Joint Convention
on the safety of spent fuel management
and on the safety of radioactive waste management

France's answers
to questions and comments received from
other Contracting Parties
on its second report for the JC

Section A – Introduction

QA.1	General § A.2.1 p. 7 Section A.2.1 General observations on factors of special interest In light of the general observations made on the report presented to the first review meeting has France changed, or plans to change, any operational/regulatory/legislative policies/procedures/practices?

Answer:
Two projects are at present subjected by the Parliament :

- The first is the law on Nuclear Security and Transparency. The nuclear security covers the security of the populations, the protection against malicious actions, the nuclear safety. The text suggests to transform the interministerial departments of the nuclear safety authority into an independent administrative authority with competence in radiation protection. The text intends also to require the transparency to contribute to public information.

- The second is the law on Nuclear Waste Management.

QA.2	General § A.3 p. 10 Section A.3. Main changes since France's first report With regard to the IAEA TranSAS (Transport Safety Appraisal Service) mission, can France supply details of the status of implementing the recommendations made in the mission report

Answer:
France has asked for a full scale IRRT including the transport activities scheduled in November 2006. This would be the first follow-up to a TranSAS mission. Two recommendations concern a formalisation of practices and the process is underway. The last recommendation concerns the non-competent authority approved packages. DGSNR increased the number of inspections on this subject and asks the owners to explain what kind of packages they use and who are the manufactures. The certificate of conformity must become mandatory in the regulations, otherwise progress could be only very limited.

Section B – Policies and practices - Article 32-1:

QB.32.1	Art. 32-1 § B.1 p. 11 Section B.1 says that out of the 1,150 tons is unloaded from the reactors and about 850 tons of fuel is reprocessed annually with the plutonium being recycled in the form of about 100 tons of MOX fuel. Is spent MOX fuel reprocessed? What is your policy for recycling of spent MOX fuel?

Answer:
Like UO2 spent fuel, MOX spent fuel is unloaded from EDF NPPs and stored, after a first cooling period, in the La Hague installations waiting for cooling and reprocessing. The quantities of UO2 and MOX spent fuel in NPPs fuel buildings and at La Hague are respectively 11200 tons and 805 tons (end of 2005).

Actually current contracts' conditions between EDF and COGEMA provide for an annual flow around 850 tons. Priority is given to UO2 fuel reprocessing, in order to optimise the total

quantity of spent fuel (volume reduction) and the quality of separated plutonium for MOX recycling in existing PWR.

For MOX spent fuel, which contains concentrated plutonium as a potential energy resource, the option would be to reprocess this fuel in order to reuse the plutonium in future advanced fast reactors GEN4, in line with future energy needs and resources. As such, this policy keeps open the option in the coming decades and depending on the energy context, of eventually using the potential energy resource contained in the spent fuel assemblies and in particular the plutonium concentrated in spent MOX fuels, which can be reused to start the GEN4 future fast reactors.

QB.32.2	Art. 32-1 § B.1 p. 11 France has chosen the reprocessing option for its spent fuel. The plutonium separated from the spent fuel is used for MOX fuel fabrication and recycled in reactors. What are the policy and the practice regarding the reprocessing of spent MOX fuel?

Answer:

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QB.32.3	Art. 32-1 § B.1 p. 11 Reprocessing leads to the separation of the spent fuel constituents: 4% in weight is high level waste (fission products and minor actinides) which is vitrified, 1% is plutonium which is recycled as MOX fuel, and the rest (95%) is slightly enriched reprocessing uranium. What are the policy and the practice regarding the use of reprocessing uranium? Is it foreseen for the fabrication of fuel elements for light water reactors? Has reprocessing uranium already been recycled in this way? If yes, in what quantities compared with the amounts separated from reprocessing?

Answer:

Today the reprocessed uranium is reused "for a part" of the total (between 20 to 40% of the total). Each year, about 800t of reprocessed uranium, still slightly enriched, is separated. After re-enrichment up to 4% U235 (equivalent to UO2 3.7%), reprocessed uranium fuel (REPU fuel) is used today on two 900 PWR NPPs, Cruas 3 and 4 (equipped with additional control rods), which amounts to one or two reloads of 40 fuel assemblies per year (2 reloads per year, or roughly 35HMt enriched REPU). This corresponds to a quantity of about 140 tons to 280 tons of reprocessed uranium per year, which is reused. Extension of the use of reprocessed uranium will depend on economic analysis and natural uranium market value. The remaining quantity of reprocessed uranium is oxidised and stored (U_3O_8) as a strategic uranium resource stockpile for future energy needs. Current perspective about natural uranium market is strengthening the economy of using REPU fuel.

QB.32.4	Art. 32-1 § B.1 p. 12 In several countries nuclear expansion depends on deciding on a final solution for the long-term disposal of spent fuel. France, however plans to continue its nuclear program, (EPR, reactors of the 4th generation, ITER), and examines at the same time different scenarios concerning spent fuel management practices. These scenarios include recycling and reuse of spent fuel in future reactors, which are technologies that still need to be developed. Please discuss if this practice does not possibly represent an antagonism with the principle of avoiding an undue burden on future generations?

Answer:

As already presented, spent fuel is currently reprocessed and the corresponding cost for reprocessing and future high level waste disposal is taken into account in the financial provisions. As a consequence, high-level waste is conditioned in glass canisters, which enable to bring a long-term confinement and to optimise the storage and future disposal of such waste. In doing so, the necessary steps are taken today so that the high level waste is duly confined for long term storage or future disposal.

As mentioned above, the MOX spent fuel will be reprocessed so as to reuse the plutonium in future fast reactors in line with future energy needs. The possibility of reprocessing MOX spent fuel has been validated. The technology for such fast reactors has already been experienced, even if studies still have to be developed for the future. In such a way, the option for future nuclear development is kept open for future generations.

On the other hand, the disposal of such MOX spent fuel has also been studied, to take into account the hypothesis that such option for future reactors was to be abandoned.

QB.32.5	Art. 32-1 § B.2.1 p. 13 The future HLW management strategy is to be discussed and decided on in the French Parliament in 2006. The Parliament's decision is expected to have significant impacts on the time schedules for HLW and nuclear spent fuel interim storage and disposal. Consequently it cannot be excluded that HLW and spent nuclear fuel will have to be stored for longer time periods, e. g. for several decades. The French report says that current facilities are able to accommodate long-term spent fuel management. To what time periods does this statement apply? Are there already any concrete plans concerning the long-term storage of HLW and spent nuclear fuel?

Answer:

Generally speaking, the long term storage could be performed either by storing HLW or spent fuel in facilities that have been usually designed for 50 years (once the safety criteria are not met anymore, a new facility is built) or by storing HLW or spent fuel in a facility that has been designed for several centuries (from 1 to 3 according to CEA's research related to the third line of research defined by article L.542 of the Environment Code). Presently, only the first case applies in France. The parliament will decide in 2006 whether the research related to long-term storage in facility designed for several centuries should be continued.

The spent fuel is stored in cooling pools, for future reprocessing. The glass canister containing high level waste are currently stored for decades in order to be disposed of in the future. The studies engaged in France for disposal in geological clay layer have shown that a cooling period of about 60 years will enable to respect the temperature conditions for such a future disposal. The possibility to extend the existing storage facilities when necessary and to operate such facilities for decades has been studied and validated by the operators.

QB.32.6	Art. 32-1 § B.2.1 p. 13 It is indicated that "Current spent fuel packaging studies also cover the transitional phases between the various options : industrial storage, reprocessing, long term storage, disposal. "Could you explain a little in detail about "spent fuel packaging studies."

Answer:
As mentioned in the report, the EDF industrial strategy is based on reprocessing of all the spent fuel unloaded. Nevertheless, studies have been made in the framework of the line 3 of the 1991 law, in the hypothesis of a long term dry storage of spent fuel followed by future disposal. Such studies have lead to the development of storage container for spent fuel.
In such design, the spent fuel is first introduced in a specific stainless steel case which is sealed, and then inserted in the storage container (7 UO2 fuel or 4 MOX fuel). A disposal container, consistent with the storage container, has also been studied. This disposal container is designed to directly accept the sealed case containing each spent fuel. The disposal container is designed to contain four UO2 spent fuel or one MOX spent fuel.

QB.32.7	Art. 32-1 § B.2.2 p. 13 CEA's reference strategy is to reprocess research reactor spent fuel. The COGEMA UP1 reprocessing plant was closed down in 1997. The text on page 13 indicates the strategy for research reactor spent fuel is interim storage. Please clarify.

Answer:
CEA's reference strategy is to reprocess research reactor spent fuel each time it is possible i.e. the reprocessing process has been developed for this type of spent fuel and if it is still in use at the French reprocessing plant of UP2 800 La Hague (AREVA nc).
For a new research reactor spent fuel, a study is done to determine the conditions of the reprocessing at La Hague. Then two cases can be met depending on the feasibility and the cost : immediate reprocessing is chosen or interim storage.

QB.32.8	Art. 32-1 § B.3 p. 14 What decisions for the categorisation into radioactive material for reuse or radioactive waste have been made concerning the reprocessed uranium and the depleted uranium in France and what are the further options for reuse or waste management?

Answer:
Some nuclear materials used in the fuel cycle are for a certain part reused and their full reuse is envisaged considering the continuation of an electronuclear program and the development on new types of reactors. They are not considered as a waste.
Uranium separated from the reprocessing operations still has a 235U content similar to natural uranium, but with some impurities in low quantities, issuing from the industrial separation process. Part of the uranium reprocessed in the La Hague facilities is converted into UF6 in order to be re-enriched in 235U abroad. The so converted quantities of uranium correspond to a third of the uranium separated in the La Hague facilities by COGEMA for EDF. The reprocessed uranium is used for nuclear fuel fabrication. This fuel is burnt in two NPP of EDF in Cruas. A part of the reprocessed uranium is therefore partly made attractive, the rest is stored.
All the natural uranium enrichment operations necessarily produce a secondary product, the depleted uranium. This one still contains 0.2 to 0.3 % of 235U which not considered today economically retrievable. COGEMA stores it on its plants of Pierrelatte and Bessines, under the form of stable U_3O_8. It has a specific activity of some 10 thousand Bq/g
However, it seems necessary to launch research programs to examine the possible management options for these materials in the case where they could be considered as end waste.

QB.32.9	Art. 32-1 § B.3 p. 14 In the B.3 "Criteria used to define and categorize radioactive wastes", you showed "existing or future disposal channels for the main solid radioactive wastes" in the table. a. Would you explain how do you classify the uranium contaminated waste that was produced with the operation of fuel fabrication facility and fuel enrichment facility in this table? b. please show us each radioactivity level of HLW, ILW, LLW and VLLW in the table numerically.

Answer:

There is no single criterion that determines the category (class) of a waste item. Indeed the activity of the various nuclides in the waste item needs to be studied to relate it to a long-term management solution (existing repository or technical solution under study) and to assign it a position in the classification. However, the waste assigned to each category generally falls into a total activity range as indicated below :

- HLW (high level waste) : the activity level of HLW is in the range of several tens of billions of Becquerels (Bq) per gram ; and this category of waste gives off heat,
- ILW-LL (long lived intermediate level waste) : the activity level of ILW-LL is generally in the range of one million to one billion Bq per gram ; and this category of waste is characterized by a significant presence of long lived radionuclides,
- LLW-LL (long lived low level waste) : the activity of this category of waste is generally in the range of :
  . some tens to some thousands of Bq per gram for radium bearing waste ; and the radionuclides are essentially long-lived alpha-emitters
  . ten thousand to one hundred thousand Bq per gram for graphite waste,
- LILW-SL (short lived low and intermediate level waste) : the activity of LILW-SL is generally in the range of a few hundred to one million Bq par gram ; the long lived (with a half-life of over 30 years) are limited in this waste (notably those that emit alpha radiation, with a statutory limit of 3700 Bq per gram),
- VLLW (very low level waste) : the activity level of VLLW is generally below 100 Bq per gram.

The uranium contaminated waste that was produced with the operation of fuel enrichment facility and fuel fabrication facility contains a low quantity of uranium which is compatible and approved for acceptance at the Aube LILW disposal facility (the waste can conventionally be included in the category LIL-SL) or, if its activity is very low, at the VLLW Centre (the waste is then included in the category VLLW).

QB.32.10	Art. 32-1 § B.3.2 p. 15 A program has been launched to find a repository site for low-level long-lived waste, particularly for graphite wastes and those containing radium. The schedule for start of operation of this repository is estimated to be 2010 (page 15). Is it possible to achieve this schedule, given that a site for the repository has not yet been selected?

Answer:

The need for a long-lived low-level waste repository (graphite waste and waste containing radium) is in the draft National Plan for Management of Radioactive Waste and Recoverable Material.

ANDRA has already performed generic safety studies which allow to define site criteria for such a repository. Now a site has to be selected. Therefore, it does not seem possible to achieve the schedule for start of operation of this repository initially estimated to be 2010.

The start of the operation is now expected to be 2013.

QB.32.11	Art. 32-1 § B.3.2 p. 15 The report states that a disposal of the graphite waste is foreseen in facilities with a depth of about 15 m - is this a "reversible disposal"; do you envisage treatment and conditioning of that waste before being disposed of; is this seen as final solution for the graphite?

Answer:

For graphite sleeves of fuel elements used in gas-graphite reactors (GGR) and the graphite piles of those same reactors, the presence of chlorine-36, resulting from the graphite-purification process, raises a specific problem that is likely impossible to resolve in a disposal facility such as the Centre de l'Aube. A 15-metre-deep disposal facility is planned in an argillaceous medium, clay being able to prevent the migration of long-lived elements through potential water seepage in the facility.

Graphite waste would be immobilised in a hydraulic binding agent with suitable containment properties. Disposal cells would consist of concrete structures fitted into the clay.
The design of the disposal facility does not include retrievability requirements. However retrievability of waste would be possible but it would require civil engineering works.

QB.32.12	Art. 32-1 § B.3.2 p. 15 It is shown in B.3.2, "typical LLLW could be disposed of in a subsurface repository at about 15meters depth in a clay stratum about 40meters thick" Could you explain the basic concept of the subsurface repository especially in relation to the protection from human intrusion after the termination of institutional control?

Answer:

Regarding human intrusion, the dossier presented by ANDRA indicates that the maximal impact is 1,2 mSv/year for a resident scenario, the time at which maximal dose is delivered is in about 15000 years.
Some types of intrusion, mainly the drillings, though of limited extent, could concern much deeper zones. ANDRA has evaluated the potential impact according to these residual hazards in order to guaranty that the safety objectives of the repository are met.
It is not excluded that, according to the state of knowledge, provisions could be taken to keep the history of the site by provisions of access limitation and long term archiving of the data of the operating life of the site.

QB.32.13	Art. 32-1§ B.3.3 p. 15 What methods are applied for conditioning of ion-exchange resins? What are the specific criteria applied to the conditioning product?

Answer:

As mentioned in B.5.1.1, for final packaging of ion exchanger resins, EDF uses the MERCURE process (encapsulation in an epoxy matrix) using two identical mobile machines.
The packages produced are intended for surface disposal. The biological protection of the packages is provided by a concrete container reinforced with a leaktight steel liner.
The final product, in which the resins are poured and fixed in an epoxy matrix and inserted in a concrete package and cover, is intended to comply both with the ANDRA standards, for safe disposal at Centre de l'Aube (low and intermediate level repository at Soulaines, with limitations in long lived beta activity as measured by Co60 and Cs137) and with international radioactive product transportation regulation as enacted by IAEA (activity and contamination at the surface of the concrete package...).

QB.32.14	Art. 32-1 § B.3.3 p. 16 A working group reporting into the PNGDR-MV is working on the inclusion of a recommended disposition route for sealed sources, unsuitable for near-surface disposal (page 16). Has this route been included into the current version of the PNGDR-MV? If so, why are the details of this route not included in the report? If not, when is it expected that these details will be finalised?

Answer:
DGSNR has recently authorized ANDRA to accept in the Centre de l'Aube repository packages made up only of sealed sources with a period lower than the one of the 137Cs, under the condition that the package meets different criteria, mainly in terms of activity, of conditioning and type of source (one single radionuclide)
The orientations of the PNGDR MV indicate that the long-term channels for the other sources must be decided by 2009. They concern in particular the possibility to dispose of these sources in the LL-LL waste repository or in deep geological formation, both repositories being under study.

QB.32.15	Art. 32-1 § B.3.3 p. 16 It is mentioned on page 16, that there are needs to be institutional surveillance of the site for 300 years. How is this consistent with Article 11, point (vii) in the Joint Convention, where it is stated that "appropriate steps should be taken to aim to avoid imposing undue burdens on future generation"?

Answer:
The principle to limit undue burden on future generations is identified in the French legislation on radioactive waste (art. L542-1 Code of the Environment). The regulation on surface disposals for LIL-SL waste establishes a limit to the duration of the surveillance phase that should not exceed 3 hundred years. The principle laid down in article 11 point (vii) is respected as the waste should not be retrieved during or after this surveillance phase which only constitutes an administrative control. The cost of such surveillance should be limited for future generations.

QB.32.16	Art. 32-1 § B.3.3 p. 16 It is indicated that "Of the low or intermediate level, short-lived waste, some have properties such that they cannot currently be accepted in the Aube repository in Soulaines, without a specific safety assessment and an additional authorisation from the ASN. "When accepting tritium and sealed sources to Aube, what kind of specific safety assessment is carried out?

Answer :
For the definitive safety case of the Centre de l'Aube, ANDRA has assessed intrusion scenarios that conducted to the definition of activity limits per nuclide and package.
For the sealed sources which present a high concentration of activity, exposure hazard can be expected in the case of drop and break of a package during the operational phase and of contamination in the post operational phase in case on an intrusion of a non informed person.
In that way, DGSNR had considered that the acceptation of these sources needs a specific authorisation that compels ANDRA to demonstrate the safety of the CSA at each deposit of source.
Recently, DGSNR has given a authorization to ANDRA in order to accept in the CSA packages made up only of sealed sources with a period lower than the one of the 137Cs, under the condition that the package meets different criteria, mainly in terms of activity, of conditioning and type of source (one single radionuclide)
For tritium, the radiological limitations are 4.10^3 TBq for the CSA and 1.10^6Bq/g for a package. However, tritium migrates rapidly under gaseous form through the package and the engineering structures walls. So for every new request for a tritiated package, ANDRA

has to make an assessment of the impact of the ground water below the repository by gaseous diffusion of the tritium before deciding the acceptance of the package or not.

QB.32.17	Art. 32-1 § B.4.1 p. 17 It is indicated that the Environmental Code set guidelines for research on management of high level and long-lived radioactive waste, including study of conditioning processes and long-term surface or subsurface storage for these wastes. Could you indicate whether the conditioning processes take into consideration that the conditioned and long-term stored waste may, in the future, be re-processed using to-be-developed transmutation technology to eliminate long-lived radioactive elements?

Answer:
Waste already produced is conditioned or needs to be conditioned (legacy waste) and stored safely. Waste to be generated in the next decades will continue to be conditioned. On the other hand transmutation is not expected to be operational before several decades. It is not desirable to consider that the conditioned waste will be treated for transmutation later on, when transmutation installations will be available for reasons of radiation protection and cost. Therefore, the conditioned and stored waste is considered as definitive to be disposed of in a deep geological repository.

QB.32.18	Art. 32-1 § B.4.1 p. 17 It is mentioned that high-level long-live radioactive waste must be managed in such a way as to protect nature, the environment and human health, taking into consideration the rights of future generations. Please explain how and why "nature" and "the environment" are differently used from each other. We understand that the term of the environment has usually been used as it includes the meaning of nature.

Answer:
Actually there is no difference in French between « protection of nature » and « protection of environment ». Either one or the other word can have been used in the report, with the same meaning, for vocabulary diversification.

