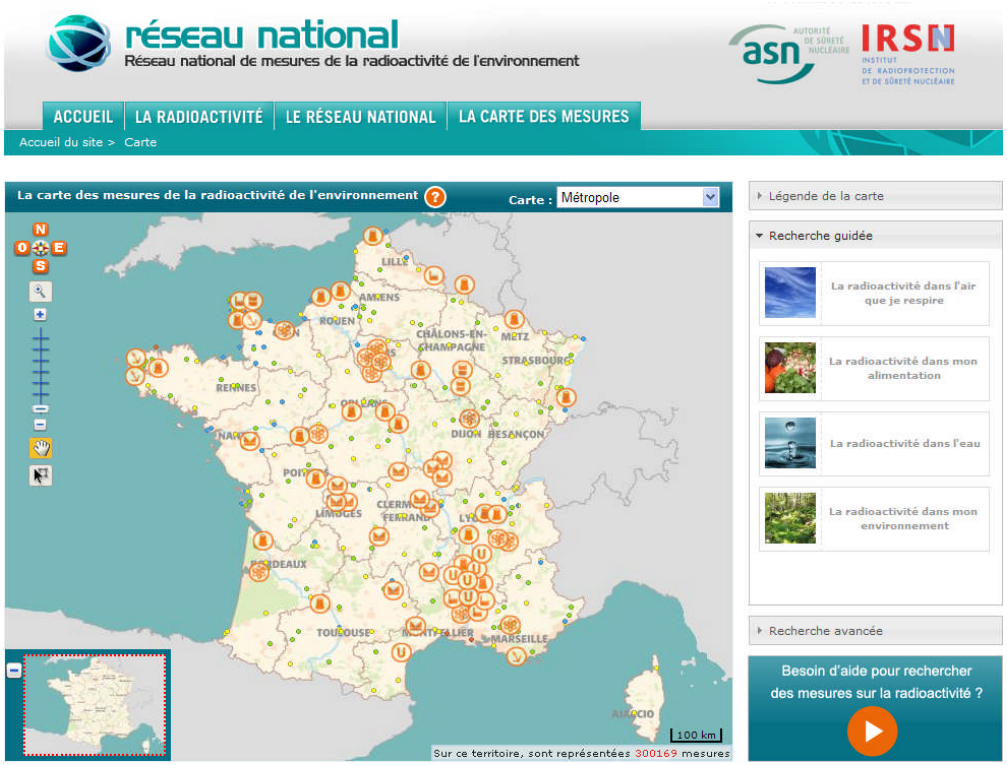


- Research and public service assignments
  - National and International Research programs to maintain and develop expertise skills



IRSN assignments regarding uranium mining issues

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



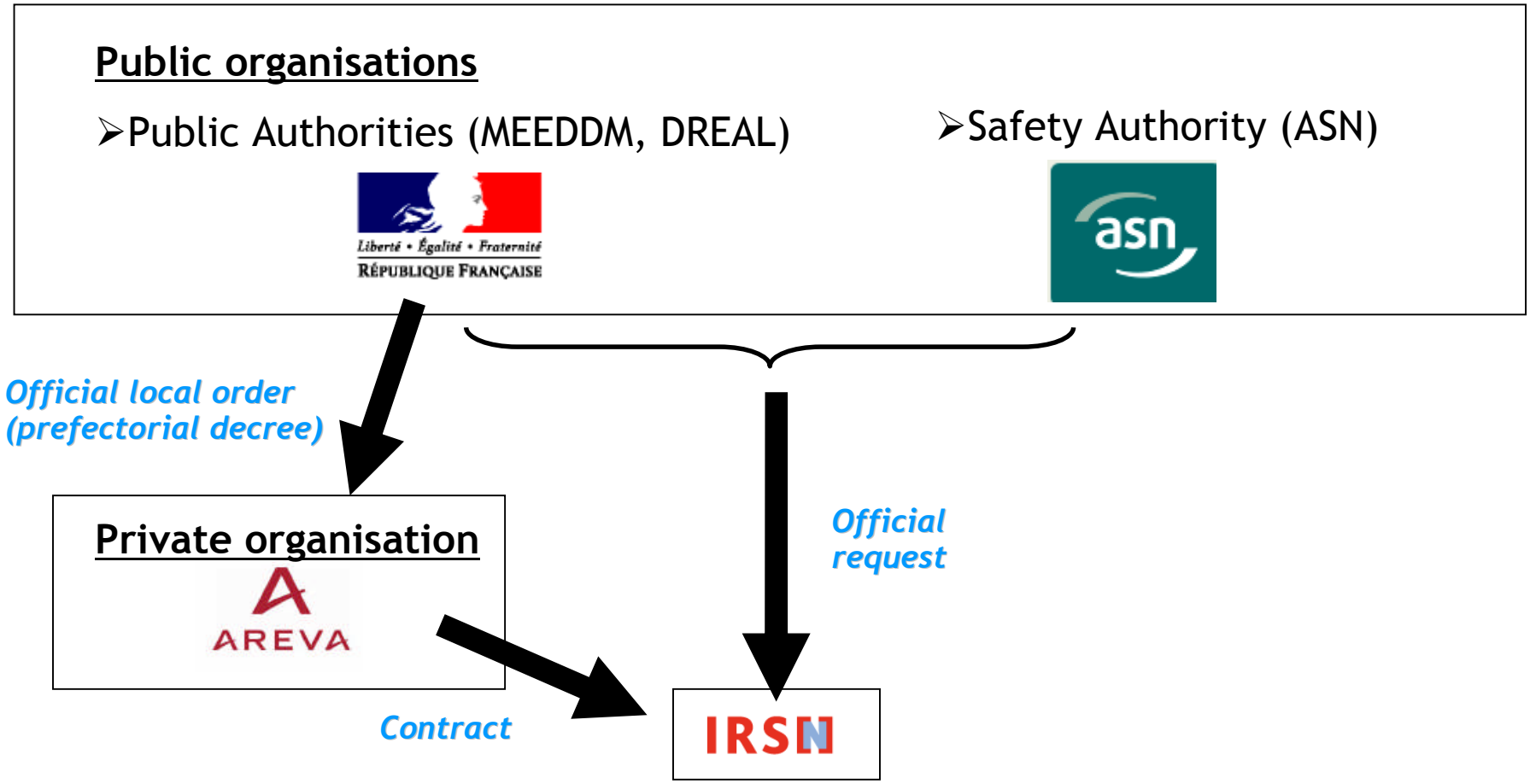
Strategy of surveillance of the former uranium mine sites reviewed in 2010

- ➢ 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

National level

Mining code

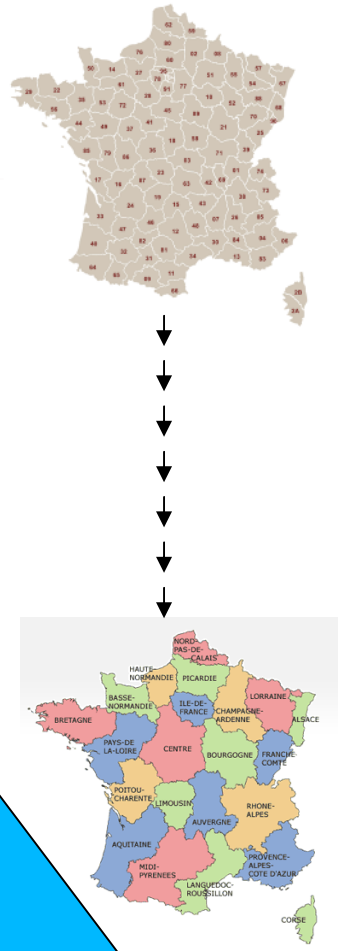
Public Health code

Environment code

- Laws and decrees
- Authorities : Ministry of Environment
  Nuclear Safety Authority

