

Joint Convention

First Meeting of the Contracting Parties, Vienna 3 to 14 November 2003

Answers to the questions on the Belgian National Report

This document presents the answers to the questions asked by parties to the Joint Convention, on the Belgian national report.

Question 1

After a five-year moratorium on further reprocessing contracts expired in 1998 what is the status of the reprocessing now?

Answer :

The moratorium decreed by the Belgian Parliament in 1993 expired in 1998, but since that time, no decision lifted the ban on the conclusion of further reprocessing contracts. The situation therefore remains unchanged.

Question 2

Could you please explain how are the ageing tests performed ?

Answer :

The ageing tests are performed to IEEE 323 (and therefore to the Regulatory Guide 1.89) and according to the Arrhenius laws;

Question 3

Is burnup-credit involved in the criticality analyses ?

Answer :

Yes, with the approval of the Safety Authorities on a case-by-case basis

Question 4

This section dealing with Art. 4 is focussed on criticality and removal of residual heat generated during spent fuel management but does not seem to cover other aspects of this Article only. What is the generation of radioactive waste associated with spent fuel management?

Answer :

The Belgian nuclear units produce annually some 270 spent fuel assemblies (2001 figures)

Question 5

This section dealing with Art. 4 is focussed on criticality and removal of residual heat generated during spent fuel management but does not seem to cover other aspects of this Article only. Are there interdependencies among the different steps in spent fuel management?

Answer :

Advanced core management and enhanced fuel performance both permit to reduce significantly the amount of spent fuel. To give an order of magnitude, in Belgium, the averaged discharge burnup has increased from 38000 MWd/t to 44000 MWd/t between 1990 and 2000. That means a 16% reduction of the spent fuel for the same energy generation.

Question 6

This section dealing with Art. 4 is focused on criticality and removal of residual heat generated during spent fuel management but does not seem to cover other aspects of this Article only. Which measures are in place to guarantee the effective protection of individuals, society and the environment from spent fuel management ?

Answer :

The effects on individuals and on the environment are specified in the environmental impact evaluation report consistent with the requirements of the Royal Decree of 20 July 2001. This evaluation covers the « general data » as specified in the European Commission's recommendations of 6 December 1999 (1999/829/Euratom) regarding the application of article 37 of the Euratom treaty. See also the answer to question 7.

Question 7

Are the recommendations of ICRP and IAEA, which are included in the license of the SCG (7.1.1.5.2, p. 68), applied also to the other installations, described in section 7.1. Section 7.1, p. 66 ff.

Answer :

The recommendations of ICRP are part of GRR-2001 and are satisfied on all Belgian sites; the recommendations of the IAEA are those concerning transport packages and are therefore not applicable to the other installations whose concepts are not based on the use of containers.

Question 8

Are chemical hazards accounted for, that may be associated with spent fuel management? (Note: Biological hazards are estimated not to be of relevance for the management of spent fuel) Section 7.1, p. 66 ff.

Answer :

The storage concept does not provoke chemical risks since it concerns a passive system without hazardous chemical substances being involved. This issue is therefore not relevant.

External hazards resulting from chemicals coming from outside the technical perimeter are taken into account (explosions). Corrosion problems are taken into account in the construction of the containers, which guarantee almost all safety functions.

Question 9

Does the legal framework address the avoidance of impacts on future generations ?

Answer :

Avoidance of impacts on future generations is not specifically mentioned in GRR-2001. However, Belgium follows the generic recommendations of IAEA (e.g. Principle 4 of IAEA Safety Fundamentals – see below) and current studies are based on the principle that future generations must have at least the same level of protection as ourselves. Financial aspects are treated under 2.4.2.

Question 10

Who takes care for budgets to avoid undue burdens on future generations?

Answer :

Synatom has been entrusted by the Law of April 11, 2003 with the responsibility to manage the financial provisions for the backend of the fuel cycle as well as for the decommissioning of the power plants. The same Law organises the way a Follow-up Committee will verify that such provisions are sufficient and available.

Concerning SCK•CEN, please refer to § 6.6.3.1.1. for fuel irradiated and waste produced before 31 december 1989 and to §6.3.2 for fuel irradiated and waste produced later.

For the management by ONDRAF/NIRAS: see answer to question 15

Question 11

This section (7.3) deals with the siting procedure for the existing sites at Doel and Tihange and of BR2. What is the procedure which would be used for any new site which might be built in the future ?

Answer :

The current licensing system is described under section 5.3.1.1 of the national report.

Disposal sites for radioactive waste are classified into class I, being the highest risk class. The licence application has to be accompanied by an environmental impact assessment, drawn up in

conformity with the (meanwhile modified) European Directive 1985/337/EEG and the Recommendations of the European Commission 1999/829/Euratom concerning the application of article 37 of the Euratom Treaty. It is investigated by the Federal Agency for Nuclear Control and submitted to its Scientific Council.

It should be noted that this licensing system may be changed in the mid-term future to take specific aspects of disposal sites into account (end of institutional control, health physics department, etc).

Question 12

Under what criteria is the systematic safety assessment carried out and the assessment of environmental impacts, as foreseen in the licensing process of radioactive waste / spent fuel management facilities ?

Answer :

The criteria regarding environmental impact evaluation of the installations are based on the US regulations, chiefly 10CFR50 App. I and 10CFR100, but have been adapted to the Belgian and European contexts. In particular, the Royal Decree of 20 July 2001 (article 20) sets a dose limit on individuals of the public, this limit being consistent with the ICRP recommendations.

Question 13

This section (8.2) deals does not seem to mention past practices as outlined in Art.12 ii, i.e. these practices which might require intervention. Are there past practices in Belgium ?

From the year 1997 onwards, the compiling of an inventory by ONDRAF/NIRAS of all nuclear installations and sites on the Belgian territory and their content of radioactive material, as well as the assessment of their decommissioning and remediation costs are required every 5 years.

The first inventory was established at the end of 2002 and was presented to the supervising authority.

An example of past practice is given under 4.3.3. where a short description of the radioactive wastes stored at Umicore - Olen can be found.

They are treated on a case-by-case basis.

Question 14

How is it ensured that the facility is realized in accordance with planning?

Answer :

Experience over the years has learnt that the planning of a disposal facility is an extremely difficult affair, and most of the disposal programmes worldwide experience important delays in their planning.

In order to try to minimize these risks of delay ONDRAF/NIRAS aims to obtain a shared view by the different stakeholders on :

1. the decisional process, with identification of the decisions to be taken and the deciders;
2. the information needed to obtain the successive licences;
3. the way the local stakeholders can participate in the decisional process.

Question 15

This section on financing does not seem to cover financial provisions which will enable the appropriate institutional controls and monitoring arrangements to be continued for the period after closure of a disposal facility. What is the planned financing scheme for a future repository in Belgium?

Answer :

A long-term fund was created at the end of the nineties to cover all costs of short-term and long-term management (i.e. disposal of the waste). This fund is operational since 1999. At the moment of waste acceptance by ONDRAF/NIRAS the corresponding financial means are also transferred to this long-term fund, which is managed by ONDRAF/NIRAS.

We refer also to the answer given to question 71.

Question 16

How are the radiation doses of workers in the controlled area recorded?

Answer :

Conform the Article 23.2 of GRR-2001, the assessments and stipulations of the Health Physics Department must be recorded (including the dose registration) . The individual doses, including doses due to the internal contaminations and accidents are reported to the medical service. Each year the licensee has to send a copy to the Ministry of Labour and the FANC.

The registers of the licensee are stored during 30 years. At the stop of all the activities they are send to the FANC.

Question 17

In which intervalls does medical suerveillance of workers take place and how are results documented?

Answer :

The intervalls of the medical surveillance of workers are fixed by the medical officer, and depend on the risks at the installations. The medical control is at least once a year (6 months for the most exposed workers). Documentation of the results: see answer of previous question

Question 18

Is there an accreditation certificate for the expertise of the individual responsible or assigned for radiation protection in the facilities?

Answer :

Yes, the head of the Health Physics Department has to be an expert of level 1 and is approved by the Belgian Authorities. The specifications and the conditions to become an expert are fixed in the Article 73 of GRR-2001.

Question 19

Has a permissible radiation dose limit been set for women of child-bearing age or pregnant women who work in the controlled area?

Answer :

Yes. For the pregnant woman or nursing / breastfeeding mother there is limit of 1 mSv for the whole period. No risk of contamination is allowed during the period.

Question 20

In 6.4.4.1 it is stated that the dose rate outside of the modern interim waste storage facility is limited to 10 μ Sv/h, corresponding to 87.6 mSv/a. How can this be reconciled with a limitation of the permissible annual exposure of the public to 1mSv? What dose rate could arise in older buildings?

Answer :

The limit of 10 μ Sv/h in contact with the buildings is a limit to protect the professional exposed workers and not the public. The conservative approach of an occupancy factor equal to 1 and the contact of a worker for 40 hours/week with the building are chosen for the impact evaluation. In practice this guarantees that the doses received by the workers by the storage activities are minor. In practice : the exposure distances are several meters from the building, hotspots are the limiting factor for the dose limit, the exposure times are a fraction of the mentioned 40 hours . Even for the older buildings this doesn't give any problem.

The areas which can be accessed by the public are several hundreds of meters from the storage buildings. For the design of these buildings it is also implemented that the impact for the public is only a fraction of 1 mSv/year (for a recent new storage building an occupation factor of 1 has been chosen for this impact evaluation).

Question 21

How is it ensured in Belgium that the radiation exposure of individual members of the public arising due to slightly radioactive materials dumped in land-fills or released will not exceed permissible limits?