QB.32.19	Art. 32-1 § B.4.1 p. 17 The system of radioactive waste management is optimized as part of a global approach. Does this commit France to compliance also with criteria outside of its national regulatory regime (e.g., IAEA Safety Standards)?

Answer:
The legislation and the regulation on the management of radioactive waste is developed to address issues raised in other countries, in particular countries where nuclear power plants, fuel-cycle facilities or nuclear research laboratories have been implemented. France participates to the establishment of safety standards of IAEA in order to propose consistent and comprehensive recommendations to those issues. Although France did not undertake a formal process to check the compliance of its regulation to the safety standards of IAEA, most of the French regulation should be consistent with the safety fundamentals principles and the safety requirements of the Agency. Nevertheless, the regulations on some matters will be completed by the transcription by 2010 of the safety reference levels established by WENRA on the safety of storage of radioactive waste and spent fuel. These reference levels were established on the basis of the existing safety requirements on the predisposal of radioactive waste management of the IAEA.

QB.32.20	Art. 32-1 § B.4.1 p. 18 In B.4.1 General framework, it is said "In anticipation of the parliamentary debate is scheduled for 2006 -----", how this debate relates or influence the regulation of HLW disposal?

Answer:
ASN decided that the Basic Safety Rule RFS III.2.f issued in June 1991 should be revised in order to take into account the act of December 30, 1991 (i. e. retrievability of the waste); and the feedback from review of safety cases as well as the evolution of recommendations from technically competent international organizations (IAEA, OECD/NEA, ICRP). However, the basic principles of the RFS which are still relevant today should not be changed. The update of the RFS III.2.f, planned in 2006, will also take into account the act of 2006 on long-term management of radioactive waste which should be voted before summer.
In particular, the Parliament will debate on whether HLW disposal should be created and could impose general objectives, for example on how a future disposal should be reversible.

Japan 3 QB.32.21	Art. 32-1 § B.4.1 p. 18 In OPECST 2005 Recommendation 5, it is mentioned of "2016 as the date of authorization to build a reversible deep geological repository", How the reversibility is established and how long it is maintained? What is the reason for require reversibility?

Answer:
Study of reversibility is specified by the law of December 1991 on HLW management. The choice of reversibility is linked to the precautionary principle. Reversibility is seen as a mean to provide decision-makers with more flexibility so that any decision to move forward is not made or perceived to be made in haste. ANDRA's approach relies on progressive construction and progressive closure, with reversibility aspects estimate at each step. ANDRA estimates the duration of reversibility at 200/300 years. ASN considers that, as a principle, reversibility can be of only limited duration because leaving waste packages readily accessible in deep disposal drifts could compromise safety over a longer period.

QB.32.22	Art. 32-1 § B.4.1 p. 18 Research into geological disposal of HLW-LL waste is currently exclusively carried out in Bure. The recommendations of the OPECST yield an authorisation of a reversible deep geological disposal repository in 2016 and its commissioning in the period 2020-2025. Given this precise time schedule, a list of possible other sites should be established in parallel. Are other sites also considered or is Bure the only option targeted by these recommendations?

Answer:
It is first to be noted that the schedule recommended by the OPECST refers to a HLW disposal in the clay layer in the same region as the Bure laboratory.
The law of 30 December 1991 specifies that the research on geological disposal be held with underground laboratories. The Government decided in 1998 that the research into geological disposal should be performed at Bure and in a second underground laboratory in a granitic site to be selected. The siting process for granite set up in 2000 did not succeed because of strong local opposition. However, in parallel with the elaboration of "Dossier 2005 argile", ANDRA produced a "Dossier 2005 granite" on the interest to implement a disposal in a granitic formation in France. The conclusion of the dossier was that it would take much more research to qualify any granitic site in France. The search of a second site does not appear to be a priority from a safety standpoint, notably because of the favourable properties of the Bure site.

QB.32.23	Art. 32-1 § B.4.1 p. 18 France began investigating a clay formation as a candidate site for a deep geologic repository for HLW-LL in 1999. Only a brief statement on progress is provided. A more detailed discussion is suggested for France's presentation at the May 2006 Review Meeting, including the results on the National Debate. Topics could include: site suitability, planned experiments, schedules, critical data needed to confirm site suitability, public input, etc. Please also describe in your presentation any cooperative efforts with other countries exploring clay as a disposal alternative - Argentina, Poland, Germany, Switzerland, and other SAPIERR countries.

Answer:

The formal opinion of the French Nuclear Safety Authority (ASN) to the Government on the result of the research on HLW management expressed on February 1st 2006 raises all those issues.

That opinion, made public on 1st February 2006 (http://www.asn.gouv.fr), states that "deep geological disposal appears unavoidable as a final management solution". ASN believes that, if Parliament were to adopt the implementation of a geological repository as a policy decision, it would be reasonable to seek a suitable area for disposal purposes in the transposition zone selected by ANDRA. ASN also feels that reversibility is necessarily a limited process in time and recommends a stepwise management of the repository.

Both ASN and CNE formulate as well recommendations for the future research programme. They stress particularly the mechanical behaviour of the repository in relation to plugs, the management of gases and the need for demonstrators with a dual view to verifying the performance of structures and demonstrating reversibility. It emphasises also the need for further studies on operational safety.

The draft law submitted by the Government to the Parliament outlines a schedule for the licensing of a repository in 2015 and the start of operation in 2025.

A large cooperative effort exists between ANDRA and NAGRA on clay formations in the Mont Terri tunnel laboratory. Many of the supporting experimental results on which conclusions of Dossier 2005 argile are based were first obtained in Mont Terri before being confirmed at Bure.

QB.32.24	Art. 32-1 § B.4.1 p. 18 Achieving public acceptance of a HLW-LL repository is extremely difficult. Please describe the critical public policy issues and potential resolutions for the Haute-Marne/Meuse site.

Answer:

In order to involve the public before the parliamentary debate of 2006 the French Government decided to organize a public debate with a view to providing the necessary information concerning the preparation of the new draft law. The organization of the debate was entrusted to the National Commission on Public Debate (CNDP). Thirteen public meetings were held and gathered approximately 3000 attendants in 11 different French cities.

The confidence deficit in public authorities or in scientists was reiterated on several occasions. In the first case, comments referred to the lack of information, the proliferation of actors and the resulting confusion between their respective roles, as well as the need for an independent authority. In the second case, some participants expressed their doubts about the statements made by scientists whose impartiality seemed questionable.

The first lesson to be drawn from the debate is the request made to see the new law addresses all radioactive waste and recoverable materials. If that should be the case, the National Inventory and the National Management Plan prepared by ANDRA and the ASN, respectively, would need to be confirmed.

Concerning more particularly high-level and long-lived waste, the idea to take advantage of the time required to develop a stepwise solution and to schedule periodical milestones emerged from the exchanges and could be summarised by the following statement made by the spokesperson from the Ministry of Industry: "to advance without taking shortcuts, to

assess in complete independence and to have the possibility to stop, if need be." The proposal for a permanent-storage concept has also appeared and would not represent a temporary solution pending the implementation of a repository, but rather another long-term solution.
In relation to the new law, the CNDP proposed both the continuation of experiments on geological disposal and the construction of a permanent storage prototype. Such a solution would allow to benefit from an alternative option and from additional time in order to take ethical considerations into account until 2020.
A high demand for information and dialogue, as well as for multidisciplinary expertise, has also been expressed. Public information and participation are recognised as condition for confidence building and as a safety factor. At the local level, the CNDP suggests that the role of local information committees (commission locale d'information) be confirmed and clarified and that its financial means be determined.
From an ethical standpoint, the request referred in many instances to the principles of justice, equity and balance not only between generations, but also between territories. In the latter case, it should be pointed out that the request for the development of territories concerned is based on partnership and implies the participation of the large utilities. The presence of an active and vigilant population also represents a safety guarantee for the waste-repository locations.
The French version of the full text of the report, together with the various documents and proceedings of the public debate, may be downloaded from the CNDP's Web site: http://www.debatpublic-dechets-radioactifs.org/.

QB.32.25	Art. 32-1 § B.4.1 p. 18,19 The OPECST report in 2005 contains recommendations for both deep disposal and transmutation technology developments. It projects a deep geology solution in 2020-2025, and industrial scale transmutation by 2040. Please describe the feasibility of the schedules for deep geologic disposal and industrial scale transmutation.

Answer:
The feasibility of the schedule announced for the construction of a repository in 2020-2025 draws from the experience gained at Bure and the state of the art in geological repository developments around the world. The date of 2040 for industrial scale transmutation is the earliest possible date considering the progress to be made in this area. It may well be that much more time will be needed to arrive at the stage of industrial developments and a responsible decision is thus not to wait for P&T before starting the development of a geological disposal program.

QB.32.26	Art. 32-1 § B.4.1 p. 19 Regarding the National plan for management of Radioactive Waste and Recoverable Material: which organisation co-ordinates its development; who prepared the initial version; have representatives of the public, non-governmental organisations and the greens taken part in the working group that developed the plan?

Answer:
The minister for the Environment asked the Nuclear Safety Authority (ASN) to develop the national Plan for the Management of Radioactive Waste and Recoverable Material in 2003. The draft plan was prepared by a working group steered by the ASN. Non-governmental associations, waste producers, ANDRA, IRSN experts, representatives of the national association of mayors or of the Office for the evaluation of scientific and technological choices, attended the meetings. One association refused to participate to the working group because the group was steered only at an administrative level. A first draft was issued in 2004 and discussed for one year inside the working group.
The initial version of the plan was issued mid 2005 and was made available on the website of the ASN for comments until the end of 2005. The main conclusions of the draft plan were

discussed during a meeting of the working group in January 2006. ASN suggested in the opinion submitted to the government the 1st of February 2006 on nuclear waste issues that the conclusions of the plan should be endorsed as part of any legislation on nuclear waste policy.

QB.32.27	Art. 32-1 § B.4.1 p. 19 With reference to the Guidelines of the National Plan for Management of Radioactive Waste and Recoverable Material, it is not clear how France balances the principle of optimization for radiological protection and the precautionary principle. Please elaborate.

Answer:
The principle of optimization for radiological protection was taken into account for the development of the National Plan for the Management of Radioactive Waste and Recoverable Material. Other principles retained in the legislation on waste were also used, as:

- the principle to minimize the quantity and the toxicity of waste,
- the limitation of transports in a defined management route,
- the reuse of waste or their recycling should be favoured if it does not harm the environment or the health of the public,
- the need for an information of the public on issues on waste management.

The precautionary principle applies if the risk posed by the management of waste is more or less unknown, which should not be the case for existing pathways. The precautionary principle then should apply for the choice of future pathways that need more studies and developments, but the development of these new pathways is submitted to an assessment of their impact from a radiation protection point of view.

QB.32.28	Art. 32-1 § B.4.1 p. 19 Are English versions of France's draft National Plan for Management of Radioactive Waste and Recoverable Material available to interested parties? If so, by what means?

Answer:
An English version of the main conclusions of the draft plan should be available soon. But the main recommendations are ;

- A pathway for the management of long-lived low-level waste (radium bearing waste and graphite waste coming from the dismantling of reactors moderated by graphite), should be developed and implemented in 2013;
- The owners of recoverable materials should provide by 2010 plans if these materials would have to be considered as waste. Some specific studies should be provided by 2008 for the recycling of some materials that have never been recycled yet;
- ANDRA and radioactive sources producers should present in 2009 a study for the management of disused sealed sources;
- The CEA should study by 2008 the best solution for the decay storage of tritium wastes before the disposal of these wastes;
- Solutions for the management of NORM waste should be reviewed in 2009;
- The operator of disposals of uranium mine and mill tailings should analyze the long-term impact of its disposals and present the results to its authorities by 2008;
- Producers of mixed (chemical and radioactive) waste should pursue study of their stabilization before appropriate disposals.

QB.32.29	Art. 32-1§ B.4.1 p. 20 A draft of the National Plan for Management of Radioactive Waste and Recoverable Material (PNGDR-MV) has been released for public comment. It is also noted that the principles and recommendations of the PNGDR-MV could be appended to the Bill on the future of high-level long-lived waste which will be tabled in Parliament in 2006 (page 20). Has a process been defined for finalising and implementing the PNGDR-MV? Will the outcomes of the plan definitely be included in the Bill, or are there other means to incorporate this information into legislation and/or regulations?

Answer:

Some recommendations of the Draft National Plan for the Management of Radioactive Waste and Recoverable Material were retained by the Government in the draft law that was submitted to the Council of ministers in March 2006. The draft law also identified the need to establish and periodically update a Plan for the Management of Radioactive Waste and Recoverable Material by decree.

QB.32.30	Art. 32-1 § B.4.2 p. 21 The report indicates that no radioprotection measures are used in managing waste containing natural radioactivity. Does this apply to uranium mines and mills? The phrase "facilities other than those classified according to the radioactive substances they contain" is not clear. Please elaborate.

Answer:

Unlike uranium ore processing residues, Norm are issued from activities that do not intend to use radioactivity, for example phosphated fertilizer or zircon working. In the frame of the transposition of Euratom directive 96/29, the order of 25 may 2005 sets the list of the concerned professional activities concerned by the provisions of this order and will allow in 2 years to draw the inventory of the concerned industries in France. However the actual doses to the workers and population will be given noticeably later.

The waste planned to be sent to hazardous waste repositories must be characterized before their reception with a detection of radioactivity by the centre that has also to implement a procedure of radioactivity detection. A circular of 10 June 2003 precises that these installations may receive NORM the activity and concentration of which can be neglected regarding radiation protection. In this case, an impact study must be performed showing the lack of impact for the most exposed population (here the workers of the site).

The ore processing residues are now stored in ancient open cast mines or in geologic basins closed by a dam. Along with the progressive shut down of the mining activities, the rehabilitation of these sites consisted in covering the residues with mechanical and radiological barriers avoiding intrusion, erosion and dispersion hazards and external and internal exposure of the surrounding population. The results on the measurements above these repositories are the same as those made in the environment of the site, complying with the dose limit of 1 mSv/year.

The national inventory of the uranium mining sites (MIMAUSA) gives for each site its administrative situation and the implemented survey provisions.

QB.32.31	Art. 32-1 § B.4.4 p. 22 It is stated that domestic fire detectors are banned, however they are widely used. What is the expected fate of domestic smoke detectors when they are no longer in use? And is it considered a radiological problem?

Answer:

About 6 to 8 millions of smoke detectors were emplaced in France for a total activity about 600 GBq (mainly Am-241). Their mean activity is very low (4 kBq for the most recent ones). Their use is prohibited for domestic use but still in function in offices or public places.

The Health Code (art. R.1333-52) indicates that the used sources must be collected by the supplier. Until now the sources of the detectors have been recycled by the manufacturers, this indicates that the number of non reused sources and so stored is low.

The supplier foresee to stop the manufacturing of these sources in a near future and to replace them by non-radioactive ones. Along with this withdrawal, the sources that were recycled, will not be recycled any more. Their long-term management must be assessed. The possibility to include these sources in the project of LLW repository must be examined. (See National Radioactive Waste Management Plan).

QB.32.32	Art. 32-1 § B.4.5 p. 22 What is the relation between "zoning" and controlled area as defined in BSS?

Answer:

The "waste zoning" is part of the "waste study" required to all BNI operators. The "waste zoning" splits nuclear installations into two zones :

- a nuclear waste zone in which the waste are likely to be contaminated
- a conventional waste zone in the other case.

It takes account of the design and operating history of the facilities and is confirmed by radiological checks.

The waste study system aims at helping to improve overall management of the waste, in particular in terms of transparency, and to develop optimised management channels.

The radiation protection zoning, required by the Labour Code, applies to the installations and defines two zones : (see F.4.1.2.1)

- a monitored zone (1 mSv/year<dose< 6 mSv/year)
- a controlled zone (6 mSv/year<dose< 20 mSv/year)

The "waste zoning" and "radiation protection zoning" are distinct but remain coherent.

QB.32.33	Art. 32-1 § B.4.6 p. 23 The waste producer has financial responsibility for the waste even after it is transferred to a storage facility or repository belonging to ANDRA (page 22). What financial responsibility is carried by the waste producer? Does this responsibility include public liability for incidents that occur at the facility? How is this financial arrangement organised and the funding to address this responsibility guaranteed?

Answer:

The waste producer remains responsible for its waste, even after it is put in a storage or repository facility. This general position does not exclude the responsibility of the National radioactive waste management agency as licensee of facilities, in particular in respect to the Paris Convention. It doesn't exist any specific financial arrangement regarding the responsibility of the waste producers ; the French system is based on the possibility, not limited in time, to come back to the producers, in case it is needed (consolidation works, new legal obligations...).

QB.32.34	Art. 32-1 § B.4.6 p. 23 The report says that the fact that a producer of RAW has transferred its waste to a storage or repository facility belonging to Andra does not mean it is no longer financially responsible. Is this a general rule? How and when the financial responsibilities of a producer are terminated?

Answer:

In France and as written in the report, the waste ownership cannot be transferred to the licensee of a disposal facility : the producer of the waste is responsible for it, i.e. in particular from the financial point of view, without any limit in time. No system has been put in place, unlike in some other countries, for the National radioactive waste management agency to take care of waste without a current disposal facility, after the producer pays a financial compensation in full discharge. The only exception to this rule is for specific waste: historical waste (e.g. radium needles) and possible long-lived waste from small research or medical activities. However, this represents a very, very small proportion of the radioactive waste in France.

QB.32.35	Art. 32-1 § B.5.1.3 p. 28,179 The report indicates that the COGEMA fuel cycle facilities produce VLLW and Types A, B, and C wastes. How are these classes related to VLLW, LLW, ILW and HLW? If not related, what types of wastes do these classes signify?

Answer:

Classification A, B, C, was the former classification of waste in France. It has been replaced by the following :

- HLW, which is identical to the former category C
- ILW-LL, which is identical to the former category B
- LLW-LL
- LILW-SL, which is identical to the former category A
- VLLW

However names A, B, C are sometimes used (instead of respectively LILW-SL, ILW-LL, HLW), especially by waste producers, as a matter of habit.

QB.32.36	Art. 32-1 § B.5.1.3.2 p. 29 Bitumen is still used (B.5.1.3.2. and B.5.1.3.4.). What is the destination of these drums (surface storage or geological repositories) ? Can bitumen be placed in clay without damaging the favourable properties of this host rock ?

Answer:

Due to the activity concentrated in the sludges, and to presence of long-term radionuclides, the bitumen drums produced at La Hague are not compatible with a surface repository and are then considered for deep repository. Feasibility studies performed by ANDRA show no incompatibility between clay and bitumen.

Bituminized waste drums are taken into account in the inventory of waste packages and radionuclides that is used for the research carried out on the feasibility of the underground repository in Meuse /Haute-Marne.

Interactions between bitumen degradation products (gas and organic by-products) and natural and engineered barriers (concrete) have been studied and are still under investigations. There is no evidence of alteration of the confinement properties of the host rock.

QB.32.37	Art. 32-1 § B.5.1.3.2 p. 29 It is said that" These drums are stored on the site. Production by these two plants has been virtually zero over the last decade, because most of the acid effluents are now evaporated in the various spent fuel reprocessing buildings and the concentrates are sent for vitrification. Activity has been replaced by retrieval and packaging of the "legacy" sludges, in particular those from the seven STE2 silos which should lead to the production of 40,000 drums of bitumen over approximately the next 15 years," " The experience acquired has enabled bituminised waste to be eliminated from the latest generation of plants, by recycling effluent and sending the residual streams for vitrification" and "The process to ship residue to foreign customers began in 1995 with standard containers of vitrified waste (CSD-V), in which most of the activity of the ultimate waste contained in the spent fuels is conditioned."1. Is the characteristics of waste package vitrified from acid effluents the same as that from high level waste in terms of packaging, size, configuration and ingredients?2. Will you return acid effluent in the vitrified form or bituminised form in the future to the foreign customers?

