

EXECUTIVE SUMMARY

REPORT N°1 - June 1995

I - WORK APPRAISAL OF THE NATIONAL ASSESSMENT COMMITTEE

Created in January 1994, set up in April 1994, the National Assessment Committee heard successively :

- * the Committee for the follow-up fuel cycle closing research
- * the ANDRA
- * the CEA
- * the IPSN
- * the COGEMA
- * the EDF
- * the CNRS/IN2P3

After examining the documents handed over by these organisms and after having heard various presentations, the National Assessment Committee was able to write its first assessment report which was sent to the government on June 30th 1995.

This assessment covers the three research areas as defined by law.

II - FIRST OBSERVATION

The Committee has heard the main research organisms within the scope of its evaluation, but it has not been able to hear some of the subcontractors who come into the picture either for field investigations or for some aspects of the scientific research. It is clear from the first hearings that the links between the actors are many and complex, this being the case for the financing as well as for the implementation of the studies. Moreover, the actors' involvement in the different areas varies.

The Committee highly stresses the need for a scientific and technical coordination of all the organisms so that all the fields of research should be openly and coherently dealt with. This means among other things that schedules and specifications should be compatible with each others and with the 15 year time limit set by the December 30th 1991 law.

The Committee wishes to be explained these points in order to include this particular aspect in the evaluation which will be done in the next report and, if necessary, to make the relevant recommendations.

The documents and the documented talks given to the Committee show that research started or continued as soon as the law was promulgated, and that some results are already available. However the Committee noticed that the research schedule and more particularly the one concerning underground laboratories, is very tight. Consequently, the Committee wishes on one hand to be regularly informed on the research schedules, and on the other hand to be regularly given the pluriannual plans as well as their updates.

As for the waste inventory coming under the December 30th 1991 law and the knowledge of their radioactive and physico-chemical characteristics, the Committee wishes an update to be regularly done so that the most realistic forecasts for the next 30 years could take into account all types of waste to be deposited and stored.

III - RECOMMENDATIONS ON THE GENERAL WASTE DISPOSAL STRATEGIES

The Committee has been thinking on one hand, on the finality of waste disposal coming under the December 30th 1991 law and on the other hand, on the general strategies to be implemented in France, after having been informed of the foreign strategies. This consideration led the Committee to formulate recommendations of a strategic nature covering the three research areas of the law. (Article 4).

From a general point of view, the Committee stresses the interest of a global strategic plan from which it would be gradually possible, thanks to the progress of knowledge and safety and technical feasibility studies, to provide a number of important clarifications. Through repeated actions, it would be particularly useful to refine a strategy which would be for each area the best compromise between the desired objectives and the real implementation possibilities. To achieve this, a global strategic thinking will have to be constantly maintained, and be a source of discussions between the various technical and scientific actors as well as the statutory or political authorities. The mission of assessment entrusted to the Committee must contribute towards the progress and the refining of this strategic thinking. In the process, some important points could be clarified, namely concerning :

- * for the first area, establishing a hierarchy among the radionuclides to be considered and setting quantified objectives for the separation and the transmutation of actinides,

- * for the second area, the durations to be taken into account for the concept of storage, namely those concerning the desired integrity of the various engineered and geological barriers, as well as the duration and the motivations concerning storage reversibility,
- * for the third area, the clarification of the expression "long-term" applied to interim disposal in the text of the law, as well as taking into account a widened disposal strategy, in particular, considering the storage prospects of irradiated fuel.

At this point, the Committee stresses the need for repetitive safety assessment studies for the envisaged sites, specifying, from the potential risks attached to the waste, the real risks resulting from the geological disposal of this waste.

Finally, the Committee noted the lack of studies on socio-political aspects among the presentations given until now. The information parameter and the public participation to the debate on radioactive waste are important and justify the wish of the Committee to be informed on this point.

IV - SPECIFIC RECOMMENDATIONS FOR EACH RESEARCH AREA

The documents given and the talks presented by the organisms during the hearings enabled the Committee to assess the scope of the research already initiated and the research planned. For each research area, some recommendations are formulated. In order for the objectives set by law to be reached and for the coherence of the research to be ensured in the different areas, a few specific recommendations are also presented in the conclusion of this report.