Answer :

There is for the moment only unconditional release approved in Belgium. The release procedures are based on the following fundamental cornerstones: well defined limits by the authorities, the responsibilities are well defined, control techniques (at least two different and independent measuring techniques are required of the producer), registration in a clearance rapport (history, inventory and origin of the produced waste, results of measurements, etc..). All the materials that are leaving the controlled area must be measured. The whole methodology for each type of clearance has to be well defined and to be approved by AVN and the FANC. For the released material there is always a period that's available for AVN and the FANC to do some additional controls. There is a practice to take on a regular base samples and to do additional measurements in an independent laboratory

Question 22

What are the measures to control the release and mitigate its effects in cases of unplanned or uncontrolled release of radioactive materials into the environment?

Answer :

- Environmental monitoring programmes (e.g. at SCK•CEN and Belgoprocess: emission, immission, dose rate, contamination, etc...) are established in agreement with AVN and the FANC in order to follow the impact on the environment. These results are periodically evaluated by the Health Physics Department and AVN.
 - The results of the continuous monitoring of the atmospheric releases and the liquid discharges are periodically sent to AVN and the FANC for an additional check.
 - The data received through Belgium's Telerad automatic radiological monitoring network can also be used. Telerad is a network with principal aim to measure routinely the emissions and make measurements in case of an accident occurring in a Belgian nuclear site or abroad : in total, 183 measurements, from 183 detectors, of ambient radioactivity in air and water are collected, treated and sent to the computer server located at the FANC.
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Question 23

A part from preparing an internal emergency plan, what precautions must the operator take, for his personnel on the one hand and his equipment on the other and in which standards, codes or regulations is this stipulated?

Answer :

In normal operation, provisions of GRR-2001 which includes all relevant radioprotection measures have to be implemented. The safety report further describes the provisions to be implemented for a safe operation of the installations. These regulations also include provisions to prevent incidents or accidents.

Pursuant Royal Decree of 27 September 1991, a internal emergency plan must be established. It includes the obligation for the operator to implement measures to protect the workers and the equipment.

Question 24

Does the message to CGCCR that an emergency has occurred originate exclusively with the emergency manager of the owner of the license for a spent fuel/radioactive waste management facility or are there other automatic early warning mechanisms, for example through Telerad?

Answer :

In the hypothesis that a release of radioactivity, beyond authorised limits, would occur, the operator is in charge of alerting the competent authorities. Should the alert not be given, which is very unlikely, the Telerad network would rapidly detect any increase of radioactivity above normal situation. The alert would therefore be given within short delay.

Question25

Exactly how does information exchange take place with neighboring countries?

Answer :

Different protocols establishing procedures of information exchanges have been settled with neighboring countries. They indicate the list of persons or organisms to contact in case of a radiological emergency and the type of information to be delivered. Information exchanges happen through phone call, fax or videoconference.

Question26

The entire section on decommissioning is focused on the financial provisions. Which provisions with respect to qualification of the staff, operational radiation protection, emergency preparedness, and record keeping, which are also addressed in Article 26, are in place for facilities undergoing decommissioning?

Answer :

The regulatory basis for decommissioning is described in the Royal Decree of July 20, 2001 on the protection of the workers, the public and the environment against the dangers of ionizing radiation.

This is a transposition of :

- Basic Safety Standards Directive 1996/29/Euratom
- Directive 1985/337/EEC on the environmental impact assessment of projects
- Obligations from Euratom-treaty.

The “decommissioning” definition, as formulated in the Royal Decree, is the following: “Whole of administrative and technical activities which are necessary or which lead to the termination of the exploitation of an installation and which bring the installation into a condition which is safe for the workers, the public and the environment.”

The Royal Decree describes the regulatory basis for the following classes of nuclear facilities :

- Class I facilities: nuclear reactors (NPP as well as research reactors); facilities containing fissile materials more than $\frac{1}{2}$ the minimum critical mass ; radioactive waste treatment facilities

- Class II facilities: production or conditioning of isotopes derived from irradiated fissile material; particle accelerators (Cyclotron, LINAC,...)

During the operation of e.g. an NPP, the operating license is applicable when a modification to the plant is necessary (such as the replacement of steam generators).

The following scheme describes the phases and applicable licences, once the stadium of decommissioning is in sight:

- 1) Termination of activities
- 2) Operational Standby (installation is temporarily stopped, could be restarted again)
- 3) Non-operational Standby (extensive work needs to be done to restart again)
- 4) Decommissioning

In general, in the case of cessation of the licensed activity, the operator has to inform the Federal Agency for Nuclear Control (FANC) and the Radioactive Waste management Agency (ONDRAF/NIRAS) of the intention to stop the activity. The operator has to inform on an appropriate destination for the radioactive substances which must be an elimination in the sense of final disposal, a recycling or a re-utilisation under satisfying conditions.

For the class I and II nuclear facilities, a decommissioning license is required which defines the ultimate objectives of the decommissioning programme. The decommissioning license request, introduced by the operator, has to contain general information, the objectives concerning the appropriate destination of the radioactive substances and a preliminary safety report as well as an Environmental Impact Assessment report. The application for decommissioning also has to include the advice of ONDRAF/NIRAS concerning the final decommissioning plan that was previously transmitted to ONDRAF/NIRAS for approval.

More specifically the contents of a decommissioning license request is the following:

PART I : General information

- Introduction
- Description of facility with all installations
- Inventory of radiological and toxic materials
- Decommissioning strategy
- Goals, decommissioning alternatives, safety principles and criteria, site destination, ...
- Project management
- Personnel, Record-keeping, Financing,...
- Quality Assurance program

PART II : Specific information

- Decommissioning activities
- Planning, decontamination and dismantling techniques, decommissioning materials management, clearance, recycling or reuse of materials,...
- Safety report
- Safety culture, ALARA, safety systems, radioprotection, accident analyses, criticality, industrial safety, emergency planning, physical protection,...
- Environmental aspects
- Summary of environmental impact assessment

PART III: Environmental Impact Assessment for the contents is in agreement with the Directive 1985/337/EEC on the environmental impact assessment of projects

- Introduction
- Effects to be considered
- Description of current environmental situation
- Project description
- Description and evaluation of environmental effects
- Environmental monitoring
- Conclusions

As article 37 of the Euratom Treaty applies, (http://europa.eu.int/eur-lex/pri/en/oj/dat/1999/l_324/l_32419991216en00230043.pdf), the FANC has to seek the advice of the European Commission before the decommissioning license can be granted.

Safety requirements continue to apply during decommissioning as much as corresponding safety functions must be ensured. Equipment, components or systems which are left over from the operational phase and which continue to be necessary, are regulated as in the operational phase by "Technical specifications". Those specifications may be adapted, after justification (safety analysis), in accordance with the decommissioning process.

Every phase in decommissioning also needs the prior approval of the Health Physics responsible and the authorized inspection agency.

The organisation of the inspection is not changed, and is the same during operation as during transition from operation to decommissioning or during the decommissioning process.

Concerns for the inspection remain the same : safety (availability of systems and components needed to ensure the remaining safety functions,...), radiation protection (ALARA, policy,...), waste production and treatment,... Periodicity or subjects of the inspection may vary, following progress of the decommissioning, in order to ensure that necessary maintenance, care and surveillance are carried out and reach their aim.

Question 27

Do you have information about orphan sources in your country ?

Do you have experience with the detection of orphan sources for example at points of entry into or out of the country or at foundries?

Answer :

Every radioactive source above defined activity thresholds, whether in used or disused, is submitted to specific provisions of European directives (Basic safety standards in radioprotection 96/29, transport 1493/93) transposed in the Belgian law (GRR-2001). Exemption levels determine those thresholds, they are very low (i.e. 10^5 for Co-60, 10^4 for Cs-137). When a source becomes disused it may be evacuated via the manufacturer or via ONDRAF. If the disused sealed source activity is fallen under the clearance level, it may be released. Those levels are defined by national authorities and are lower than exemptions levels. When the future European directive on the control of high activity sealed radioactive sources will enter into force, each sealed source emitting a dose flow of 1 mSv/h at 1 meter or more will be submitted to strict provisions, including traceability ones.

Belgium does not possess a precise inventory of the orphan sealed sources present on its territory, but estimates exist at European level. When an orphan source is detected in metal scrap yards, foundries, often equipped with detection portals, or at any other place, emergency measures are taken by FANC and ONDRAF/NIRAS, with the assistance of an inspection body in order to remedy the situation and place the source in a safe place where it does not constitute a danger from the radioprotection point of view. There are no systematic detection portals installed at the border or at nodal points in order to detect entry on (or out) the Belgian territory. However detection portals do exist at specific places.

The financing of orphan sources recovery is settle on a case by case basis, when the owner cannot be identified. The further technical conditioning of the sources, which becomes a waste, is made by ONDRAF/NIRAS. However, the financing of those tasks is still a pending problem which should find a satisfactory solution when the directive on the control of high activity sealed radioactive sources will enter into force.

Question 28

What is planned in future with the SF from BR 1 and Venus ?

Answer :

Spent fuel from the BR1 reactor (natural uranium) will be packaged as medium level waste and be managed as such (see also section H of the national report, page 90).

Concerning VENUS, the present option is dry storage in canister awaiting a final decision. This latter will depend on the future of the MOX fuel from power power plants. If it may be reprocessed and if this operation is cheaper than its management as waste (present option) SCK will introduce a request in that sense.

Question 29

What are the criteria for the conditioning of radioactive waste designated for long term storage or disposal?

Answer :

It is not very clear what the question exactly aims at.

There are no precise criteria for waste conditioning in view of its disposal, mainly because there is not yet a disposal facility in operation. On the other hand two important principles are being applied:

1. conditioned waste should be compatible with the studied reference solution for deep disposal in the Boom clay. This implies that the conditioned waste may not disturb (chemically, mechanically, or otherwise) the performance of the natural barrier or any other main component of the system
2. when needed the conditioned waste should significantly contribute to the long term safety functions of the system. This is mainly the case for the high-level waste (vitrified waste and spent fuel), but not really for the category B waste.

Question 30

In the sentence before the last in that paragraph it is stated, that 17% of the glass mass in the canister consist of radioactive materials – mainly fission products oxides and actinide oxides. Is it o.k. to assume, that these are mainly inactive?

