

THE PLURALISTIC EXPERT GROUP ON URANIUM MINE SITES IN LIMOUSIN, FRANCE

Didier GAY, Yves MARIGNAC, Annie SUGIER¹

Introduction

Growing public awareness of environmental risks as well as new regulations on stakeholder involvement have led authorities in France to set up structures for open dialogue, both at regional and national levels.

In the nuclear domain, local information committees, created for each nuclear site, have seen their position and their role reinforced by the 2006 law on nuclear transparency. Similarly, the 2002 law on technological and industrial risks, adopted following the catastrophic explosion at the AZF chemical plant, also stipulates the creation of such committees for high-risk industries.

Moreover, it has become apparent that on complex technical subjects prone to controversy, authorities should go one step further and create the conditions for a more open examination of the issues by calling on independent experts, who may be opposed to the projects in question, in addition to the government's usual institutional experts. The Comité de la Prévention et de la Précaution which mission is to advise the French minister for the environment was asked to give its opinion on the expert assessment of industrial accident risks. It produced a report which identified the conditions for conducting expertise jointly with the parties involved. According to this report, the most advanced method of joint expertise is the pluralistic approach. The document stated that pluralism involves calling on a variety of disciplines and practitioners, as well as on representatives of various viewpoints, including those of the stakeholders. This approach is well suited to risk assessment, and a benchmark example of its application in France is provided by the Groupe Radioécologie Nord Cotentin (pluralistic group organised in response to the controversy surrounding the reportedly high rate of leukaemia close to the La Hague site).

Against this backdrop, the French ministers for the environment, health, and industry created a pluralistic expert group (GEP) focused on the decommissioned uranium mines in the Limousin region of France. This group brings together experts with varied skills and backgrounds (from institutions, associations and industry, including independent and foreign experts). The French Institute for Radiological Protection and Nuclear Safety or IRSN is the public body for expertise which, upon request from local authorities, performs an overall critical analysis of the 10-year environmental reports produced by AREVA NC, the industrial company currently in charge of managing the French mining sites. The IRSN also oversees the technical secretariat for the Limousin mine GEP and provide inputs to technical discussions.

Background

Uranium mining activities played a role of prime importance in Limousin for many years. Their decline in the 1980s led to the progressive shutdown of the region's mines. This required considerable technical and administrative effort to rehabilitate the sites in accordance with environmental protection and human safety objectives.

The complexity of the process and the multitude of sites involved resulted in divergent analyses of the quality of this rehabilitation. These differences, principally fuelled by measures and studies initiated by local and national

¹ Didier GAY : French Institute for Radiological Protection and Nuclear Safety (IRSN), head of the Geosphere-Related Risk Analysis Department / Environment and Emergency Operations Division - BP 17 – 92262 Fontenay aux Roses Cedex - FRANCE
Yves MARIGNAC : Director of WISE-Paris – 31-33 rue de la colonie – 75013 Paris - FRANCE

Annie SUGIER : IRSN, Advisor of Director General – BP 17 – 92262 Fontenay aux Roses Cedex - FRANCE

associations, led to significant legal and media developments in recent years. It was in this context that French policymakers decided to create a pluralistic expert group or GEP focused on uranium mining sites in the Limousin region. This was announced on 28 June 2006, by a joint press release from the French ministers for ecology and sustainable development, industry, and health. The group was already being set up according to the terms of the mission statement dated 9 November 2005 and addressed to the group's president.

Mission of the GEP

The GEP has been given the task of critically evaluating the technical documents supplied by AREVA NC (Cogema), the mine operator for the Haute-Vienne sites, in particular their 10-year environmental report (BDE), drafted in accordance with the prefectural order dated 13 January 2004. The group's objective is to provide the government and the operator with further information on long-term management and monitoring options for the facilities.

To meet this goal, the GEP is helping direct the overall critical analysis of the BDE assigned to the IRSN. In compliance with the prefectural order of 12 December 2005, this "third-party expertise" involves 24 mine sites identified in the BDE and must answer questions concerning the status of rehabilitation at these sites, health and environmental impacts, monitoring methods, and any reuse of materials from the mining operations.