Area 1 : The Committee recommends to the actors of the research to place the entire work in the context of the two strategies explained by the Committee, knowingly :

- ◆ the separation - transmutation strategy (S-T)
- ◆ the separation - conditioning strategy (S-C)

Concerning the advanced chemical separation, which is a factor common to the two S-C and S-T strategies, the priority must be put on the separation of americium and curium from lanthanides, then americium and curium for the first of these strategies.

For the second strategy, the effort mainly concerns some long life fission products, namely those with which transmutation appears very difficult like Cesium, as well as separated actinides. The separation of technetium, which may be processed according to either strategies, is also recommended.

As for transmutation, the Committee recommends to carefully define short and middle term options which concern industrial systems or systems being industrialized, such as fast reactors or future reactors, and longer term options which are based on all the innovative systems under consideration.

Talking about short and middle term options, the Committee believes that waste production should be reduced, as far as possible, that plutonium production should be modulated according to needs and that performances of actinide recycling should be improved, namely in water reactors.

Long term options concern systems such as transmutation-dedicated reactors or accelerator-assisted systems, which require an important effort in fundamental and applied research and in development. Also the Committee recommends to carefully identify the various technical options, including an assessment (advantages - disadvantages), and a technical feasibility study (performances, waste production, combined cycle operations, operability, costs, industrialisation). Before this, a more important and fundamental effort in research should be made in many fields such as nuclear data, simulation models and tools, high intensity accelerators, materials.

The Committee wishes that the various concerned actors of the research, mainly the CEA and the CNRS, more particularly on all the assessments and research related to these long term options, privilege cooperation among themselves, and that appropriate means be granted.

Area 2 : The Committee unanimously considers that the planning presented by the ANDRA to fulfill its mission is very tight. It wishes to be informed on the influence of various hazards on the provisional schedule and to receive in good time the necessary documents in order to give its opinion.

The Committee advises the ANDRA to pay particular attention to the following points that seem important to its members and to take the relevant actions :

- ♦ setting objectives and priorities to the subcontractors to ensure the coherence of the schedules and specifications,
- ♦ establishing and presenting the experimental programmes to be realized in the future underground laboratories, according to the progress of their realization,
- ♦ establishing basic data for barriers, particularly for engineered barriers and packages,
- ♦ fundamental studies concerning water geochemistry, geoprospective, paleocirculations and the transfer pathways of radionuclides to the biosphere,

- ♦ repeated and integrated studies for safety assessment taking into account the results of on-site investigations as soon as they are acquired. As it has already been stressed, these studies are essential for a global strategy definition.

Area 3 : The Committee formulated recommendations on the five following areas :

- ♦ for the matrices and the confinement materials, the pursuit of research on glass (for the new types of waste stemming from the evolution of reprocessing) and their long term behaviour, must be a priority. Long term behaviour studies of the other matrices (bitumen, hydraulic binder) must however be pursued and widened. Research on mineral matrices (ceramics, minerals known for their stability on geological time scale) must also benefit from an increased effort to reach rational choices. Finally, a test harmonization allowing matrix and confinement material intercomparisons must be developed,
- ♦ for the waste stored loose, the decisions concerning the future of this waste must be taken separately according to the type of waste and the conditions of its present disposal. A detailed examination will have to be carried out for each disposal technique taking into account long term perspectives and acceptance criterias from the ANDRA for the final packages before taking any decision motivated by short term safety,
- ♦ for the B type waste packages, works on high performance and high integrity containers must be continued. Interfaces waste/containers, and containers/environment will have to be studied with particular care. Studies relative to old waste, particularly those of the B type, and those relative to the whole of advanced reprocessing processes will have to be coherent and concrete and lead to specified packages as compatible with the storage concept,
- ♦ for the interim storage in the reprocessing option, the quality of old waste confinement must be privileged. The development of new "long term" interim storage will have to be presented to the Committee as soon as possible and include : duration, safety options and required specifications for the packages,
- ♦ as for interim storage in the direct storage option, the scenarios, the options, the study schedules will have to be presented to the Committee as soon as the strategic options on reprocessing or non-reprocessing will be proposed by EDF and COGEMA.