Answer :

The radioactivity of the glass canisters is only due to the fission products and actinides oxides embedded in the inactive vitreous matrix.. The activity of the actinides is much lower than the activity of the fission products.

Question 31

The number of canisters that must still be repatriated is estimated at 280 units. 140 canisters had been returned to Belgium. In which time or in which year the reprocessing of spent fuel will be finished?

Answer :

The very last Belgian spent fuel elements sent to La Hague have been reprocessed in late 2001.

Question 32

Some radioactive wastes are declared as « non-routine solid waste ». These are old steam generator or the reactor vessel head of Tihange 1. In which way do you plan the treatment and conditioning of this waste for disposal ?

Answer:

These wastes will be treated during the dismantling of the NPP, together with the steam generators and the reactor vessel heads still in use at the end of the life of the NPP. The treatment and conditioning methods have to be described 3 years before dismantling.

Question 33

In this table different waste categories for conditioned waste are described. In building 270 the waste category "R" is stored. What is your definition of the waste category "R"?

Answer :

Category R waste refers to radium-bearing waste; this is defined as waste with radium activity levels significantly above natural radium levels in typical materials as soils, construction materials etc.

Question 34

In column 4, row 7 the capacity of building 155 is not given and the filling rate is laid down with 0%. Does it mean that the building does no longer exist? In this case, where are the packages to be transferred to that are “buffered” in building 270?

Answer :

The capacity of the building 155 is 2 x 2400 m³ (two separate halls). If needed this capacity could be increased to 2 x 2900 m³ by increasing the stacking height.

Question 35

Based on the information provided, four levels of emergencies are applied – N1 – N4. Do they comply with the classes of emergencies recommended by the IAEA in the “Emergency Preparedness and Response to a Nuclear or Radiation Accident” (GS-R-2)? If no, are there plans in Belgium intended to bring the national classification into compliance with IAEA recommendations?

Answer :

These levels (N0 to N4) are not related with the GSR-2 but with the risks associated with the situation. As they are compatible with the relevant IAEA recommendation for emergency planning, no change is envisaged at the present time.

Question 36

Is it mistake or what considerations are taken to change from 2 kW/m³ to 100 times less value for thermal power?

Answer :

A 100 times lower limit for the heat output from category C waste has been defined, because of the low heat conductivity of the Boom Clay, which is being studied as the reference host formation for deep disposal.

Question 37

What are requirements for transport of unconditioned waste to be met for such transport?

Answer :

1. The transporter must be registered as a conventional transporter. This registration is documented by a recognition certificate issued by the competent ministry of the concerned country.
2. The transport of radioactive waste in Belgium can only be carried out if the transporter is registered as a transporter of radioactive waste. This registration is documented by an official authorization issued by the Federal Agency for Nuclear Control (FANC).
3. The royal decree of 20 July 2001 on the protection of the population and the workers against the danger of ionizing radiation, chapter VII, transport of radioactive materials, article 57, must be complied with.

4. The transporters must demonstrate that the personnel in charge of these services is qualified to perform the transport of dangerous goods by road according to the ADR agreement (European Agreement concerning the International Carriage of Dangerous Goods by Road).

Question 38

Could you provide additional information about safety considerations for design and safety assessment of that facility, because such approach of disposal for radium containing waste could be applicable also in other countries.

Answer :

The Uranium Mill Tailings Remedial Action Project (UMTRAP) developed for the Olen site started in 1984 with feasibility studies and design investigations. A construction plan was developed and construction was completed in 1986.

The design, performance evaluation methods, construction practices, and surveillance and monitoring program that were utilized and implemented for the UMTRAP represent the state-of-the-art in the mid-eighties that has been developed and was applied in the United States for the permanent and final closure of uranium mill tailings sites.

No long-term safety assessment has been performed in the construction phase, but is recently being carried out.

Question 39

It is stated in the introduction that the political Authorities in Belgium have chosen to abandon the use of fission nuclear energy for industrial electricity production, by prohibiting construction of new NPP:s and by limiting the operational period of existing NPP:s to 40 years. Please explain to what extent, and in what ways, the system for securing financial provisions – for decommissioning of nuclear facilities as well as the realization of repositories for spent nuclear fuel and radioactive waste – has been affected.

Answer :

The system for securing financial provisions for the decommissioning of nuclear facilities and for the backend of the fuel cycle is not affected by the law concerning the abandonment of fission energy for the electricity production, but by the law of April 11 2003. In compliance with that law a set of actions have to be undertaken during a period of six months beginning at the date of publishing of the law in the Official Journal. The methodology for calculating the nuclear provisions will be presented during that period to the Follow-up Committee and, if requested, will be amended to take their remarks into account.

Question 40

During the operation of the storage installations, the operator may obtain insight useful for modifications to the installations. Please provide more information about any modifications to the storage installations resulting from operational feedback.

Answer :

Based on operational feedback, a number of modifications have been made, such as (not exhaustive) :

- Modifications of the overhead handling cranes;
- Modifications to the access doors;
- Replacement of certain neutron-absorbing materials (boraflex) by steel sheets containing boron;
- Modifications to the handling and transfer systems of spent fuel shipping containers.

Question 41

Issues related to spent fuel disposal are treated in Section H. However, Section H (Page 108) states that for disposal facilities, no specific regulatory measures have been imposed so far and these measures will be developed in due time. When does Belgium expect to develop its own legislative and regulatory framework relating to the disposal of radioactive waste?

Answer :

As mentioned in Section H of the national report, no specific regulatory measures have been imposed so far for the disposal of spent fuel. However, in the framework of the discussions between ONDRAF/NIRAS, FANC and AVN on the disposal of low level short lived radioactive waste, discussions have started between FANC and AVN on the development of a regulatory framework for disposal (specific steps of the licensing procedure, content of SAR, acceptance criteria,...). Although these discussions focus mainly on the disposal of low level short lived radioactive waste, it is expected that they can serve to some extent also for the disposal of high level waste and spent fuel (knowing that of course additional specific requirements will be needed for these types of waste).

Question 42

Because a disposal facility is not yet in a detailed design phase, no specific regulatory measures have been imposed. Has Belgium made any preliminary study of the records transfer, records maintenance and other logistic arrangements to support a post-closure programme for eventual disposal of spent fuel, other high-level or low and intermediate level radioactive waste? Please provide information on these topics, if available.

Answer :

ONDRAF/NIRAS has created a working group placed under the coordination of a Knowledge Manager and entrusted with the development and implementation of a records management system specific to the disposal programs. The system will aim at the efficient management of the PLI (Primary Level Information) set on very long periods of time and contain several complementary modules: specific hard-copies archives, electronic archives, narrative mapping of knowledge, GIS, interconnected auxiliary data banks, ...

Question 43

Belgium has no specific regulation with regard to “decommissioned” sealed sources”. Guidance is being developed to establish thresholds defining sources that must be taken into account. What are the decision criteria or thresholds for disused sealed sources?

Answer:

Please see answers to question 27

Question 44

Belgium is studying clay formations for geologic repository disposal. How has Belgium interacted with other countries (such as Poland) in their clay disposal studies?

Answer :

The exchange of information and knowledge is organised in two ways.

1. International collaboration organised by international organisations like NEA/OECD (Paris) and by the European Commission. Within NEA/OECD a Clay Club was created to bring together all countries directly involved in assessing clay host formations as potential disposal options.
 2. bilateral contacts with Andra (France) and NAGRA (Switzerland) with the aim to mutually inform on disposal in clay.
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Question 45

Table 2 shows a total quantity in storage of 16,582 cubic meters, while the latest published reports by IAEA (Waste Profile Report for 2000) shows a total of 64,938. Can you explain the difference?

Answer :

The volume of 16 582 m³ concerns conditioned waste of categories A, B and C, in storage on date of 30.09.01. The volume of 64 938 m³ not only consists of conditioned waste, but also contains unconditioned waste and radioactive waste of category R, the latter representing the bulk of the aforementioned quantity.

Question 46

A covered storage area at the Umicore facility composed of concrete bunkers covered with clay, sand, and gravel layers. What is the final disposal plan for this stored material?

Answer :

No final decision has been taken yet about these concrete bunkers and their contents (e.g. radium).

UMICORE holds a Class II authorization (storage) for this installation. Umicore has been asked to submit an environmental impact assessment and a safety study to the FANC in order to decide whether they can be transformed into a disposal facility.

Question 47

The report on whole Section E introduces a good established and sustainable legal system, which incorporates all adopted on an international level requirements and standards including the unified concept for separation of the functions, prime and sole responsibility of the license holder. This legal system is in compliance with the model developed by the Euratom Treaty.

Following the report, the obligation for disposal of radioactive waste is the primary mission of the public legal person (ONDRAF/NIRAS) establishment of which is clearly motivated (e.g., involvement of the State, via its public organisation, to guarantee protection of future generations). What are the financial and legal instruments for ensuring fulfilment of this obligation, that is, whether any special fund exists required by the legislation and in what form and statute?

Does the State participate in the financing of disposal activities and to which extent? Are financial resources accumulated by the generators of radioactive waste used for this purpose? There is a close link between the above mentioned issue and the idea of the legislation - a public (agency) person managing radioactive waste not as legally obliged person but as a provider of services under a contract to the person which main responsibility is to manage waste (operator, RAW generator).

Thus, the legislation guarantees prime responsibility of the waste generator without transferring it to the State, imposing on it extrinsic obligations. In this case, what are the financial and legal instruments – whether a separate fund exists to finance all other RAW management activities (excluding disposal), in which State participates with its own resources (in order to support the management activity) or, as it is mentioned in the report, these activities are performed by a public legal person (agency) instead of the beneficiary to which the service is provided?"

Answer :

Detailed information of the financial mechanism is given in section 6.2.2.

