República Argentina

JOINT CONVENTION ON THE SAFETY OF SPENT FUEL MANAGEMENT AND ON THE SAFETY OF RADIOACTIVE WASTE MANAGEMENT

SECOND NATIONAL REPORT

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SECOND NATIONAL REPORT

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JOINT CONVENTION ON THE SAFETY OF SPENT FUEL MANAGEMENT AND ON THE SAFETY OF RADIOACTIVE WASTE MANAGEMENT

SECOND NATIONAL REPORT[1]

On 19 December 1997, during the 41st Session of the General Conference of IAEA, Argentina subscribed the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management agreed in Vienna in the course of the Diplomatic Conference held on 15 September 1997. The Honorable Congress of Argentina enacted Law Nº 25279 on 6 July 2000, ratifying the terms of the Joint Convention which came into effect on 18 June 2001.

The present National Report has been elaborated in accordance with Article 32 of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, for its presentation as stipulated in Article 30 of said Joint Convention.

JOINT CONVENTION ON THE SAFETY OF SPENT FUEL MANAGEMENT AND
ON THE SAFETY OF RADIOACTIVE WASTE MANAGEMENT

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[1] This version of the National Report is a translation of the official report in Spanish

TABLE OF CONTENTS

GLOSSARY

- *"CLASS B radioactive waste"* means those materials treated and conditioned containing low activity concentration of β/γ emitters with half lives lower than 30 years and non significant activity concentrations of α emitters;

- *"CLASS M radioactive waste"* means those materials treated and conditioned containing medium activity concentration of β/γ emitters with half lives lower than 30 years and non significant activity concentrations of α emitters;

- *"CLASS A radioactive waste"* means those materials treated and conditioned containing high activity concentration of β/γ emitters with half lives greater than 30 years and or significant activity concentrations of α emitters;

- *"clearable waste"* means those radioactive materials that can be removed from the regulatory control due to its activity concentration and or total activity, after a limited storage period for decaying;

- *"closure"* means the completion of all operations at some time after the emplacement of spent fuel or radioactive waste in a disposal facility. This includes the final engineering or other work required to bring the facility to a condition that will be safe in the long term;

- *"decommissioning"* means all steps leading to the release of a nuclear facility, other than a disposal facility, from regulatory control. These steps include the processes of decontamination and dismantling;

- *"discharges"* means planned and controlled releases into the environment, as a legitimate practice, within limits authorized by the regulatory body, of liquid or gaseous radioactive materials that originate from regulated nuclear facilities during normal operation;

- *"disposal"* means the emplacement of spent fuel or radioactive waste in an appropriate facility without the intention of retrieval;

- *"disposable waste"* means those materials that can not be dispersed in the environment due to its activity concentration and or total activity and therefore require treatment conditioning and final disposal;

- *"historical waste"* means those radioactive waste treated, conditioned or finally disposed applying criteria beyond the current regulatory frame and that require its re-assay;

- *"license"* means any authorization, permission or certification granted by a regulatory body to carry out any activity related to management of spent fuel or of radioactive waste;

- *"nuclear facility"* means a civilian facility and its associated land, buildings and equipment in which radioactive materials are produced, processed, used, handled, stored or disposed of on such a scale that consideration of safety is required;

- *"operating lifetime"* means the period during which a spent fuel or a radioactive waste management facility is used for its intended purpose. In the case of a disposal facility, the period begins when spent fuel or radioactive waste is first emplaced in the facility and ends upon closure of the facility;

- *"radioactive waste"* means radioactive material in gaseous, liquid or solid form for which no further use is foreseen by the Contracting Party or by a natural or legal person whose decision is accepted by the Contracting Party, and which is controlled as radioactive waste by a regulatory body under the legislative and regulatory framework of the Contracting Party;

- *"radioactive waste management"* means all activities, including decommissioning activities, that relate to the handling, pretreatment, treatment, conditioning, storage, or disposal of radioactive waste, excluding off-site transportation. It may also involve discharges;

- *"radioactive waste management facility"* means any facility or installation the primary purpose of which is radioactive waste management, including a nuclear facility in the process of being decommissioned only if it is designated by the Contracting Party as a radioactive waste management facility;

- *"regulatory body"* means any body or bodies given the legal authority by the Contracting Party to regulate any aspect of the safety of spent fuel or radioactive waste management including the granting of licences;

- *"reprocessing"* means a process or operation, the purpose of which is to extract radioactive isotopes from spent fuel for further use;

- *"sealed source"* means radioactive material that is permanently sealed in a capsule or closely bonded and in a solid form, excluding reactor fuel elements;

- *"spent fuel"* means nuclear fuel that has been irradiated in and permanently removed from a reactor core;

- *"spent fuel management"* means all activities that relate to the handling or storage of spent fuel, excluding off-site transportation. It may also involve discharges;

- *"spent fuel management facility"* means any facility or installation the primary purpose of which is spent fuel management;

- *"State of destination"* means a State to which a transboundary movement is planned or takes place;

- *"State of origin"* means a State from which a transboundary movement is planned to be initiated or is initiated;

- *"State of transit"* means any State, other than a State of origin or a State of destination, through whose territory a transboundary movement is planned or takes place;

- *"storage"* means the holding of spent fuel or of radioactive waste in a facility that provides for its containment, with the intention of retrieval;

- *"transboundary movement"* means any shipment of spent fuel or of radioactive waste from a State of origin to a State of destination.