Local level

- Licence and site-specific regulatory requirements (prefectorial orders)
- Authorities : Prefect of region,
  Local technical support service (DREAL)



Regulatory aspects

Uranium mines

ICPE regulation Framework :

➔ Tailings Repositories

Mining code regulation Framework :

➔ Mine sites

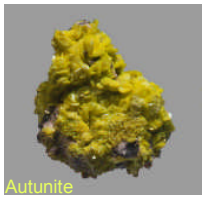
AUTHORITIES : Ministry of environment and ASN

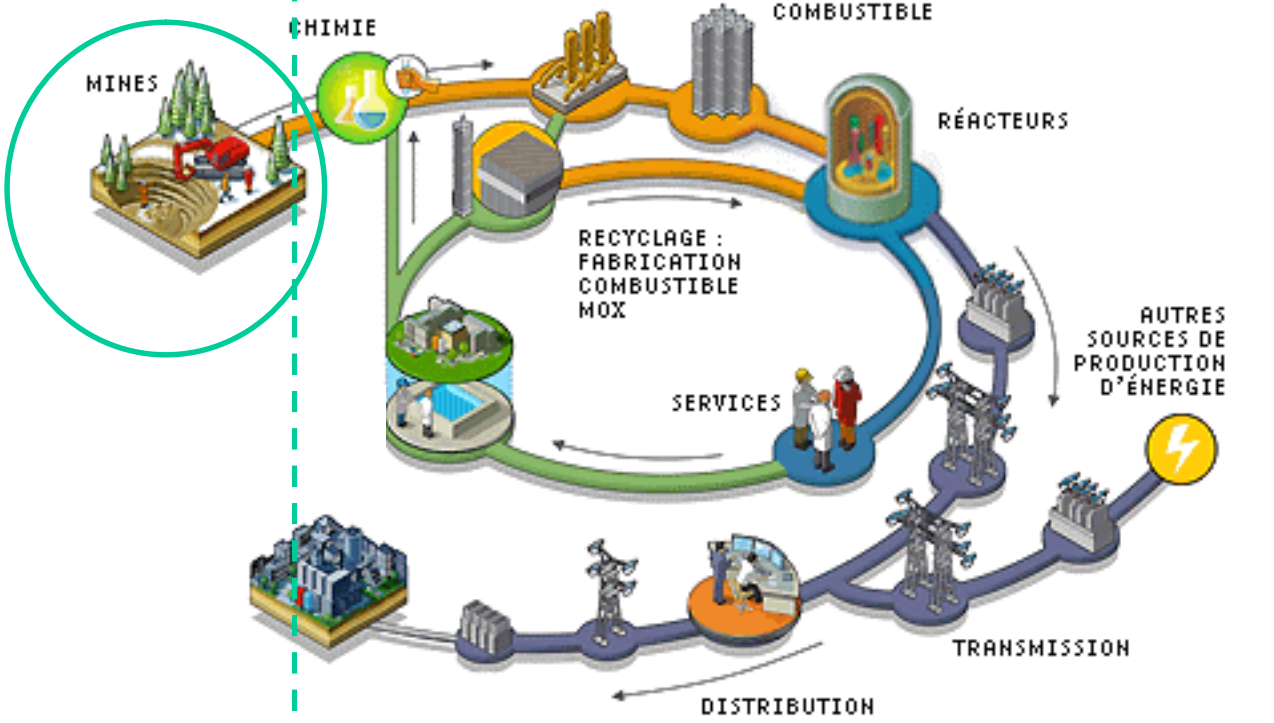
Nuclear installations

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

1. **Control** the former sites

2. **Investigate further into** the environmental and health impacts and improve the monitoring of the sites

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

4. **Increase** information and dialogue

PLAN of ACTIONS to

PURSUE the MANAGEMENT of the FORMER U MINES

DREAL ASN IRSN AREVA CLIS GEP

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

Stakeholder involvement

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)