In application of the *polluters pays principle* all financial obligations are charged on the producers or owners of the waste. At the moment the waste is transferred to ONDRAF/NIRAS, the producer pays a tariff which includes all the variable costs and a part of the fixed costs. The waste producers have conventionally taken the obligation to pay the fixed costs necessary to realise the disposal activities, even if they don't continue to deliver the waste as intended by the capacity reservation they have underwritten. For the waste already transferred in property to ONDRAF/NIRAS the fees paid for disposal are collected in the 'long-term fund'. For the waste produced, but not already transferred to ONDRAF/NIRAS, the producers had the obligation to make provisions in their own accountability.

There are no subsidies of the Belgian State. The State contributes to the waste financial mechanism as the other waste produces, in particular for the historically generated waste, for which the State has taken over the responsibility of the producers.

The law of 11 April 2003 has introduced special mechanisms to guaranty the availability of the provisions established by the utilities for the decommissioning of the nuclear power plants and by SYNATOM for the management of the irradiated fuel (see paragraph 6.2.2.2.).

Question 48

How the implementation of the obligations in Art. 27, par. 1., p. IV is ensured?

Answer:

The requirements of article 27 para1 iv is met by applying the European directive 92/3 transposed in Belgian law by the royal decree of 20 July 2001, more specific in chapter IV. This requires that the competent authority of country of origin of the radioactive waste consult with all other competent authorities involved in the shipment (countries of transit and country of destination) even when these countries are outside of the European community. Only when all competent authorities agree the shipment can take place.

Question 49

Do you have experience with contamination of soil inside or outside nuclear installations?

Answer :

The experience of contaminated soil inside nuclear installations that are in decommissioning is very limited and only slight contaminations have been observed, mainly in the area of open air low level liquid storage installations. No specific soil remediation actions have been undertaken as the small quantities of soils where considered as radioactive waste.

Soils are regularly controlled around existing nuclear installations but no contamination has been observed.

Question 50

Did you set the activity limits for contaminated soil in the environment as the result of an accident or after the decommissioning of nuclear installation ?

Answer :

Contaminated soils are treated on a case-by-case basis and an Environment Impact Assessment is required.

Of course, the clearance limits given in GRR-2001 (annex Ib) are of application.

Question 51

Who is responsible for decision how and where to store large volumes of contaminated soils ? Is it possible to dispose contaminated soil at radioactive waste disposal sites which were originally designed for nuclear waste ?

Answer :

The FANC is responsible for the final decision.

As ONDRAF/NIRAS is responsible for the management of all radioactive waste on Belgium territory, it is up to ONDRAF/NIRAS to decide what to do with large volumes of contaminated soils when they have been considered as radioactive waste.

As no disposal site is currently available, the design still can be adopted to the specific types of conditioned radioactive waste that have to be disposed off.

Question 52

Do you have appropriate technology for safe processing of contaminated soils?

Answer :

Up to now, there has been no need in Belgium for the processing of large volumes of contaminated soils.

Question 53

Is the disposal facility designed to deal only with nuclear wastes or will it accept the wastes from medicine, industry etc. as well?

Answer :

The disposal facilities will be designed to also accept waste from medicine, industry, etc..

Question 54

Did you set the long-term dose limit for the members of population related to the disposal site after institutional control ?

Answer :

The dose limit will most probably be equal to or lower than 0,3 mSv / year but it is not fixed yet as GRR-2001 does not specifically address this issue.

The current licensing system may be changed in the mid-term future to take specific aspects of disposal sites into account (end of institutional control, health physics department, etc).

Question 55

How did you solve the problem with intrusion scenarios at disposal site after institutional control?

Answer :

For surface disposal of low level short-lived waste intrusions scenarios are analysed in the safety evaluations and the outcome of this analysis (radiological impact as a result of a possible future intrusion) is used to determine the maximum activity levels for the critical radionuclides in the installation. Also, a institutional control period of 200 to 300 years is foreseen, as this is the period of important radioactive decay of the short-lived radionuclides present in the waste. During this control period intrusions can of course be excluded.

For deep disposal there is a broad international consensus that the most important aspect to evaluate is the resilience of the disposal system in case of a intrusion, and the consequences for the people living on the site of disposal. Dose calculations for the intruder are less relevant for assessing the long-term safety of the system.

Question 56

What kind of international recommendations did you take into account in order to take the decision about dose limits during and after institutional control of disposal facility ?

Answer :

Belgium will follow ICRP (e.g. ICRP 81 , ICRP 82) and IAEA documents (e.g. DS 154).

Question 57

Which authority is in charge to set up the limits and conditions for non-radioactive gaseous effluents from radioactive waste incineration facility ? Which authority is in charge to perform regulatory control of this non-radioactive part of incineration process ?

Answer :

Licences for non-radioactive effluents are the responsibility of the regional authorities.

A cooperation agreement between federal and regional authorities is being prepared to facilitate the licensing and inspection of “mixed installations” (= installations with radioactive and non-radioactive aspects).

Question 58

Is removal of control used for very low level waste to provide for waste minimization? If yes, do you have activity based criteria for removal of control (clearance) and how clearance carried out in practice?

Answer : The concentration criteria (in Bq/g) are included in GRR-2001 (Royal Decree of 20th July 2001 – annex Ib). They are based on a document prepared by a group of Euratom-experts: “Radiation Protection 122: Practical use of the concepts of clearance and of exemption, part I : Guidance on general clearance levels for practices”.

The following dose criteria were used in preparation of this document: 10 μ Sv/y individual, 1manSv collective dosis.

The procedures for the clearance of solid materials depends of the type of waste to be cleared.

Normally, two separate measurements are made before the waste is officially cleared. The health physics department of the facility and the authorized inspection agency are both involved in the procedure.

If half-life is less than 6 months, a nearly complete decay (at least 10 half-lives) is required.

Moreover, FANC may also allow clearances “case-by-case”.

Question 59

Please provide more information on the regulatory body FANC; what are the responsibilities (authorisation, rulemaking, review etc.) and what are the resources for performing these tasks?

Answer :

Please see answer to question 73.

Question 60

How is it determined that the requirements and regulations currently in place are effective in maintaining doses as low as reasonably achievable, social and economic factors taken into consideration, that the burden on future generations is minimized and that releases to the environment have no adverse short- or long-term effects?

Answer :

Given that the question refers to “the burden on future generations”, we suppose that this question relates to disposal of radioactive waste. As said in the response to question 41, no specific regulations for waste disposal have been elaborated so far, but actions have been started recently on this matter. In this work, international guidance (IAEA, EC, ICRP, etc) will of course be considered and taken into account where applicable. This approach should ensure that the concerns raised in the question (maintaining doses ALARA, minimisation of burden to future generations, no adverse short- or long-term effects of releases) are adequately dealt with.

More generally, the Belgian requirements and regulations are based on international documents and studies (ICRP, IAEA, NEA) and in accordance to European Union directives.

Independent controls are organized and an Automatic Radiation Monitoring Network is operational (TELERAD - www.telerad.fgov.be).

Question 61

How do the results achieved, as a consequence of applying Belgium's requirements and regulations, compare with international standards or recommendations, and with neighbouring countries' requirements?

Answer :

The Belgian requirements and regulations are based on international documents and studies (ICRP, IAEA, NEA) and in accordance to European Union directives. This is also the case in all neighbouring countries.

Question 62

What restrictions/conditions, including financial guarantees, are in place relative to the export and re-entry of sealed sources, especially to and from countries which do not have any programs in nuclear power and/or research, or to and from countries which do not have a nuclear regulatory body and/or rules and regulations governing the use and shipping of radioactive material?

Answer :

Re-entry of exported sealed sources is not mandatory in Belgium.

Concerning shipments of disused sealed sources within the European Community, please refer to section J of the national report, page 110 and more specifically to the provision of the European directive 1493/93. For exports to other origin States of disused sources, there are no specific regulation. States concerned by these exports have appropriate regulation or regulatory body. However, the future European directive as well as the code of conduct on the safe management of high radioactive sealed, recently adopted at the IAEA, provide additional conditions prior to any return of the sealed sources.

Question 63

In the event of waste facilities being close to borders with other countries, are there joint emergency plans and emergency exercises, and are the permissible release limits under both normal and abnormal conditions developed jointly?

Answer :

Yes, there are joint emergency exercises organised for nuclear installations located near the borders. Although permissible releases limits are not harmonised between countries, they are largely discussed during the different technical meetings that take place between Belgian authorities and the homologues of neighboring countries.

Question 64

To what extent are financial guarantees required for long-term storage of spent fuel and radioactive waste, and for how long are they required to cover costs such as regulatory monitoring and possible remedial actions (not necessarily accidents)?

Answer :

We refer to section 6.2.2.1 for the requested information.

With respect to possible remedial actions, the contracts of waste acceptance by ONDRAF/NIRAS include a clause in accordance with which the conditioner is obliged during a period limited to 50 years to indemnify ONDRAF/NIRAS for additional costs resulting from a proved latent defect (not detectable at the time of the Acceptance) which occurs during the storage-period or during the disposal-operations.

Finally, the cost of the monitoring and control period is relatively low compared to the total cost of the disposal programme, and with a relatively modest fund sufficient annual financial means can be generated to finance the control period.

The financial guarantees are made up of the provisions constituted by Synatom and other waste producers to cover all the costs related to the backend of the fuel cycle including provisional storage and final disposal of the conditioned radioactive waste and spent fuel.

Question 65

Please explain the public consultation process prior to making decisions related to waste disposal sites, and how the results of this process are factored into those decisions.

Answer :

For the low-level and short-lived waste programme ONDRAF/NIRAS is collaborating with the local stakeholders in a partnership. This partnership, with representatives of all sections of the local community, is the first decisional level. If the partnership agrees to continue the disposal programme, the municipality council has to decide if they agree or not. Finally, the government takes the final decision. The partnership can at all times decide to stop the collaboration with ONDRAF/NIRAS. At this phase of the programme the decision at hand is the decision to proceed to a project phase.

ONDRAF/NIRAS is defining at the moment how the consultation with the public for the deep disposal programme of high-level and long-lived waste could be organised.