ACRONYMS

AECL	**Atomic Energy of Canada Ltd.**
AGE	**Ezeiza Radioactive Waste Management Area**
ALARA	**As Low As Reasonably Achievable**
ANSI	**America National Standard Institute**
ARN	**Nuclear Regulatory Authority**
ASECQ	**Spent Fuel Dry Storage System**
ASME	**American Standard Mechanical Engineering**
BSI	**British Standard Institute**
CAB	**Bariloche Atomic Centre**
CAC	**Constituyentes Atomic Centre**
CAE	**Ezeiza Atomic Centre**
CALPIR	**Advisory Committee for the Licensing of Personnel of Type I Installations**
CANDU	**Canadian Deuterium Uranium Reactor**
CFR	**Code of Federal Regulations**
CNA I	**Atucha I Nuclear Power Plant**
CMFSR	**San Rafael Mining and Milling Complex**
CNE	**Embalse Nuclear Power Plant**
CNEA	**National Atomic Energy Commission**
CSA	**Canadian Standards Association**
DCMFEI	**MTR Spent Fuel Central Storage Facility**
DIN	**German Standards Institute**
DLM	**Master Logical Diagram**
DOE	**US Department of Energy**
ENREN	**Former Nuclear Regulatory Body**
FACIRI	**Storage Facility for Research Reactors Spent Fuel**
IAEA	**International Atomic Energy Agency**
ICRP	**International Commission on Radiological Protection**
ISO	**International Standard Organization**
LWR	**Light Water Reactor**
MTR	**Material Testing Reactor**
NASA	**Nuclear Power Plant National Operator**
NORM	**Natural Occurring Radioactive Material**
NUSS	**IAEA Nuclear Safety Standards**
OSART	**Operational Safety Review Team**
PEGRR	**Radioactive Waste Management Strategic Plan**
PHWR	**Pressure Heavy Water Reactor**
PNGRR	**Radioactive Waste Management National Program**
PPR	**Radioisotope Production Plant**
PPRS	**Radiological Protection and Safety Program**
PRAMU	**Uranium Mining Environmental Restoration Project**
PSA	**Probabilistic Safety Assessment**
PTAMB	**Treatment and Conditioning Plant for Medium-Level and Low-Level Liquid and Solid Radioactive Wastes**
RA 1	**Argentine Reactor 1**
RA 2	**Argentine Reactor 2**
RA 3	**Argentine Reactor 3 (MTR)**
RADWASS	**IAEA Radioactive Waste Safety Standards**
RWMRO	**Radioactive Waste Management Responsible Organization**
SAC	**Quality Assurance System**
SEU	**Slightly Enriched Uranium**
SIEN	**Nuclear Emergency Intervention System**
SIER	**Radiological Emergency Intervention System**
SIFEM	**Federal Emergency System**
USA	**United States of America**
WANO	**World Association of Nuclear Operators**

JOINT CONVENTION ON THE SAFETY OF SPENT FUEL MANAGEMENT AND ON THE SAFETY OF RADIOACTIVE WASTE MANAGEMENT

NATIONAL REPORT

SECTION A INTRODUCTION

A.1 Overview

This report describes the actions taken in Argentina on the safety of spent fuel management (SF) and on the safety of radioactive waste management, in order to provide evidence of the fulfilment of its obligations under the Joint Convention. To facilitate the reading and a better understanding of this report a summary of those parts of the 1st Report that were considered necessary have been included.

Since its creation in 1950, the National Atomic Energy Commission (CNEA) of the Argentine Republic has worked in the development of applications for the pacific use of nuclear energy. They have included, among others, research and development activities in basic and nuclear technology areas, the operation of important facilities working on the production of radioisotopes for medical and industrial applications and the performance of tasks in connection with the nuclear fuel cycle, mining and uranium processing activities, manufacturing of fuel elements, production of heavy water and the operation of two nuclear power plants. In the past, experimental reprocessing programs were undertaken.

As a result of such activities and of other activities performed in the nuclear field by other private and public entities, various types of radioactive waste have been and are produced, which are managed applying legal and regulatory provisions in agreement with the obligations under the Joint Convention.

The legal framework applicable to radioactive waste is commensurate with the provisions of the Constitution and with the legislation adopted by the National Congress by Act 24804[1] which regulates the nuclear activity, and Act 25018[2] which lays down the Radioactive Waste Management System.

The existence of a number of provincial and municipal regulations, in a basically federal country, has a significant impact on management activities.

The National Law of Nuclear Activity not only sets the objectives pursued by CNEA but also assigns to CNEA the state ownership of spent fuel and the responsibility for the management of radioactive wastes, thus becoming the Responsible Organization. The Law sets forth that

[1] Act 24804 National Law of Nuclear Activity
[2] Act 25018 Radioactive Waste Management Regime

CNEA shall take full responsibility for the decommissioning of nuclear facilities and any other significant facility (Type I installations).

Furthermore, the National Law of Nuclear Activity, also established a regulatory body called the Nuclear Regulatory Authority (ARN) which is empowered to regulate and supervise the nuclear activity in all matters related to radiation and nuclear safety, physical protection and control of the use of nuclear materials, the licensing and surveillance of nuclear facilities and international safeguards.

Act 25018, the Radioactive Waste Management System, establishes CNEA as the implementing Authority to perform all activities related to radioactive waste management and sets up Radioactive Waste Management National Program (PNGRR), which includes the *Strategic Plan*. To date the *Strategic Pl*an has not been enacted as required by Act 25018.