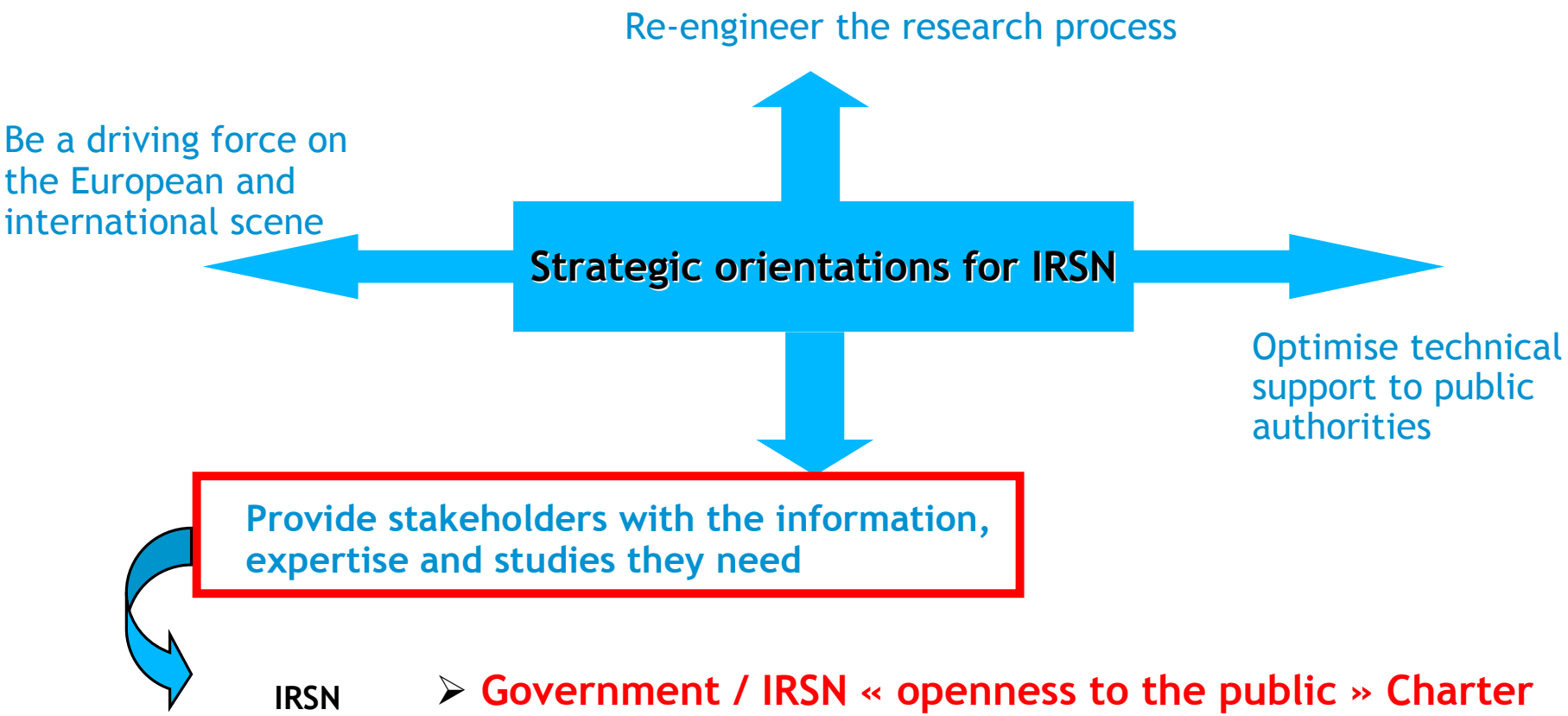
→ **No, but**

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

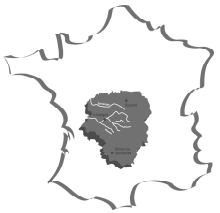
Cultural awareness in the public

- 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
  - GEP experiences

Groupe d'Expertise Pluraliste



Stakeholder involvement

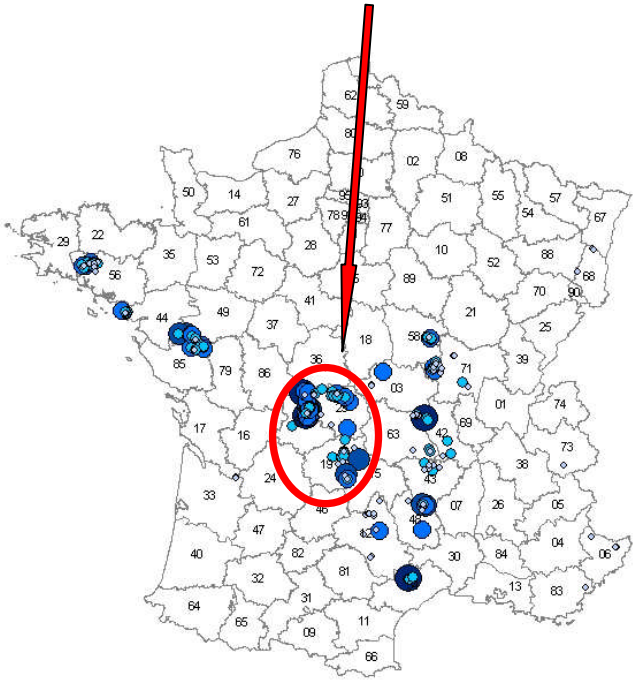
Joint assessments : the GEP-mine example

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

The **expert pluralistic group** (GEP)

▪*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

Groupe d'Expertise Pluraliste

The **expert pluralistic group** (GEP)

▪*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

- Prioritary 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

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

Institutional perspective and regulatory body	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.
Knowledge of sites, studies and research	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.
Relevance and field of evaluation of impact, public health.	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.
Systems of surveillance of the sites and the environment	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.
Robustness of remediation works and long term considerations	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.
Information and participation for sustainable management	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 Crouzille sites**
5. Expertise of AREVA assessment of the long term impact of tailings repositories
6. The MIMAUSA program

IRSN expertise of AREVA environmental report

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

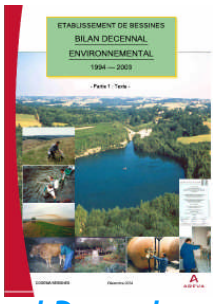
- Context
- Lessons regarding the **regulation**
- Lessons regarding **surveillance issues**
- Lessons regarding **long term issues**
- Lessons regarding **impact assessment**
- Lessons regarding the past practice of **re-use of waste rock** in the public domain

IRSN expertise of AREVA environmental report

Context

Prefectorial regulation (January 2004)

AREVA

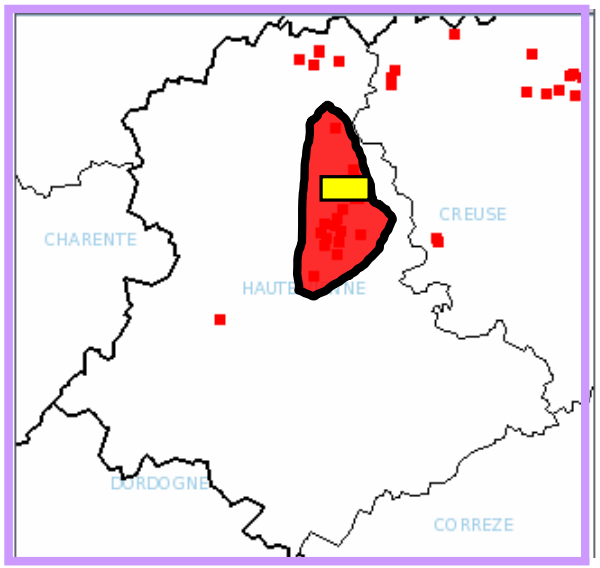


Issued December, 2004

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

Crouzille Mine Division :

- 24 sites
- 4 tailings repositories



IRSN expertise of AREVA environmental report

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

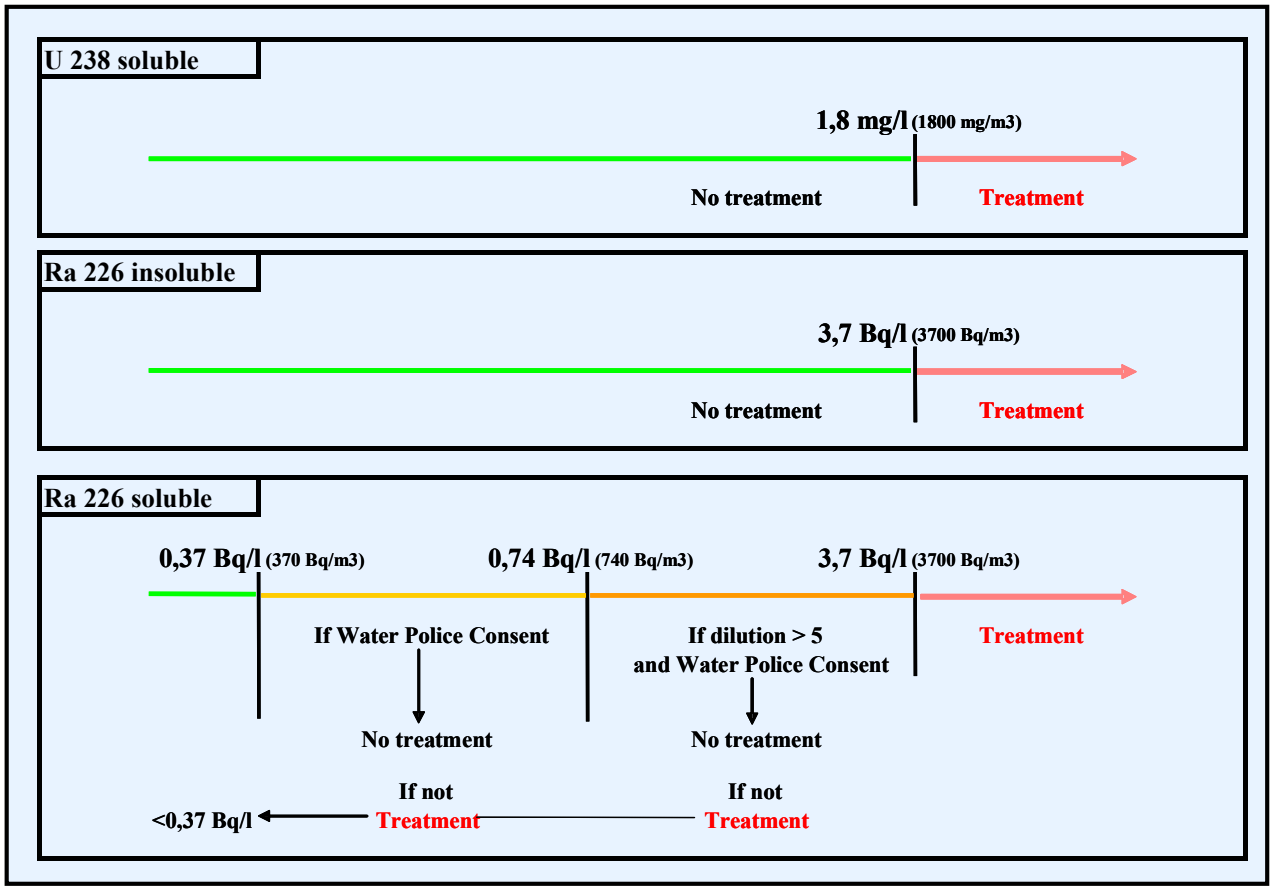
Issued Jan & Dec 2007, Nov 2008

IRSN expertise of AREVA environmental report

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 : $U_{soluble}$ = 0,1 mg/L Augères treatment plant)