Question 66

Please clarify the relationship between EURATOM and the EC directives with the national regulatory body.

Answer :

Within the scope of the EURATOM Treaty, regulations or directives are developed. Regulations, once approved at European level, are directly applied at Community and national levels. Directives need first to be transposed within the national legal framework.

There are no direct binding relations between Euratom and the regulatory bodies. However, different working groups exist where experts from national regulatory authorities exchange their experiences on specific issues. The Nuclear Regulatory Working Group is one of them.

Question 67

Please elaborate on the Belgian experience with implementing the stated requirements, with specific significant safety issues encountered in particular situations, and how they were dealt with. Also, how is feedback of operating experience acted upon, and corrective measures evaluated?

Answer :

As far as we understand the question sections G and H present how the safety requirements are implemented. Further clarification of the question should be given during the meeting for further elaboration.

Question 68

On Page 9 it is indicated that a moratorium on the conclusion of any new reprocessing contract should be prolonged until new data becomes available. What is the time frame that the Belgium government is considering for the moratorium?

Answer :

The programme of the new government issued from the recent elections does not consider any time frame regarding the end of the moratorium.

Question 69

No final back-end strategy has been identified (for spent fuel)". Disposal into geological clay formations is being investigated, but given that ONDRAF is a member of ARIUS, is it keeping the regional repository option open for consideration, either as host or as client?

Answer :

ONDRAF/NIRAS is a member of ARIUS for two years as part of a "double tracks" approach keeping considering the disposal of nuclear waste of Belgian origin on the national territory as the reference option.

Question 70

What is the approximate ratio between funds contributed by the nuclear industry and government organizations (ONDRAF/EC) to R&D programmes on disposal?

Answer :

It is to be noticed that funds contributed by NIRAS are funds contributed par the producers (mainly the nuclear industry) of waste and may not be considered as "governmental" funds.

Research performed by the SCK•CEN in the field of “waste management” (including spent fuel) is paid by NIRAS (money from producers) for about 90% and by European funds for 10%. No Belgian governmental money is used for this research.

Question 71

It is stated on Page 14 that waste producers have been paying provisions for long-term management (disposal) of radioactive waste since 1985, and that since 1999 a long-term fund of ONDRAF/NIRAS is operational. Is this a different fund from what the waste producers were contributing to? If so, who is contributing to this fund?

Answer :

Before the long-term fund was operational (1999) the major waste producers (Electrabel, Synatom, ...) were not paying provisions to ONDRAF/NIRAS, but they were managing these provisions, based on the ONDRAF/NIRAS tariffs, themselves in their own books. Since 1999 these provisions are transferred to ONDRAF/NIRAS' long-term fund at each act of waste acceptance by ONDRAF/NIRAS.

The small waste producers (hospitals, universities, ...) have always paid their provisions directly to ONDRAF/NIRAS at the moment of waste acceptance by ONDRAF/NIRAS.

Question 72

Please clarify the statement made on Page 37 that FANC is "supervised" by the Federal Minister of Internal Affairs. Does this allow FANC to maintain a state of independence?

Answer :

The statute of the FANC provides a large independence *de jure* as well as *de facto*. Nuclear safety is a responsibility of the State which must ensure that the operator fulfils all the requirements. This tasks has been given to the FANC through the Law of 15 April 1994. The role of the commissioners referred to, page 37 of the report, is to make the link between the Minister of Internal Affairs and the FANC, and to represent his Minister at the Board. The respective roles of the Director General on one hand, the Board and the Commissioner on the other are precisely detailed and do not prejudice the independent exercise of the FANC competencies or decisions related to the safety of nuclear installations.

Question 73

Please clarify the relationships between, and authorities of, FANC, ONDRAF/ NIRAS and AVN; e.g. which is the regulator (which one issues licenses), and the extent of independence of the regulator from licensees. Please also clarify the extent of interaction and independence of the various players in the Belgian regulatory system, and the designation of the responsibilities of each, especially in the areas of technical assessments, issuing licenses and approving designs/changes. Also, does FANC conduct audits, verifications, or inspections of ONDRAF or private nuclear operators?

Answer :

The relationships between FANC and AVN on one side, and ONDRAF/NIRAS and Belgoprocess on the other side, are schematically represented on an organizational scheme (see annex). FANC is the regulator who issues the safety licenses. ONDRAF/NIRAS qualifies the waste producing or treating installations only from a perspective of the quality of the conditioned waste in view of its safe management on the short and long term, in order to fulfil its own legal obligations. ONDRAF/NIRAS is owner of installations for the processing, conditioning and storage of radioactive waste, which are operated by Belgoprocess. AVN and AVC are authorized inspection organizations. They operate under the authority of the FANC, and conduct audits, verifications and inspections of the most important nuclear fuel cycle installations, for instance these of Belgoprocess and Electrabel.

Question 74

Page 38 states that AVN is an authorized inspection organization. Do these inspections replace those that would normally be performed by the regulator?

Answer :

Please see answer to previous question

Question 75

On Page 44 it is indicated that the Royal Decree concerning financial resources places the responsibility on the polluter according to the "polluter pays" principle. However ONDRAF, which is state-run and has the monopoly in Belgium for radioactive waste, appears to be in a conflict position. How does ONDRAF calculate the cost per polluter and how is this utilized?

Answer :

For the various waste streams specific technical solutions of short- and long-term management have been defined, being specific chains of waste treatment and conditioning, waste storage and waste disposal. For each specific management chain the cost calculation for the waste that enters into that specific chain is based on the waste volumes presented by the various waste producers.

Question 76

Page 44 states that "The financing modalities for the waste management for the regular waste producers will be fixed in an agreement to be concluded by ONDRAF/NIRAS and the producer". Is this an agreement or is it the result of a regulatory relationship, i.e., the producer proposes and the regulator disposes?

Answer :

This is indeed an agreement within a fixed legal framework.

Question 77

According to statements on page 62, the legal assignments for management of decommissioning and related liabilities are assigned to ONDRAF/NIRAS, the national agency for radioactive waste and enriched fissile materials. Does this extend to the Umicore site in Olen, briefly described in Section 4.3.3 and appearing to be a historical site from the radium industry? If not, what are the long term plans for this site

Answer :

The legal assignments regarding the management of decommissioning and related liabilities entrusted to ONDRAF/NIRAS do not encompass the execution of the decommissioning activities itself. The responsibilities for decommissioning of nuclear installations remain with the owner of the installation. ONDRAF/NIRAS plays a role by approving decommissioning plans.

With respect to UMICORE site at Olen, all responsibilities for site remediation are with the polluter, i.e. mainly or exclusively UMICORE. The remediation project for all the contaminated areas outside the fences of the plants is in a phase of preparation of the licence applications. It is foreseen to start the site remediation activities in 2007. The disposal of the very low level materials from de remediation activities will be on site.

Question 78

In Section 8.2, there is no reference to past practices which may have been associated with the radium industry historically. Has there been a history of contaminated sites from this, or other, historical activities and if so, how have these been dealt with? Is there a current program or would such sites be dealt with by ONDRAF/NIRAS on a case-by-case basis? Are historical sites, if present, considered to be within the scope of the Convention?

Answer :

The UMICORE site in Olen is the main site with radioactive contaminations from past practices. A global point of view for the remediation of this site and the long-term management of the resulting radioactive materials was presented by the Federal Agency for Nuclear Control and by ONDRAF/NIRAS. At the moment, a remediation programme for all the contaminations outside the UMICORE plant fences has been agreed upon by all parties involved and is in a phase of preparation of licence applications.

The responsibility for the remediation programme is with the polluter and the role of ONDRAF/NIRAS is limited to the long-term management of the radioactive materials coming from the remediation activities. A transfer of responsibilities and financial means will accompany the acceptance by ONDRAF/NIRAS of the radioactive materials.

Historical sites are indeed considered to be within the scope of the Convention.

Question 79

Page 111 mentions that the competent authority must establish appropriate provisions in order to recover orphan sources. Are these provisions for sources within Belgium or does Belgium recover orphan sources from other countries which originated from within Belgium? Also, please provide more explanation on the fund for covering orphan sources and related clean-up: where do the funds come from, who holds and manages the fund, etc?

Answer :

The mention that is referred to is related to the European directive project that will be implemented in the future. In the scope of directives, implementation modalities are left free to the States. Therefore, Belgium has not decided yet the way to constitute the funds related to the recovery of orphan sources. The purpose of these funds is to recover orphan sources found on the national territory.

Question 80

The Act dated the 31st of January 2003 states that the political authorities have decided to abandon the use of nuclear fission energy for electrical industrial production, by discontinuing the licensing of new nuclear power plants and by limiting the operation period of the existing ones to 40 years, closing them progressively between 2015 and 2025. Considering the proximity of the closure of the facilities,

- What actions are being considered for the storage of spent fuel, the final disposal of the low- and medium-level radioactive wastes, and the final storage of very low-level radioactive (declassified) wastes?

- What type of facilities would be used, in which locations and what would be the cost?

Answer :

1. The spent fuel is being stored at the moment at the sites of the power plants, under the responsibility of the fuel owner (Synatom and Electrabel).
 2. For the disposal programmes run by ONDRAF/NIRAS the reader is referred to sections 2.2 and 2.4, as well as to section 8.3.2.
 3. No final siting decisions have yet been taken; for the deep disposal of the high-level and long-lived waste ONDRAF/NIRAS is studying the Boom Clay as a potential host formation.
 4. The most recent cost evaluations have been presented in the SAFIR 2 report (NIROND 2001-05 E, December 2001). Cost assessments, however, are judged to be outside the scope of the Convention.
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Question 81

What is the legal base under which ONDRAF/NIRAS may force the operators to implement general rules for waste conditioning and packaging?

Answer :

The legal procedure for waste acceptance by ONDRAF/NIRAS is based on the concepts of general rules and waste acceptance criteria. ONDRAF/NIRAS can only accept radioactive waste (conditioned or unconditioned) if the waste producer can demonstrate compliance with the waste acceptance criteria.