For a better understanding of the contents of this National Report, the definition of radioactive waste has been specified so that it includes:

- **clearable (clearance) radioactive materials**, means radioactive materials that on account of their concentration of radioactivity and/or total radioactivity may be released from regulatory control.

- **dischargeable waste**, means liquid and gaseous radioactive materials that originate from the normal operation of a nuclear facility and that due to their total radioactivity may be discharged into the environment in a planned and controlled manner

- **disposable radioactive waste**, means materials that on account of their radioactivity concentration and/or total radioactivity, cannot be dispersed into the environment and therefore, require treatment, conditioning and final disposal.

A.2 National Program for Spent Fuel Management and Radioactive Waste Management.

In 1998, the Argentine Government through Act 25018 appointed CNEA as the implementing authority for matters related to radioactive waste management and required it to develop a *Strategic Plan for Radioactive Waste Management*, subject to the approval of the National Parliament (Congreso Nacional).

The *Strategic Plan* outlines the commitments that the National Government must assume for the safety of Spent Fuel Management and Radioactive Waste Management, ensuring public health, the protection of the environment and the rights of future generations.

The Strategic Plan, which covers the period from 2003 through 2076, recommends the course of action for the safe management of low, intermediate and high level radioactive waste

produced in the performance of practices and those generated from decontamination and decommissioning of nuclear and radioactive facilities; research and development plans related to technologies selected for all management stages; professional training of qualified human resources; availability of necessary funds for its fulfilment and Social Communication-related[3] activities.

The Strategic Plan presents technological solutions that in the light of present knowledge allow for the safe and effective compliance with the tasks appointed by law.

Within this framework and in accordance with constant advances in technical knowledge in the world, CNEA proposes in the *Strategic Plan*, the best solution in line with the evolution of knowledge and international development, which shall be updated every three years.

Within the present context spent fuel is considered a potential energetic resource due to its fissile material content. Notwithstanding, up to the moment there are no reprocessing plants in operation in Argentina and such plants are not included in near future plans. The decision on whether reprocessing shall form part of spent fuel management has not been made.

The activities included in the *Strategic Plan* which may entail a hazard in the frame of the responsibilities established by the law, are regulated and controlled by the Argentine Nuclear Regulatory Authority (ARN). The regulations adopted by the National Authority, based on nuclear and radiological safety criteria, are consistent with those adopted by international consensus on the matter.

The proposed *Strategic Plan* is encompassed within the environmental policy of our country that, in the case of waste management, takes into account the concurrent powers of the Nation, the Provinces and the City of Buenos Aires. Section 4 of Act 25018 sets forth that CNEA shall coordinate with the Provinces and the City of Buenos Aires all matters relative to the enforcement of Act 25018, to make the management of radioactive waste produced by them possible and set up cooperation and advisory systems for the competent organizations considering the complexity of the topics to be dealt with.

With regards to the sites where the future facilities for the final disposal of radioactive wastes shall be located, Act 24804 sets forth that to define the siting of the final repository, CNEA, in its role of Responsible Organization, shall propose the potential sites that may arise as a result of the studies made. The sites must have ARN's approval from the radiological and nuclear safety point of view and they must also be approved by an Act from the Provincial Government where the proposed repository would be emplaced.

[3] Strategic Plan for Radioactive Waste Management

A.3 Main topics of the report – Summary

The structure of this National Report complies, as possible, with the *Guidelines Regarding the Form and Structure of National Reports* approved in the Preparatory Meeting held in Vienna in December 2001.

Section A summarizes the scope of the nuclear activity developed in Argentina since 1950 and the legal and regulatory framework. It also makes reference to the *Strategic Plan for Radioactive Waste Management* (*Strategic Plan)*, which describes the strategies for the safety of Spent Fuel Management and Radioactive Waste Management.

Section B sets out the policies for the safety of Spent Fuel Management and Radioactive Waste Management and includes a description of national practices in connection with these policies. As in Argentina such policies and practices have not suffered any change, the content of this section is the same as the one specified in the 1st National Report.

Section C lays down the scope of application for Argentina of the terms of the Joint Convention, regarding to spent fuel (SF), naturally occurring radioactive materials (NORM) and disused sealed sources. As in Argentina the criteria on the scope of application have not suffered any change, the content of this section is the same as the one specified in the 1st National Report.

Section D describes the facilities used for Spent Fuel Management and Radioactive Waste Management, and their respective inventories. Discharges and pertinent doses are included in Section L.

The Legislative and Regulatory framework is explained in Section E, special emphasis is given to the implementation of safety measures and regulations. The structure and responsibilities of the Regulatory Body are also described.

Section F explains the responsibilities of the license holder, human and financial resources, quality assurance, operational radiation protection, emergency preparedness and decommissioning. This section also includes emergency plans at national level.

Section G deals with the safety of spent fuel management and the responsibilities defined by the Joint Convention regarding:

- General safety requirements
- Existing facilities
- Site of proposed facilities
- Design and construction of facilities
- Safety Assessment of facilities
- Operation of facilities and
- Final disposal of spent fuel

This section includes a brief description of the facilities, their condition and the actions taken or that will be taken to improve safety.

Section H specifies the degree of compliance with the responsibilities provided for radioactive waste management on the following matters:

- General safety requirements
- Existing facilities and past practices
- Site of proposed facilities
- Design and construction of facilities
- Operation of facilities
- Institutional measures after decommissioning

This section includes a brief description of the facilities, their condition and the actions taken or that will be taken to improve safety. *Section M* of the 1st National Report covered specifically the wastes originated from mining and uranium processing, but as in this report *Section M* is not included, a summary of measures for such wastes is included in this section.