Sometimes, concerns the receiving media

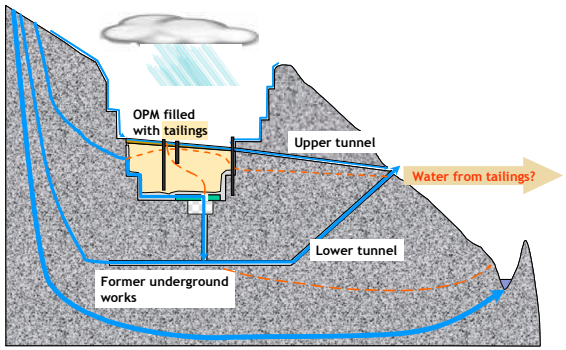
- Ex : 3700 Bq U^{238}/kg in the sediment of the Saint-Pardoux waterpond

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

IRSN expertise of AREVA environmental report

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**

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**

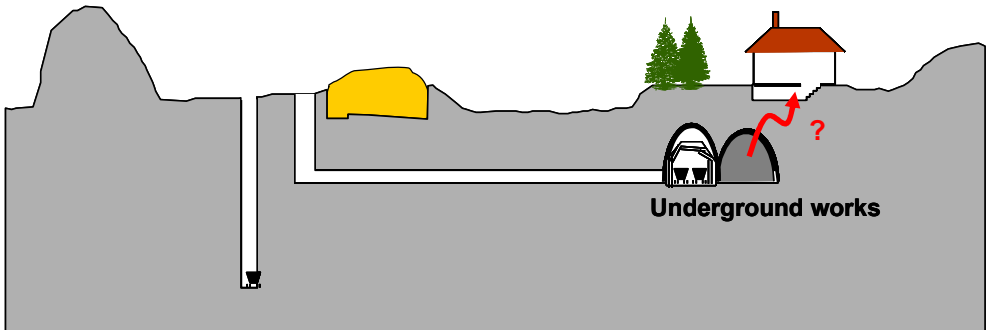
The surveillance of radon and gamma dose rate in the villages located in the vicinity of the former mine sites is not relevant (problem to **discriminate** the natural contribution from the contribution of the former mining rehabilitated sites, influence of many (climatic) parameters, extenuation of 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 exhalaison flux cartographies *(according to a frequency control to be defined)*

Need to

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

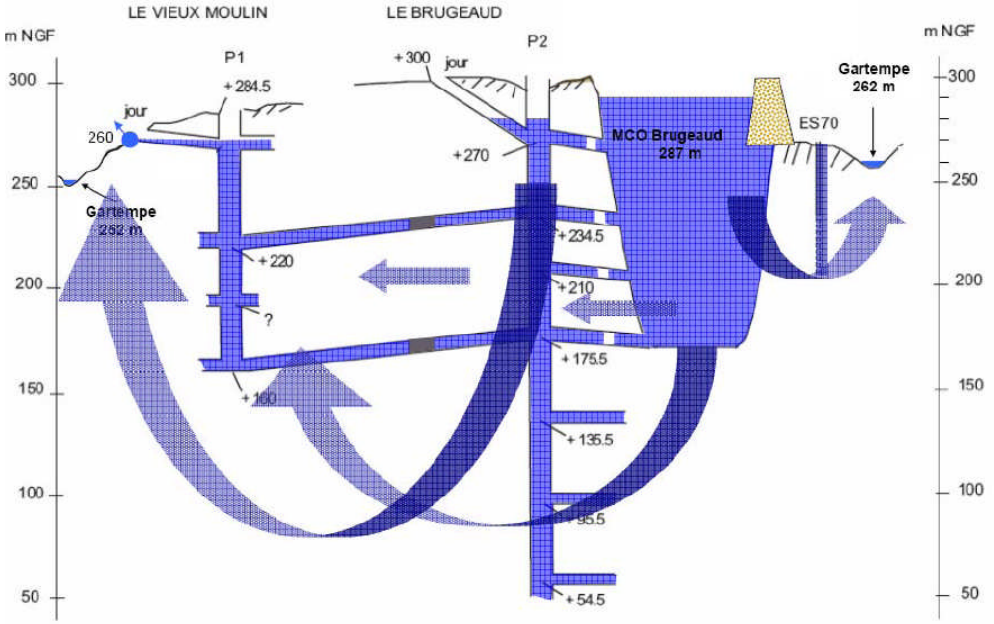


IRSN expertise of AREVA environmental report

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



IRSN expertise of AREVA environmental report

Lessons regarding impact assessment

➔ **need to re-assess the hypothesis of isotopic equilibrium (^{210}Pb/^{210}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}Po > ^{210}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)

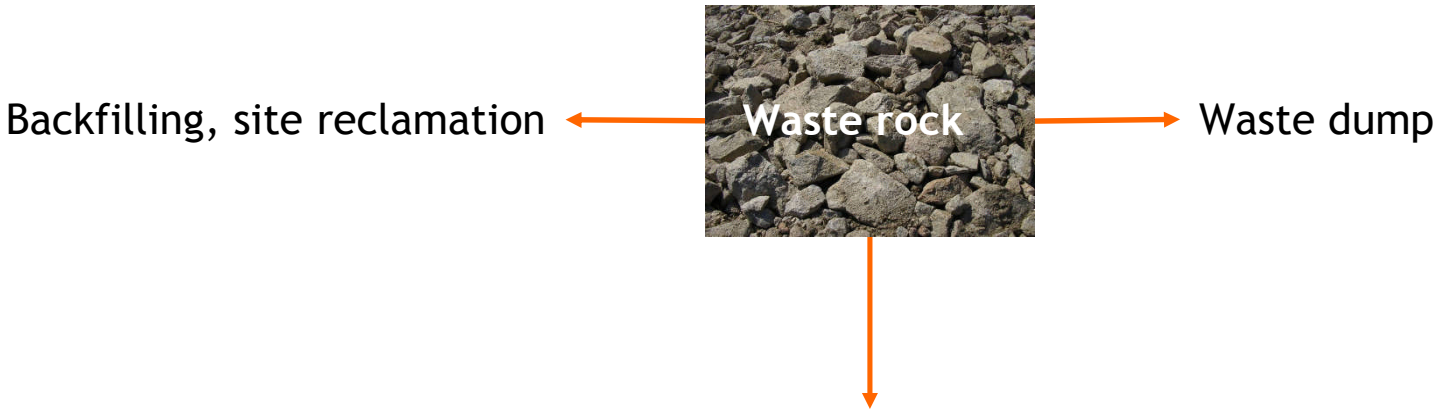
The feasibility of the application of such a methodology to a particular watershed within the Limousin Region has successfully been tested by the members of the GEP (on the basis of the actual measured radionuclide concentrations in the environment)