By helping to lead this effort, the GEP will become familiar with the reports supplied by AREVA NC, provide input on the results of the critical analysis performed by the IRSN, and validate or even influence the final conclusions and recommendations. In the follow-up to the third-party expertise, the GEP will be able to offer a framework for certain complementary efforts, the need for which will be determined by the conclusions.

Furthermore, the GEP must formulate recommendations aimed at reducing the impact of mine sites on the surrounding populations and the environment. The group must also make proposals for managing the sites on a more or less long-term basis, especially by comparison with similar industries or efforts abroad. These recommendations are mainly aimed at the central government entities which authorised the group, but also at local authorities (prefect and DRIRE²), which provide regulatory oversight for the facilities in question.

Finally, it will contribute to informing local actors and the public. One of the GEP's key priorities will be presenting its results on a regular basis to the local information and monitoring committee currently being organised, which will be instrumental to the local dimension of the group's mission.

GEP makeup and approach

The GEP is composed of more than 20 experts with diverse backgrounds, including independent experts as well as those from institutions in France and abroad, associations and industry groups. The GEP can expand its competencies in earth science, environmental science and radiological protection as needed by calling on other experts in specialised workgroups focused on specific themes. Three workgroups, jointly led by an IRSN expert and an outside expert, have been created to address the following areas: releases and transfers to the environment (GT 1), environmental and health impacts (GT 2) and the regulatory framework together with long-term issues (GT 3).

The GEP works on two levels. It plays a critical role in the IRSN's expertise by providing feedback throughout the development of analyses and by initiating investigations as early as possible on themes relevant to its mission and not addressed by the third-party expert. The GEP produces its own documents to report on its work.

² Translator's note: Regional authority for industry, research and the environment

Given the important role played by the prefect and the DRIRE at the local level in defining and updating the prescriptions applicable to the facilities and in monitoring the sites, the GEP has taken the initiative of bringing together the various authorities by inviting them to participate as observers in their meetings and by sending them copies of important correspondence and technical documents as well as the interim report. Central government entities have also been invited to participate.

Choosing priorities and coordinating with the third-party expert

The GEP decided it should demonstrate its capacity to produce opinions and recommendations as early as its first semester of operation.

According to the priorities identified by the third-party expert within the scope of the prefectural order establishing third-party expertise, the GEP selected the following priority themes at its first meeting on 29 June 2006:

- Rehabilitation status of various disposal sites for tailings from ore processing. These tailings contain most of the radioactive substances extracted during operations to isolate uranium from the ore. Furthermore, in terms of radioactive toxicity, crushed rock is more leachable than solid rock. The Bellezane site was the first examined.
- Environmental impacts, primarily related to liquid releases of all sorts, which may be responsible for the principal manifestations in the environment, and the relevance of the actions the mine operator has taken or plans to take. The priority areas are catchments basins, which correspond to the most considerable releases and locally enhanced radioactive concentrations: the Ritord basin was the first to be examined.

In parallel, the GEP has initiated investigations on other themes defined in the prefectural order of 12 December 2005: health impacts, site monitoring, and potential reuse of any materials outside the mine sites. It is also examining complementary themes that it considers pertinent to its mission: a broader approach to health and environmental monitoring, the regulatory framework, and long-term issues.

Work related to the source term and releases or transfers to the natural environment

2006 saw progress in the analysis of two priority areas: the Bellezane disposal site and the Ritord catchment basin.

▪ Bellezane tailing disposal site

Given the long half-life of the radioactive products they contain, tailings from uranium ore processing require long-term management. At the Bellezane site, the operator's solution consisted of converting the two open-pit mines, known as MCO 68 – 105, into disposal vaults. This long-term management approach is not based on containment of the mining residues, but rather on the site's capacity to guarantee long-term control of releases and transfers of radioactivity. This approach must be evaluated in terms of waterborne and airborne transfers. This requires considering the site's hydraulic characteristics and the efficiency of its drainage system, for transfers via water, and the efficiency of covering materials used to reduce radon emanation and exposure to gamma radiation, for transfers via the air.