It should be noted that to the extent that spent fuel management facilities and radioactive waste management facilities are located in the same site, either in the Ezeiza Radioactive Waste Management Area (AGE), in Atucha Nuclear Plant I (CNA I), or in Embalse Nuclear Power Plant (CNE), the contents of Section G also apply to Section H equivalent responsibilities, except for those cases where Section H responsibilities are specific.

Section I covers the responsibilities and experiences inherent to transboundary movement provided in article 27 of the Joint Convention.

Section J includes existing provisions for disused sealed sources provided in article 28 of the Joint Convention.

Section K details the activities proposed to improve safety, and specifies the measures that will be adopted in the future on such matter.

Section L includes the following Annexes:

- List of Operating Facilities Authorized to Make Discharges
- Radioactive discharges into the environment
- Annual dose to the critical group
- Annual collective dose and average individual dose
- National Conventions, Acts, Regulations, Standards and Documents
- Reassessment of Ezeiza Radioactive Waste Management Area (AGE) safety
- Training
- Agreements
- Joint Projects with IAEA

SECTION B POLICIES AND PRACTICES

B.1 Spent fuel management policy

In the Argentine Republic SF management policy lays down that:

- The Argentine Government exercises the state ownership of special radioactive fission material contained in SFs originating from the operation of Nuclear Power Plants and from experimental, research and/or production reactors. (Act 24804, Art 2).
- The decision to reuse fissile material contained in SFs or not, has to be adopted before 2030. At such time it will be essential to have the required technical and human resources to implement whatever decision is adopted. (Strategic Plan – Act 25018)
- With regard to SF's originating from Research or Radioisotope Production Reactors and for which no further use is envisaged, the strategy considers two alternatives:

    - Shipping them back to the country where they were originally enriched, if possible.
    - Their conditioning for final disposal.

B.2 Spent fuel management practice

Up to now, Argentina has adopted the wet storage method, either in pools or in other facilities, during the time necessary to allow its radioactivity to decay and its later transfer to interim dry storage.

Irrespective of the decision adopted, the Strategic Plan provides for investments and research and development activities in connection with the final disposal both of spent fuel and high level wastes contained therein.

SF of CNA I nuclear power plant is temporarily stored in pools till the end of the operational life of the nuclear power plant. It is contemplated that they will be then moved to an interim dry storage facility, which is included in present schedules, and it is foreseen to become operational in 2017.

In the case of CNE nuclear power plant the SF is stored in pools at the facility for a period of not less than six (6) years and is subsequently transferred to dry storage in concrete silos. (ASECQ).

For SF from research and radioisotope production reactors, the SF is cooled down in water pools at the reactor site and later, transferred to the MTR Spent Fuel Central Storage Facility (DCMFEI), where the fuel is temporarily stored in a wet storage facility

SF from research and production reactors containing highly enriched uranium (HEU) has been

mostly returned to the country of origin and the remaining shall be returned in the near future.

For the remaining low enriched (20%) SF, an initial cooling stage in a water pool is planned and the SF will later be moved to a dry storage, until their final destination is decided.

B.3 Radioactive waste management policy

Radioactive waste management policy is laid down in the following assertions:

- The determination to manage radioactive waste originating from domestic nuclear energy applications, including wastes from the decommissioning of related facilities.
- The allocation of responsibilities for the performance of radioactive waste activities, and essentially the long term surveillance and institutional control required by the different final disposal systems used.
- The assurance that said management activities are and will be performed safely, ensuring the protection and the rights of present and future generations and the environment.
- The development of a *Strategic Plan (PEGRR)* which is authorized, periodically reviewed, and audited by the National Congress.
- The establishment of a proper procedure to obtain and manage the necessary financial resources to comply with the obligations arising from the performance of the assigned responsibilities, considering that many of them imply deferred costs.
- Maintenance of a recording and information system which provides a total knowledge and control of inventories of radioactive waste generated and to be generated from all nuclear activities.
- Development of a public communication and information program.

Other additional factors to be considered in this context:

- The Argentine Government is the sole responsible for radioactive waste management and *National Atomic Energy Commission (CNEA*) is the organization responsible for its implementation.
- The regulation and supervision of radioactive waste management are duties inherent to the National Government and the *Autoridad Regulatoria Nuclear (ARN)* is the independent state entity responsible for its implementation.
- In accordance with the present national nuclear program, the policy to be implemented by CNEA to this effect shall follow the guidelines of the *National Radioactive Waste Management Program*, with the responsibilities specified in Act 25018.
- That its main objective is to conduct Radioactive Waste Management in the Argentine Republic with an integrated perspective.

In order to achieve its objectives the *National Radioactive Waste Management Program* shall ensure the following:

- Identification and assessment of accumulated and projected waste inventories;
- Adoption of the most appropriate technological solutions for the management of such wastes and scientific-technological support;
- Definition of responsibilities and specification of obligations and interrelation of involved parties for all stages of management, from generation to the final stage of management.
- Definition of the necessary facilities for final disposal;
- Public communication and information;
- Assessment of the actual costs inherent to their activities, financial sources, financing and management methods..

The establishment of the *Strategic Plan* (PEGRR) requires the definition of treatment procedures and final disposal systems for the different types of wastes. The review every three years, established by Law, provides the opportunity to make the necessary modifications, which shall contemplate not only the optimisation of the technological aspects of radioactive waste management derived from scientific advances, or from the development of innovative technologies, but also possible changes in strategic definitions relative to SF treatment.

