



Analysis of long term options in the management of closed uranium mining sites in France: *A pluralistic expertise experience*

Y. Marignac, WISE-Paris; Pierre Barbey, ACRO; Olivier Catelinois, InVS; Philippe Crochon, Areva; Michaël Petitfrère, IRSN; Robert Guillaumont

URANIUM MINING LEGACY

Uranium Mining in France

- Started in 1948, ended in 2001 (> 50 years)
- More than 200 sites in 23 mining zones
- 76,000 tons of uranium produced, > 200 Mt of waste rocks
- > 50 million tons of mill tailings on 17 storage sites
- From scattered owner to a major operator (Areva NC)



Uranium mining zones in France

Uranium in Limousin

- Core of this industry, from first mine to last closure
- 40% of French production, 30 sites



Local Context / Crouzille Mining Division

- 24 mining sites (58 Mt waste rocks; 100 ppm)
- 4 mill tailings storage sites (20 Mt; mean Ra226 conc. 30 Bq/g)
- 7 watersheds
- enhanced concentration found in some sediments (up to ~10 Bq/g)
- water collection network (up to ~1Bq/l for Ra226 and 1mg/l for U), water treatment where necessary
- calculated added effective dose close to 1 mSv for some local groups

REMEDIATION AND CONCERNS

Post-Mining Activities

- Closure work completed at most sites
- now monitoring and control plus some water treatment
- issue of (long term) sustainability of the systems implemented



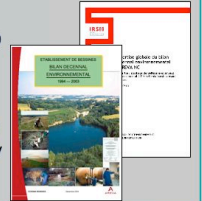
Mill tailings storage site after rehabilitation (MCO 68 - 105, Bellezane)

Local and National Concerns

- Controversies on rehabilitation / local pollution particularly in Limousin
- actions of environmental NGOs and independent counter-assessment of risks
- media coverage and juridical trials opposing NGOs and Areva
- Update of national policy on long term management of radioactive residues and contaminated sites

Pluralist Expertise in a Global Framework

- End of 1990s: guidelines for the long term management of mill tailings
- From 2004: 10-year environmental assessment on Crouzille by Areva and its technical review (mostly by IRSN)
- 2005: commissioning of a national pluralistic expertise group (GEP)
 - End 2005, joint letter by 3 Ministers: Environment, Industry, Health
 - 2007, complementary letter by Ministries of Environment & Industry and Nuclear Safety Authority (ASN)
- Coordination / 2006 Law on radioactive waste management



ROLE AND MEANS OF THE PLURALISTIC EXPERTISE GROUP ON URANIUM MINING SITES IN LIMOUSIN (GEP)

GEP's Comprehensive Commitment (mid 2006-end 2009)

- Contribute to the critical analysis:
 - Discuss Areva's 10-year environmental assessment and monitoring plan
 - Participate in the discussion of orientations of IRSN's technical review
- Help choices with management and monitoring options:
 - Recommendations for the reduction of impacts from mining sites
 - Medium to long term perspectives and options
 - Methodology for extending recommendations to all French sites
- Contribute to the information of local stakeholders and the public

Pluralistic composition

- Around 30 experts gathered in the plenary (~30 more in working groups)
- From various technical fields = pluralism of competencies
- In various positions = pluralism of viewpoints

Public Institutes and Administration	NGOs and independent	Industry	Foreign experts
- IRSN, InVS - Academics - Authorities	- Independent experts - Local NGOs	- Areva NC	- International REX (IAEA) - UK, Switzerland, Belgium, Israel, Luxemburg...
16 experts	5 experts	3 experts	6 experts

Suitable and Effective Means

- Shared animation of groups: IRSN / independent or academics
- Public funding, including for independent / foreign experts work
- Support of external expertise from Areva, IRSN and any other source incl. new recommended ones if needed
- Dialogue with local stakeholders through Local Information Commission(s)
- Openness to / exchange with comparable experiences in other sectors / countries