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

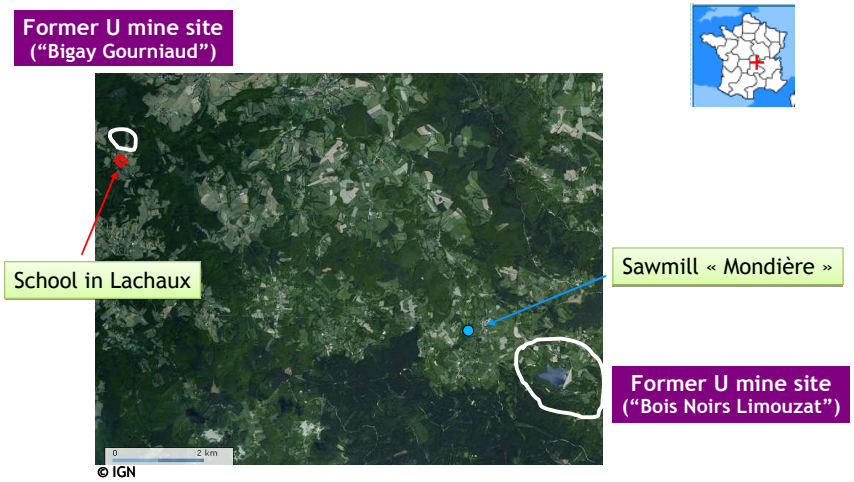
➔ **need to assess the consequences of this practice**

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) :

2009 - 2010

➢ **Measurements by radiological air detection**

- Investigative superficies : (1000 + 2000) km^2
- Flying over altitude : 40 m
- Speed : 100 km/h
- Grid cell : 15 m

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

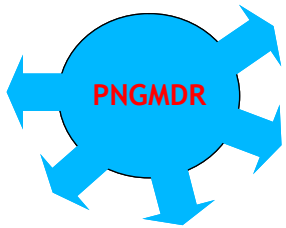
Long term impact of tailings repositories

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]; …



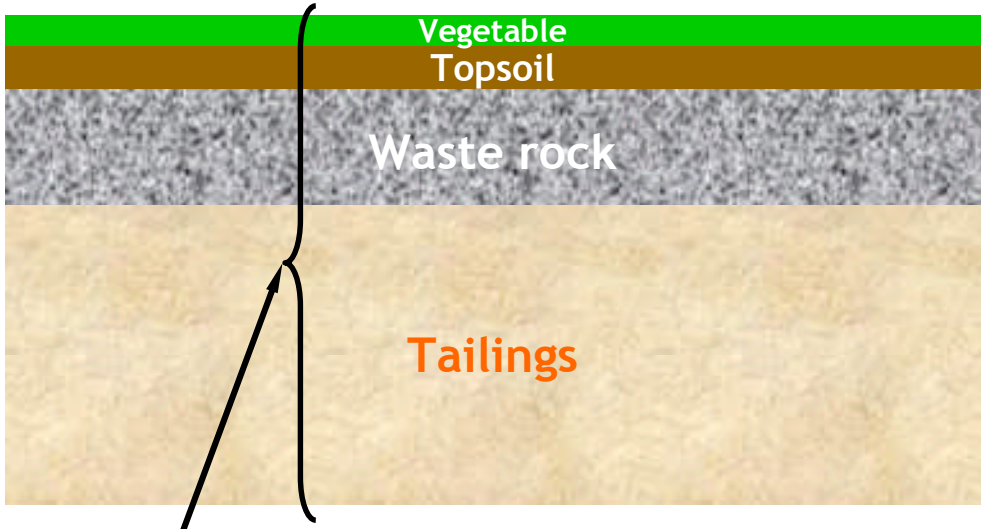
Assessment of the long term issues related to uranium tailings repositories
➔ *assessment expected by the end of 2008, to be delivered by AREVA*

- 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

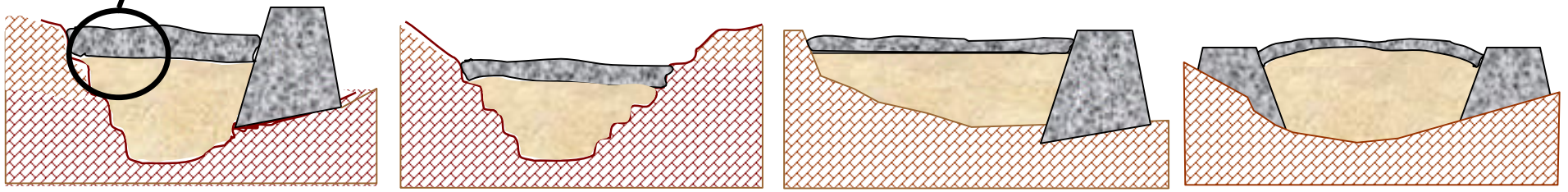
Long term impact of tailings repositories

The different types of tailings repositories

Repository cover structure

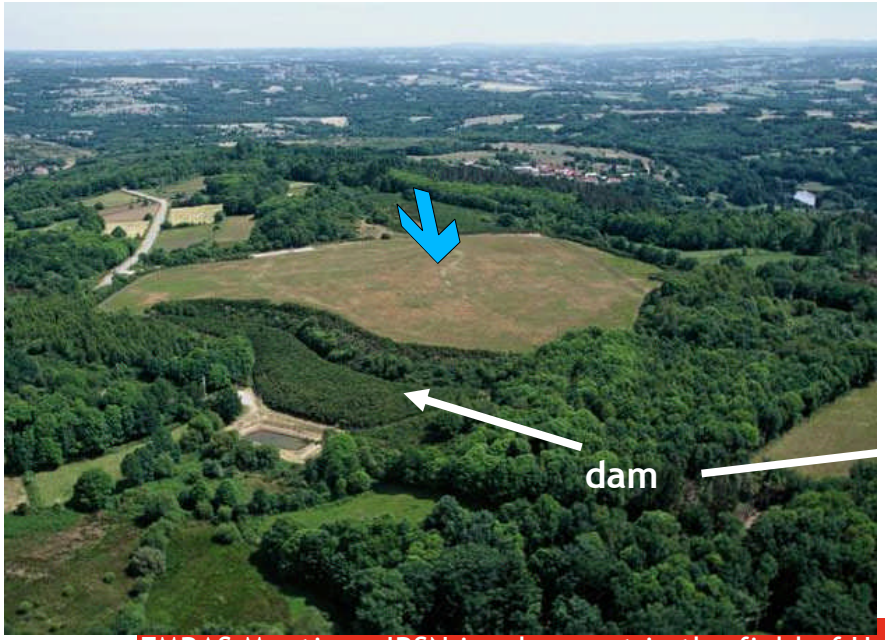


- 17 repositories, of which 11 enclosed with dams
- Facilities classified for the Protection of Environment Regulation (ICPE)
- Control exerted by the local Authority (DRIRE/DREAL), on behalf of the Environment Ministry (MEEDDM)



OP + dam | Backfilled OP | Thalweg + dam | Depression + ring dam

Long term impact of tailings repositories



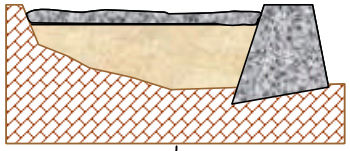
Long term impact of tailings repositories