The public communication and information program shall be implemented contributing clear and objective information so that the population may be informed about the scope of the proposed plans and of the benefits they will get from its implementation, providing the adequate environment for public participation in subjects of their concern.

Development and implementation costs as well as financing sources of the Plan shall contemplate that future generations are free from financial burdens attributable to those who at present benefit from the activities which produce such wastes.

Regarding the remaining wastes, that is, radioactive waste subject to clearance from regulatory control and dischargeable waste, it is the regulatory framework and the regulations in force that define the criteria for their management. In all cases, safety methods applied have been the result of discussions and international consensus on this matter.

B.4 Radioactive waste management practice

In Argentina the following criteria are applied to Radioactive Waste Management:

a. Allow for the withdrawal of radioactive material from regulatory control when on account of its activity concentration and/or total activity it may be released from regulatory control
b. Authorize the planned and controlled discharge of liquid and gaseous radioactive materials that originate from the normal operation of a nuclear facility and which on account of their total radioactivity may be released into

the environment.

c. Treatment, conditioning and final disposal of radioactive waste, understanding that radioactive waste means materials that on account of their concentration of radioactivity and/or total radioactivity cannot be released into the environment.

In the first case, the Regulatory Authority sets the acceptable doses for the release from regulatory control in accordance with the exemption criteria. As provided in AR 10.1.1. Radiological Safety Standard, the effective dose constraint value for exemption is 10 μSv/year for individuals most exposed to radiation and 1Sv man/year as an effective collective dose value.

In the second case, the AR 6.1.2, Radioactive Effluents Limitation Standard for Type I Radioactive Facilities, establishes that:

- The annual effective dose in the critical group from the release of radioactive effluents shall not exceed 0.3 mSv.
- The collective effective dose from the release of radioactive effluents shall not exceed 1.5 Sievert man by TBq year of the value of the annual integrated inventory.

In the case of Nuclear Research Reactors, Standard AR 4.1.2 provides the same individual dose constraint but refers the collective effective dose to thermal energy generated so that:

- The collective effective dose by unit of thermal energy generated shall not exceed 5 mSv man per MW year.

For nuclear power plants, Standard AR 3.1.2. provides the same constraint to the individual dose as Standard AR 6.1.2 but refers the collective effective dose to the electric power generated so that:

- The collective effective dose does not exceed 15 mSv per MW year of generated power.

Such reference values are included in the Operating License of the facilities and the responsibility for their compliance rests with the Responsible Organization.

Finally, Radioactive Waste Management, regulated by Standard AR 10.12.1 lays down the general and particular criteria for waste generators and for those responsible for their management. This standard regulates the management of wastes that on account of their nature and/or activity cannot be released into the environment.

B.4.1 Basis for defining and characterizing radioactive waste

The criteria to define and characterize radioactive waste in Argentina are related to the final disposal technological system proposed for each category.

The Argentine *Strategic Plan* has provided three types of technological systems for final disposal:

- Engineered Surface System, for radioactive waste requiring isolation periods of up to fifty (50) years.
- Monolithic Near-Surface Repository, for radioactive waste requiring isolation periods of up to three hundred (300) years.
- Deep Geological Repository, for radioactive waste requiring isolation periods in excess of three hundred (300) years.

According to such criteria and with the only purpose of characterizing radioactive wastes included in existing inventories reported, they are defined as:

CLASS B Disposable Radioactive Waste: means material treated and conditioned, with β/γ emitters and half-life of up to 30 years with radioactive concentration lower than 37 GBq/t and/or concentrations lower than 370 MBq/t from α emitters.

CLASS M Disposable Radioactive Waste: means material treated and conditioned with β/γ emitters and half-life of up to 30 years with radioactive concentration in excess of 37 GBq/t and lower than 3.7 TBq/t and concentrations lower than 370 MBq/t from α emitters.

CLASS A Disposable Radioactive Waste: means material treated and conditioned with β/γ emitters and half-life in excess of 30 years and/or whose activity is in excess of 3.7 TBq/t and/or whose concentration from α emitters exceeds concentrations of 370 MBq/t.

Notwithstanding the above classification, reference values assigned to a final disposal facility are specifically established in the respective license.

B.4.2 Origin of radioactive waste

The origin of wastes included in each of the categories stated in Section B.4.1 is the following:

Class B Disposable Waste (Low level)

Low level waste is conditioned under quality system procedures and packed in 200 liter drums specially designed and disposed of in accordance with technologically improved final disposal systems. Such wastes include:

- solid and liquid waste generated from nuclear power plants, isotope production facilities, research and production reactors, and facilities related to the fuel cycle;
- non-compactable waste from the operation of both nuclear power plants conditioned in cement matrices;
- spent sealed sources (short lived, $\tau<5$ years), conditioned in drums and embedded in cement matrices;

- liquid and solid biological waste generated from research centers, medical applications, etc., treated and conditioned in accordance with specific appropriate techniques.

Class M Disposable Waste (Intermediate Level)

The main volume consists of spent ionic exchange resins and filters used in the cleaning systems of nuclear power plants primary circuit. To date, accumulated resins and filters are stored at nuclear power plants awaiting for the conditioning process.

A secondary volume of intermediate level waste consists mainly of spent conditioned sealed sources, conditioned structural material from the partial dismantling of a reactor for the production of radioisotopes, and some structural material generated from the industrial production of Co^{60}. Most of it is not conditioned and is at an interim storage facility awaiting its final disposal in an intermediate level repository which to date has not been built.