TRANSFERS TO THE ENVIRONMENT

Rehabilitation Status of Disposal Sites

- Site by site approach - Focus: Bellezane
- Studies:
 - hydraulic characteristics of the site (hydrogeology)
 - monitoring efficiency for waterborne transfers
 - efficiency of the cover for airborne transfers
- Understanding current level of efficiency
Assess future efficiency in various scenarios
- Behaviour of Liquid Discharges
 - Approach by catchment basin - Focus: Ritord
 - Studies:
 - sources of radioactivity added to natural background
 - efficiency of water treatment retaining reservoirs and clay sediment deposition
- Adapt water treatment and target activities to impacts

ENVIRONMENTAL AND HEALTH IMPACTS

Innovative and Adapted Methods

- First application of an innovative method to evaluate impact of radioactive substances on local ecosystems
- Feasibility of quantitative evaluation of radioactive risk other than additional effective dose to reference groups
- Health monitoring: reviewing public health surveillance
- Specific efforts to consider chemical risk

1 Environmental Impact radiological & chemical	Go beyond health impact assessment set forth in regulations to: - adapt to a specific context - respond to existing concerns - characterize the impact in projected conditions
2 Health Impact radiological & chemical	
3 Health monitoring	

REGULATORY ISSUES AND LONG TERM

Consideration for Non-Technical Issues

- Link technical analysis with:
 - Changing priorities in the area of environmental protection
 - Sustainability of rehabilitation works
 - Long term liability (transfer from the operator to the state)
 - Stewardship and stakeholders involvement
- Framework for Long Term Options
 - Legal qualification of the materials and sites
Discuss the most appropriate implementation of the regulatory framework for long-term management
 - Long-term aspects of monitoring
Timescale and scenarios to consider
Move towards less active monitoring and features

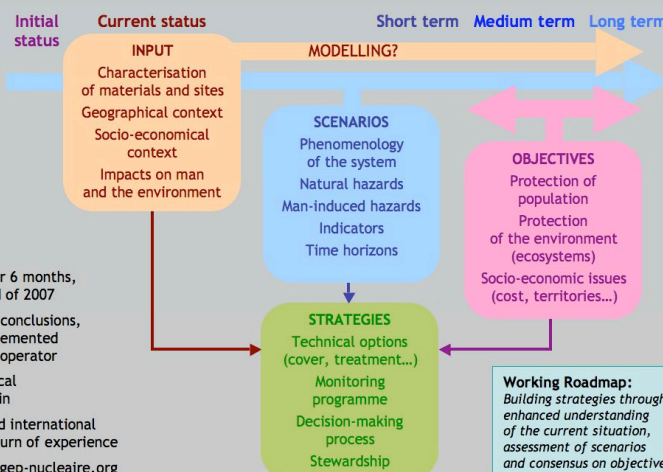
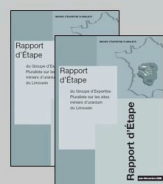
GEP'S WORK IN PROGRESS: INTERIM BALANCE AND NEXT STEPS

Reinforced Initial Priorities

- Rehabilitation status of mill tailings storage/disposal sites
- 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

Demonstrated Operational Status

- Interim deliveries:
 - 1st interim report after 6 months, 2nd interim report end of 2007
 - first specific and local conclusions, recommendations implemented by the authorities and operator
 - started reporting to local commissions in Limousin
 - developed national and international exchanges to share return of experience
 - website on-line: www.gep-nucleaire.org



Evidence of Added Value

- playground for broader technical and scientific dialogue
- enrichment of a multiple approach, enhanced methodology
- interlinking technical and societal analyses to address long term issues

Challenges for Future Work

- Main challenges that remain in view of a final delivery planned end of 2009:
 - extending the detailed analysis to a larger number of sites
 - concluding on innovative studies engaged on key issues (transfer and impact)
 - building from analysis of current situation to assess prospective options
 - deriving a global approach from available site-specific analysis
 - shaping consistency with risk management in other fields (radiation protection, mining industry, etc.)