➤ Hydraulic characteristics of the site:

The GEP believes that the site's configuration and organisation are globally conducive to controlling the water circulating in the system. Despite the near impermeability of the deep granitic body overall, the existence of leaks cannot be completely ruled out. These postulated leaks, potentially responsible for observed environmental impacts, are estimated by models as being relatively insignificant, but it is impossible to assess them directly.

This situation justifies an additional effort to understand the hydraulic characteristics of the site and the efficiency of its drainage system. Consequently, the GEP is developing recommendations in this area, especially regarding the installation of new piezometers at different points in the system.

➤ *Monitoring efficiency for waterborne transfers:*

The GEP believes that the site's geochemistry should be mapped out, and that the observed environmental impacts on water should be correlated with the different natural and anthropogenic origins; potential sources of diffuse chemical and radiological substances should also be identified. The GEP therefore recommends undertaking a geochemical study to better understand the system. The results will make it possible to improve the site's environmental monitoring system if necessary and will provide validated hydraulic and hydrochemical models, which are useful for evaluating the site's long-term outlook.

➤ *Efficiency of cover for airborne transfers:*

While the GEP feels that disposal and cover design essentially meet the rehabilitation objectives, few data are available on the characteristics of the waste rock once it is laid over the disposal area, and the GEP believes this material may present a large degree of heterogeneity. The GEP therefore recommends that AREVA NC define an additional programme to characterise the covering material. This programme should focus on producing a detailed map of dose rates for the site, or on expanding the use of the existing radiation detector maps³. The group also emphasises the importance of evaluating the cover's sustainability and efficiency relative to the risk of long-term exposure. Such an assessment should account for the cover's current thickness and the degree of incline at various site locations.

▪ **Ritord catchment basin**

The Ritord catchment basin has been affected by considerable mining activities, in the form of open-pit mines and/or underground operations, the environmental impact of which is primarily waterborne. This impact is reinforced by the existence of retaining reservoirs and the associated mechanisms of clay sediment deposition due to a slowing of natural flows. Areas of investigation include the sources of radioactivity added to the natural environment, water treatment, the impact of releases after treatment, and manifestations in the sediments.

➤ *Sources of radioactivity and water treatment:*

Concurring with the operator in its BDE and the IRSN in its third-party expertise, the GEP believes that the primary source of anthropogenic radioactivity ("source term") in the Ritord catchment basin is the Fanay Augères water treatment station, where the volume of water has increased due to past improvements to protect the reservoirs providing water to the city of Limoges. These observations led the GEP to draw attention to the water treatment issue. The GEP emphasises the need to adapt water treatment to the types of impact observed downstream, to align detection limits of the measurement systems to measurement objectives and to target activity values as allowed by available techniques, and to analyse the effects of changes made to treatment since 2001 to limit the mass of uranium released.

➤ *Impact on the Ritord creek:*

The GEP notes that the activities measured are low, but that the reference zones selected to represent the natural background (no impact from mining activities) are in fact influenced by earlier mining operations. The group is drafting recommendations on the need for additional measurement points and on the choice of references for the natural environment, which should target zones unaffected by the mine sites and representative of comparable geological contexts.

³ This recommendation should be confirmed with regard to analyzing the site's surface radioactivity map prepared by AREVA NC.

➤ *Observed sedimentary impact:*

The aggregation and precipitation of suspended matter in Lac Saint-Pardoux, a reservoir with low hydraulic energy, has produced locally enhanced radioactive concentrations in sediments. According to the GEP's recommendations, the evaluation of a solution to improve the sedimentation by adding another settling basin should include an in-depth verification of the system's efficiency and environmental impact. In particular, this would require characterising and assessing the process leading to the sedimentary impact observed.

Work related to health and environmental impacts

The first step of the analysis consisted of listing and prioritising the themes to assess. The GEP decided to go beyond the health and environmental impact assessment set forth in the regulations and focuses on new methods in these areas. The GEP therefore considered a study commissioned by AREVA NC which focused on radioactivity concentrations in Lac Saint-Pardoux and their effect on certain fish populations, and on the chemical component of the substances in question. Moreover, the GEP esteemed that the entire analysis process should account for the impacts of radioactive and chemical releases.