Class A Disposable Waste (High Level and/or Long Lived)

This type of waste mostly comes from fission products contained in SF generated from the operation of nuclear power plants and SF used in research and production reactors. The cooling channels parts with stellite replaced at CNA I Nuclear Power Plant should also be considered within this type of waste.

Besides, wastes with alpha emitters from the experimental development of mixed oxide fuel (MOX) and other material which contains long lived isotopes, as those used in medicine (Radium tubes, cells and needles, Pu pacemakers, etc.) and in industry (neutron sources) are also within this type of waste.

Waste from Uranium Mining

This waste comes from the operation of six uranium mines, five of which are closed, and only one is presently in conditions to be operated, but temporarily shut down in safe conditions. Such wastes are the result of processed material called “tailings” or “mill tailings”. In general, it is a finely divided material, similar to sand, from which the greatest possible quantity of uranium has been extracted. The tailings together with low-grade ore (not subject to economic exploitation) and the sterile, are called “mining waste”.

B.4.3 Practices in radioactive waste management

Radioactive waste management practices are laid down in the *Strategic Plan* and were developed after considering different alternatives for final disposal and taking into account technical, operational and financial factors.

Minimization and segregation practices are performed at the generation plant. Based on the segregation made, treatment and conditioning technologies are applied to each type of waste according to the final disposal alternative foreseen .

Class B Disposable Waste (Low Level)

Concerning compactable *solid radioactive waste* generated from the operation and maintenance of Nuclear Power Plants, the treatment consists in reducing the waste volume compacting it in 200 liter drums. Non-compactable solid waste such as concentrates and sludge from the cleanup of tanks are immobilized in cement matrices and conditioned in 200 liter drums. Afterwards these wastes are conditioned for transport, storage and/or final disposal. To such effect, specific written procedures are followed which meet the waste acceptance requirements laid down by the Radioactive Waste Management Responsible Organization (RWMRO).

Management of low level *liquid wastes* generated from nuclear power plants is different for each plant on account of the various technologies used. Thus, at CNA I, liquid waste generated from operation and maintenance activities is treated by concentration by means of evaporation; concentrates as well as sludge from the cleanup of tanks are immobilized in cement matrixes and conditioned in 200 liter drums. At CNE liquid radioactive waste originated from operation and maintenance activities are treated in ionic exchange resin beds, discharging into the environment on the basis of planned and controlled procedures the exhausted stream, following pre-established procedures and within the authorized constraints of discharges. Spent ionic exchange resin beds, classified as intermediate level radioactive wastes, are stored at the facilities of each Power Plant.

In connection with the final disposal of *Class B (Low Level)* solid radioactive wastes the concept used is based on the disposal of waste packages in *engineered enhanced surface disposal system* located in the Ezeiza Radioactive Waste Management Area (AGE). AGE is a facility operated by National Atomic Energy Commission (CNEA) that is the Radioactive Waste Management Responsible Organization. The system was developed considering a 50 year post-closure institutional control of the final disposal system. The ARN has licensed said facilities and set up the criteria and limits for the safe disposal of such waste.

In the case of *very low level radioactive liquid waste*, the practice consists in the adsorption of radioisotopes by silt-calcareous soils with an abundant content of high retaining capacity clays, thus radionuclides with short half-life decay to negligible levels during their permanence in the bed volume.

Disposition of *structural waste* which on account of its size cannot be conditioned in drums is made directly in AGE's *Structural Material Final Disposal System*, where it is possible to dispose of low level specific radioactive waste. In general, such waste consist of metal pieces from contaminated areas. At regular intervals concrete casting is poured in order to immobilize the contaminated material, prevent its spreading and reduce the dose rate at the access entrance thus facilitating its operation.

At AGE all final radioactive waste disposal activities have been discontinued since 2001 [See H.2.4].
In the case of disused Sealed Sources, only the sealed sources which are not going to be recycled and/or reused, will be conditioned prior to their storage and/or disposal.

Class M Disposable Waste (Intermediate Level)

In the case of *Class M (Intermediate Level)* waste a monolithic repository near surface is foreseen, similar to those in operation in L'Aube, France and El Cabril, Spain. The design of this type of repositories is based on the use of multiple, redundant and independent barriers. The model considers the application of 300 years of institutional post-closure control. Wastes will be immobilized in cement matrices and packed in 200 liter drums or in special concrete containers.

Until High and Intermediate Level Repositories are available, waste awaiting its final disposal is stored at facilities specially designed for such purpose.

Intermediate level radioactive solid waste originated from operation and maintenance activities of the two Power Plants, consist mainly of mechanical filters from the primary circuit of the reactor and by spent ionic exchange resin beds. Such intermediate level radioactive solid waste is stored at the facilities of each Power Plant awaiting treatment and conditioning in accordance with written procedures which meet the waste acceptance requirements laid down by the RWMRO.

At AGE, there is a specially designed facility where non-conditioned wastes may be stored prior to their processing as well as conditioned waste packages awaiting their transport and/or final disposal.

In the case of conditioned waste packages with high exposure rate, high performance concrete containers have been developed, to provide suitable shielding for their safe handling.

Class A Disposable Waste (High Level and/or Long Lived)

With regards to *High Level and/or Long Lived Disposable Waste* generated in the final stage of the nuclear fuel cycle, Argentina is temporarily storing the SF until a decision is adopted on its reprocessing or direct final disposal.