Answer:
1/ The new management of the effluents implemented at La Hague since 1995, is aimed at concentrating a part of medium activity effluents and at incorporating them by vitrification in the same packages as for the fission products. The activity and so the contribution of these effluents to the volume of glass returned to the client is insignificant. These low amounts have no impact on the mean characteristics of the glass.
2/ Discussions are under way between clients and regulatory bodies for the return of the packages containing such effluents. These returns could be done under the form of bitumen drums or other to be designed.

Section C – Scope of application - Article 3:

No question or comment was received concerning this section of the French report.

Section D – Inventories and lists - Article 32-2:

QD.32.1	Art. 32-2 § D.1 p. 37 There is only a small amount of detail on the spent fuel inventory in various facilities in France. Is it possible to provide more detail, or does this raise security concerns?

Answer:
The spent fuel inventory is described in the Inventory of Radioactive Waste and Recoverable Material which is periodically published by ANDRA, on the website : www.andra.fr.

QD.32.2	Art. 32-2 § D p. 37,47 Does the "national inventory of radioactive waste and recoverable materials" include the data bank of wastes containing naturally occurring radioactive materials and which do not originate from the fuel cycle? If not, is there any other data bank to contain them and which was the procedure established to get the information from the industries?

Answer:
The national Inventory of radioactive waste and recoverable materials comprises the NORM and mainly the radium containing waste. They are considered as ILW or LLW. They are issued form NORM in industrial processes. Natural radioactivity is concentrated in the mining residues.
DGSNR asked the organization "Robin des bois" for a study on the effects of natural radioactivity enhanced by human activities and the polluted sites. The report referring to the industries out of the fuel cycle has been published in 2006 available on "Robin des bois" website.

QD.32.3	Art. 32-2 § D.1.2.1.2 p. 38 Section D 1.2.1.2 The Future: consolidation of the Cap Le Hague site into a single optimised plant It is noted that 'the contracts helping to finance the plants are completed (7,000 tons reprocessed for foreign customers)'. Have new contracts been obtained and if so how will the associated income be sent?

Answer:
Beyond the Service Agreement Contracts, for which the spent fuel has been treated mainly until 2000, French and foreign contracts are running at present. They cover the operating expenses of the plant.

QD.32.4	Art. 32-2 § D.1.2.1.2 p. 38 Has the SITOP project identified any areas of particular concern in relation to 'human factors'?

Answer:
The SITOP project has taken into account the human factor from the conception and in all the steps leading to the definition of the process and of all the organizations involved in this project.
Experience feed back of the efficiency of this new organisation has not shown any malfunction.

QD.32.5	Art. 32-2 § D.1.2.1.2 p. 38 The report indicates that the two plants at La Hague have reached maturity. The previous paragraph refers to 4 plants; please indicate which plants are involved? Is it the intent that all the 4 plants would be consolidated into one plant? Please explain.

Answer:
The text was unclear : STE3 is not a plant but a BNI, whose function is only to treat effluents.
On La Hague site, there are 3 reprocessing plants, UP3, UP2-800 and UP2-400. The oldest one, UP2-400, is now shut down.

QD.32.6	Art. 32-2 § D.1.2.1.5 p. 39 Section D 1.2.1.5 Reprocessing Installations. It is reported that 'some residual radioactive gases, in particular krypton … are simply controlled before being discharged into the atmosphere'. Has krypton abatement been investigated and, is so, why has it not been implemented?

Answer:
The only technical route that was studied was the cryogenic distillation, very energy consuming and demanding high investment costs. Moreover, the question remains about the storage of the krypton.

QD.32.7	Art. 32-2 § D.1.2.1.6 p. 40 Section D.1.2.1.6 Return of foreign waste. While waste belonging to foreign customers outside France is returned, can France provide justification for discharging radioactive waste produced as a result of reprocessing operations and which is not contained?

Answer:
The French law makes distinction between radioactive waste and effluent release. According to article L 542-2 of the environment code relating the radioactive waste, France does not store on its territory waste issued from foreign spent fuel. The effluent releases are subjected to an authorisation belonging to a specific regulation that sets strict limitations. The authorities check the respect of these limits.

QD.32.8	Art. 32-2 § D.1.2.2 p. 41 The report notes that the PEGASE facility should cease operation around the year 2010. How will the currently stored material be managed when the facility is closed?

Answer:
For spent fuel, a removal plan has been established by CEA and is based on 3 "elimination" ways :
- reprocessing at La Hague for many of the spent fuel which were stored on Pegase,
- interim storage in CASCAD facility after eventual conditioning operations in a French laboratory at Cadarache,
- interim storage in a pool facility for some of them.

As regards the waste containing plutonium, this waste will be conditioned and stored in the future CEDRA facility pending disposal in geological formation.
The removal of spent fuel and plutonium waste will be carried out during the operational lifetime of the PEGASE facility.

QD.32.9	Art. 32-2 § D.2 p. 41 The inventory of stored spent fuel in this report is the same as the one from the First National Report. What quantity of spent fuel has been generated in France since 2002?

Answer:
The revision of the national inventory of 2005 came too late to be taken into account in the French report. Yet this lack of evolution shows a relative balance between annual production of spent fuel and reprocessing. A little remaining gap is on the way to be reduced because EDF will apply for more authorisations MOX (recycling)
As mentioned above, the quantity of spent fuel generated annually in France is about 1150 t per year. The quantity of EDF spent fuel currently stored in cooling pool in NPPs fuel buildings and at La Hague are respectively 12005 tons (end of 2005: 8124 t at La Hague and 3882 t in NPPs cooling pools).

QD.32.10	Art. 32-2 § D.2 & § D.4 p. 41,45 Is there any national database system for inventory of spent fuel and radioactive waste ? And how often licensees of related facilities report to regulatory body about such information of spent fuel and radioactive waste?

Answer:
The spent fuel and radioactive waste inventory is periodically published in the ANDRA inventory of radioactive waste and recoverable material, on the website "www.andra.fr".

QD.32.11	Art. 32-2 § D.3.1.4 p. 42 The national report states that ANDRA coordinates clean-up of polluted sites either under the authorisation from the regional prefects or at the request of the owner of the site. I. Could it be provided a more precise explanation of ANDRA's role?

Answer:
The role of ANDRA for the polluted sites clean up management depends on several criteria :
The nature of the radionuclide, if the owner is at the origin of the pollution, if the site owner can support the financing of the clean up. According to those criteria, ANDRA's intervention differs :
1/ In case of radium polluted sites:
A "Radium fund" has been instituted by the interministerial meetings of 2001 and 2005. In this case, ANDRA is the main operator for the decontamination design and it establishes the requested studies for these activities.
2/ In case of an inefficient operator
An interministerial order describes the procedures to be applied for polluted sites and precises that the clean up operations must be financed by the responsible.
In the case of absence of a responsible, ANDRA, on demand of the ministers, works as delegate client in the frame of the financial procedures defined in the interministerial circular of 1997.
3/ on the request of the owner :
In order to guaranty the acceptability of the waste coming from a clean up operation, ANDRA can perform the work of rehabilitation.

QD.32.12	Art. 32-2 § D.3.1.4 p. 42 The national report states that French regulations provide rules for treatment and clean-up operations if a site uses or stores naturally occurring radioactive materials in certain conditions. i/. Are polluted sites classified as ICPE? ii/. Is ANDRA responsible of the final disposal of radioactive wastes produced in these sites?

Answer:
The polluted sites are generally not classified as ICPE except if they were ICPE in the beginning of operations. However when waste cannot be removed in a short term, ANDRA can request that the site becomes a provisional ICPE for the storage for waste on site.
ANDRA is responsible for the final disposal of radioactive waste produced in these sites even if ANDRA does not become the owner of these waste. Any kind of radioactive waste that respects the acceptance criteria for a licensed disposal site may be disposed of in such a site. Hence, contaminated soil, as long as its radioactivity content respects the acceptance criteria and it is conditioned according to the acceptance criteria, can be disposed of in disposal sites primarily designed for waste coming from nuclear facilities.
If the administration gives its authorisation for leaving the waste on the site, it must define for the site owner, the technical prescriptions for the survey.

QD.32.13	Art. 32-2 § D.3.3.2 p. 43 The report notes that the design of the Aube repository benefited considerably from feedback of experiences from the design and operation of the Manche repository. What where the most important lessons learned from the design and operation of the Manche repository?

Answer:

During the 25 years of operation of the Centre de la Manche, between 1969 and 1994, the design of the disposal facility and the long-term safety principles have been gradually developed and consolidated. In particular safety principles that are presently used for Centre de l'Aube are derived from Fundamental Safety Rules Nos. I.2 and III.2e that were originally issued in 1985.

The main lessons learned from Centre de la Manche repository are described in the followings :

- the package concept as a component of a multi-barrier system (the other barriers are the disposal vaults and the geology) was first developed for Centre de la Manche. Waste must be conditioned in packages, a package is a characterised object with specified properties. An acceptance process is performed in order to check that the characteristics of packages comply with specified properties.
- an effluent management system was implemented to separate water that is or may be in contact with waste packages from other waters. It is a specific underground water collection system that collects water from the disposal vaults
- tritiated waste must be managed with caution. Tritiated waste was disposed in Centre de la Manche and tritium could be measured in the ground water table as in the streams in the neighbourhood of the facility. These waste were retrieved. At present tritiated waste are accepted cautiously in Centre de l'Aube.
- Radium-bearing waste should not be managed in disposal facilities as Centre de la Manche or Centre de l'Aube. Even if for low activity level waste long term scenarios may lead to an acceptable impact, radon gas in the monitoring gallery requires a venting system that is not suitable when a passive institutional control period is searched.

Lessons learned from the capping system of Centre de la Manche will also be used as guidelines for the design of the capping system of Centre de l'Aube facility.

QD.32.14	Art. 32-2 § D.3.3.3 et § D.3.3.2 p. 43,44 What are the operational and post closure dose limits for the population of the Aube and Morvilliers repositories?

Answer:

The law (Health Code Livre III, Titre III Chapitre III) makes provision that the impact for the public of a nuclear installation must not be higher than 1 mSv/year. ANDRA has set for its Aube repositories a limit of 0,25 mSv/year for the operational and post closure phases.

QD.32.15	Art. 32-2 § D.3.3.3 p. 44 In the answers to the questions of the last French report in 2003 it says "Universal clearance levels are not applied as the French Nuclear Safety Authority estimates that they are too dangerous. The criterion of 10 micro-Sievert (report § B.4.2 - p. 15) is one reference value for the decisions about case-by-case clearance of radioactive waste. However, many other considerations have to be taken into account." Can you name these other considerations and how is protection of the population (10 µSv/a) ensured by the inventory of the Morvilliers very-low-level waste repository? What are the differences to a conventional landfill with base seal that is only allowed to take in a limited amount of radioactivity?

Answer:

At first, the repository of Morvilliers cannot be defined as a "case by case clearance of radioactive waste". It is above all, a repository for radioactive waste even if their radioactivity is low and close to the "clearance levels" defined at an international level.

The law (Health Code Livre III, Titre III, Chapitre III) makes provision that the impact of a nuclear installation must not be higher than 1 mSv/year. ANDRA has set for its Aube repositories a limit of 0,25 mSV/year .
For the Morvilliers repository, the maximal dose has first been calculated in the case of a normal evolution of the storage, considering the transfer of the contained radionuclides (Tc, Cl, Np, U, Pu, Th, Ra..) to the population through the ground and surface water. The impact has been evaluated to 3.10^{-5} mSv/year after 200 years. For a pessimistic scenario, the dose has been evaluated to 0.14 mSv/year. For other scenarios, like road construction, settling, children play grounds, the values are 0.02 to 0.05 mSv/year , that is far lower than the threshold of 0.25 set by ANDRA.
The fact that a single operator centralizes the disposal of VLLW is favourable in term of traceability and characterization.
The CSA meets the requirements for a CTE K1 corresponding to hazardous conventional waste. Moreover, equipments have been installed to protect the waste from the water seepage and so delaying the transfer of the radionuclides and toxic chemicals to the post survey phase. ANDRA conducted impact assessments on short and medium terms to estimate the radiological capacity able to meet the safety requirements.

QD.32.16	Art. 32-2 § D.3.3.3 p. 44 In section D.3.3.3, the report states that the Morvilliers VLLW disposal facility is not covered by the regulations applicable to basic nuclear installations (BNI) but the regulations for installations classified on environmental protection grounds (ICPE). Does this mean that Articles 11 to 17 of the Joint Conventional are not applicable to the Morvilliers VLLW disposal facility? What is the differences between the major contents of the national report Chapter H (i.e. performance objectives, siting process, and safety assessment, etc.) and the provisions applied to the Morvilliers VLLW disposal facility?

Answer:
The criterion that distinguishes a BNI from an ICPE is the radioactive authorized content of the facility. The evaluation of the radioactive content of Morvilliers facility is so low that it is an ICPE (less than 37 TBq equivalent group 1 of radio-nuclides).
This storage facility complies with the environment code relative to the ICPE that requires following steps : an authorization under a form prefectoral order, a public inquiry, an impact study. The procedure gave rise to two public inquiries in 2001 and 2002, the first dealing with the clearing of a forest compartment and the second with the creation of the facility itself.
Besides the safety approach selected for the VLLW Disposal Facility is consistent with the safety approach adopted for the Centre de l'Aube repository. It covers the impact of the facility with regard to both the radiological and chemical toxicities of the waste, in operation and, in the long term, after closure.
The radiological risk is characterised by dose calculations. Doses are compared with value limits, proposed by ANDRA in accordance with the regulations or the proposed objectives of international organisations, such as the International Atomic Energy Agency (IAEA) or the International Commission on Radiological Protection (ICRP)

The toxic risk was considered for chemical elements having an effect related to a threshold or reference value (As, Zn, Pb, Cd) and for chemical elements having a carcinogenic effect (As, Cd).
Therefore Articles 11 to 17 of the Joint Convention are applicable to the Morvilliers VLLW disposal facility and the provisions of national report Chapter H also applies to this repository.

QD.32.17	Art. 32-2 § D.3.3.3 p. 44 Which are the parameters/factors that contribute most to the values given for the Class Number of the radionuclides in the derivation of the IRAS? What kind of impact indicator does the IRAS parameter measure?

Answer:
Four classes were calculated by ANDRA with a view to minimize the radiation risks for workers and people from the public, in all situations considered as plausible. These situations regard not only the normal operation of the repository but also incidents or accidents in the short and long term. IRAS is thus an indicator of the dose liable to be absorbed by workers or people of the public.
The most severe constraints result from protection of workers during the operational lifetime of the facility since workers can work near waste during long periods of time. In particular classes 0 and 1 mainly concern gamma emitters of a high energy such as 60Co, 137Cs (irradiation) or alpha emitters such as 236Pu to 240Pu, 241Am, 242Pu, 244Pu (inhalation of dusts).
It is recalled that IRAS is defined in order to determine the acceptability of a waste batch in the VLLW repository.

QD.32.18	Art. 32-2 § D.4.1 p. 45 Section D.4.1 Annual production of radioactive wastes Has there been any estimation of how these figures will change in future years?

Answer:
The National Radioactive Waste Inventory that was published in 2006 provides data about existing waste at the end of 2004 and forecasts of production for 2010 and 2020. Quantities (stored or disposed) are given in volume of waste when conditioned.

Type of waste	Volume at the end of 2004 (m^3)	Volume at the end of 2010 (m^3)	Volume at the end of 2020 (m^3)
LILW-SL	~794,000	~929,000	~1,193,000
ILW-LL	~46,000	~49,000	~55,000
HLW	~1850	~2500	~3600

For LILW-SL an increase of the production is forecast as the consequence of decommissioning activities. For ILW-LL the small decrease in annual production is provided by the improvement of conditioning processes that concentrate more the activity. HLW production is stable, directly dependent on the electricity generated by nuclear plants.

QD.32.19	Art. 32-2 § D.4.2 p. 46 In section D.4.2, it is indicated that France possesses 46 000 m^3 of ILW. Can France indicate where these wastes are stored?

Answer:
These waste are at present stored on the sites of La Hague (Basse Normandie), Marcoule (Languedoc-Roussillon) and Cadarache (Provence-Alpes-Cote d'Azur).

QD.32.20	Art. 32-2 § D.4.2 vs. § B.3.2 p. 46 What other disposal options than shallow land burial are being considered for the 52,200 m^3 of graphite, mostly still in cores of natural uranium-graphite-gas reactors? How is the Wigner energy issue taken into account?

Answer:
A small part of graphite sleeves has been disposed of in the Centre de l'Aube facility (sleeves from Bugey power plant). Most of the graphite should be disposed of in a dedicated disposal facility.
Wigner energy effect depends on the temperature of the reactor. For the power reactors the temperature of the graphite in the reactor excludes such a hazard. For other reactors used

for military applications an increase of the temperature of the graphite can prevent this hazard.

QD.32.21	Art. 32-2 § D.4.3 p. 47 Table D.4.3 gives the total beta-gamma and total alpha activities of the waste disposed of. No nuclide-specific values are given. The same applies to the other waste types (decommissioning waste, conditioned waste, SSRS).

Answer:
The following table updates table D.4.3 is at the end of 2004 :

31 December 2004	Centre de la Manche	Centre de l'Aube
Disposed volume	527,000 m^3	~167, 800 m^3
Total beta-gamma activity	18,500 TBq	2,100 TBq
Pu 241	3,300 TBq	660 TBq
Co 60	820 TBq	400 TBq
Ni 63	4,700 TBq	380 TBq
Cs 137	7,000 TBq	260 TBq
Fe55		250 TBq
Sr 90	1,800 TBq	80 TBq
H 3	330 TBq	30 TBq
C14	280 TBq	14 TBq
Total alpha activity	640 TBq	70 TBq
Am 241	270 TBq	18 TBq
Pu 239	220 TBq	17 TBq
Pu 238	74 TBq	21 TBq
Pu 240	44 TBq	10 TBq

For Centre de Morvilliers, at the end of 2004, total beta-gamma activity is about 260 GBq provided by tritium (84%), Caesium 137 (5%). Total alpha content is about 40 Gbq from Uranium isotopes. Disposed volume is about 16,600 m^3.

QD.32.22	Art. 32-2 § D.4.3 p. 47 The report presents volume and activity level in "final storage". Could France elaborate on the meaning of "final storage"?

Answer:
The translation was imprecise : one must read "disposal facility" instead of "final storage".

Section E – Legislative and regulatory system – Articles 18 to 20:

QE.18.1	Art. 18 § E.1.1 p. 49 Can France please provide an update of the progress under the Law of 1991?

Answer:
The deadline of 15 years of research prescribed by the Law of 30 December 1991 is soon coming to an end. On 30 June 2005, the Minister for Higher Education and Research and the Minister for Industry received the CEA and ANDRA reports on the investigations that were carried out and on their findings.

Both reports present the results of the 15 years of research performed in accordance with the law on the different methods for the management of HL-MLW, focusing on three main areas:

- partitioning and transmutation of long-lived elements;
- disposal in a deep geological formation;
- long-term conditioning and storage.

Being responsible for investigations on deep geological disposal, ANDRA submitted two reports on disposal options in clay and granite formations: the Dossier Argile 2005 and the Dossier Granite 2005, respectively. The first report covers the overall information gathered on waste packages and on the Meuse/Haute-Marne Site (Bure Site), as well as studies on repository design and safety assessments. Due to the absence of a relevant site, the second report includes the same type of documents on a generic basis concerning granite formations. Both reports may be downloaded in French from ANDRA's Web site:

http://www.andra.fr.

They should be available in English by the end of June 2006. Activities at the Meuse/Haute-Marne Laboratory continued and the junction of the drifts running between the shafts was achieved in December 2005.

