

SUMMARY AND MAIN RECOMMENDATIONS

REPORT N°2 - June 1996

I - 1995-1996 APPRAISAL OF THE NATIONAL ASSESSMENT COMMITTEE

Since the publication of the first report in June 1995, the National Assessment Committee has continued auditing the actors of the law and their main sub-contractors. Thus, it has spent nine sessions to assess recent work by the ANDRA, the CEA, the COGEMA and the EDF. Besides, it has heard the DSIN and the IPSN for the choice of the sites and the safety analyses, and finally all the actors of the law concerning their 1996-2006 programmes required by the December 27th 1995 ministerial letter.

After examining the documents presented by these organisms, and after auditing, the Committee spent seven sessions to write the assessment report number 2.

The present report was sent to the Government on June 25th 1996, then presented to the ministerial Cabinets on June 27th 1996.

The assessment covers the three research areas defined by law.

II - GENERAL OBSERVATION

The sites

1996 has seen the first event planned on the ANDRA schedule. After being advised by the Management of Nuclear Installations Safety (DSIN) on April 10th 1996, the Conseil des Ministres (Counsel of Ministers) authorized the ANDRA on May 13th 1996 to bring in the request of building and operating authorizations for underground laboratories (DAIE) for the sites which have been subjected to geological survey investigations.

The Committee has examined all the technical dossiers and the synthesis of the criterias established by the ANDRA for each site. It has evaluated the entire work carried out on the three sites which are candidates for the building of an underground laboratory. In this occasion, it stresses the importance of geological survey work which has been carried out by the ANDRA, in accordance with the set schedule.

At the present stage of investigation, the Committee estimates that the site situated to the East of the Parisian Basin complies with the criterias determined for the building of an underground laboratory. The necessary exploration work possible from the surface has been satisfactorily carried out and interpreted by the ANDRA : the results are positive. Therefore the Committee recommends the building of an underground laboratory on this site.

The two other sites, Vienne and Gard, which have a more complex geology, are creating problems which can be solved first by taking complementary measurements from the surface or by modelling, then possibly by the realization of an underground laboratory. The Committee could voice its opinion on a possible choice between these last two sites only after having read the results of complementary surface studies.

In the case where the complementary data collected by the ANDRA on the Chapelle Bâton site in the Vienne Department would not lead to a favorable scientific advice for the building and operating authorization of an underground laboratory on this site, the Committee recommends that the consequences of possibly giving up a granitic site should be evaluated against the strategies which will be retained (possible storage in its original state of irradiated waste, 50 or 100 year retrievability...). Some difficulties could be removed if the granite showed on the surface (absence of aquifers in the sedimentation, better knowledge of the crystallin rock roof mapping).

The Committee would like the ANDRA to carry out the complementary measurements and the modelling according to the recommendations it was given.

Strategy

Following the ministerial letter dated December 27th 1995, confirming the pilot mission of the ANDRA (area 2) and of the CEA (area 1 and 3) and asking them to set up a programme-plan which would take into account the scientific recommendations in the National Assessment Committee first report, a programme-plan, established by the actors of the law and covering the 1996-2006 period, has effectively been presented to the Committee.

The Committee considers that this programme, even if it fulfills the request for coherence within an area and between the areas of the law, does not answer the request for the global strategy which had been required. This strategy cannot simply amount to a coordination structure and a schedule. Consequently, the Committee strongly repeats its report n°1 recommendation on the need to elaborate a strategic plan. In this respect, it particularly recommends the setting up as early as 1996 of a global strategic thinking body of research with all the actors of the law*, including the industrial operators, and taking into account all the objectives of the law; it also wishes all the coordination levels to be set up as soon as possible, and their missions to be clarified as well as the missions of the combined research groups.

* CEA-ANDRA-CNRS-EDF-COGEMA-FRAMATOME in agreement with the public authorities

The Committee also notes that the programme presented by the actors of the law does not clearly covers all the objectives of the law but that it focuses mainly on "the needs expressed by the producers". Without denying the importance of the industrial transfer of research, which it feels is essential indeed, the Committee considers :

- * that this research must faithfully answer the spirit of the law,
- * that the whole scientific area planned by law should be covered.

The political and social acceptance to build underground laboratories could not be considered as positively acquired if the "contract" of the law was not fulfilled.

The Committee read many documents written by the actors involved in the research covering the three areas of the law; these documents are well structured and sometimes present ambitious programmes. However the Committee recommends to the actors of the law to give information on the number of people involved in the programmes and on the budgets they have at their disposal, and to also mention the possible difficulties in the achievement of these programmes, particularly regarding the observance of the provisional schedule.

Besides, the Committee encourages the publication of the results of the scientific research, which in some cases reaches high quality levels, in the relevant international journals and newspapers.