Methodology of the impact assessment

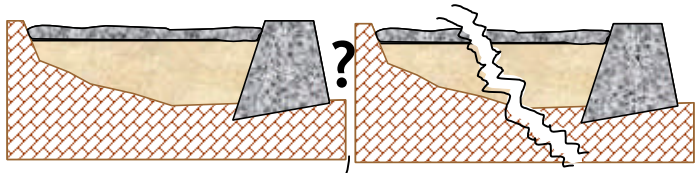
based on a national doctrine, formalised in 1999 in a ministerial circular

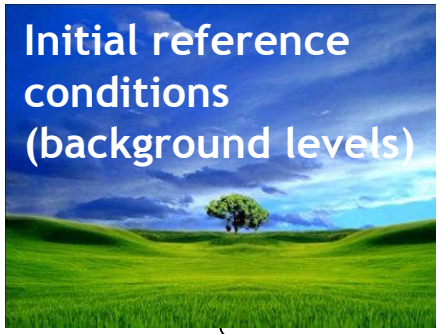
Mining works

Post-rehabilitation (current situation)



Long term situation(s)





Environmental measurements (water, air, sediments, food chain)

Calculated environmental concentration

Hypothetical exposed populations

Current potentially exposed populations

Scenarios

Scenarios (1 reference SC, 5 altered SC)

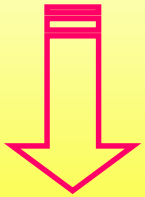
Radiological impact (dose)