The characterisation programmes currently performed in the drifts being excavated and the experimental programme were carried out according to schedule. A large number of experiments are ongoing in order to confirm or to complete many acquired data, especially with regard to the mechanical behaviour of the rock, the characterisation of the excavation disturbed zone (EDZ tests), plug-sealing tests (Key experiments) and the diffusion of radioelements.

Review of Dossiers 2005

After the presentation of both Dossiers to the Ministers, the second half of 2005 was marked by the review of those reports, the exploitation of the first results obtained at level –490 m of the Meuse/ Haute-Marne Laboratory and reflections on a potential programme after 2006.

The Dossier 2005 Argile, in its June 2005 version, was the subject of a threefold review at the request of French public authorities: the first, by the National Review Board (Commission nationale d'évaluation – CNE), as prescribed by the Law; the second, by the Nuclear Safety Authority (Autorité de sûreté nucléaire – ASN) on account of its prerogatives, and the third, by a group of international experts under the aegis of the OECD Nuclear Energy Agency (OECD/NEA) at the request of ANDRA's supervisory ministers. In the case of the Dossier granite, the report was also assessed by the CNE and ASN.

The National Review Board followed constantly the progress of the research programme and published a yearly report accordingly. On a more specific basis, it also heard ANDRA on 9--10 November 2005 on the results of the Dossier 2005 and on 14 December on the new findings achieved at the underground laboratory.

The report on the three regulatory research areas was submitted to the government at the end of January 2006. More particularly, it recommends that disposal be considered as the reference solution. It advocates that the work conducted in that area compare with "the best international standards". The CNE believes especially that those investigations have not only demonstrated that the Callovo-Oxfordian formation constitutes a "remarkable environment, both in quality and in quantity", but also that the rock present on the Bure Site is highly homogeneous and is free of water-conducting faults.

CNE recommendations for the future programme deal notably with the continuation of ongoing experiments in the underground laboratory, which are considered essential, and the survey of the transposition zone in order to verify the presence of sizeable areas compatible with the implementation of a repository and having similar favourable characteristics to those observed at Bure. The Board also recommends that research activities be addressed as to integrate social and economic issues relating to the insertion of a disposal project in its host area. It also recommends that a demonstrator programme be installed in order both to verify the performance of the different repository components and to test the reversibility of proposed concepts.

The CNE drew a list of suggested themes to be furthered during the next phase of the programme, with priority being given to the three following themes:

- radionuclide migration within the rock, with particular emphasis on the study of issues associated with the variability assessment of rock properties at various scales,;
- the future of the corrosion gases within the repository and, especially, its impact on the resaturation phase of the repository;
- the efficiency of the plugs in relation to the long-term evolution of the EDZ.

The CNE also feels that there is a reasonable probability that a survey process may be fully completed in order to select a suitable site.

Upon the request of ASN, the French Institute for Radiation Protection and Nuclear Safety (Institut de radioprotection et de sûreté nucléaire – IRSN) reviewed both the Dossiers Argile and Granite from August to November 2005. The Institute published an assessment report that was submitted to the Advisory Committee on Waste at its meeting of 12-13 December 2005. The final opinion of the Committee was sent officially to ASN on 15 December 2005. Confirming the IRSN's report, it issued a very positive opinion about the case ("the Advisory Committee emphasises that the Dossier 2005 Argile provides a thorough and high-quality coverage of the case and constitutes a significant advance"). In addition, the Advisory Committee "issues a favourable opinion on the assessment made by ANDRA and believes that the implementation of a radioactive-waste repository in a clay formation, for which ongoing studies are carried out through an underground laboratory at Bure, is feasible. If Parliament is to adopt the implementation of a radioactive-waste repository in a geological formation as a policy decision, the Advisory Committee feels that no safety-related argument would hinder the selection process of a suitable repository site within the transposition zone selected by ANDRA."

The Advisory Committee also formulated recommendations dealing with the continuation of the survey programme of the sector, the clarifications to be brought to the specifications of the different repository components, scientific tests and technological demonstrations to be performed, etc. That opinion and the IRSN report were made public at the end of January 2006, which marks a première for such an assessment.

Furthermore, the IRSN submitted its opinion to the ASN on the Dossier Granite. Conclusions are : its content is positive, ANDRA has fulfilled the overall demands of the Advisory Committee as formulated in 2003 and has drawn the maximum benefit from the available data in the absence of a suitable investigation site.

Concerning P&T of long-lived radionuclides ASN says that it couldn't be applied industrially before 2040-2050, would leave residual waste and would not be applicable, for reasons of radiological protection, safety and cost, to already conditioned waste. As for long interim storage, above ground or just below ground, ASN says its safety would require continual

active monitoring that cannot be guaranteed for more than a few hundred years, placing an unacceptable burden on future generations.

The review of the Dossier 2005 Argile by the International Review Team (IRT) set in place by the OECD/NEA was based on the Terms of reference set by ANDRA's supervisory ministries in order to channel the review according to the following themes: the long-term safety strategy, the quality of the scientific and technical bases of the case report, the reversibility approach, the relevancy of the conclusions, as well as the clarity of the documentation and of its structure.

The IRT concluded that the recommendations formulated at the end of the previous review had been implemented, that the programme compared fully with best international practices and proved to be the most advanced in several fields. ANDRA's reversibility approach was considered as innovative without compromising the safety of the repository. The IRT concluded that "the Dossier 2005 successfully establishes confidence in the feasibility of constructing a repository".

The IRT also formulated recommendations concerning the pursuit of hydrogeological models of the site through complementary boreholes, diffusion experiments over longer timescales, a more thorough integration of gas issues in the definition of repository structures and the need for technological demonstrators in order to validate concepts.

QE.19.1	Art. 19 § E.2 p. 53 How is the ownership of spent fuel, and high-level waste from reprocessing, determined? Does ownership and responsibility remain with the producer (EdF)?

Answer:
With regard to la Hague reprocessing plant, the owners of the stored spent fuel (French and foreign clients) are known. The repartition of the waste resulting from the reprocessing operations at la Hague plant is based on the so called UR system, (see the national inventory of radioactive waste and recoverable material : www.andra.fr) mainly based on radioactivity, and audited by the French administration.
Each French owner (EDF, CEA, AREVA) remains responsible for the long-term management of its waste. During the storage phase of spent fuel and waste at la Hague plant it is AREVA who is responsible of the safety of its installations including storage facilities.

QE.19.2	Art. 19 § E.2 p. 54 Who is responsible for eventual disposal or perpetual storage of spent fuel and HLW?

Answer:
The environment Code (art L 542 –12) precises that ANDRA is in charge of long-term management operations of the nuclear waste. It is to note that the operators have to manage their waste during the operational phase. This means that the financing remains in the responsibility of the producers of the waste according to the principle of polluter-payer.

QE.19.3	Art. 19 § E.2 p. 54 Could you provide the information whether any kind of financial warranties must be provided by the BNI applicant before a licence is granted (as to demonstrate sufficient financial resources in case of bankruptcy or liquidation of the BNI operator or in case it fails to implement the prescribed radiation protection measures)?

Answer:
The draft bill on nuclear waste that should be voted by the French Parliament in 2006, enforces that financial BNI's applicants must provide warranties during license granting. "See draft bill (in French) : http://www.assemblee-nationale.fr/12/pdf/projets/pl2977.pdf".

QE.19.4	Art. 19 § E.2.2.1 p. 54 It is noted that there are facilities, of various types, which will are undergoing decommissioning and some that have completed decommissioning. Appendix L.3 shows a number of facilities that have been dismantled and removed from the Basic Nuclear Installation (BNI) list. There appears to be no reference in the report to the regulatory mechanism for releasing a decommissioning site for unrestricted use. Have any facilities been removed from regulatory control and released for unrestricted use? What legal process was, or will be, used to release a site from regulatory control after the completion of decommissioning? What safety and environmental criteria was, or will be, used to determine whether decommissioning has ended and the site operator relieved of its responsibility for the safety of the facility?

Answer:
A regulatory procedure is currently being written regarding the release of a site after decommissioning. However, regarding sites that were released in the past (or that are currently released), an institutional mechanism is implemented to preserve memory of past activities and set up use restrictions if needed. Before the release of a site, the operator must ensure (and demonstrate) that the site meet the clean-up objectives.
For each BNI , the authorization decree for the dismantling operations states that the release of the site after these operations is submitted to the Nuclear Safety Authority for approval.

QE.19.5	Art. 19 § E.2.2.2 p. 54 Would you provide brief information whether a case exists when the fulfilment of Article 37 of EURATOM Treaty caused difficulties in planned disposal of radioactive waste in France.

Answer:
The case of repositories has been referred twice to the EC in accordance with article 37 of the Euratom Treaty. These two cases receive favourable recommendation from EC.
The dossier about the releases of the site, drafted on 23 May 1991 for the commissioning of the Centre de l'Aube, was accepted on 12 November 1991. It has been updated in 2002 at the occasion of a new gaseous and liquid release application, and transmitted to the EC.
In the same way, the transition from operation to survey of the Centre de la Manche, a dossier has been submitted on March 2000 and accepted on 19 October 2000.

QE.19.6	Art. 19 § E.2.2.2 p. 54 It is noted in the report that the construction of a BNI must be referred to the public debate commission whenever it concerns any new nuclear power production site or any new nuclear site not producing electricity and corresponding to an investment of more than 300 million euros. Is the anticipated investment cost the overriding rationale for organising a public debate or are there other rationales as well? Please elaborate.

Answer:
The criteria for organising a public debate are defined by a decree (2002-1275 of 22 October 2002). The overriding rationale is mostly the anticipated investment cost, which depends on the nature of the investment in question. In this framework, a public debate on radioactive waste management was not necessary.
However, the French Government, and more specifically the minister in charge of environment and the minister of industry, decided to launch such a debate, because of the extreme sensitivity of the public to this subject, which raises a lot of interrogations relating to the radioactive waste management and the social, economical and environmental issues for present and future generations.

QE.19.7	Art. 19 § E.2.2.2 p. 54,55 E.2.2.3.1.1 The safety options says; "When an operator intends to build a new BNI, it is normal although not mandatory for it to present the safety objectives and main characteristics as early as possible, and well before submitting a licence application. The ASN asks the IRSN for its opinion on these proposals and then informs the operator of the questions to which it will have to provide answers in its authorisation application. This preparatory procedure does not replace the subsequent regulatory examinations, but aims to make them easier." Does this mean this preparatory procedure is not codified? On the other hand, "E.2.2.2 " says ; "Well before requesting an authorisation, the operator informs the administration of the site(s) on which it envisages building a BNI. It is then possible to examine the main characteristics of the future sites at a very early stage." Is this information provision by the operator mandatory? Is this codified?

Answer:
The preparatory procedure about the safety options is not legally codified, but there is a guide (issued by the Nuclear Safety Authority) defining what content of the dossier is expected from the operator who intends to build a new BNI .

QE.19.8	Art. 19 § E.2.2.3.2.2 p. 55 BNI site selection procedures: Your decision concerning a public debate before searching a suitable site for new BNI from geological point of view can lead to certain difficulties. Do you have sufficient number of prospective sites for such a BNI like a deep geological repository?

Answer:
The law of 30 December 1991 specifies that the research on geological disposal be held with underground laboratories. The government decided in 1998 that the research into geological disposal should be performed at Bure and in a second underground laboratory in a granitic site to be selected. The siting process for granite set up in 2000 did not succeed because of strong local opposition. However, in parallel with the elaboration of Dossier 2005 argile ANDRA produced a Dossier 2005 granite on the interest to implement a disposal in a granitic formation in France. The conclusion of the dossier was that it would take much more research to qualify any granitic site in France and ASN position is that seeking a second site does not appear to be a priority from a safety standpoint, notably because of the favourable properties of the Bure site. The provisions to make before deciding the construction of a geological repository as for public inquiries or public debate will be included in the law of 2006 on radioactive waste management.

QE.19.9	Art. 19 § E.2.2.3.1.2, 2.2.3.2.1 and 2.2.4.2 p. 55,57 In the section E2.2.3.1.2, 2.2.3.2.1 and 2.2.4.2, you say that the operator is required to submit "preliminary safety analysis report" for a plant authorization, the "provisional safety analysis report" for pre-commissioning license and a "final safety analysis report" for authorization for final commissioning and you also say that the "final safety analysis report" has to be updated at every periodical safety reviews. Please give the difference or the definition of each "safety analysis report"

Answer:
The preliminary safety analysis report is appended to the plant authorisation application which leads to the publication of the authorisation decree for the construction of a BNI. It details the main safety characteristics of the future BNI at an advanced stage of the project. The authorisation decree requires the operator to submit to the ASN at least six months before the date scheduled for initial loading of facilities containing a reactor with nuclear fuel or use of particle beam or radioactive substances in other facilities, some reports and especially the provisional safety analysis report. This report contains information guaranteeing the conformity of the installation with technical construction requirements of the authorisation decree. This decree sets the time within the installation is to be commissioned. After first start-up, the operator submits a final safety analysis report and the ASN has to

review it before the time set within the installation is to be commissioned. This document must reflect the experience acquired during the operating period since the initial start-up.

QE.19.10	Art. 19 § E.2.2.3.2.2 p. 56 It is noted in the report that the subject of the public inquiry is to inform the public and receive its perceptions, suggestions and counter-proposals, to enable the competent authority to obtain all the information it needs. It is also noted that the length of the public inquiry is between a minimum of one month and a maximum of two months, although it can be extended by a further two. Is the public involved in some way at an earlier stage of the process? A period of a few months for the public inquiry seem to allow a very short time for interested persons to act?

Answer:
For the BNI for which the anticipated cost is higher than 300 Million Euros, the legislation stipulates a public debate must be organized, before the public inquiry. Interested people are thus able to act in a longer time-frame before the construction of the facility. Nevertheless, the decision to build some nuclear power plant or the ITER reactor were taken before the organization of the debate, which seems confusing about what types of issues could be raised in such debates.

QE.19.11	Art. 19 § E.2.2.4.6 p. 60 Could France provide some additional information on ASN´s 2003 instruction concerning shut down and dismantling? Is that publicity available?

Answer:
The statutory procedures for the decommissioning of basic nuclear installations are given in the SD3-DEM-01 guide, which is available in French on the ASN website : www.asn.gouv.fr.
It is also available in English on request.

QE.19.12	Art. 19 § E.2.2.6 p. 61 What aspects are checked in inspections of the general designers and suppliers of the operating organisations, and how are they checked? How are results of such inspections taken into account in activities of the operating organisations, contractors and suppliers? What are the results from inspections of the FRAMATOME-ANP capability of designing facilities for spent fuel management?

Answer:
According to the law (decree of 10 August 1984) the operators set provisions to define, obtain and maintain quality of the structural elements, the materials, the equipments, and their operating conditions. These conditions are adapted to the level of the safety function. They apply from the design stage.
The control of the ASN consists in verifying the compliance of the operators, responsible of the safety of their installations, with the quality reference frame.
This control mainly takes the form of inspections in the engineering offices of the large nuclear operators, in the workplaces of the subcontractors, on the construction sites or on the plants where the safety-related components are manufactured.
Even if the inspection is not done on the nuclear site, the BNI licensee is answerable of the results particularly concerning the quality of the work and its survey at its subcontractors.
The licensee must make sure that the subcontractors take into account the results of the inspections of ASN.
So ASN does not perform inspections at manufacturers of installations to be built abroad.

QE.19.13	Art. 19 § E.2.2.6.3 p. 62 E.2.2.6.3 Environmental Protection mainly deals with the limits of discharge of chemical substances. 1. Do the safety regulations require; 1) To assess the very long-term effect of the chemical substances contained in waste packages disposed of on the environment and human being?2) To assess the effects of radioactive materials and chemical substances contained in the waste packages disposed of on the species other than human being? 2. Which is the regulatory body that regulates the discharge of chemical substances?

Answer:
ASN is in charge of the survey of the gaseous and liquid releases and the waste issued from the BNI. Radioactive waste management therefore falls within the general framework defined by law n° 75-633 of 15 July 1975. The basic principles of this law are the prevention of waste production, the responsibility of the waste producers up until disposal, the traceability of these wastes and the need for public information.
For the BNI's the waste management is required in by the order of 31 December 1999. According to this order, every BNI licensee must produce a "Waste study" describing the risk of producing contaminated, activated or non-radioactive waste. The licensee must describe in what way it reduces the volume and the chemical biological and radioactive toxicity of the waste and how he favours recycling versus a definitive disposal, only reserved to ultimate waste.
Moreover there are specific rules for waste packages, for industrial waste or radioactive wastes transport operations, for recycling operations, and for the storage or disposal provisions.

QE.19.14	Art. 19 § E.2.2.7.1.2 p. 64 The report notes that ASN draws up an annual programme of inspections, taking account of the inspections already conducted, its knowledge of the installations and the progress made on technical subjects under discussion between the ASN and the operators. What about long-term strategies? Are there plans covering longer periods of time as well?

Answer:
ASN draws up a planning of technical subjects to be inspected on a periodic basis on every facility. For example 13 topics to be inspected every 3 years and 18 topics to be inspected every 5 year are taken in account for NPP. The same principles are applied for radioactive material transportation, for nuclear fuel cycle facilities and for research nuclear facilities. ASN applied this strategy for radiological facilities.

QE.19.15	Art. 19 § E.2.2.7.1.2 p. 65 From the table one can see that the proportion of unannounced inspections in relation to the total number of inspections has increased from about 10% in 1998 to almost 30% in 2004.What is the reason for this development? Please elaborate.

Answer:
Generally, inspections are announced to the operator several weeks before in order to give information about the inspection, to plan the availability of the persons, and prepare the documentation. When the inspection aims at verifying the on-field operations, unannounced inspections are performed. This is the case for inspections about outage supervision, dismantling or clean-up operations, effluent release control, emergency or fire drills. The number of inspections upon these topics has increased and so the number of unannounced ones.

QE.20.1	Art. 20 § E.3.1.3 p. 72 What part of the ASN staff is responsible for regulation of the activities covered by the Convention?

Answer:
ASN first sub-directorate (SD1) is, among others, in charge of fuel cycle supervision. The second sub-directorate (SD2) is in charge of nuclear reactors supervision. The third sub-directorate (SD3) is, among others, in charge of nuclear waste and decommissioning of nuclear installations supervision. These three directorates are therefore in charge of the supervision of activities covered by the Convention. One should add though the staff from ASN regional teams whom in-the-field supervision include waste and fuel control.

QE.20.2	Art. 20 § E.3.1.3.1.1 p. 72 If CEA executives are made available to ASN to serve as employees, how does the regulatory body avoid conflicts of interest and ensure independence between the regulator and the operator?

Answer:
CEA executives employed by ASN serve to regulate activities conducted by other nuclear operators such as EDF, ANDRA, AREVA or to regulate radiological operators (hospitals, gammagraphy…) These CEA executives are not in charge of direct supervision of CEA's facilities.

QE.20.3	Art. 20 § E.3.3 p. 76 The report notes that the in 1990, the Parliament asked the Parliamentary Office the Parliamentary Office for assessment of scientific and technological options to examine how the safety and security of nuclear facilities was supervised. Since then, this duty has been renewed on a yearly basis. Is this to be interpreted such that the office performs a yearly review of e.g. ASN with regards to adequate authority, competence and financial and human resources of the ASN to fulfil its assigned responsibilities? Please elaborate.

Answer:
Please, read further information on :
http://www.assemblee-nationale.fr/documents/index-oecst-gb.asp.
OPECST senior executives have identical powers as French budgetary " rapporteurs ": they may carry out direct investigations on any organisation dependent of the State and have access to any available document, with the exception of those dealing with military matters or State security. In addition, in the event of difficulties encountered in exercising their mission, OPECST senior executives may request to be given the prerogatives granted to parliamentary committees of inquiry.
Over the last ten years, the ASN has closely worked with the Parliamentary Office. The ASN feels that, even though executive power is to remain within Government hands, the Office plays a major positive role in the Parliament supervision of Government nuclear activities supervision.