The legal base for this is the Law of creation of ONDRAF/NIRAS and the related Royal Decrees, and the recent Royal Decree on the qualification of waste treatment and storage facilities (Royal Decree of November 18, 2003).

Question 82

When the radioactive wastes are transmitted to ONDRAF/NIRAS is ownership and full responsibility also transferred to the Agency? In its case, where is this specified in the law or in the conventions signed with the operators?

Answer :

The Acceptance of radioactive waste by ONDRAF/NIRAS with the view of their treatment/conditioning, transport, storage and disposal is statutorily allotted to the National Organism in accordance with the Royal Decree of 16.10.1991 (Art 3- §3).

The Acceptance is commercially covered by contracts between the Producers and the National Organism. The contracts specify among others the modalities of the transfer of responsibility as well as the financial and technical requirements.

The contracts include a clause in accordance with which the conditioner is obliged during a period limited to 50 years to indemnify the National Organism for additional costs resulting from a proved latent defect (not detectable at the time of the Acceptance) which occurs during the storage-period or during the disposal-operations.

Question 83

In case the operator of an installation decides to implement its dismantling by his own means, is it still necessary that ONDRAF/NIRAS approve the D&D plan?

Answer :

The decommissioning plan always has to be approved by ONDRAF/NIRAS.

Question 84

Considering that the current legal framework only requires availability of the total amount needed to implement dismantling of the installations 30 years after start-up of commercial operation (40 in the regulation), what are the financial sureties required to ensure full availability of funds in case an early final shutdown and dismantling has to be faced and who supervises them?

Answer :

The law of April 11, 2003 fixes the share of the funds managed by Synatom which can be lent to the nuclear operators and the conditions to comply with. Moreover the Law provides that a Follow-up Committee has to be created in order to survey the adequacy and availability of the financial guarantees.

Question 85

Is ONDRAF/NIRAS responsible for taking care of orphan sources found in Belgium? In affirmative case, who pays for this service in case no liable person can be identified?

Answer :

Please see answer to question 27.

Question 86

Which are the measures that the Safety Authorities can impose to the producers in order to prevent accumulation of radioactive material on producer's sites? Is ONDRAF/NIRAS playing some role as the body responsible for the inventory?

Answer :

Maximum quantities of radioactive materials are specified in the authorizations. The Health Physics Department of the operator must keep an up-to-date inventory of the activities and of their location on the premises. AVN and AVC verify that the operator applies the conditions of the authorizations.

ONDRAF/NIRAS as the responsible body for the radioactive waste inventory has to look at all the sites in Belgium where radioactive materials are present, and has to assess if sufficient financial means are or will be available for the safe management of all the resulting radioactive waste.

Question 87

Synatom is the company responsible for managing irradiated fissile materials, and for this reason, has created some provisions. How are these provisions estimated considering the dual scenario with and without reprocessing and the disposal option? A project of law is in preparation regarding the management of these provisions. Is this law contemplating the future transfer of financial means to ONDRAF/NIRAS for their final management?

Answer :

The financial provisions have been calculated by taking into account the most penalizing backend management strategy in order to have available, in any time and in any circumstances, the sufficient provisions level. In compliance with the laws in force in Belgium ONDRAF/NIRAS has determined the tariffs covering the storage and disposal services, specific to each waste category. As waste are transferred to Ondraf/Niras, the producer pays the sum in proportion of the volume of the identified category.

Question 88

It is also mentioned a project of law regarding the management of the dismantling provisions of the 7 NPPs, and the foreseen role of Synatom as manager of both provisions. Will this project imply any change of the status of Synatom? How will the provisions be managed and who will supervise their adequacy? Will ONDRAF/NIRAS continue to its mission on seeing that the necessary provisions for dismantling and for the irradiated fissile materials have been created?

Answer :

The statutes of Synatom have been changed accordingly. The law of April 11, 2003 provides that a Follow-up Committee has to be created in order to survey the adequacy and availability of the financial guarantees.

The law provides that the General manager of ONDRAF/NIRAS may attend the meetings of the Follow-up Committee with an advisory capacity.

Question 89

It is mentioned that licensing procedures of waste disposal would be examined, in particular those aspects related to decision-making process and the consultation of stakeholders. Can you provide more detailed information on the plans, the leading organisation as well as other parties involved, and time schedule of this initiative. Which will be the role in the development of these licensing procedures of the specific agreements between ONDRAF/NIRAS and FANC - AVN?

Answer :

Consultation of stakeholders is currently taking place for Category A waste disposal projects and the leading organization is ONDRAF / NIRAS.

The specific agreements are not finalized yet.

The FANC is following and partly participating the this process. It intends to include the lessons learnt into its future project related to the authorisation procedure for disposal site.

Question 90

Could Belgium provide information on the envisaged management strategies for BR1 and VENUS reactors spent fuel?

Answer :

Please see answer to question 28.

Question 91

Could Belgium provide information on the planned schedule for full implementation of the new Safety Authority organization and the current situation?

Answer :

As mentioned on page 23 the reform has not yet been finalised. Currently there is a transition period in force that has been legally established. Without further prolongation this transition period terminates on 1 September 2004. In the coming months the blueprint of the new organization will be determined and consequently implemented.

Question 92

The paragraph presents some differences in the licensing procedures for class I to IV facilities. Could Belgium provide an extensive description of these different licensing procedures or provide the mentioned GRR-2001 document as an appendix?

Answer : The licensing procedures for the different kind of facilities are outlined in chapter II of the GRR-2001. The text is in French available on the website of the FANC (see http://www.fanc.fgov.be/newfanc/fr/reglementation_20_07_2001.htm).

Question 93

Could Belgium clarify the part of the mentioned workforces dedicated to the waste and spent fuel management activities? Could Belgium provide some statistics and past experience of the inspections mainly in the field of the Convention?

Answer :

Only for the waste and spent fuel management activities there are for the moment no specific statistics available. The inspections of AVN are performed by a dedicated inspector at each unit of the nuclear power plants or at each nuclear fuel cycle facility. For the Belgoprocess-plant (central waste processing company in Belgium) there are at least 2 visits each month by the AVN inspector, or 24 inspections a year. Each installation or building is visited at least once every three months. The inspectors in this field have also other functions within AVN and they perform also other type of inspections in other fields of the nuclear fuel cycle industry.

Question 94

Is the mentioned dose the sum of internal and external doses?

The mentioned doses are the total doses (sum internal and external doses).

Can Belgium provide some examples of dose constraints from spent fuel facilities?

Answer :

For the spent fuel facilities there is no different approach compared with the other nuclear activities. But in practice the dose related with a spent fuel storage facility are very low. In general they are only a fraction of 1 mSv/year.

In Belgium, the intermediate storage is on the sites of the nuclear power plants (Doel, Tihange). The legal limit for the workers is 20 mSv/y. Of course the operators have to apply the ALARA principle ; practically they take measures to stay lower than 10 mSv/y.

Question 95

Do the mentioned thresholds correspond to “limited” or “excluded” levels of contamination?

Answer :

This is a second limit (first limit = no contamination) used by the operator to constraint the level of contamination.

Question 96

Are they applicable to other facilities than dry storage facilities?

Answer:

There are no reasons to have very different limits from these who are in general defined for the controlled area. Based on the function of an area, the activities, the means of protection, the contamination risk, the frequency the area is occupied by the staff, etc... specific limits can be of application. But the limits for surface contamination are for "the other facilities than dry storage facilities" of the same level.

For the pool storages there are also limits for the pool water contamination.

Question 97

Could Belgium provide information on the specificities of the emergency plans of the concerned facilities, in particular as regards accident taken into account, triggering criteria associated and emergency planning zones?

Answer :

The Royal Decree of 27 September 1991 encompass all measures to be taken in case of a radiological emergency. Specificities of the installations are to be found in the internal emergency plan and in the emergency exercises that are regularly performed for which specific scenarios are developed according to the different risks of the installation. The triggering criteria are related to the NO to N4 levels which translate the potential risk of each accidental situation.

Question 98

Could Belgium provide information on licensing procedures of D&D operations, safety studies for decommissioning, experience feedback, collection of information and archiving, review of emergency plan for decommissioning?

Answer :

Decommissioning is allowed on a case-by-case basis. A report has to be submitted to FANC. It includes a general description, a safety report and an environmental impact assessment.

Question 99

Could Belgium enlighten the differences between reactors and waste and spent fuel facilities regarding safety principles and implementation?

Answer :

Under current licensing system (described in 5.3.1.1.), disposal sites for radioactive waste are classified into class I, being the highest risk class.

Defence-in-depth and the multiple barrier approach are common principles.

Regarding implementation, the safety culture is emphasized in both cases.

The current licensing system may be changed in the mid-term future to take specific aspects of disposal sites into account (end of institutional control, health physics department, etc).

Question 100

Could Belgium provide detailed information about the necessity of public inquiry for spent fuel facilities, corresponding regulations and implementation?

Answer :

Spent fuel in storage pending a decision regarding its future is at this moment neither regarded nor declared as radioactive waste by its owner Synatom. Consequently its management is not included in the scope of responsibility of ONDRAF/NIRAS.

The facilities are classified under class I, being the highest class (see section 2.1. and 2.2.).

In Belgium, spent fuel interim storages facilities are located on the sites of the Doel and Tihange NPP's. There are regular contacts between the operator, the regulator and the local communities.

Question 101

Could Belgium clarify the existence of regulatory documents related to licensee internal organization regarding safety? (Independence of the safety staff, working procedures, etc.)?

Answer:

Article 23 of GRR-2001 describes the key role of the Health Physics Department (HPD). This department is, in a general way and amongst other duties, responsible for the organisation and the supervision of the necessary means for operational radiation protection. The tasks are in a general way described in this Article. How the working procedures are implemented depends on the type of the installations. The head of the HPD is also charged with the "internal service for prevention and protection at work". It's the task of the HPD to prove at the Authorised Inspection organisation and the FANC, that the licensee internal organization regarding safety, can fulfil this tasks in a appropriate and independent way.