➤ *Environmental impact:*

The GEP is giving priority to the proposal from the third-party expert to use an innovative method in the Ritord catchment basin to evaluate the impact of radioactive substances. This method is based on a European research project to which the IRSN gave a strong contribution. Parallel to the group's review of this proposal, the list of chemical substances related to mine site activities is being drawn up, and the associated impact will be evaluated conjointly with INERIS [Institut National de l'Environnement Industriel et des Risques].

➤ *Human impact:*

The GEP is examining the application of the regulatory approach adopted by the operator. This approach involves determining additional effective doses received by those population groups most likely to be exposed ("reference" groups). At this stage, the third-party expertise has not sufficiently addressed this subject to serve as the only basis for the group's analysis, which is mainly focused on a methodological discussion in preparation for obtaining and interpreting future results. Hence, the relevance and feasibility of a quantitative evaluation of health impacts is being considered; an indicator of exposure other than the additional effective dose may be used.

➤ *Health monitoring:*

Drawing on the competencies of the InVS [the French health monitoring institute] the GEP is reviewing public health surveillance. This involves verifying that local and national registers for collecting personal data on potentially relevant pathologies have been identified. Based on current knowledge, the InVS has recommended focusing analysis at this point on malignant pathologies such as lung cancer and leukaemia. Literature monitoring could be implemented to identify potential links between exposure to uranium and its progeny, and other pathologies (whether malignant or not).

Work related to the regulatory framework and long-term issues

The changing priorities in the area of environmental protection as well as the long-term questions on the sustainability of rehabilitation efforts and the move towards less monitoring all justify conducting an in-depth analysis. The GEP makes a specific contribution to these issues. First of all, the regulatory and long-term issues are not part of the objectives set in the BDE requested from AREVA NC, and are thus not expressly addressed in this document, nor in the third-party expertise provided by the IRSN. Secondly, this analysis concerns both technical questions, which are fundamental to the GEP's approach, and socioeconomic questions. The GEP must

therefore mobilise the skills necessary to answer these questions and address the concerns of public authorities (local and national) and local populations.

During this first phase, the priority themes were identified as well as the available analyses and feedback; an approach was also selected to define a work programme for the coming months.

▪ **Priority themes:**

The initial information collected, especially from the public reports on this issue, has made it possible to identify eight themes related either to organisational aspects (duties, memory) or to more operational aspects (monitoring systems, unknown factors). In the coming months, priority has been given to three themes: legal qualification of the materials and sites, identification of potential future outcomes at the sites, and identification of the associated active and passive monitoring systems. The other themes to be addressed include responsibility for and conservation of site memories, long-term funding of monitoring, involvement of and control exercised by stakeholders, and health and environmental impacts (linked to the work of other groups).

➤ *Legal qualification of the materials and sites:*

The GEP emphasises the need to clarify the legal nature of the sites and materials relative to the various applicable laws, with a view to the most appropriate implementation of the regulatory framework associated with long-term monitoring. To enrich its analysis in this area, the GEP has decided to invite a series of legal specialists in this field to provide their input. In preparation for these sessions, the GEP is highlighting the fundamental difference between this open and forward-looking dialogue, and the legal proceedings which opposed Sources et Rivières du Limousin and AREVA NC.

➤ *Long-term aspects of monitoring:*

In this domain, there is an important corpus of French and international policy documents on which the GEP plans to base its analysis. French policy on rehabilitating disposal sites for mine tailings will be compared with that of other disposal sites, in order to arrive at a more global understanding of the long-term monitoring approach and the potential solutions. International feedback collected and analysed by the International Atomic Energy Agency (IAEA) will be presented to the GEP by one of the agency's experts. A more in-depth analysis of the solutions implemented in two neighbouring countries – Germany and Spain – will be the object of two missions, in which members of various workgroups will participate.