Section F – Other general safety provisions – Articles 21 to 26:

QF.21.1	Art. 21 § F.1.2 p. 79 F.1.2 Radioactive waste management It is noted that 'the producer of …[radioactive] waste remains responsible for it up until final disposal in duly authorised facilities'. What are the implications if the producer of the HLW is no longer in business before a storage location has been found?

Answer:

The draft law regarding radioactive waste management presented by the Government to the Parliament contains an article concerning financial provisions and funds to be built up by the nuclear operators, in order to cover future expenses related to the long term management of their radioactive waste (notably HLW and ILW-LL) and decommissioning/dismantling of all their nuclear installations. According to the draft law the funds, managed by the operators, shall be earmarked. They shall be used for the purpose they have been built for and protected against creditors in case of bankruptcy. The operators shall issue a report periodically. The level of provisions (estimate) and the funding system (including the assets) shall be controlled by the administrative authorities. The administrative authorities shall ask the operators for corrective measures if needed.

QF.22.1	Art. 22 § F.2 p. 81 Could you provide cost estimates for storage/disposal of a volume or weight unit of radwaste depending on activity?

Answer:

Centre de l'Aube present operating costs give a mean cost per delivered cubic meter of about 2,200 €. It takes into account construction and closure of disposal vaults. However this figure is very sensitive to delivered volume as the main part of expenditures is made of fixed charges (that do not depend on delivered volume). Therefore an increase of deliveries would reduce the volume unit cost. This cost includes operating of the conditioning facilities of Centre de l'Aube. Other cost components can also be considered:

- siting and construction costs for the facility (without vaults): about 213 million € (1989),
- closure cost. As an indication the cost for Centre de la Manche closure (disposed volume: 527,000 m^3) was about 110,000 k€ (1990). Closure works should be simpler for Centre de l'Aube due to the design of the vaults and to the present requirements for waste packages.
- monitoring costs for the institutional period. As an indication the assessment commission for the closure of Centre de la Manche gave a target value of 1 million € (1996) per year for long term monitoring that could be provided by an initial fund of 75 million €.

For Centre de Morvilliers facility the mean disposal fare is 270 €/t (2003) of delivered standard waste. It includes construction, operation (including conditioning facilities), closure and institutional control (30 years). However Main generators secures this cost by a guaranteed inventory to be delivered to the repository and by safeguard in case of a change of operation conditions.

QF.22.2	Art. 22 § F.2.1 p. 81 Regarding the special fund that is planned to be created in France: are research activities on management of LILW going to be financed; is the fund going to be used to cover ANDRA's future expenses for long-term storage of all wastes and of spent UOx and MOX fuels; how is the fund going to be managed and what mechanism is envisaged for collection of contributions from all waste producers?

Answer:
In France, at present, there is no special fund for the long-term management of radwaste. This is incumbent upon the licensees in the general frame of their own financial provisions. However, the French Government asked CEA, AREVA and EDF to build up dedicated funds.

QF.22.3	Art. 22 § F.2.1 p. 81 As far as at present national funds for management of spent fuel and radioactive waste, including post-closure control of disposal facilities, does not exist, how is the assurance of sufficient financial resources of the operators of spent fuel and radioactive waste management facilities guaranteed?

Answer:
For the future, the Government does not propose, in the draft of the bill, the creation of such a special fund for radwaste management but only asks the operators to identify and provide the necessary assets.
The amount of these assets must be equal to the provisions built up for the nuclear charges. The financial yield should allow disposing, after the operational phase, of sufficient resources in order to finance the dismantling operations and the radwaste management.
These assets cannot be used for another purpose and cannot be claimed by any creditor.
They must be registered in a distinct manner.

QF.22.4	Art. 22 § F.2.2.1 p. 82 Andra funds come from conventions or contracts signed with the main waste producers. Do the contracts contain provision, that in case of the production of extra amount of radioactive waste (for example during an incident), who will cover the cost of the building of a new repository?

Answer:
No. For the construction of each repository, ANDRA negotiates with industrial firms, usually CEA, COGEMA and AREVA, a private contract so that the costs are covered. This question concerns in fact waste producers. When they produce waste, they have to make the correct reserve or "legal provision". They are responsible for their wastes.

QF.22.5	Art. 22 § F.2.2.1.1 p. 82 Are there any considerations that Andra or an other "state utility" will be responsible for the decommissioning of all nuclear installations instead of the operator?

Answer:
The French Nuclear Safety Authority favours a decommissioning by the operator who used to operate the installation, to take advantage of the knowledge and the experience gained through decades of operation.
There is no consideration to ask ANDRA or another "state utility" to be responsible for decommissioning of all installations.

QF.22.6	Art. 22 § F.2.2.1.1 p. 82,83 The report says that the national Agency for radioactive waste management (Andra) funds come from conventions or contracts with the main waste producers. a) Is there any legal requirement that specifies the amount and duration of funding or an allocation system for the different waste producers?b) In which way is it ensured that the received income meets the actual costs of planning, licensing and construction of a repository? Does the fund already comprise all the means to cover the estimated costs (of €5 bn)? c) What happens if the received income does not meet the estimated costs?d) Who was/ is responsible to pay into the fund?e) Who is the manager and the controller/supervising authority of the fund?

Answer:

Up to now, one must have in mind that neither ANDRA nor the state have specific funds. The costs of the waste management are supported by the producers according their needs and after private law negotiation

- there is no regulatory or legal request that sets the amount and the duration or the balance of the payments.
- For each contract ANDRA negotiates with the producers
- If it is an "at cost" contract the financing is euro to euro. If it is a "fixed rate" contract, ANDRA can lose but also earn money
- Any operators who sends waste on the ANDRA site must pay for it
- There are no public funds. The financing of ANDRA is guaranteed by contracts. The board of directors is composed of representatives of EDF, CEA, AREVA and members of the government.

The waste producer must consider, in their account, funds for financing the nuclear waste.

QF.22.7	Art. 22 § F.2.2.2 p. 83 How are the payments in the specialised fund for decommissioning of the CEA nuclear facilities collected; who makes payments?

Answer:

The dedicated fund of CEA for the dismantling of civilian installations is an internal fund aimed at collecting and identifying the available assets needed during the different dismantling operations. An initial capital endowment has been paid by the funds when it was created in 2001. Each year, CEA also devotes a part of the dividends paid out by AREVA to its funding.

QF.22.8	Art. 22 § F.2.2.4.2 p. 85 a) Is the term "reserve" to be understood as "provision" in the meaning of a balance sheet?b) Do any additional mechanisms exist to ensure the assets are availability at the time of decommissioning?c) Who is in charge of (1) managing and (2) controlling/supervising the "reserves"/ assets?

Answer:

The term "reserve" has to be understood as "provision" in the meaning of International Accounting Standards. Additionally, EDF is gradually building a portfolio of dedicated assets (equity and bonds) so as to match some of these provisions (decommissioning and high level waste long term disposal) and to ensure the availability of financial resources when needed. The situation of the provisions are checked periodically by independent accounting auditors and also, on his own initiative, by the French High Accounting Court.

QF.22.9	Art. 22 § F.2.3 p. 86 It is noted in the report that the ASN examines the general organisation of the operators and that there are at present no particular problems in this area with the operators. Nonetheless, the ASN is currently working to improve its system of human resources supervision. What is the rationale for this work and what is the scope? Does it relate to improvements in general or specific questions?

Answer:

The ASN is currently developing actions for improving the supervision of human and organisational factors, in relation with its technical support, the IRSN.

This concerns different issues related to human and organisational factors, including licensee's human resources. Improvement is based on different actions such as training of inspectors, elaboration of specific inspection guides, etc.

Regarding human resources and competence, the "Quality" order of 10 August 1984, requires, in particular, that only adequately skilled staff be assigned to quality-related tasks. Accreditation of an individual for a given activity is granted by the operator for the activities performed by its staff or by the supplier if they are sub-contracted, and this accreditation attests to a person's qualification for the specified tasks and responsibilities.

The ASN is not involved in the accreditation process of operators' staff.

The management of competence within the licensee organisation is mainly supervised through :

- safety assessment of the licensee's approach, method and results,
- inspections on site, in particular specific inspections on management of competence,
- other elements of information coming from meetings, documents, local authority information and overviews concerning sites.

QF.22.10	Art. 22 § F.2.3 p. 86 ASN is currently working to improve its system of human resources supervision. What types of changes are ASN considering to improve human resources supervision?

Answer:

The ASN is currently developing actions for improving the supervision of human and organisational factors, in relation with its technical support, the IRSN.

This concerns different issues related to human and organisational factors, including licensee's human resources. Improvement is based on different actions such as training of inspectors, elaboration of specific inspection guides, etc.

Regarding human resources and competences, the "Quality" order of 10 August 1984, requires, in particular, that only adequately skilled staff be assigned to quality-related tasks. Accreditation of an individual for a given activity is granted by the operator for the activities performed by its staff or by the supplier if they are sub-contracted, and this accreditation attests to a person's qualification for the specified tasks and responsibilities.

The ASN is not involved in the accreditation process of operator's staff.

The management of competence within the licensee organisation is mainly supervised through :

- safety assessment of the licensee's approach, method and results,
- inspections on site, in particular specific inspections on management of competencies,
- other elements of information coming from meetings, documents, DSNR information and overviews concerning sites.

QF.23.1	Art. 23 § F.3 p. 89,95 How can be made consistent the application of ISO 9001 (conventional industry and focused to the clients) with fulfilling AIEA and others international nuclear quality assurance standards (focused on the safety and more strict), applicable to activities concerning the safety of spent fuel and radioactive waste management?

Answer:
The implementation of the quality order of 10 August 1984 is applicable to activities concerning the safety of spent fuel and radioactive waste management. The quality assurance rules have proven to be fully consistent with both this quality order and ISO 9000 requirements.

QF.23.2	Art. 23 § F.3 p. 89,95 What is the regulatory framework for inspecting external companies?

Answer:
According to the law (order of 10 August 1984) the operators set provisions to define, obtain and maintain quality of the structural elements, the materials, the equipments, and their operating conditions. These conditions are adapted to the level of the safety function. They apply from the design stage.
The control of the ASN consists in verifying the compliance of the operators, responsible of the safety of their installations, with the quality reference frame.
This control mainly takes the form of inspections in the engineering offices of the large nuclear operators, in the workplaces of the subcontractors, on the construction sites or on the plants where the safety-related components are manufactured.
Even if the inspection is not done on the nuclear site, the BNI licensee is answerable of the results particularly concerning the quality of the work and its survey at its subcontractors.
The licensee must make sure that the subcontractors take into account the results of the inspections of ASN.

QF.23.3	Art. 23 § F.3 p. 89,95 How do you inspect the procedures or quality assurance system of both licensee and external companies regulating the interactions between the licensee and its external companies?

Answer:
Inspection of the procedures or quality assurance system of both licensee and external companies regulating the interactions between the licensee and its external companies is one of the technical topics conducted every 3 years on NPP. During outage, relations between operator and external companies are checked. Conclusions of inspection are sent to the operator who is responsible of safety. Inspectors have the opportunity to interrogate employees of external companies.

QF.23.4	Art. 23 § F.3 p. 89,95 How does your Regulatory Body maintain confidence in the way licensees control the work done by the external companies?

Answer:
ASN maintain confidence in the way licensees control the work done by the external companies on the basis of the conclusions of inspections conducted on the topics of "external companies" .

QF.23.5	Art. 23 § F.3 p. 89,95 What type of inspections does your Regulatory Body carry out to verify the effort spent by the Licensee doing contractors supervision?

Answer:
Inspection of the procedures or quality assurance system of both licensee and external companies regulating the interactions between the licensee and its external companies is

one of the technical topics conducted every 3 years on NPP. During outage, relations between operator and external companies are checked. Conclusions of the inspections are sent to the operator who is responsible of safety. Inspectors have the opportunity to interrogate employees of external companies.

QF.23.6	Art. 23 § F.3 p. 89,95 Do you visit external support companies or manufacturers sites? If not, why not?

Answer:
Yes.

QF.23.7	Art. 23 § F.3 p. 89,95 Does Regulatory Body have regulatory authority over the external companies of licensees and their subcontractors?

Answer:
No, ASN's authority applies to the operator who is responsible of safety.

QF.23.8	Art. 23 § F.3 p. 89,95 For contractors located away from the nuclear power plant, in what capacity do you visit the external companies' sites?

Answer:
Insofar as the subcontractor participates directly or not to the safety of the nuclear installation, its contribution must be taken into account in the quality reference system of the licensee. The control of ASN is about the compliance of the licensee with this system, and so the control can be performed at the subcontractors. However, the licensee has to account for the results of the control by ASN.

QF.23.9	Art. 23 § F.3 p. 89,95 What do you do to make sure that safety related recommendations by external companies are assessed and implemented?

Answer:
In the frame of inspection on the topic of " the compliance with the commitments" ASN makes sure that the licensee has implemented his commitments following the control of ASN. In this case he makes sure that the commitment toward the subcontractors has been taken into account.

QF.23.10	Art. 23 § F.3 p. 89,95 Which qualification and training requirements for recruiting personnel are currently applied for suppliers?

Answer:
For AREVA, the requirements concerning the training and the qualification of the subcontractor's workers are the same as the ones applied to AREVA group workers. This commitment is written in the nuclear safety Chart of the group : subcontractors and co-workers are treated in the same way.
For CEA the heads of the installation make sure that the contracting companies are able to give the expected training to their employees.
For EDF for any safety related activity, the suppliers and their personnel must be recognized as being qualified or able to work within a pre-established quality framework. A control or surveillance program is implemented by the nuclear operator.

QF.24.1	Art. 24 § F.4.1.1.1 p. 97 How exactly is the optimization process implemented in the operational radiation protection? Who is responsible for the planning of work carried out in the restricted areas and who controls it?

Answer:
According to the law, the optimization process is implemented at all the BNI operators: the level of optimization defined by the operators must also be justified.
A permanent check of the operational dosimetry aims at verifying the progress of the operation. The permanent follow up of the operational exposure aims at verifying that the operation will reach the foreseen objectives of the doses. In case on a discrepancy, complementary studies and corrective actions are put in place.
The operations in the monitored zones, are authorized under the responsibility of the head of the installation according to dosimetric issues. He relies on the radiation protection board's expertise.

QF.24.2	Art. 24 § F.4.1.2 p. 98,99 Are the dose limits in terms of the critical group or the maximally exposed individual?

Answer:
The release limits are set on the basis of the estimation of the radiological impact on the most exposed reference group.

QF.24.3	Art. 24 § F.4.1.2.2 p. 99 It is reported "clearance" is not used and the notion of "trivial dose" (e.g. 10 microSv/year) is not introduced in French regulations (F.4.1.2.2.). However special arrangements for organising and monitoring radioactive decay in-situ are possible (half-life of less than 100 days). When can the supervisor decide that radioactive decay is sufficient ?

Answer:
For the management of waste and effluents from other establishments than BNIs and ICPEs, the operator has to discriminate the waste including radionuclides with a half-life of less than 100 days from those with a half-life of more than 100 days. This should be done from the beginning of the waste production. Radionuclides with a half-life of less than 100 days can be monitored by radioactive decay in a specific room. The waste can be released after a period at least 10 times the half-life and after a specific monitoring to prove the radioactivity is sufficiently low (1.5 to 2 times the background radioactivity). The operator has to describe his management of waste and effluents in a report which is submitted to the ASN.

QF.24.4	Art. 24 § F.4.1.2.2 p. 99 What are the dose constraints for any member of the public during normal operation and in accident conditions of radioactive waste disposal facility?

Answer:
The regulation about surface disposals for radioactive waste does not ask the operator to comply with a dose constraint, but imposes that the current regulation on radiation protection shall be applied. Nevertheless, ANDRA sets in its safety report a limit of 0,250 millisievert per year to verify the acceptability of its safety analysis in the case of normal evolution scenarios. For unlikely events, ANDRA considers an objective of 10 mSv per year. The limit of 0,250 millisievert also exists as radiological criterion in the Basic safety rule III.2.f that sets the criteria for the siting of a geological disposal.

QF.24.5	Art. 24 § F.4.1.3 p. 104 Professional activities that lead to exposure now have obligations to monitor doses to the public (page 104). Is this a new responsibility? If this is a new responsibility, why were the doses to the public from these facilities not monitored previously?

Answer:
The concerned professional activities have been listed on the basis of EEC recommendations. Under the responsibility of the operator (responsible of the facility), public exposures have now to be assessed, for each facility. Doses to the public have not been monitored before because of the absence of regulation.

QF.24.6	Art. 24 § F.4.1.4 p. 105 The release of a new order that defines new radiological monitoring programs for mains water and non-mineral bottled waters is noted (page 105). Have the levels of radionuclides in these sources of drinking water been monitored prior to 2002? Why has this new order been promulgated, and are there separate orders for mineral bottled waters?

Answer:
The monitoring of the radiological quality of drinking water was still required before 2002 but not for each sampling point (only for the most important catchments). The new order extends the monitoring for all water supplies, in accordance with WHO recommendations and EEC directive (98/89). Regulation of mineral water is separated at European and national levels, without any reference to radiological issue.

QF.24.7	Art. 24 § F.4.1.6.1 p. 107 Which assumptions or models have been used to derive the discharge permits which ensure that the annual dose limit for the population is not exceeded? How does France derive discharge permits from immission values? What is the order of magnitude of the annual discharge activities of the most important waste management facilities?

Answer:
Concerning the Centre de la Manche repository it is first recalled that :

- the drainage systems collect the water liable to be contaminated (called « hazardous » effluents),
- this water is inspected and then discharged to the sea through COGEMA's systems.

A ministerial order then sets the limits for the sea releases. These limits are :
- alpha emitters : 0.125 GBq/year
- beta gamma emitters : 0.25 GBq/year
- tritium : 125 GBq/year

For these limits, the calculated impact is 6.7 10^{-5} microSv/year.
In 2004, the actual releases were the following
- alpha emitters 2,73 MBq,
- beta gamma emitters : 9,69 MBq
- tritium : 7,8 GBq

The impact of the releases on the population is calculated by models considering the released activities, the dispersion effect by the sea, the activities of the seabed sediments and the marine fauna, the calculation of the dose by internal and external exposure and the sum of both.
This modelling, considering in a penalizing way the alpha releases as plutonium 239 and the beta gamma releases as cobalt 60, led to an estimation of the impact on the reference group of 6.7 10^{-5} microSv/year.

Note : for the Centre de l'Aube repository, a revised interministerial order is in preparation and should be issued in the next future.

QF.24.8	Art. 24 § F.4.2.2.4 p. 111 Water monitoring - how deep do you have your dumps for sampling of underground water? Why do you measure total alpha activity in underground water only at the CEA and COGEMA sites? What is the difference between the level of radioactivity near BNI's in comparison with the average level of natural radioactivity in France - is it comparable?

Answer:

The survey program for an AREVA site depends on the site itself for the monitoring of the quality of ground waters under or close to the buildings of each site : so the depth of the drillings depends on the geological nature of subsoil and is aimed at controlling the hydrodynamic, chemical and radiological characteristics of the aquifers and their evolutions.
CEA measures total alpha radioactivity in underground water at its sites due to its activities.
At EDF, environmental monitoring includes continuous environmental monitoring and measurements of radioactive and non-radioactive discharges into the environment.
The monitoring function ensures that the regulations are complied with. The follow-up function comprises radio-ecological studies (ten-year review, annual reviews, special studies and surveillance, etc.), and hydro-ecological campaigns.
Every year, radio-ecological follow-up is carried out on all operating nuclear sites. It is part of a follow-up programme which covers the entire installed base since 1992 and offers a picture of the impact of the facilities in terms of both space and time.
A ten-yearly review, comparable to the "point zero" at the time of commissioning the first unit of a site, is also conducted. Analysis of the radio-ecological follow-up results confirms the absence of any impact of radioactive discharges on the environment.
The regulation for waste release includes measurements in the different areas of the ecosystem which are mainly based on beta total emitters, potassium and tritium activity measurements. It is to be noted that for EDF NPPs, any alpha release, which would be a consequence of fuel cladding leakage, would be first detected by primary water measurements. In case of such potential leakage of small alpha quantities in the environment, they would be accompanied with tritium and beta activity which are in larger quantities and much more easily measurable in the environment at a precocious stage, as required by regulation.
It is to be recalled that before any liquid release, a measurement is performed to check the absence of alpha emitters. Some alpha measurements are performed during the ten yearly radio-ecological review within soils and sediments as mentioned above.