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

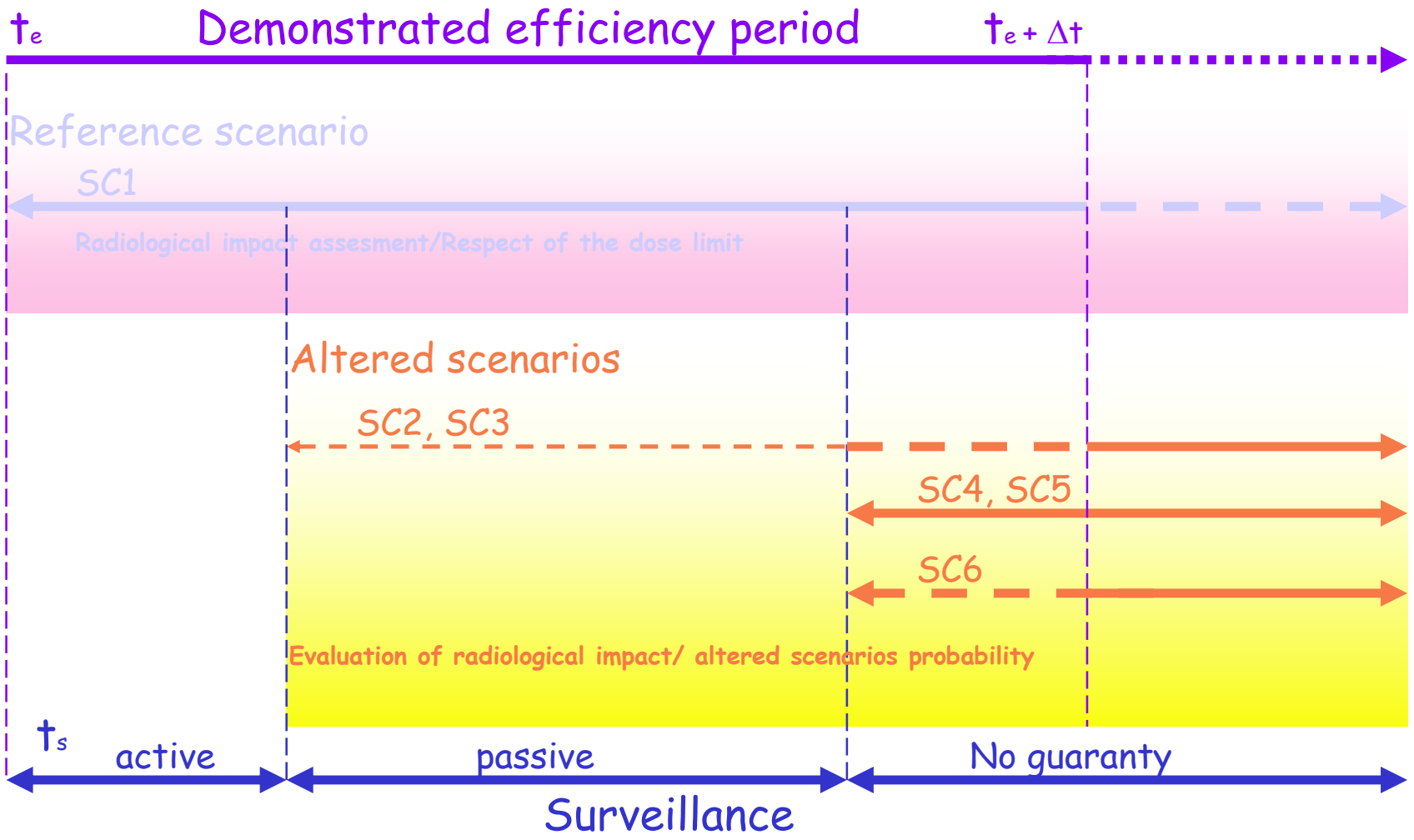


Altered evolution scenarios

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

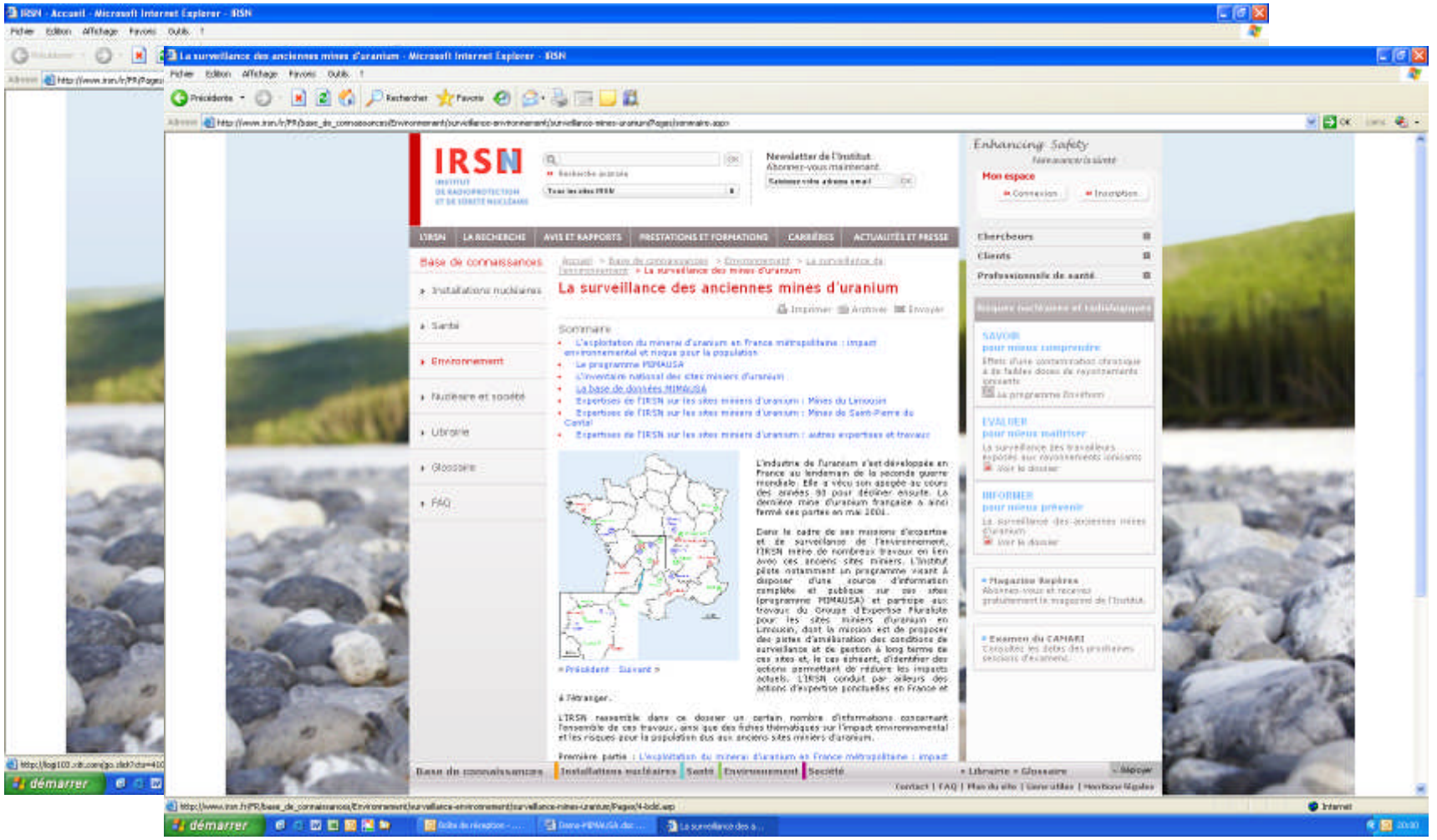
210 sites miniers

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

As of today, more than 230 sites!