The studies for the siting, construction and operation of a Deep Geological Repository are planned. The deadline to adopt a decision on the possible reprocessing or direct final disposal of the SP is subject to the completion of the studies for the siting of the Geological Repository which have to be concluded at the latest by 2030, as it is foreseen in the Strategic Plan.

If the reprocessing (closed cycle) option is adopted for high level radioactive waste generated from the last stage of the fuel cycle , high level waste segregated there shall be conditioned, immobilizing it in specially designed glass matrices and containers and shall be disposed of in the Deep Geological Repository.

If on the contrary, the closed cycle option is not acceptable, SF shall be conditioned and finally disposed of in the Deep Geological Repository.

Low and Intermediate Level of Long Lived Radioactive Waste

Duly conditioned *Low and Intermediate Level of Long Lived Radioactive Waste* shall be disposed of in the Deep Geological Repository.

Discharges of effluents

Operating licenses granted by the ARN to the Facilities, specify the authorized restrictions of discharges of liquid and gaseous effluents.

In all cases the facilities have interim storage tanks for liquid radioactive effluents where they are controlled and inventoried. Once they have reached lower levels than the authorized restrictions, they are discharged into the environment in accordance with conditions set forth in the Operating Licenses.

In the case of discharges of gaseous radioactive effluents, they are collected at their place of origin, and are transferred to decay storage facilities or retention systems. Once reached levels below authorized limits, they are discharged into the environment in rationed doses, controlling the release in accordance with radioactivity levels.

SECTION C SCOPE OF APPLICATION

The National Report deals with safety in the management of Spent Fuel and Radioactive Waste arising from all the uses of nuclear energy, both inside and outside the Fuel Cycle, including waste originated from the generation of electricity, manufacturing of nuclear fuel, mining and milling of uranium, production of radioisotopes for medical purposes, industrial uses, research and development activities and controlled and planned radioactive discharges from the normal operation of the facilities where the above mentioned practices are performed

This Report also deals with safety of disused Sealed Sources.

This National Report is not applicable to naturally occurring radioactive material (NORM) originating outside the fuel cycle

Up to the moment there are no reprocessing plants in operation in Argentina and such plants are not included in near future plans.

SECTION D LISTS AND INVENTORIES

Includes information on Radioactive Waste Management and Spent Fuel Management facilities and on their inventories.

D.1 Spent fuel management facilities

The existing spent fuel management facilities are the following:

SITE	FACILITY NAME
Atucha I Nuclear Power Plant	I & II Pool House
Embalse Nuclear Power Plant	Storage pool
	Storage silos (ASECQ)
Ezeiza Radioactive Waste Management Area (AGE)	Central Storage Facility for Research Reactor (DCMFEI)

A brief description of each installation is shown in *Section G.2 Existing facilities*

D.2 Spent fuel inventory

D.2.1. Atucha I Nuclear Power Plant

INVENTORY TILL 12-31-2004					
SYSTEM	**QUANTITY**	**U Nat t**	**ULE t**	**Pu(*) t**	**PF (*) TBq**
Pools	**8,055**	**1,231.00**		**4.12**	**2.23E+06**
Pools	**912**		**141.53**	**0.63**	**7.49E+06**
TOTAL	**8,967**	**1,231.00**	**141.53**	**4.75**	**9.72E+06**

(*) PF = Fission products: Estimates obtained with computational codes, on the base of the burn-up of SF, their residence time, their positions in the core and the decay time.

D.2.2 Embalse Nuclear Power Plant

INVENTORY TILL 12-31-2004				
SYSTEM	**QUANTITY**	**U Nat t**	**Pu (*) t**	**PF (*) TBq**
Pool	**40,877**	**772.72**	**2.78**	**1.73E+07**
Silos	**57,240**	**1,077.15**	**3.90**	**2.59E+06**
TOTAL	**98,117**	**1,849.87**	**6.68**	**1.99E+07**

(*) PF = Fission products: Estimates obtained with computational codes, on the base of the burn-up of SF, their residence time, their positions in the core and the decay time.

D.2.3 MTR Spent Fuel Central Storage Facility (DCMFEI)

LEU (20%) – INVENTORY TILL 12-31-2004					
SYSTEM	**QUANTITY**	**MTR kg**	**PINS* kg**	**Pu g**	**PF GBq**
Tubes	**68**	**86.88**			
Tubes	**232**		**14.19**		
TOTAL		**86.88**	**14.19**		

* Pins: Research reactors pin type fuel

D.3 Radioactive waste management facilities

Existing radioactive waste management installations are the following:

SITE	INSTALLATION
Atucha I Nuclear Power Plant	System for Treatment & Conditioning of Liquid Radioactive Waste
	Facility for Immobilization by Cementation of Liquid & Non-compactable Structural and Solid Radioactive Waste
	System for Treatment & Conditioning of Solid Radioactive Waste
	System to Store Mechanical Filters from the Reactors Primary Circuit
	System to Store Exhausted Ionic Exchange Resin Beds
	System to Discharge Gaseous Radioactive Waste
Embalse Nuclear Power Plant	System for Treatment & Conditioning of Solid Radioactive Waste
	Installations to Store Solid Radioactive Waste
	Exhausted Resin Storage Tanks
	System for Treatment & Conditioning of Liquid Radioactive Waste
	Installation for Treatment of Gaseous Radioactive Waste
Ezeiza Atomic Center	Plant for Decay, Pre-treatment and Discharge of Active Liquids from the Radioisotope Production Plant - PPR
Ezeiza Radioactive Waste Management Area (AGE)	Installations for Treatment of Low Level Solid Radioactive Waste
	Semi containment System for Solid Radioactive Waste
	Semi containment System for Low Level Liquid Radioactive Waste
	System for Final Disposal of Structural Solid Radioactive Waste and Sealed Sources
	Deposit for Interim Storage of Radioactive Sources and Wastes
	Handling Yard and Stowage of Items