QF.24.9	Art. 24 § F.4.3.1 p. 119 Could you provide the explanation what is the reason that only contractors from BNIs (Basic Nuclear Installations) exceeded the annual dose limit of 20 mSv? This might indicate that outside (contract) workers have not the same level of radiation protection as the plant personnel.

Answer:

Doses received at the work places by the subcontractors are often higher due to the specificity of operations as maintenance or decommissioning that require their presence close to contaminated or irradiating equipments.

QF.24.10	Art. 24 § F.4.3.2 p. 120 Obviously there is noticeable overexposure in medical and industrial branches. Do you plan any corrective measures?

Answer:

For medical activities, practices of concern are mainly in the field of interventional radiology. Information actions are in progress. In industry, radiography is a priority for the inspections.

The report of IRSN of 2004, does not show an abnormal number of over exposures in the industrial and medical fields. The number of doses exceeding 20 mSv has dropped by a factor 4, from 40 in 2003 to 10 in 2004.

QF.25.1	Art. 25 § F.5.1.3.2 p. 123 In the emergency response plan there is an adoption of accident scenarios determining the envelope of possible consequences. Are there any scenarios which are based on possible accident of spent fuel assemblies? Have you ever had an emergency response exercise regarding spent fuels?

Answer:
There has been an emergency exercise based on an accident of fuel assembly handling, taking place in the Tricastin NPP, in the fuel building, in November 2005.

QF.25.2	Art. 25 § F.5.2.1.1 p. 124 What is the monitoring measures taken to check the emergency situations in radioactive waste facilities such as the Aube repository?

Answer:
The measures taken in the case of emergency situations at the Centre de l'Aube, are described in a regulatory document called Internal Emergency Plan (PUI) Each site (repository and research laboratory) has his own PUI.
This document describes the situations that could occur namely : drop of a package, fire, accident on a person, lost of a utility (power, water, compressed air supply) lost of containment of the conditioning installations, lost of computerized system, abnormal release.
In the occurrence of such an event, an computerized information is sent and stored 24 hours a day. On the site there are sensors for continuous survey equipped with alarm: radiation protection, air or water contamination, fire, utility failure…
Cases where these events could affect the environment have been identified and if such events occurred would lead to following actions :
- for the storm water tank, the valves would be closed and the release pumps would be shut down
- for the stacks, the ventilators would be automatically shut down
- for the underground water, the origin of the pollution would be investigated.

QF.25.3	Art. 25 § F.5.2.1.3 p. 124 It is stated that ASN participates in informing public and media along with Prefect, local and national operators. What arrangements are in place to ensure dissemination of information by various organizations in consistent and coordinated manner?

Answer:
ASN takes part to the public information in close relation with the operators and the local prefect. If it is agreed that these structures communicate in their own field of competence, this is done in full consultation before communicating. Drills allow to verify the coherence of the messages sent.

QF.25.4	Art. 25 § F.5.2.2 p. 125,126 The report suggests that IAEA and EU would be involved in the response to a significant emergency originating from a French operation. How would the French authorities reconcile any conflicting direction from the EU (CEC), IAEA and the Prefect with respect to a national emergency having international dimensions?

Answer:
The French emergency preparedness takes into account the exchanges with the neighbouring countries and the EC, mainly in the frame of international organisations (IAEA, NEA). France has signed an international convention on rapid notification of an accident and a convention on international assistance in case on a nuclear accident and applies European rules on importation or contamination of consumption goods. Bilateral agreements precise

the provisions for the alert and the consultation between the local and national authorities on both sides of the border.

The Prefect of the *département* in which the facility is located, is responsible for deciding on the necessary measures to protect the population and property threatened by the accident. He acts within the framework of an off-site emergency plan (PPI) which has been specifically prepared for the facility in question. In this respect, he is responsible for co-ordinating the resources committed in the PPI, both public and private, material and human. He informs the population and the elected representatives.
The organisation is tested during nuclear emergency drills. France participated to international drills organised by the EC and IAEA (Convex 3 and Ecurie 3)
At present there is no organisation for consultation or for conflict regulation at international level in emergency situations but the drills aim at identifying the difficulties to be raised.
Steady exchanges in normal situation, and the bi- or multilateral drills must allow to identify the drifts between the national practices. This is a first step in the way of the harmonization of the counter measures to limit the sources of conflict.

QF.25.5	Art. 25 § F.5.2.4.3 p. 128,129 What kinds of on-site and off-site emergency drills are carried out? And how often such drills are conducted?

Answer:
There are two types of emergency response plans for nuclear facilities: the on-site emergency plan (PUI), drawn up by the operator, and the offsite emergency plan (PPI), drawn up by the Prefect, which is designed to provide short-term protection of the population
The PUIs are tested once a year and the PPIs every 3 years. Two topics can exist : one about nuclear safety, the other about population security.

QF.25.6	Art. 25 § F.5.2.4.4.1.3 p. 130 F.5.2.4.4.1.3 Stable iodine preventive distribution Has France any plans to improve its iodine distribution method in order to increase the iodine coverage of the population, in the area surrounding nuclear facilities that require an off site emergency plan (I), from 80% to 100%?

Answer:
New distribution methods have been tested in 2005. They aim at covering all the population living inside the PPI perimeters. They consist in a nominative invoice of a withdrawal bill at the chemist's followed by postal sending of the tablets to the people who have not withdrawn them at the first phase. A report will be done by the end of 2006. The first results are encouraging.

QF.25.7	Art. 25 § F.5.2.4.4.1.3 p. 130 Luxembourg appreciates the detailed description of the stable iodine prevention distribution. However, given the problems with effective distribution methods, the shelf-life of these tablets seems to be very short. How was the extension of the shelf-life from 3 to 5 years achieved? Do you consider to further extending the shelf-life of the tablets?

Answer:
In order to put a medicine on the market, one must have a specific authorization (autorisation de mise sur le marché : AMM) that indicates among others, the shelf life limit. The producer of the iodine tablets has first obtained an AMM with a shelf life of 3 years. Tests performed under the supervision of AFSSAPS on older batches allowed to extend this limit first to 5 then to 7 years.

QF.25.8	Art. 25 § F.5.2.4.4.1.3 p. 130 Please describe in some more detail the French strategy on iodine tablet distribution, i.e. is there a centrally located store from where iodine tablets will be distributed in case of emergency? And what are the routines for distribution of iodine tablets so that they are available for all who would need them in case of an emergency?

Answer:
Two cases must be considered :
- Distribution inside the PPI perimeters :
New distribution methods have been tested in 2005. They aim at covering all the population living inside the PPI perimeters. They consist in a nominative invoice of a withdrawal bill at the chemist's followed by postal sending of the tablets to the people who have not withdrawn them at the first phase. A report will be done by the end of 2006. The first results are encouraging.
- Distribution outside the PPI perimeters :
The stocks foreseen outside the PPI perimeter of the installations likely to discharge Iodine, have been distributed in the "*Départements*" according to the local context. Situation can be very different. Generally there are several dozen of storage places and several hundreds of distribution places. The stockpiling was a difficult operation and is not yet achieved or in place. A new estimation of the needs and of the operation is under way.

QF.25.9	Art. 25 § F.5.2.4.4.1.5 p. 131 Could you provide a latest information on the status of setting a structure in charge of establishing national doctrine of post-accident phase management?

Answer:
DGSNR is the structure officially designated to establish a post incidental doctrine. A structure named CODIRPA has been put in place to federate these reflections for mid 2007.

QF.26.1	Art. 26 § F.6 p. 133 What are the licensing procedures for decommissioning of nuclear facilities? Are they different to CEA, COGEMA and EDF?

Answer:
The licensing procedure regarding decommissioning are given by the 1963 decree and the SD3-DEM-01 guide issued in 2003. Rules are the same for all operators of nuclear facilities.
The SD3-DEM-01 guide in French is available on the ASN website (http://www.asn.gouv.fr).
An English version can be available on request.

QF.26.2	Art. 26 § F.6 p. 133 What kinds of records are kept in the decommissioning stage? And how can they be utilized for future decommissioning cases in the different organizations?

Answer:
Rigorous data management and record keeping are recognized as an essential part of decommissioning due to the long period involved. This record keeping is managed during the 4 main phases of the life cycle of the nuclear installation. The list below is illustrating the main documents to be kept but has not the objective to be exhaustive.

Phase 1 : Conception and Construction
The following documents are of utmost importance and have to be traced because they constitute the basis of the initial physical inventory.
The Safety report (necessary to obtain the operating decree).
The Waste Zoning of the installation and the waste study.
The engineering construction data books (containing cells, equipments data)
The decommissioning cost elaboration (required to establish the funds)...

Phase 2 : Operation
Trace of all the modifications during the operating life (these will be integrated in the different revision of the Safety report).
Trace all the incidents. (event tracking service)
Records of the different operator teams.
Preliminary studies to start the decommissioning.(post clean out operations and dismantling global scenario).
Radiological inventory of the installation.
Waste study.
Environmental Impact Study.

Phase 3 : During decommissioning
As the operating experience of a nuclear facility may be lost when the installation is shutdown, one important key element of the planning is to identify and store before shutdown.
Decommissioning management information system (planning, execution, supervision, organisation, cost).
Safety documentation analysis.
Decommissioning work reports.
Feed-back decommissioning reports.

Phase 4 : After decommissioning
Final feed back report.
All Documents justifying of the final state.
Environmental impact study.
Reports on servitudes (in case of transfer of ownership).

For CEA The dismantling end reports are made available to new projects. A CEA unit is in charge of collecting the lessons learnt and to return them back for other projects. These informations can be used for direct use or for establishing dismantling guides.

QF.26.3	Art. 26 § F.6 p. 133 What kinds of criteria are considered for decommissioning in the design stage of nuclear facilities?

Answer:
The preliminary safety report, appended to the plant authorization application which leads to the publication decree for the construction, contents a chapter devoted to provisions for the future decommissioning of the plant
This chapter, which was rather short in the past, becomes more detailed in the case of new plants. For example the preliminary safety report of the EPR at Flamanville indicates provisions, at the design stage, in the following areas, in order to facilitate the future dismantling itself (in particular to minimize radiation doses to the workers) and to minimize production of waste:

- optimized choice of materials,
- provisions for dismantling (also useful for maintenance) of pieces of equipment (easiness of removal, access, handling, dismantling of the vessel in a context of water, design of auxiliary equipment, design of the circuits minimizing deposits and contamination...),
- layout of the site anticipating needs for dismantling,
- collection and archive of all the necessary documents and data.

QF.26.4	Art. 26 § F.6.1 p. 133 The report says "The technical provisions -------- to measures to reduce the risks of accidents and minimise their effects". How is the differences in regulatory activities to the decommissioning stage in comparison with those of operational stage? Are regulation level reduced for decommissioning stage according to the reduced risk level? (graded approach)

Answer:
During the decommissioning stage, the number of inspections may be slightly reduced, depending on the level of activity on the site (graded approach). During major decommissioning operations, the number of inspections is as high as the one in operation. Indeed, if the risk level due to the important amount of radioactive substances present during the operational phase usually decreases during decommissioning, new risks may appear (radiation protection notably in areas where the workers have to go and handling risks for example).

QF.26.5	Art. 26 § F.6.1 p. 133 What are a "typical" time frame for an immediate decommissioning (after shut down)?

Answer:
The « typical » time frame for an immediate decommissioning (after shut down) is :

- 5 to 10 years for small facilities (research laboratory, small research reactor)
- 10 to 30 years for large facilities (nuclear power reactor, reprocessing facilities).

QF.26.6	Art. 26 § F.6.1 p. 133 Does the ASN evaluate and comment in the process of licensing also economic and financial aspects of proposed solutions for dismantling?

Answer:
No, in the present legal framework. The reflection in this field is under development, in the framework of the draft laws to be debated in the Parliament in 2006 : the law on Nuclear Security and Transparency should address the issues of the technical and financial ability of the operator of a BNI and the law on Nuclear Waste Management should set up requirements on the funding of dismantling operations.

QF.26.7	Art. 26 § F.6.1 p. 133 The report does not address record keeping for information important to decommissioning. Please explain.

Answer:
The ministerial order of 10 August 1984 regarding quality assurance in BNIs stipulates that the operator shall take all necessary measures to archive information concerning quality and description of his installations.
The records to be stored and criteria for record keeping are defined by the operator.
In the framework of inspections, the nuclear safety authority may control what measures are actually taken.
For example in the case of la Hague reprocessing plants (UP3 and UP2-800), rigorous data management and record keeping are recognized as an essential part of decommissioning due to the long period involved. This record keeping is managed during the 4 main phases of the life cycle of the nuclear installation. The list below is illustrating the main documents to be kept but has not the objective to be exhaustive.

Phase 1 : Conception and Construction

The following documents are of utmost importance and have to be traced because they constitute the basis of the initial physical inventory.

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Trace all the incidents. (event tracking service)

Records of the different operator teams.

Preliminary studies to start the decommissioning.(post clean out operations and dismantling global scenario).

Radiological inventory of the installation.

Waste study.

Environmental Impact Study.

Phase 3 : During decommissioning

As the operating experience of a nuclear facility may be lost when the installation is shutdown, one important key element of the planning is to identify and store before shutdown.

Decommissioning management information system (planning, execution, supervision, organisation, cost).

Safety documentation analysis.

Decommissioning work reports.

Feed-back decommissioning reports.

Phase 4 : After decommissioning

Final feed back report.

All Documents justifying the final state.

Environmental impact study.

Reports on servitudes (in case of transfer of ownership).

QF.26.8	Art. 26 § F.6.1 p. 133,135 The ASN [Nuclear Safety Authority] specified the regulatory framework for BNI [Basic Nuclear Installations] dismantling operations in a note signed on 17 February 2003…a) Of what legal character (binding/ non-binding/ recommendation) is the aforementioned note?b) Is the safe enclosure of a BNI a (legal) option pursuant to decree 63-1228 of 11 December 1963 or to any other law or binding regulation?c) Does any (legal) distinction between a final shutdown decree and a dismantling decree exist? If so: What typical technical measures are content of(1) a final shutdown decree and/ or(2) a dismantling decree?

Answer:

The SD3-DEM-01 note is a guide. It has no legal authenticity, but it reflects the ASN's interpretation of the 1963 decree. As a consequence, it can be considered as a recommendation. However all that is requested in this guide is required by the 1963 decree or other laws (regarding environmental impact assessment for example).

The SD3-DEM-01 guide introduces a new framework with only one license (decree) for decommissioning (which means that there is no legal distinction between final shutdown and decommissioning). The regulation does not stipulate dismantling as soon as it is reasonably feasible. However, the ASN is in favour of immediate dismantling. The legal authenticity of the SD3-DEM-01 should be enforced with the future law on Nuclear Security and Transparency.

QF.26.9	Art. 26 § F.6.1 p. 133,135 An important aspect of planning the decommissioning of a facility is that appropriate records are available when they are needed and that the timescale for keeping the records is considerable. It is not made clear what mechanisms are in place for generating, keeping and storing records to ensure that all information, for example on design, modification and operation of facilities, waste inventories and possible physical and chemical conditions of waste is kept for the long periods of time needed. How does the operator a facility decide what records (on, for example, design, modification and operation of facilities) important to decommissioning need to be kept? Do the Decommissioning plans specify the operational records that need to be kept? What powers does the regulatory body have to ensure that the operating organisations of facilities using radioactive materials, including those concerned with waste and spent fuel management and storage, have mechanisms for the collecting and storing of such records, so that they may be retrieved when needed?

Answer:

The ministerial order of 10 August 1984 regarding quality assurance in BNIs stipulates that the operator shall take all necessary measures to archive information concerning quality and description of his installations.

The records to be stored and criteria for record keeping are defined by the operator.

In the framework of inspections, the nuclear safety authority may control what measures are actually taken.

For example in the case of la Hague reprocessing plants (UP3 and UP2-800), rigorous data management and record keeping are recognized as an essential part of decommissioning due to the long period involved. This record keeping is managed during the 4 main phases of the life cycle of the nuclear installation. The list below is illustrating the main documents to be kept but has not the objective to be exhaustive.

Phase 1 : Conception and Construction

The following documents are of utmost importance and have to be traced because they constitute the basis of the initial physical inventory.

The Safety report (necessary to obtain the operating decree).

The Waste Zoning of the installation and the waste study.

The engineering construction data books (containing cells, equipments data)

The decommissioning cost elaboration (required to establish the funds)...

Phase 2 : Operation
Trace of all the modifications during the operating life (these are integrated in the different revisions of the Safety report).
Trace all the incidents. (event tracking service)
Records of the different operator teams.
Preliminary studies to start the decommissioning.(post clean out operations and dismantling global scenario).
Radiological inventory of the installation.
Waste study.
Environmental Impact Study.
Phase 3 : During decommissioning
As the operating experience of a nuclear facility may be lost when the installation is shutdown, one important key element of the planning is to identify and store before shutdown.
Decommissioning management information system (planning, execution, supervision, organisation, cost).
Safety documentation analysis.
Decommissioning work reports.
Feed-back decommissioning reports.
Phase 4 : After decommissioning
Final feed back report.
All Documents justifying the final state.
Environmental impact study.
Reports on servitudes (in case of transfer of ownership).

QF.26.10	Art. 26 § F.6.1 p. 134 The report says "a file be submitted, explicitly presenting all the various works envisaged from final shutdown to attainment of the target final state, and demonstrating at each step the nature and scale of the risk presented by the installation and the steps taken to control it". The detailed plan of the works can be modified in some cases. Then, what is the regulation process for the change of the work procedure?

Answer:
The file submitted by the operator details the works which will be carried out in the next few years (typically five years after the decree authorizing the dismantling of the installation). The main lines of the works beyond this period are presented in the file.
Therefore the decree authorizing the dismantling of the installation is detailed with regard to the aforesaid period. For the subsequent phases of works the decree mentions the main obligations, and states that specific authorizations are needed before starting certain works deemed as crucial : authorizations are given on the basis of detailed files to be provided by the operator.
To illustrate this procedure, the example of Superphenix reactor is given below.
The decree authorizing the dismantling of this installation foresees 3 phases :

- phase 1 : final shutdown and sodium treatment confined in the reactor vessel,
- phase 2 : treatment and dismantling of the reactor vessel,
- phase 3 : demolition of the buildings

The file provided by the operator provides details on the works phase 1. The decree authorizes the sodium treatment. It does not technically detail this operation, but requires the operation shall be authorized by the Nuclear Safety Authority on the basis of a technical file to be submitted by the operator.
According to the decree, the start of phase 2 will have to be authorized by the ministries in charge of Nuclear Safety, on the basis of a detailed safety report.
The decree has no special requirement with regard to phase 3. However, phase 3 will have to be authorized in the framework of the "Waste study" which will need to be revised and submitted to the ASN for approval.

QF.26.11	Art. 26 § F.6.1 p. 134 Could France elaborate some more on record keeping in relation to decommissioning: How do the regulators ensure that the operators collect and store the appropriate records of information so that they are available when needed? Who specifies what records should be stored and what are the criteria for record keeping? For how long are the records supposed to be stored?