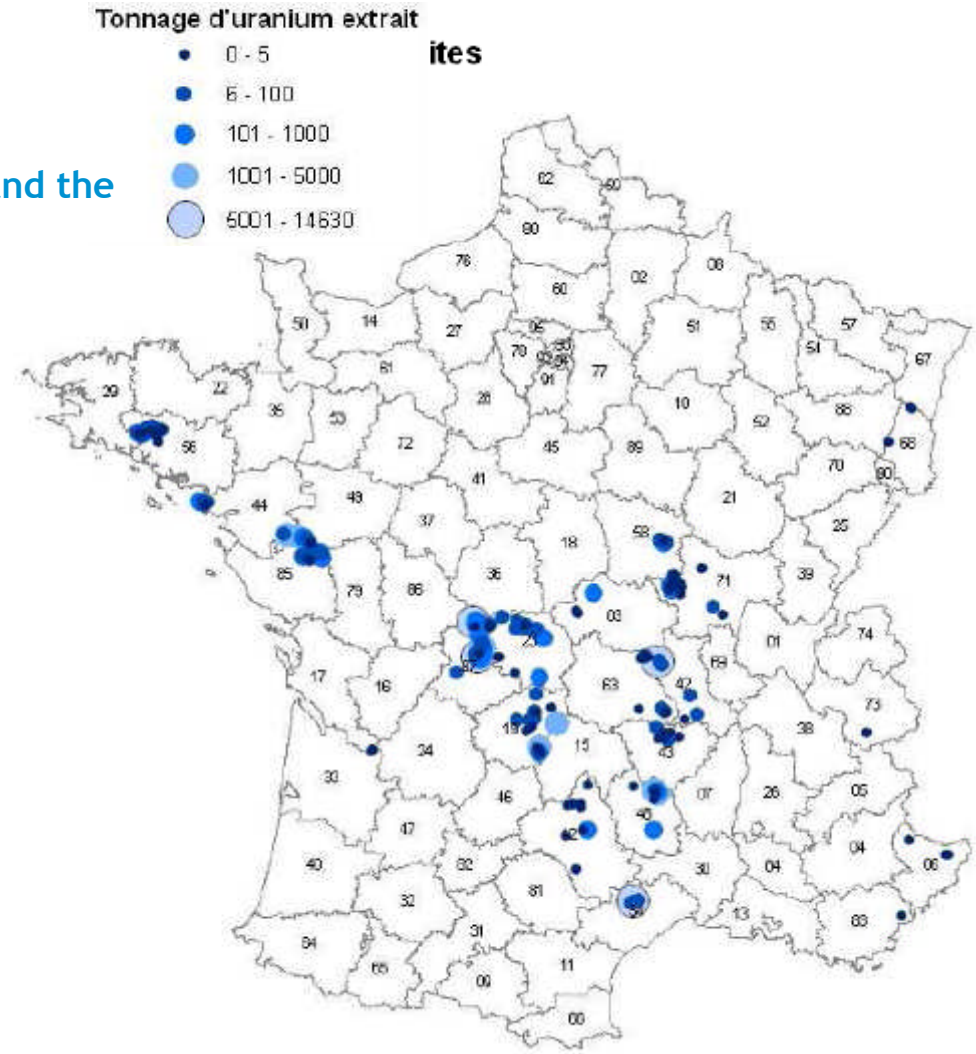
The MIMAUSA program

- **2009 : an interactive map made available on line**



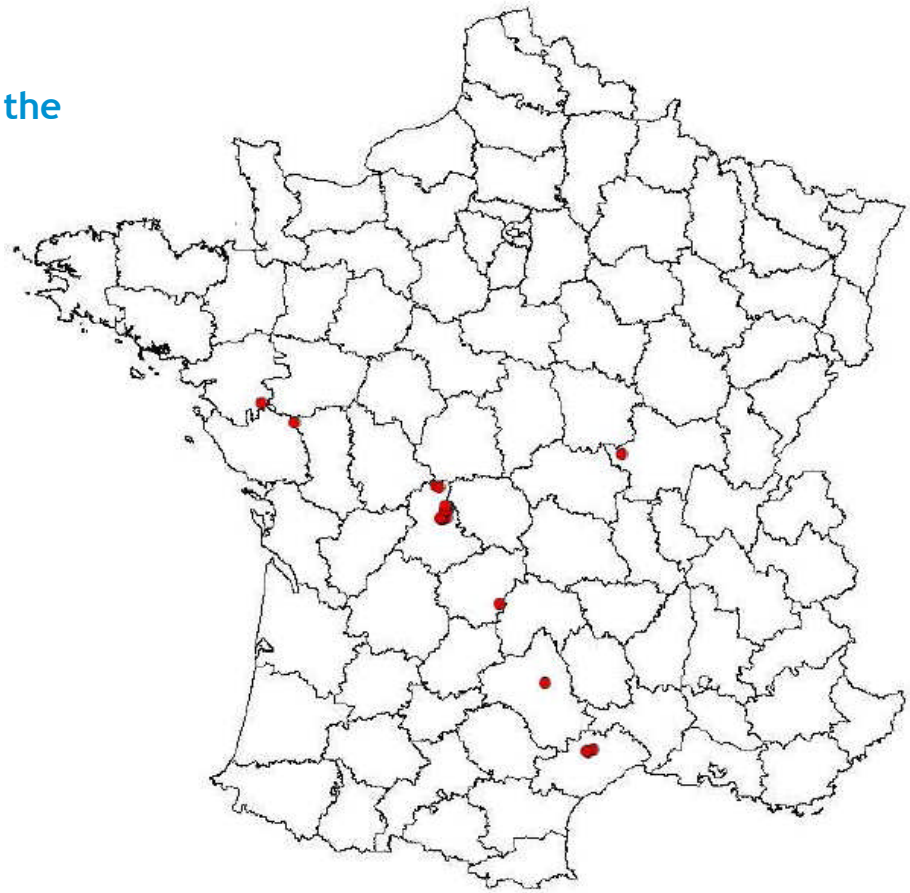
Exploitation of the data

- Geographical distribution of the sites and the U production



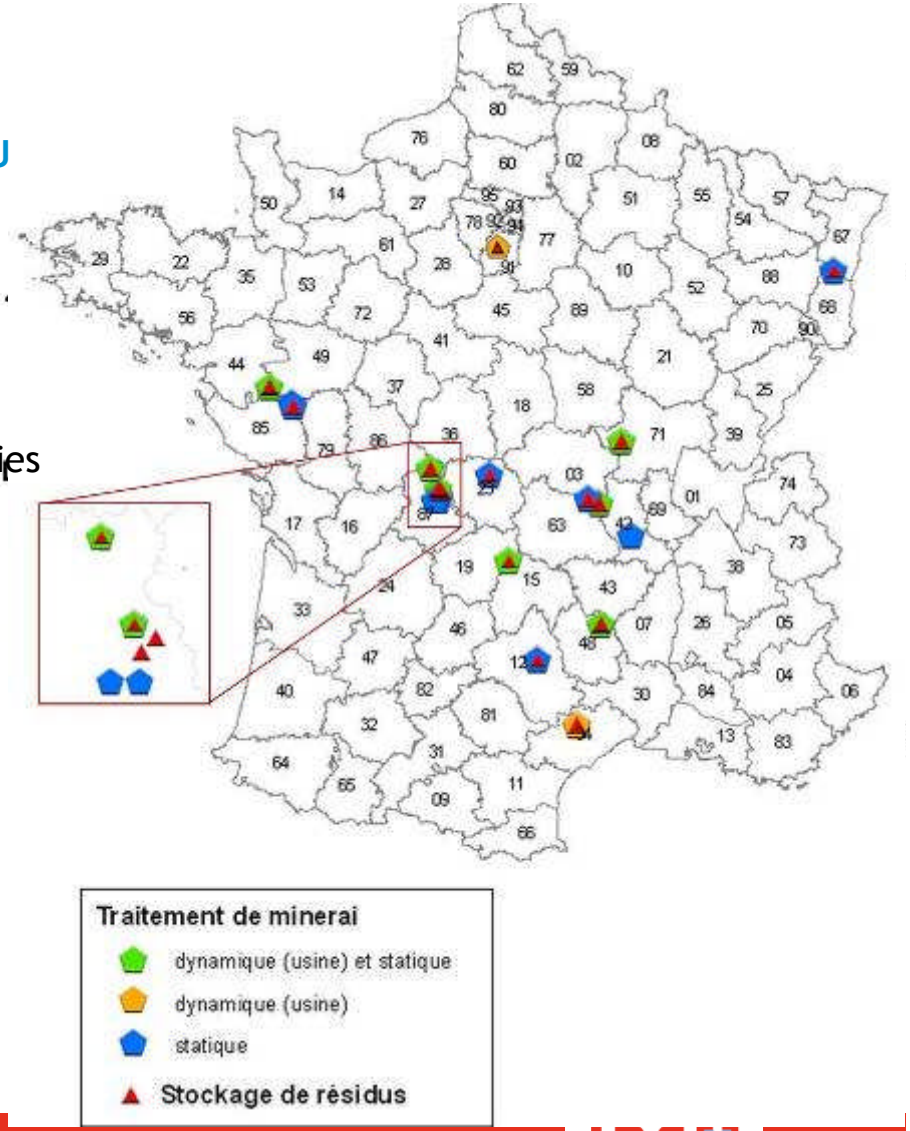
Exploitation of the data

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



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
  - …



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

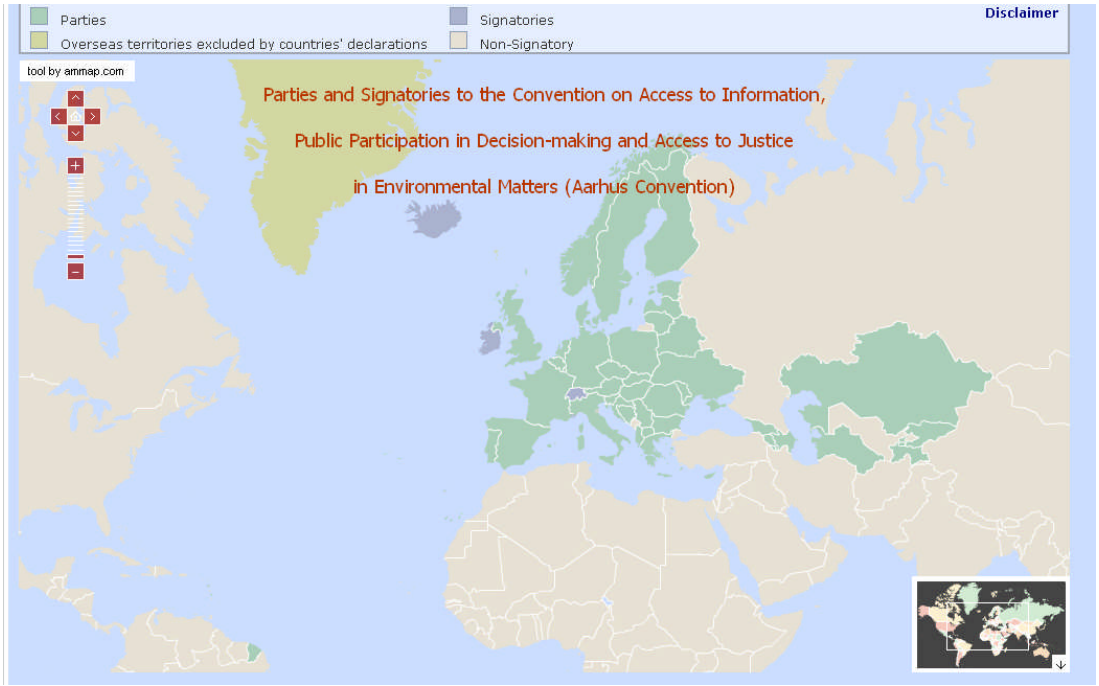
Stakeholder involvement

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 ?

Communiqué de presse

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 suivis et d'informations dans un cadre généralement pluraliste (i.e. Commissions locales d'information, Groupe 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 REVOL, examinera de manière approfondie cette question à partir de sa prochaine réunion ordinaire qui se tiendra le 17 mars 2009.

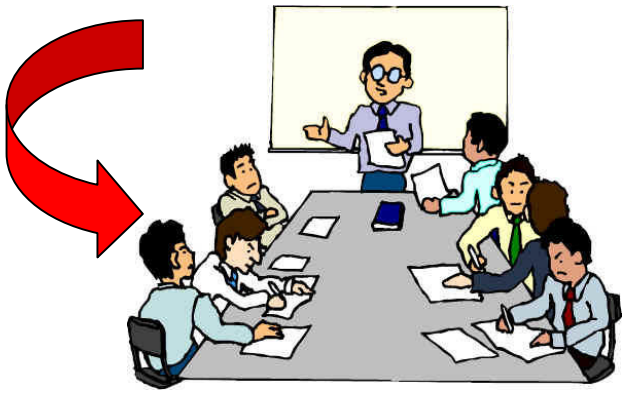
Contact :

Monsieur Stéphane NOEL - ☎ 06.74.16.37.26

Haut comité pour la transparence et l'information sur la sécurité nucléaire
C/o DGPR - Immeuble ATRIUM
5, place des Vins de France
75573 Paris cedex 12

Mail : hctisn@gmail.com
Web : www.hctisn.fr

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)