GRR-2001 : General Radioprotection Regulation for the protection of the workers, the population and the environment, issued in 2001 by Royal Decree of 20 July 2001

Question 102

It is said, "No incident, even a minor one, took place in the spent fuel intermediate storage installations in Belgium"

It seems that the applied criteria for declaration are those applied to nuclear reactor (for instance, it is only referred to the IRS system and not to the FINAS one for the international system). Could Belgium provide precisions such as:

Applied criteria for INES classification incase of minor containment losses, applied criteria for radiological incidents and existence of a system of experience feedback of incidents?

The spent fuel intermediate storage installations are located at the nuclear power plants and that is why the criteria for declaration are those for power plants. In Belgium the general criteria for the INES classification are of application as mentioned in the User's manual: off-site impact criteria, on-site impact criteria and defence in depth criteria. The applied criteria for radiological incidents are the levels of the contaminations on-site (type of contamination, radio nuclide, etc...), the doses, the releases (atmospheric and liquids), etc....

Let us not forget that the INES system is for rapid public communication and the IRS is to disseminate lessons learned to avoid recurrence. All safety related incidents are reported to the Authorised Inspection Organisation and to the FANC. The licensees have their own system of experience feedback.

Question 103

Could Belgium provide specific information on the planned measures to upgrade safety of existing facilities and better characterize waste resulting from past practices?

Answer :

The regulatory imposed ten-years safety review of the installations is an important means to re-assess the safety of the installations and to take the necessary measures to improve safety if needed. This safety review is made by the operator of the facility together with the official control body.

Mostly, the waste from past practices has been characterised following the specifications in force at that time. A possible insufficient characterisation from these past practices could create problems on the level of waste acceptance in general by ONDRAF/NIRAS, and also with respect to the acceptance in a specific disposal facility. An effort is made by ONDRAF/NIRAS with the waste producers of historical waste to better characterise these waste streams. Several actions are running in parallel: tracing back all available information on waste origin and composition; measurements of radionuclide spectra and of total activities, enveloping estimations of activities ... This is a rather slow process and it will continue for many more years.

With respect to the disposal of historical waste, ONDRAF/NIRAS will not accept radioactive waste in a possible future disposal facilities if insufficient characterisation of the waste puts doubts on the compliance with the activity or other limits imposed or if the compatibility of the waste with the disposal system cannot be assured.

Question 104

Could Belgium clarify site selection procedures and the Existence of guidelines setting criteria?

Answer :

For low and intermediate level short-lived waste (LILW-SL) – category A in the Belgian waste classification system – the Belgian government asked ONDRAF / NIRAS to limit the studies to the four existing “nuclear zones” of Mol-Dessel, Fleurus, Doel and Tihange. Then more specific sites have been chosen with active participation of the local municipalities via local partnerships. The two technical options ‘surface disposal’ and ‘deep disposal’ are studied in parallel.

The relevant site related factors for surface disposal are in line with the required site characteristics in the IAEA Safety Requirements for Near Surface Disposal of Radioactive Waste and in the IAEA Safety Guide on Siting of Near Surface Disposal Facilities.

Question 105

Could Belgium provide information on regulatory documents specifying, at the design stage, the necessary measures for the closure of a disposal facility?

Answer :

No such regulatory documents exist at the moment.

Question 106

Could Belgium provide more detailed information on the safety assessment procedures (such as lessons learned from internal analysis of design improvement, control before granting a license, prerequisites for introduction of radioactive materials, definition of safety limits for safety-related parameters?)

Answer:

This very large question may be tackled in three steps. First, the licensing procedure (described in the national report) ensure feed-back from a large panel of experts in order to an up-to-date approach of the safety taking into account all relevant parameters. Second, for existing installations, inspections regime leads regularly to adjust safety parameters according specific findings. Third, the periodic safety review is a process were all safety issues are re-examined and is a key tool for continuous improvement.

The Quality Management System is a complementary process that contribute to continuous improvement of effectiveness and of the safety.

Question 107

Could Belgium provide information on the clearance of materials? Such as waste packages characterization and categorization, related QA, examples of implementation

Answer:

In a practical view, there is for the moment only unconditional release approved in Belgium. The release procedures are based on the following fundamental cornerstones: well defined limits by the authorities, the responsibilities are well defined, control techniques (at least two different and independent measuring techniques are required of the producer), registration in a clearance rapport (history, inventory and origin of the produced waste, results of measurements, etc..). All the materials that are leaving the controlled area must be measured. The whole methodology for each type of clearance has to be well defined and to be approved by AVN and the FANC. For the released material there is always a period that's available for AVN and the FANC to do some additional controls. There is a practice to take on a regular base samples and to do additional measurements in an independent laboratory.

Please, see also question 111

Question 108

The report states that the interim storage building of spent fuel is designed to cope with external accidents such as airplane crash. What are the design specifications of the airplane crash for storage building design?

Answer :

Building DE Tihange, which accommodates the wet storage, is designed to withstand the impact of a Boeing 707/720 at 100m/s or of one of its engines as well as the impact of an F16 fighter plane at 150 m/s. The vibrations induced by the impact have also been taken into account as concerns the safety-related equipment, including the cooling systems. The resistance to fire following an aircraft is provided by the thickness of the reinforced concrete walls.

Dry storage at Doel is arranged in individual containers which are designed to withstand the same conditions as at Tihange (engine of a Boeing, F16, fire). The building itself is not designed to withstand an aircraft crash.

Question 109

What is verification method for structural integrity including corrosion-protection for 10-year periodic safety evaluation?

Answer : This question will be tackled during the meeting

Question 110

What is the reason for specifying the dose constraint as a range of 0.1 to 0.3 mSv/year, not a specific limit value, to be applied for the period after repository closure?

Answer:

There is no related dose constraint in the GRR-2001 ; specific aspects of disposal sites may be included in new regulations currently under development. The range given in the report is in accordance with international documents (ICRP, IAEA) and safety reports of other countries.

Question 111

What criteria are applied for the clearance of radioactive waste? And what is the management method for the waste after clearance?

Answer:

The concentration criteria (in Bq/g) are included in GRR-2001 (Royal Decree of 20th July 2001 – annex Ib). They are based a document prepared by a group of Euratom-experts: “Radiation Protection 122: Practical use of the concepts of clearance of exemption, part I : Guidance on general clearance levels for practices”.

The following dose criteria were used in preparation of this document: 10 μ Sv/y individual, 1manSv collective dosis.

The procedures for the clearance of solid materials depends of the type of waste to be cleared.

Normally, two separate measurements are made before the waste is officially cleared. The health physics department of the facility and the authorized inspection agency are both involved in the procedure.

If half-life is less than 6 months, a nearly complete decay (at least 10 half-lives) is required.

Moreover, FANC may also allow clearances “case-by-case”.

The clearance is unconditional, no specific destination or follow-up of the waste is required.

Question 112

How does the regulatory body perform to assure the effectiveness and implementation for the quality assurance program of Belgoprocess, which is in charge of the management of radioactive waste, and what are the measures to assure the independence of the inspections?

Answer :

Belgoprocess is ISO-9000 certified. The certification association is SGS which inspects the facilities on a regular basis.

The Quality Assurance system is described in the report submitted, by the operator, when an authorization is required. FANC does not conduct specific inspections.

ONDRAF/NIRAS plays also a role in the evaluation of the QA programmes of all waste treatment and storage facilities: for the qualification of these facilities by ONDRAF/NIRAS (qualification is a necessary condition before a later waste acceptance by ONDRAF/NIRAS) the facility manager has to demonstrate that an appropriate QA programme is applied.

Question 113

What are the critical radiological accidents during decommissioning of the nuclear facilities and the emergency preparedness for those situations?

Answer :

An Environmental Impact Assessment has to be submitted to FANC. See also section related to emergency planning (article 25). Accident scenarios have to be described in the report submitted when a decommissioning authorization is requested.

These scenarios are not very different from the ones considered during the operational life when nuclear fuel is still present (criticality, water level, etc). Once the fuel has been removed, general radiological protection rules are applied.

Also, the internal emergency plan must be adapted to the specificity of the installations and performed tasks.

Question 114

How do you keep and manage the important information for decommissioning and records collected during decommissioning?

Answer :

ONDRAF/NIRAS has developed a “Decommissioning Management System “(DMS). This decommissioning database and its evaluation tool consists in a fully linked modular data structure: the data storage architecture and evaluation functions have been developed in ACCESS, and its multi-users interfacing facilities in VISUAL BASIC 6

The database mainly involves an inventories module, an evaluation module, and so called auxiliary modules integrating unit prices of the various decontamination and dismantling techniques, unit rates for standard waste processing, interim storage and final disposal, estimated unit prices for special waste.

Question 115

What are the list and status of nuclear facilities under decommissioning?

Answer :

Please see § 4.4 of the national report

Question 116

Belgium is a high populated country. How can you reach the public acceptance in the case of the establishing of radioactive waste repositories?

Answer :

Please see answer to question 65.

Question 117

How do you monitor the surrounding of the radioactive waste installations?

Answer :

Each installation possesses its own detectors to monitor radioactivity continuously. Beside this, the Telerad network covers the whole Belgian territory and monitors radioactivity continuously. Should the radioactivity exceed the normal authorised level, alarms would automatically be triggered, an analysis of situation would be performed and the emergency plan activation.

Question 118

Do you have an inventory of stored radioactive wastes in Belgium? What is the uncertainty of the inventory?

Answer :

ONDRAF/NIRAS has an inventory at its disposal which lists all radioactive wastes on Belgian territory, stored in licensed nuclear facilities. This inventory is based on the waste producers' information. Any data on uncertainties as far as radiological characteristics of this waste are concerned is currently under investigation.