Answer:

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The records to be stored and criteria for record keeping are defined by the operator.
In the framework of inspections, the nuclear safety authority may control what measures are actually taken.

For example in the case of la Hague reprocessing plants (UP3 and UP2-800), rigorous data management and record keeping are recognized as an essential part of decommissioning due to the long period involved. This record keeping is managed during the 4 main phases of the life cycle of the nuclear installation. The list below is illustrating the main documents to be kept but has not the objective to be exhaustive.
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All Documents justifying the final state.
Environmental impact study.
Reports on servitudes (in case of transfer of ownership).

QF.26.12	Art. 26 § F.6 p. 134,138 Considering that France has had several decommissioning projects throughout the years, it would be very interesting to be presented with a more detailed description on how feedback experience from earlier decommissioning projects is passed on to future decommissioning projects, both for operators and regulators.

Answer:

As regards the regulator, The ASN strives to integrate relevant feedback from past projects dismantling in France and abroad regulatory practices concerning dismantling operations were updated along the feedback in 2003 to encourage complete dismantling immediately.
Moreover, operators are asked to take into account relevant feedback in France and abroad in the decommissioning plan submitted to the approval of the ASN.
Operators keep their reports regarding the dismantling of their installations, including information on dosimetry and quantities of waste generated and these reports are available for future decommissioning projects.
For example, in the Commisariat à l'Energie Atomique a unit is in charge of collecting the feedback from dismantling operations and restitute it to other projects. Feedback is used for technical and methodological issues as well as for safety purposes (see CEA presentation at IAEA conference at Athens 2006).

QF.26.13	Art. 26 § F.6.2 p. 135 How the decommissioning fund is created and how its efficient use is controlled? (administrative measures).

Answer:

The present situation is described below:
The funds of AREVA for decommissioning are individually identified and are managed by this company as presented in its annual report.
The CEA civilian fund has been created in 2001, and its financial management is placed under the authority of the general Director and is checked by a survey committee.
EDF is gradually building a portfolio of dedicated assets (equity and bonds) so as to match some of the provisions for decommissioning and high-level waste long-term disposal and to ensure the availability of financial resources when needed.
The situation of these provisions are checked periodically by independent accounting auditors and also, by the French High Accounting Court.
It is to be noted that the draft law regarding radioactive waste management presented by the Government to the Parliament contains an article concerning financial provisions and funds to be built up by the nuclear operators, in order to cover future expenses related to the long term management of their radioactive waste (notably HLW and ILW-LL) and decommissioning/dismantling of all their nuclear installations. According to the draft law the funds, managed by the operator, shall be earmarked. It shall be used for the purpose they have been built for and protected against creditors in case of bankruptcy. The operator shall issue a report periodically. The level of provisions (estimate) and the funding system (including the assets) shall be controlled by the administrative authorities. The administrative authorities shall ask the operator for corrective measures if needed.

QF.26.14	Art. 26 § F.6.2.1 p. 135 The report says "certain waste produced by dismantling (special waste such as oils, solvents, graphite or sodium) is also an obstacle to those operations". Are there any special plans of treatment or disposal of these material, especially for graphite?

Answer:

Yes, according to the National Plan for the Management of Radioactive Waste and Recoverable Material.

QF.26.15	Art. 26 § F.6.2.3 p. 136 What is the most recent status and time frame of the decommissioning of the shut-down Superphenix fast reactor at Creys-Malville? How does it compare to the immediate dismantling policy of the ASN?

Answer:
The decommissioning decree for the Superphenix reactor was signed by the Ministers on 20 march 2006 and published in the Official Gazette on 21 march 2006. It allows the treatment of the contained sodium and the full dismantling of the installation. The schedule is the following : treatment of the sodium 2007 to 2015, end of the dismantling around 2025.
It is to be noted that the policy of EDF is the immediate dismantling which actually corresponds to the policy of the French Nuclear Safety Authority.

QF.26.16	Art. 26 § F.6.2.3 p. 136 In the section F.6.2.3 it is written about 6 natural uranium/gas graphite technology reactors and that they are shut down. What is the policy on management of graphite from these reactors? What kind of researches are performed in this field?

Answer:
As mentioned in section B, art 32, and under the supervision of the "National Plan for Management of Radioactive Waste and Recoverable Material", the low level long-lived waste, such as the irradiated graphite contained in the natural uranium/gas graphite reactors to be decommissioned, could be disposed of in a subsurface repository.
ANDRA has already performed generic safety studies which allow to define site criteria for such a repository. Now a site has to be selected.
The first package could be disposed of by 2013.

QF.26.17	Art. 26 § F.6.3 p. 137 The report notes that the current procedure covering decommissioning of BNIs is cumbersome and has a number of undesirable effects … that will lead to a 2003 revision of the currently applicable texts. What is the most relevant improvements in the revised texts?

Answer:
The aims of the new regulatory framework regarding decommissioning are :
- Allow a global overview of the decommissioning projects (for both operator and regulator);
- Issue only one decommissioning license for the whole project (instead of two)
- Reaffirm the need of keeping at all times an up-to-date safety documentation (hence allow flexibility)
- Introduce a framework for the license termination process.

QF.26.18	Art. 26 § F.6.3 p. 137 The report notes that the ASN has requested summary documentation on decommissioning from EDF as well as a comprehensive dossier on complete dismantling of the CEA's installations. Have this documentation been submitted to ASN? How will it be examined and what are the expectations on the outcome of the examination?

Answer:
The overall decommissioning plans of EDF and CEA have been submitted to ASN.
The assessment of EDF decommissioning plan was performed in 2004 by the ASN and its technical support organizations (IRSN and Advisory Committee for nuclear facility).
The conclusion is that the strategy of EDF is relevant for the dismantling of the EDF reactors shut down.
The assessment of CEA decommissioning plan (for the next ten years) is to be performed by the end of the year 2006. This will allow to verify that CEA has well taken into account safety and radioprotection requirements as well as the management of the waste to be generated.

Section G – Safety of spent fuel management – Articles 4 to 10:

QG.4.1	Art. 4 § G.1 p. 139 What kinds of measures have been taken to minimize the generation of radioactive waste associated with the spent fuel management?

Answer:
For la Hague reprocessing plant, § B.5.1.3.4 page 30 describes the route which allows to reduce these volumes : it's a new management implementing compaction for the structural waste (hulls and end parts) of the spent fuel and conditioning them in standard packages of reduced volume.
On the other hand the new management of the effluents implemented at La Hague since 1995, is aimed at concentrating a part of medium activity effluents and at incorporating them by vitrification in the same packages as for the fission products. The activity and so the contribution of these effluents to the volume of glass returned to the client is insignificant.

QG.4.2	Art. 4 § G.1.1 p. 139,14 The report states that the requirement to "strive to avoid actions that impose reasonably predictable impacts on future generations greater than those permitted for the current generation" are met by setting "the same radiation protection requirements for future generations". Does the setting of "the same radiation protection requirements for future generations" include radiation requirements relating to accidental or environmental degradation of the capability of the facilities?

Answer:
Provisions are included in the French Basic Safety Rule RFS III.2.f (June 1991) which states that during the period of stability of the site which should be at least 10.000 years the 0.25 mSv/year dose criteria strictly applies. After this timeframe, the value is only a reference to judge the acceptability of the safety case.

QG.5.1	Art. 5 § G.2.1 p. 145 For uranium enrichment the ultracentrifuge process will be replaced from 2012 with gaseous diffusion. There is a large-scale project determining the future of enrichment in France, which has just been through a process of public debate prior to the public inquiry associated with the authorization decree application. What are the lessons learned from the public debate?

Answer:
There was first a public debate, which held since September 1st to October 22th 2004 and preceded the public inquiry scheduled in springtime this year. The documents are available on the following web address:
http://www.debatpublic.fr/historique/debats_publics_maitre_ouvrage.html.
The main objective of information of public was reached but the participation was modest. All questions about safety and security, employment and so on received answers from AREVA.

QG.5.2	Art. 5 § G.2.1 p. 145 It is indicated that "The first is to compare the level of safety of the facilities with their initial reference framework in order to identify any deterioration in the facility over time, along with any shortcomings or weaknesses in the safety analysis. This is the conformity check" in SECTION G.2.1. However ,in SECTION G.2.2.2, the safety review by COGEMA did not indicate it. It is indicated the evaluation of the ageing of systems, structures and components in periodic safety reviews by COGEMA (section G. 2.2.2). But it is thought that the evaluation of the ageing should be included in periodic safety reviews. What kind of evaluation of ageing is performed concretely in periodic safety reviews by COGEMA?

Answer:
The ageing of the installations is taken into account during the periodic safety reviews for all their structures and processes, according to the experience feedback, the maintenance programs and of course of the initial design margins for ageing (corrosion, fatigue…) These reviews are specific to each process or structure regarding its activity or use.
These periodic checks and the preventive maintenance lead to the survey of the ageing. They can lead to the modification or replacement of equipments (pressurized boilers, ventilation motors…)
La Hague plant committed to a systematic methodology for the analysis of the low signals of ageing or obsolescence using experts advice and a global management approach of its installations.

QG.6.1	Art. 6 § G.3 p. 150 Do you still consider different geological environment for a deep geological repository for waste disposal (according to your former decision) or do you plan to enlarge your underground laboratory for these needs?

Answer:
The results of the research study conducted in France according the law of 1991 are related to clay and granitic substratum. For the first one, the geological formation that has been considered for the feasibility of a storage is the Callovo Oxfordian clay formation, where the underground laboratory of Meuse/Haute Marne is sited. For the granitic substratum, according to the lack of a site for the study, the research is generic.

Section H – Safety of radioactive waste management – Articles 11 to 17:

QH.11.1	Art. 11 § H.1.2.3 p. 158 The report indicates that HLW and long-lived ILW waste packages are designed to comply with basic safety rule III.2.f, which is listed in Section L.4.2 as a "definition of goals to be set in the engineering and works phases for final disposal of radioactive waste in deep geologic formations in order to ensure safety after the operational life of the repository." Because France is still studying options for HLW and LL-ILW disposal options, please explain how the post-operational disposal repository performance is addressed for these current waste disposal package designs for HLW and LL ILW.

Answer:
The way in which ANDRA has reapplied the notion of "barrier" as described in the RFS.III.2.f is the multiple "safety function" approach and the repository's design approach is based on an analysis of the expected functions. The repository's design is part of an iterative approach making it possible, at each stage, to identify the important phenomena and to place them in order of importance, define the timescales and physical spaces involved, and gradually define the design to reflect this analysis and as far as possible, the waste package designs

must have characteristics that are conductive to safety. Through that iterative process, producers and ANDRA exchange on the expected performance of the forthcoming waste package. For the existing waste packages, the design is adapted with respect to their available performances. The government and the legislator have to decide to pursue this program or not. Pending the law expected this year, new experiments and tests could be performed in the underground laboratory and in the geologic zone surrounding this laboratory.

QH.11.2	Art. 11 § H.1.2.3 p. 160 The report states that in 2004, PWR reactor vessel heads were accepted as-is by the Aube repository for packaging in-situ. In that case, does it meet the waste acceptance criteria and especially is it below the specific-activity limit defined for the Aube repository?

Answer:
Yes, vessel heads meet acceptance criteria defined for Centre de l'Aube. However it is not a standard geometry of packages and some specific scenarios were developed to assess possible long-term situations.
The activity level of the vessel head is under the "embedding" level (it is a low level waste). This means that it is not necessary to demonstrate containment properties of the package. In the safety assessment pessimistic containment properties are taken into account, relevant with the conditioning mode.

QH.12.1	Art. 12 § H.2 p. 161 What is the contribution of the risk associated with the transport of radioactive waste to the total risk posed by the waste management?

Answer:
The risk is limited since the transport of radioactive waste must fulfil the requirements of international regulation of transport (ADR, RID, IMDG). The main risk is associated with possible contamination of packages which is an event which must be notified to the competent authority and rated on INES scale.

QH.12.2	Art. 12 § H.2.1 p. 161 As stated under section H.2.1 a 10-year safety review is applied to radioactive waste management facilities. What are the main features of such reviews to ensure the long-term safety of facilities and of radioactive waste interim storage?

Answer:
The periodic reviews aims at checking that the facility is in accordance with the safety case established for the latest safety review considering the major changes of the facility. In addition, the safety level of the facility is evaluated through the latest safety requirements, the new scientific knowledge, the new safety rules and/or guide. Moreover, for storage facility, a deep examination of the feedback regarding monitoring of the facility, the packages and the environment is performed to detect any abnormal release of radioactivity.

QH.12.3	Art. 12 § H.2.1 p. 161,163 Morvilliers VVLW repository is not covered by BNI regulations (stated in page 159 last paragraph). Which are the measures taken by ICPE operators relative to Article 12 (section H.2 of the report refers to measures taken by BNI operators)?

Answer:
The Morvilliers VLLW repository is a ICPE , and as such was submitted to a licensing procedure for authorization. This procedure included an impact study and a study of danger according to articles 2 and 3 of the decree 77-1133 of 21 September 1977.

QH.12.4	Art. 12 § H.2.2.3 p. 162 In the discussion of the measures being taken to recover old waste from La Hague, it is indicated that COGEMA proposes to incorporate sludge from the STE2 building into bitumen with the aim of limiting the number of drums of bituminized waste that would be produced. What types and concentrations of radionuclides are present in the sludge, and what will be the level of activity in the resultant waste forms? What maximum waste loading (percent by volume and activity) can be accommodated by the bitumen?

Answer:
COGEMA is under way to define a packaging specification according the sludge characteristics, with a threshold to guaranty the safety in the repository phase and another threshold that will limit the salt content in the bitumen. The sludge coming from past activities of the reprocessing plant contain beta-gamma (Cs, Sr,..) radionuclides as well as alpha (U Pu, Am,..) ; a drum should contain activities of 2.10^{12} Bq beta-gamma and 1.10^{11} Bq alpha. The specification of this type of conditioned waste will be reviewed by ANDRA and ASN.

QH.13.1	Art. 13 § H.3.1 p. 166 It is reported that in legal framework for environmental suitability an opinion of Conseil d'Etat is required. What kind of competences does this court have?

Answer:
Conseil d'Etat is one of the three French highest courts – the other ones being the Conseil Constitutionnel and the Cour de Cassation. It is special advisor to the French Government. It is to check draft bills and draft orders suitability to the French legal framework. Conseil d'Etat is also the supreme court for any dispute between citizens and the French Administration. Most experienced French magistrates are members of the Conseil d'Etat.

QH.13.2	Art. 13 § H.3.2.1. and § H.5.2.1 p. 167,171 It is mentioned (in H.3.2.1. and H.5.2.1) that the transition of the Manche repository to the surveillance phase was carried out as for creation of a new BNI, e.g. by transmitting a dossier to the European Commission under article 37 of the Euratom treaty. Is it a common practice or was it done on a voluntary basis for this repository only ?

Answer:
For the Centre de la Manche repository, the transition from operation to survey followed the same process as for the creation of a BNI, including public consultation. However, the release conditions until then not regulated, have been regularized and transmitted to EC according to the article 37 of the Euratom Treaty.

QH.14.1	Art. 14 § H.4 p. 169 What safety requirements serve as the basis for selecting structural materials for the design and construction of radwaste storage facilities?

Answer:
There are no specific requirements for selecting structural materials for the design and construction of radwaste storage facilities. The operator of such facilities should demonstrate in its safety report that the materials chosen permit a safe operation all along the intended life of the installation.

QH.14.2	Art. 14 § H.4.1 p. 169 The report notes that new waste management facilities need a decommissioning plan and refers to decree 73-278 which requires them to be described in a chapter of the safety analysis. Does this apply to all Basic Nuclear Installation (BNI) facilities? Do all nuclear licensed facilities now have a Decommissioning plan? What is the frequency of review of these plans, are they reviewed as part of the Periodic Safety Reviews and do these reviews reflect changes in the facility and advances in the technology?

Answer:

The operators are asked to provide information about the provisions they intend to set up for the decommissioning of their facilities.

The need to formally establish a decommissioning plan is a « safety reference level » of WENRA report on the decommissioning of nuclear installations, which should be incorporated into the French regulation by 2010.

QH.15.1	Art. 15 § H.5.1 p. 170 Concerning institutional supervision,1. When this is initiated and how long or till when it must be continued?2. And what will be required as institutional supervision?3. What kind of regulatory base is established for institutional supervision? 4. Is the institutional supervision granted as the base for the radiation protection? If so, could you show us what is granted as base more concretely (for example, establishment of protection zone that eliminates the possibility of excavation) in relation to the repository for HLW or for long-lived Trans-Uranic waste.

Answer:

The only closed installation is the Centre de la Manche. An evaluation Commission ordered by the Ministers of Environment and Industry has recommended the split of the post operational period into three phases of 300 years in total:

- a 5 years period for a very active survey of the chemical and radiological impact and for research related to the bituminous layer and to the migration of radionuclides
- a 5 to 50 years period of active survey dedicated to the he implementation of the above provisions
- a last period of reduced survey

The decree of 10 January 2003 gave the authorization to ANDRA to modify the operating conditions of the Centre de la Manche and so to enter the surveillance phase.

This decree requires a very active survey phase of the installation and its environment and the publication in 2009 of an up-date of the definitive safety case, the operating rules, the emergency plan and the survey plan. A report shall be produced describing the interest of putting in place a new cover guarantying the passive long-term safety of the repository. The survey is mainly focused on the stability of the cover, on the watertightness of the galleries, on the ventilation system of the galleries, on the control of the releases, on the quality of the environment (air, surface and ground waters, sediments…)

A lighter survey phase could then be proposed by ANDRA in 2009 based on experience feed back of the past years. In this case, ANDRA should submit the controls it intends to maintain on the site until the light survey phase foreseen in 50 years.

The decree of 2003 also requires that every 10 years ANDRA must submit to DGSNR an up-date of the safety case, the operating rules, the emergency plan and the survey plan

Therefore, the adopted procedure is a step-by-step procedure. The institutional controls after the last period of reduced survey (memory, restriction of use) should be defined in due time.

QH.15.2	Art. 15 § H.5.1 p. 170 Concerning institutional supervision, "France does not currently have any ILW-LL (contaminated with Trans-Uranic Isotopes) or HLW disposal facility in operation." 1. Concerning ILW-LL (contaminated with Trans-Uranic Isotopes),(1). What kinds of institutional measures are envisaged to ensure sustaining safety in the longer term after the responsibility of the disposal facility operator is cleared? (2). What sorts of institutional measures are taken into consideration as regulatory effective credits in safety? An example we have in our mind is that by setting protective area to exclude from human activities such as excavation.2. Concerning HLW,(1). What kinds of legislation or nuclear safety regulation and how long are envisaged to ensure sustaining sound institutional measures? Nuclear regulation, Environmental protection or others? (2). What sorts of institutional measures are taken into consideration as regulatory effective credits for safety? Before and after clearing the institutional measures, respectively. An example we have in our mind is that by setting protective area to exclude from human activities such as excavation.

Answer:

The design of the deep disposal facility allows retrievability of the waste during a certain period. During this period the repository will be monitored and no intrusion is to be anticipated.

On the other hand, the Basic Safety Rule RFS III.2.f estimates that the loss of the existence of the repository could reasonably occur after 500 years and indicates that this value of 500 years shall be taken as the minimum lapse of time before human intrusion might occur. ANDRA has studied the impact of intrusion scenarios in the "dossier Argile 2005" consequently.

QH.15.3	Art. 15 § H.5.1 p. 170 What is the practical application of repository re-assessment results for its further operation, mainly in terms of technical specification (L&C) modification, technical measures taken, monitoring and surveillance program revision, etc.?

Answer:

In the framework of the safety re-assessment of the Centre de l'Aube repository, ANDRA. transmitted the updated safety report which is now being reviewed by the French Nuclear Safety Authority and its technical supports (IRSN, Advisory Committee).