III - RECOMMENDATIONS ON WASTE DISPOSAL

After EDF had presented material flows in the fuel cycle and the publication of this information in the report by the parliamentary office for the assessment of scientific and technological choices, written by Mr. BATAILLE (March 20th 1996), the Commission recommends that EDF explains the solutions it is thinking to implement for long term disposal of the fuel which is not reprocessed at present, as well as the research effort dealing with disposal and packaging; it is also pondering over the future in store for these fuels stocked for long periods of time.

As for plutonium recycling, the Committee noted a few differences in viewpoints between the COGEMA and the EDF. It wishes to be enlightened on the recycling possibilities and the constraints of any nature that this would imply, particularly in terms of high activity and long life waste management. It also wishes to know the characteristics and the status of the uraniums stemming from reprocessing and a possible recycling.

The Committee insists that the three components : separation - transmutation - conditioning (of separate elements) be not treated independently but in the context of two strategies separation-transmutation (S-T) and separation-conditioning (S-C).

As for the incineration of minor actinides, the Committee recommends that the feasibility could be established from the pressurized water reactors composing the current reactor fleet.

IV - RECOMMENDATIONS FOR THE RESEARCH AREAS OF THE LAW

Area 1 : Separation-transmutation

The Committee formally records the positive answers provided by the CEA and the EDF to the demands that it formulated on the plutonium recycling possibilities. However it recommends that detailed assessments on the current reactors as well as the EPR European Reactor project (European Pressurized Reactor) be presented to the Committee, including also sensitivity studies and taking into account the industrial possibilities and the safety constraints.

In terms of innovative research, it records the common initiative CEA-CNRS-EDF which led to the creation of a Research Group for waste management by new options (Gestion des Déchets par les Options Nouvelles : GEDEON).

The preliminary assessment by the scientific Committee in charge of assessing the capacities of Superphenix as a research tool, created on September 11th 1995 and chaired by Professor Raimond CASTAING, was presented to the Committee; the important conclusion of this Committee is the wish not to limit this researched knowledge to one objective only of qualification of this particular reactor, but to give it as far as possible a more general scope. This Committee handed in its report to the ministers at the end of June 1996.

As for the separation studies, the Committee recalled the great importance it gives to the hierarchical organization of the radionuclides and to the Separation-Transmutation and Separation-Conditioning strategies. It noted with interest the progress made in the actinides separation studies, DIAMEX process, and in the separation of the americium according to the promising SESAME process. It hoped that the research teams working on these areas would soon be able to use the ATALANTE facilities. Generally speaking, the Committee encouraged the CEA to continue researching on separative techniques in chemistry in a willful and coordinated way between fundamental and operational - even prospective - research, in other words based on modelling.

Area 2 : deep geological storage

The diversity of the research in this area, some of it requiring long experiments, implies a unity of programming, coordination and training. In this respect, the "near field" project which the Committee recognizes as being important, must be a place where results converge and the stimulator for future research. The Committee recommends that this project be well structured on a decisional level.

The Committee would like to be presented by the ANDRA the research programmes that it intends to implement in the underground laboratories. It also would like the data specific to these sites concerning geochemistry, hydrology, mechanics and transfer pathways to be collected in coherence with the parameters that seem to be the most sensitive at the time of the preliminary safety analyses on these sites.

Finally, concerning the possible radiological impact of the storage on the sites and in connection with methodological studies, it is necessary to develop research on the solubility and retention of long life radionuclide such as iodine and cesium, in order to clarify the objectives to be reached in terms of conditioning, engineered barrier and geological barrier performances.

Concerning safety analyses, the Committee has noted ANDRA's preliminary studies; nevertheless it is renewing its recommendation from its first report for the need and importance of integrated safety assessment studies taking into account data specific to each site in a given storage concept. It considers it is important that the role of the IPSN be clarified in the research strategy written in the law and that this role appear in the programme-plan.

Area 3 : Conditioning and interim storage

First, ANDRA must establish before the end of 1996 preliminary specification for the packages that have to be stored.

Concerning the packages, the Committee takes note of the important improvements which have been realized in the studies on the long term behaviour of the matrices presently used.

As for the glass matrix, the Committee recommends to favour the prospective modelling of its alteration by leaching (PREVIDER code) particularly by measuring silicium diffusion in gel. It also recommends to ensure that the availability of the teams working on the long term future of nuclear glasses is maintained.

As for hydraulic binders, studies on reactive powder-based materials have been developed indeed and must be continued.

As for bitumen, studies about long term characteristics have been progressing and must also be continued.

The studies conducted on new matrices must be maintained at a high level and integrated into the separation-conditioning strategy.

In the sector of metallic materials that could be used for the manufacturing of containers, research should be more intense and better integrated into area 3.

In the field of spent fuel leaching, the Committee would like to be presented with the current acquired knowledge and facts as soon as possible.

Concerning old sludge retrieval, the Committee recommends to examine any innovative process aiming at keeping on line with the orientations of the law and favouring long term behaviour.

Reflexions on waste interim storage have begun. The Committee supports the growing number of studies undertaken on long term interim storage.

It hopes to be rapidly informed on the content of these reflexions and on the fuel direct storage programme.