Question 119

The descriptions of the 'open' and 'geological' groups suggests a 1-1 relation with the classes 'short half-life' and 'long half-life' in Table 1.

Is this contradicted in the paragraph on the three main waste categories that states that category C belongs to the 'geological' group, whereas in Table 1 high-level short-lived waste ('open' group) is attributed to the category C ?

Answer :

The waste types belonging to this subcategory (short half-life and high-level activity) are typically disused sealed sources. As these waste types are not acceptable in a surface disposal facility, they belong to the geological group.

Question 120

***What is meant by "radiferous" waste (Radium-contaminated, radioactively contaminated, ...)?
What is the meaning of the waste category "R" for this building in Table 2 ?***

Answer :

Please see answer to question 33.

Question 121

Please provide a table or figure clarifying the structure of the regulatory framework.

Answer :

Please see answer to questions 73/74

Question 122

***Table concerning legal framework of ONDRAF/NIRAS:
Please explain the last reference (second item of 'Other legal elements')***

Answer :

The qualification of installations is a responsibility of ONDRAF/NIRAS; it is a necessary first condition for waste acceptance by ONDRAF/NIRAS. This means that only waste treated and conditioned in a qualified installation can be accepted.

Please also refer to the answer given to question 112.

Question 123

It is stated that nuclear operators have to record gaseous and liquid discharges, as well as stored solid wastes and the amounts of cleared materials. Are stored gaseous and liquid wastes exempted from this recording requirement ?

Answer :

Yes.

Question 124

Please define "less important facilities" which only have to notify FANC before starting decommissioning activities ? Does this refer to all class III and IV facilities ?

Answer :

The less important facilities are class III, class IV and certain class II facilities which have a low radionuclide content.

Question 125

Class 1 expert : does this refer to "recognized experts" of "an authorized inspection organization" for control of "class 1 facilities" ?

Answer :

Yes.

Question 126

Re. note on government bill, 5th bullet of list:

It is stated that provisions for the management of irradiated fissile material (i.e. spent fuel) will be kept proportional to 'the amount of fissile material generated'. In this context, what is meant by 'fissile material generated'?

Answer :

The wording refers to the quantity of fuel definitively unloaded from the reactor core plus a due share of the fuel partly irradiated and still in use in the reactor.

Question 127

What criteria are used to determine the adequacy of financial provisions for decommissioning (e.g. duration of period of deferred dismantling period, discount rate?) In terms of financial provisions for decommissioning, what are the functions and powers of (i) the Electricity and Gas Control Committee and (ii) the new Control Committee intended to replace it? What powers does the Belgian Government have (now and as planned in future) to oversee decisions taken by Synatom?

Answer :

The criteria used to determine the adequacy of financial provisions for decommissioning will be fixed by the Follow-up Committee replacing the Electricity and Gas Control Committee which has been discontinued. According to the law of April, 2003, the Follow-up Committee expresses opinions (i) on the methods used to evaluate the financial guarantees, (ii) on the maximal share of such guarantees which can be lent to the nuclear operators and (iii) on the other financial instruments categories, for the remaining part of those guarantees. It also verifies (i) the data provided by Synatom for the evaluation of the guarantees, (ii) the correct implementation of the methods used for that calculation, (iii) the financial conditions made by Synatom for the funds lent to the nuclear operators, (iiii) the policy of the nuclear operators regarding mortgage and preferential rights.

Representatives of the public authorities (ministries, National Bank, Finance Administration, ...) are parts of the Follow-up Committee. The golden share owned by the Belgian State gives him the right to have two representatives attending the meetings of the Board of Directors of Synatom and who can veto any decision contradictory with the government policy regarding fresh fuel supply and backend strategy.

Question 128

How do the Belgian notification levels (N0,) N1 to N4 relate to the levels of the INES scale?

Answer :

They are not related with the INES scale. The notification levels N_x are operational levels to be used only for emergency response purposes. The associated criteria for each notification level are only based on : (expected or real) atmospheric releases, technical state of the installations. On the opposite, the INES-scale is an evaluation of the impact of the incident a short time after it happened and is meant for public information (not an emergency response tool !).

Question 129

p. 60, “Co-ordination and Crisis Committee”: What do the U2 and higher ‘alarm levels’ mean (also named ‘alert levels’ in Section 6.5.2.3)? Are these levels related to the notification levels Nx in Section 6.5.2.1?

Answer :

The notification levels N_x are the levels to be used by the utilities to notify the authorities whereas the alarm levels U_x are the response operational levels of the authorities. The proposed notification level is considered as a proposal for the alarm level, which has to be later confirmed officially by the Emergency Director of the Authorities. The alarm level U1 is, by definition, a pre-alert and the concerned people and services related with the emergency plan are in standby except for the evaluation cell which is activated.

Question 130

A number of ongoing Belgium national activities concerning the improvement of safety w.r.t. spent fuel (section 7.7.7) and radioactive waste management are mentioned. However, is there a system for systematic improvement?

Answer :

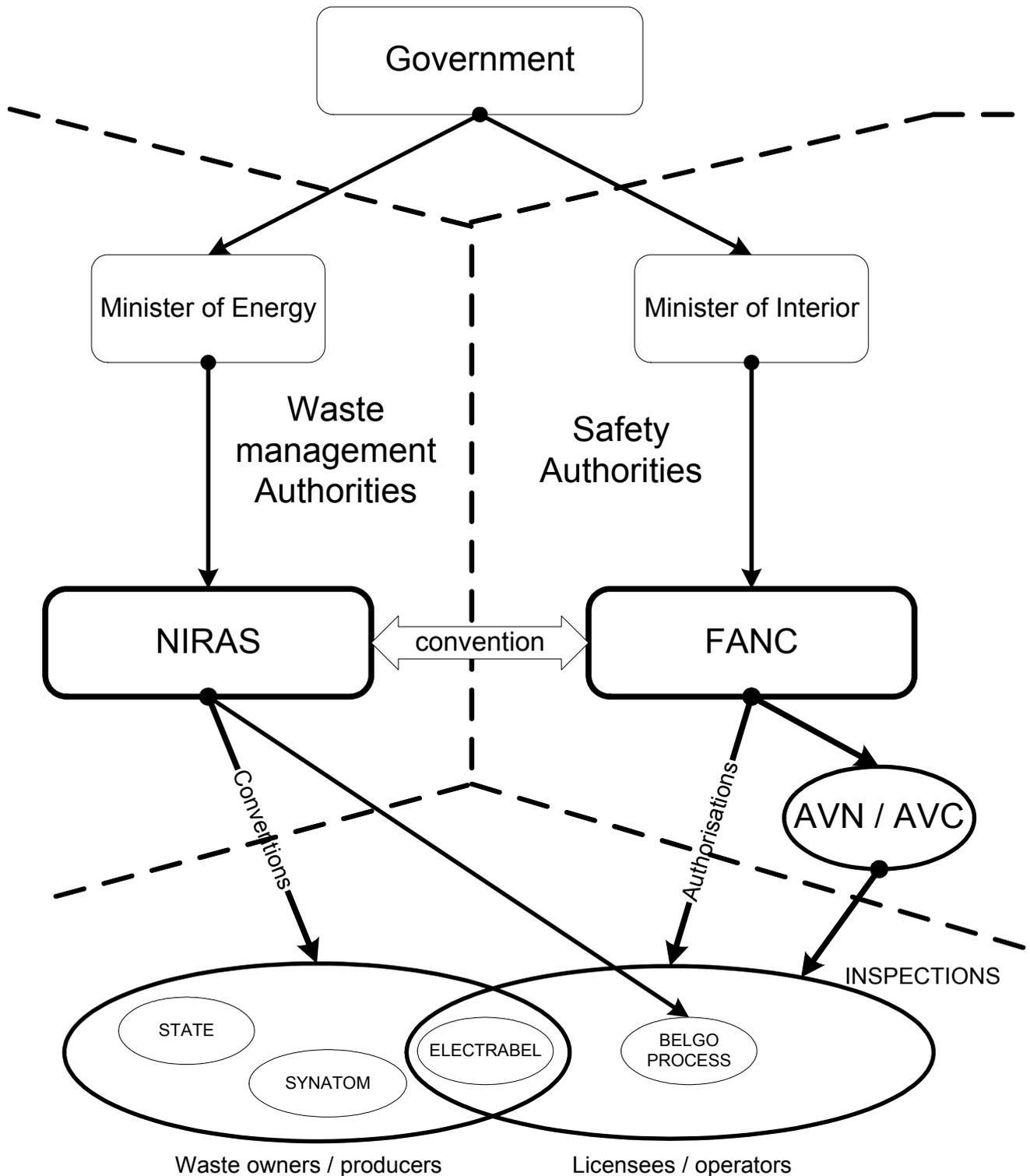
Yes, in the different phases of radioactive waste management (design of the waste treatment or storage facility, phase of construction of the facility, phase of exploitation of the facility and the quality of the end product) the goal of the Quality Management System is also to have a continuous improvement of the system. The continuous improvement of safety will also be pursued by regular inspection and safety studies performed in particular within the legal framework like the decennial safety review of installations.

Question 131

The unconditional clearance of solid radioactive waste originating from a licensed facility of class I,II and III ... is only permitted if it responds to the generically determined clearance levels or conditions stipulated in the GRR-2001 ... The clearance levels determined in the licence have to be based on impact studies clearly confirming that two radiation protection criteria are observed, namely the individual dose of maximum 10 μ Sv/year and the collective dose rate of 1man.Sv/year. Questions from Japan are 1) For the preparation of impact studies, are there any guidelines documented and published that clarifies the procedures, methods, or other conditions necessary for the preparation? 2) Were there any cases that experienced clearance of solid radioactive waste that were originated from fuel cycle facilities including NPP?

Answer: Please see question 58 and 26. Experiences cases will be discussed during the meeting.

Organizational Structure of the Relationships between the Waste management Authorities and the Safety Authorities



Belgoprocess is the daughter company of ONDRAF/NIRAS