This reviewing is focusing on the following issues :

- updated radiological inventory,
- elements important for safety and associated requirements,
- feedback drawn from operation, including in the field of specific packagers (radiating packaged waste, big packages),
- consequences from complexing agents,
- sealed sources,
- specifications for waste acceptance
- ANDRA's reflections and studies about the future cover of the repository.

The reviewing will be followed by a letter from the Nuclear Safety Authority to ANDRA asking for further investigations about certain points if needed, and/or corrective measures, should the case arise.

QH.15.4	Art. 15 § H.5.1 p. 170 What timescales or time frames are specified in the French regulations relating to the post closure safety assessment of the (deep) geological disposal?

Answer:

Considering long-term safety criteria the French Basic Safety Rule RFS III.2.f (June 1991) states that during the period of stability of the site which should be at least 10.000 years the 0.25 mSv/year dose limit criterion strictly applies. After this period the 0.25 mSv/year is only a reference value to judge the acceptability of the safety case.

QH.16.1	Art. 16 § H.6.2.1 p. 173 Do you have any experience with parallel co-existence of different parts of repository within the site covered by different type of license, e.g. in the same time one part of disposal facility under operation and other part under closure or construction, respectively. (e. g. possible extension of the capacity)

Answer:
For the Centre de la Manche facility, ANDRA experienced a period during which a part of the repository was being covered and another part was in operation. But these different activities were covered by a single license, valid for the whole facility.

QH.17.1	Art. 17 § H.7 p. 175 Could you please summarise the legal provisions - if any - governing post-closure issues, relating to i) monitoring, ii) active or passive institutional control such as archive requirements, iii) ownership or other legal issues foreseeing post-closure events and activities?

Answer:
The only closed installation is the Centre de la Manche. An evaluation Commission ordered by the Ministers of Environment and Industry has recommended the split of the post operational period into three phases of 300 years in total:
- a 5 years period for a very active survey of the chemical and radiological impact and for research related to the bituminous layer and to the migration of radionuclides
- a 5 to 50 years period of active survey dedicated to the he implementation of the above provisions
- a last period of reduced survey.

The decree of 10 January 2003 gave the authorization to ANDRA to modify the operating conditions of the Centre de la Manche and so to enter the surveillance phase.
This decree requires a very active survey phase of the installation and its environment and the publication in 2009 of an up-date of the definitive safety case, the operating rules, the emergency plan and the survey plan. A report shall be produced describing the interest of putting in place a new cover guarantying the passive long-term safety of the repository. The survey is mainly focused on the stability of the cover, on the watertightness of the galleries, on the ventilation system of the galleries, on the control of the releases, on the quality of the environment (air, surface and ground waters, sediments…)
A lighter survey phase could then be proposed by ANDRA in 2009 based on experience feed back of the past years. In this case, ANDRA should submit the controls it intends to maintain on the site until the light survey phase foreseen in 50 years.
The decree of 2003 also requires that every 10 years ANDRA must submit to DGSNR an up-date of the safety case, the operating rules, the emergency plan and the survey plan.
Therefore, the adopted procedure is a step-by-step procedure. The institutional controls after the last period of reduced survey (memory, restriction of use) should be defined in due time.
The expenses induced by the surveillance phase are at charge of the producer who remain owner and responsible of their waste.

QH.17.2	Art. 17 § H.7.1 p. 175 In the section 7.1, there is an example of institutional measures after closure of the Manche repository. How long is the period of the surveillance phase? How are passive institutional controls(land use control or etc.) at the surveillance phase? How are institutional controls after the surveillance phase if any?

Answer:
The only closed installation is the Centre de la Manche. An evaluation Commission ordered by the Ministers of Environment and Industry has recommended the split of the post operational period into three phases of 300 years in total:
- a 5 years period for a very active survey of the chemical and radiological impact and for research related to the bituminous layer and to the migration of radionuclides

- a 5 to 50 years period of active survey dedicated to the he implementation of the above provisions
- a last period of reduced survey

The decree of 10 January 2003 gave the authorization to ANDRA to modify the operating conditions of the Centre de la Manche and so to enter the surveillance phase.
This decree requires a very active survey phase of the installation and its environment and the publication in 2009 of an up-date of the definitive safety case, the operating rules, the emergency plan and the survey plan. A report shall be produced describing the interest of putting in place a new cover guarantying the passive long-term safety of the repository. The survey is mainly focused on the stability of the cover, on the watertightness of the galleries, on the ventilation system of the galleries, on the control of the releases, on the quality of the environment (air, surface and ground waters, sediments…).
A lighter survey phase could then be proposed by ANDRA in 2009 based on experience feed back of the past years. In this case, ANDRA should submit the controls it intends to maintain on the site until the light survey phase foreseen in 50 years.
The decree of 2003 also requires that every 10 years ANDRA must submit to DGSNR an up-date of the safety case, the operating rules, the emergency plan and the survey plan
Therefore, the adopted procedure is a step-by-step procedure. The institutional controls after the last period of reduced survey (memory, restriction of use) should be defined in due time.
The expenses induced by the surveillance phase are at charge of the producer who remain owner and responsible of their waste.

QH.17.3	Art. 17 § H.7.1 p. 175 Please describe the requirements and processes to implement the Article 17 requirements for preservation of records. Are there access restrictions at the sites after closure? If so, please describe them.

Answer:
The long-term archiving must allow the preservation of documents and data all along the survey phase of the Centre de la Manche. This aims at informing future generations about the existence and the content of the site and at facilitating corrective actions if needed (radioactive or chemical detection, movements of the cover layer…).
The documents to be stored, composed of synthesis records and detailed records, are duplicated on special paper called "permanent" . In order to limit the risks of destruction, they are kept in three distinct locations : Centre de la Manche, Centre de l'Aube and National Archives.
The records must be accessible to all and comprise a trace of the history of the site, the typology of the centre and of the packages, the consolidated inventory of the waste (radiological and chemical aspects), the survey provisions, the last safety report, the existence, the localisation and the composition of the detailed records and the last administrative documents related to the phase modification. These records will also be kept at international level in the EC and IAEA.
The detailed records are composed of all relevant technical and administrative documents necessary to understand the design, the operating and the survey phases of the repository. The selected documents should allow to cope with possible incidents.
The institutional controls after the last period of reduced survey (memory, restriction of use) should be defined in due time.

QH.17.4	Art. 17 § H.7 p. 175,176 What are the requirements for long-term records management (media, language, safety of records, etc.)?

Answer:
The long-term archiving must allow the preservation of documents and data all along the survey phase of the Centre de la Manche. This aims at informing future generations about the existence and the content of the site and at facilitating corrective actions if needed (radioactive or chemical detection, movements of the cover layer…).

The documents to be stored, composed of synthesis records and detailed records, are duplicated on special paper called "permanent" . In order to limit the risks of destruction, they are kept in three distinct locations : Centre de la Manche, Centre de l'Aube and National Archives.
The records must be accessible to all and comprise a trace of the history of the site, the typology of the centre and of the packages, the consolidated inventory of the waste (radiological and chemical aspects), the survey provisions, the last safety report, the existence, the localisation and the composition of the detailed records and the last administrative documents related to the phase modification. These records will also be kept at international level in the EC and IAEA.
The detailed records are composed of all relevant technical and administrative documents necessary to understand the design, the operating and the survey phases of the repository. The selected documents should allow to cope with possible incidents.
The institutional controls after the last period of reduced survey (memory, restriction of use) should be defined in due time.

Section I – Transboundary movement – Article 27:

QI.27.1	Art. 27 § I p. 177 What is a public tolerance for transboundary movement of spent fuel and radioactive waste concerning the spent fuel reprocessing operations performed in the La Hague plant?

Answer:
The public generally accepts transboundary movements of spent fuel and radioactive waste. Some opponents make mediatic actions from time to time.

QI.27.2	Art. 27 § I p. 177,178 What laws and administrative arrangements has your country put in place to address the authorised transboundary movement of spent fuel and radioactive waste under Article 27.1.(1)H of the Convention .

Answer:
Articles L541-40 to L541-42 of the Environmental Code regulate the transboundary movements of waste. These provisions also apply to radioactive waste. In particular they provide that:

"To prevent [nuisances], the import, export and transit of certain categories of waste may be prohibited, regulated or subject to prior agreement from the interested States. Prior to any operation to import, export or transit waste, the holder of the waste informs the competent authorities of the interested States. The import, export and transit of waste are prohibited when the holder is unable to provide proof of an agreement binding him or her to the recipient of the waste or when the recipient does not possess the capacity and competencies to dispose of this waste under conditions that do not present any risk either to human health or to the environment." (Article L541-40 of the Code of the Environment).

Decree No. 94-853 of 22 September 1994 on the Import, Export, Transit and Exchange of Radioactive Waste between EC Member States has implemented Directive 92/3/Euratom of 3 February 1992 on the Supervision and Control of Shipments of Radioactive Waste between Member States and into and out of the Community.

QI.27.3	Art. 27 § I.1 p. 179 What requirements should be met by the infrastructure of ports to comply with the required level of nuclear safety in transport of spent fuel by sea?

Answer:
The rules applied to the port infrastructures are derived from the International Maritime Dangerous Goods (IMDG) code as indicated in the report of TranSAS mission in France.

QI.27.4	Art. 27 § I.2.5 p. 181 The report notes that the IAEA TranSAS (Transport Safety Appraisal Service Mission) assessed the French radioactive materials transport organisation and its implementation of international regulations (page 181). The ASN is planning to implement the recommendations of this group. Could you provide details of how and when these recommendations will be implemented?

Answer:
France has asked for an IRRT full scope including the transport activities scheduled in November 2006. This would be the first follow-up to a TranSAS mission. Two recommendations concern a formalisation of practices and the process is undergoing. The last recommendation concerns the non-competent authority approved packages. DGSNR increases the number of inspections on this subject and asks the owners to know what kind of packages they use and what is the fabricant. The certificate of conformity must become mandatory in the regulations, otherwise progress could be only very limited.

Section J – Disused sealed sources – Article 28:

QJ.28.1	Art. 28 § J p. 183 What is the number and disposal pathway of Am-241 sealed radioactive sources currently used in smoke detectors?

Answer:
About 6 to 8 millions of smoke detectors were emplaced in France for a total activity about 600 GBq (mainly Am-241). Their mean activity is very low (4 kBq for the most recent ones). Their use is prohibited for domestic use but still in function in offices or public places.
The Health Code (art. R.1333-52) indicates that the used sources must be collected by the supplier. Until now the sources of the detectors have been recycled by the manufacturers, this indicates that the number of non-reused sources and so stored is low.
The supplier foresee to stop the manufacturing of these sources in a near future and to replace them by non-radioactive ones. Along with this withdrawal, the sources that were recycled, will not be recycled any more. Their long-term management must be assessed. The possibility to include these sources in the project of LLW repository must be examined. (See National Radioactive Waste Management Plan).

QJ.28.2	Art. 28 § J p. 183 What is the current status of the parliamentary decision regarding the further RAWM strategy?

Answer:
The Parliament should decide in 2006 the principles for the management of radioactive waste. The draft law submitted by the Government to the Parliament established the geological disposal as a solution of reference for the management of radioactive waste that should not be disposed of in surface or subsurface disposals. The draft law gives two deadlines:
the first one for the examination in 2015 of an application submitted by ANDRA in order to authorize the creation of deep geological repository ;
the second one for the start of operation of the deep geological repository in 2025.
The draft law also identified the need to establish and update periodically a Plan for the Management of Radioactive Waste and Recoverable Material. This plan should be also submitted periodically to the Parliament, and especially the Office for the evaluation of scientific and technological choices.

QJ.28.3	Art. 28 § J p. 183 France has enforced traceability systems for radioactive sources. It is also stipulated that the supplier of sealed sources (even if from abroad) is obliged to recover them (via the distributor). We have three questions :a) What can be done to recover old sources (sold when the traceability systems were not yet enforced) ?b) Is it also mandatory for a French supplier to recover sources sold abroad ? c) Lot of lightning arrestors using radioactive materials were installed more than 20 years ago and are still in service. What can be done to recover them ?

Answer:
a) These are dealt on a case-by-case basis. The potential for a recovery campaign has been considered as part of the National Plan for the Management of Radioactive Waste and Recoverable Material. Such campaign has already occurred in the past, specifically for radium sources used in medical practices. Funding for new campaigns is not obvious so no formal decision has yet been made.
b) The legislative requirement extends to sources used in registered or authorized practices in France. The supplier has to keep up to date a list of sources to be returned. As for sources exported, current practice is to have the supplier detail whether, from a contractual point of view, the disused source is likely to be taken back.
c) About 400 to 500 lightning arrestors are recovered by ANDRA each year.

QJ.28.4	Art. 28 § J p. 183 What methods and criteria are used for the leaktightness test of sealed sources, if any?

Answer:
In France there is an AFNOR norm for the test of the leak rate of the sources. (cf ISO norms 2919 et 9978). However, during their life, sources are checked for the licensees by approved organisations according specific methods.
An effort for the rationalization of these methods is under way under the responsibility of DGSNR.

QJ.28.5	Art. 28 § J p. 183 Could France describe in more detail the procedures, regulatory and technical requirements under preparation to downgrade sources to waste?

Answer:
For the sealed sources unused or out of date, an order is still under preparation. Criteria being considered vary depending whether the source is "downgraded" by its final user, its supplier or its manufacturer. Anticipated criteria focus on two points : residual activity should be lower than the exemption threshold and dose rate should be lower than 1µSv/h on

contact to the source. The downgraded sources could be disposed of in channel or authorized installations.

QJ.28.6	Art. 28 § J p. 183 How is the Council Directive on High Activity Sealed Sources (2003/122/Euratom) implemented in the legislative and regulatory system? It would be of particular interest to be informed how art. 3 para 2 (b) has been implemented (financial security or any other equivalent means) and to what extent implementation of the requirements in art 9 para 3 and 4 has been made (systems aimed at detecting orphan sources and campaigns to recover orphan sources left behind from past activities)?

Answer:
Directive 2003/122 is being transposed. Some of its provisions were already in France regulatory framework. Legislation won't need to be updated, the proposed regulation update has been notified to the European Commission at the beginning of 2006 and should come into force soon.
As for financial security, French current legislation requires a high activity sealed source supplier to have a financial guarantee. This requirement came into force in the early 90s
As for detection and recovery of orphan sources, detection systems are being installed at waste management facility (regulated under the Environment Code). Currently, orphan source recovery is dealt with on a case-by-case basis.

QJ.28.7	Art. 28 § J.2 p. 183 Could you provide more details on activities, currently under research and preparation in France, leading to possible disposal option of disused sealed sources in near surface facilities, as referred in section J.2?

Answer:
ANDRA performed specific studies to define acceptance criteria for the sealed used sources in the Aube repository(activity and half life of the contained nuclides). In January 2006, DGSNR has given a license to ANDRA in order to accept in the Centre de l'Aube repository packages made up of only of sealed sources with a period lower than the one of the 137Cs, under the condition that the package meets different criteria, mainly in terms of activity, of conditioning and type of source (one single radionuclide). The National Plan for the Management of Radioactive Waste and Recoverable Materials asked that long-term solutions concerning non-acceptable sealed sources at the Centre de l'Aube should be defined at the end of 2009.
On another hand, CEA works at denaturing some sources to reduce their attractive and concentrated aspects to make them acceptable in the CSA.

QJ.28.8	Art. 28 § J.2 p. 183 What are the financial sources and who is responsible for each step in disused sealed sources management?

Answer:
For radioelements above a certain level of activity an authorisation by the relevant administration (within the DGSNR) is required to distribute to users sealed sources or apparatus with sealed sources inside. After 10 years if there is no request for a prolongation, the source must be recovered by the supplier. To mitigate a possible failure, the supplier is held to contract a financial guarantee near Ressources association, or to make to ANDRA a deposit the amount of which will make it possible to cover the recovery of the marketed source.

QJ.28.9	Art. 28 § J.2 p. 183 How is authority insight into the CEA database on radioactive sources ensured? In what way does France keep record of radioactive sources from other suppliers than CEA? That is, how do you get an overall picture of all radioactive sources?

Answer:
The CEA manages a centralized source database. The inventory is verified as part of inspections performed at CEA sites. More generally, France has a centralized sealed source database (SIGIS) managed by IRSN as defined in the Public Health Code.

QJ.28.10	Art. 28 § J.2 p. 183 It is stated that France sometimes has to recover radioactive sources from remote countries and that they often require characterisation owing to the lack or inadequacy of the documentation normally associated with these sources. How common is this problem? Has France any procedure to minimize these problems in the future?

Answer:
This kind of problem is very infrequent. French suppliers do keep data on sources they export. However, it is the source owner responsibility, according to the regulatory framework of the "remote" country to manage the source and archive associated documents.

QJ.28.11	Art. 28 § J.2 p. 183 How does France ensure that there are sufficient financial resources to enable that the disposal of disused sealed sources takes place in a safe manner?

Answer:
ANDRA has established default disposal costs. Source suppliers have either to make a safety deposit to ANDRA or become a member of a sealed source supplier association (Resources) that provides financial guarantee.

QJ.28.12	Art. 28 § J.2 p. 183 Could you please give an overall picture of how, in practice, the handling of disused sealed sources is carried out in France?

Answer:
Disused sealed sources recovery must be done according to the following provisions :
The supplier must recover the sources without condition. The supplier has to transfer them to the manufactory or to a duly authorized installation.
Before any movement, a form must be sent to IRSN for registration. In case of an anomaly, IRSN has to inform the competent authority.

Section K – Planned activities to improve safety

QK.1.1	General § K.1.2 p. 185 What are the main safety features for the disposal of radium-containing waste and graphite waste (subject of a contract between Andra and the State)?

Answer:
Safety criteria for a waste repository are not yet defined in a safety guide but rely on the principle to interpose several barriers between the waste and the environment: the package, the engineering structure, the geological barrier and the cover. Each barrier plays an important role and has to comply with strict criteria as : watertightness, containment properties, radiological protection, mechanical resistance….
For information disposal concepts for graphite and radium containing waste are following:

For the disposal of radium containing waste, the concept is constituted of cavities at –15 metres in a clay substratum. It includes two barriers: one is made of the residues which by its physical and chemical properties will perform self confinement of radionuclides and chemical toxics; and the other is the geologic layer and the cover comprising a confining layer and a protection layer.
For the disposal of graphite the storage is made of concrete cavities containing the waste encapsulated in concrete packages. These cavities are also located at –15 metres under a confining layer of about 12 m and a protection layer of 3 metres.

QK.1.2	General § K.1.2 p. 185 What are the developments in concluding a contract between Andra and State since the 2nd Nation Report was completed?

Answer:
The contract between ANDRA and the French State was signed the 1st of August 2005. It is available on the website of ANDRA. It draws out the main objectives assigned by the State to ANDRA until the end of 2008. For the first time, the contract identifies the mission to recover radioactive waste from non solvent owners or take remediation action on polluted sites contaminated by radioactive materials. The contract also identifies the possibility to receive a financial contribution from the State in order to undertake this kind of actions. The contract forecasts the need to establish criteria to use the funds that are currently in discussion in 2006 and ANDRA and public authorities agreed in a meeting in March 2006 to identify a priority list of actions to undertake in 2006 and in the next few years.

QK.1.3	General § K.1.2 p. 185 The report notes that for nuclear safety, the CEA is developing a policy aimed at boosting public confidence on the basis of e.g. transparency. What is the rationale for this objective? Please elaborate.

Answer:
CEA like the other operators has a communication policy about its BNIs
For example, CEA carries out the systematic publication through Internet, of all the incidents (even those classified beyond the INES scale) and the liquid and gaseous releases of the BNIs. Furthermore, it has organized the consultation before the public inquiries for the projects for new installations and has participated to information meetings and to the local information committees.