A brief description of each installation is shown in *Section H.2 Existing Installations*

D.3.1 List of installations with Mining Wastes and Processing of Uranium Minerals

Existing installations with Mining Wastes and Processing of Uranium Minerals are the following:

SITE	FACILITIES
MALARGÜE (Mendoza Province)	Malargüe former mining & milling complex 1954 - 1986
HUEMUL (Mendoza Province)	Huemul Mine: discontinued operations in 1974.
CÓRDOBA (Córdoba Province)	Córdoba milling complex started operating in 1982
LOS GIGANTES (Córdoba Province)	Los Gigantes former mining & milling complex 1980 - 1990
PICHIÑÁN (Chubut Province)	Pichiñan former mining & milling complex 1976 - 1980
TONCO (Salta Province)	Tonco former mining & milling complex 1960 - 1981
LA ESTELA (San Luis Province)	La Estela former mining & milling complex 1982 - 1990
LOS COLORADOS (La Rioja Province)	Los Colorados former mining & milling complex 1992 - 1996

A brief description of each installation is shown in *Section H.2.6 Mining Wastes and Processing of Uranium Minerals*

D.4 Radioactive waste inventory.

Below follows the radioactive waste inventory till 12-31-2004, while Section L.1.1 provides information on liquid and gaseous annual discharges made by authorized installations in the 2000-2004 period. In the case of inventories with incomplete records corresponding to historical wastes, they were completed with data based on the analysis of the processes that originated them.

D.4.1 Atucha I Nuclear Power Plant

ATUCHA I NUCLEAR POWER PLANT				
STORED WASTE	**ACTIVITY (GBq)**			**VOLUME**
	Co 60	**Cs 137**	**Actinides**	**(m^3)**
Non-conditioned solids	- - - - -	- - - - -	- - - - -	86.00
Conditioned solids	- - - - - -	- - - - - -	- - - - - -	42.60
Exhausted ionic exchange resin beds	1.12E+04	3.74E+04	- - - - - -	74.88
Filters	- - - - -	- - - - -	- - - - -	15.03

D.4.2 Embalse Nuclear Power Plant

EMBALSE NUCLEAR POWER PLANT				
STORED WASTE	**ACTIVITY (GBq)**			**VOLUME**
	Co 60	**Cs 137**	**Actinides**	**(m^3)**
Non-conditioned solids	- - - - -	- - - - -	- - - - -	20.00
Conditioned solids	- - - - - -	- - - - -	- - - - -	270.56
Structural	- - - - -	- - - - -	- - - - -	27.80
Exhausted ionic exchange resin beds	- - - - -	- - - - -	- - - - -	187.23
Filters	- - - - -	- - - - -	- - - - -	56.25

D.4.3 Pilcaniyeu Technological Complex

PILCANIYEU TECHNOLOGICAL COMPLEX		
STORED WASTE	**Natural Uranium**	
	Mass (kg)	**Vol (m^3)**
Process waste	5.2	3.6
Operation waste	317.9	64.5

D.4.4 Córdoba Manufacturing Complex

CORDOBA MANUFACTURING COMPLEX		
STORED WASTE	**Natural Uranium**	
	Mass (kg)	**Vol (m^3)**
Filters & Pre-filters	**(*)**	**(*)**
Operation waste	**45**	**13**

***** During 2004 Filters & Prefilters were dismantled in order to reduce the volume of contaminated material, therefore, filter & pre-filter inventory is null. This radioactive waste is now part of the operational waste inventory.

D.4.5 Ezeiza Radioactive Waste Management Area (AGE)

EZEIZA RADIOACTIVE WASTE MANAGEMENT AREA (AGE)												
RADWASTE MANAGEMENT SYSTEM		SPECIFIC RADIONUCLIDES										
		ACTIVITY (MBq) (*)										VOLUME
		Co^{60}	H^{3}	Sr^{90}	Cs^{137}	Ni^{63}	C^{14}	Actinides	Ra^{226}	U Nat		(m^3)
DISPOSED OF	SSRRS or LLSWT	1.20E+06	6.11E+06	1.97E+04	9.76E+05	7.17E+02	7.32E+03	1.40E+04	0.00E+00	3.79E+04		1,584.0
	SSRRL or LLLWT	1.41E+03	0.00E+00	9.40E+04	4.46E+05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00		1,200.0
	SDFFSYRE or CP	1.66E+05	1.10E+04	5.22E+04	1.79E+06	4.87E+02	5.30E-02	8.07E+05	6.60E+05	8.54E+01		140.5
	TOTAL	**1.37E+06**	**6.12E+06**	**1.66E+05**	**3.22E+06**	**1.20E+03**	**7.32E+03**	**8.21E+05**	**6.60E+05**	**3.80E+04**		**2,924.5**
STORED	A1 or M1	1.12E+09	2.34E+07	1.80E+06	1.56E+08	1.92E+04	1.69E+02	1.39E+07	3.05E+05	2.44E+03		140.7
	A2 or TN	6.30E+05	1.09E+02	1.45E+04	1.45E+06	0.00E+00	2.26E+00	2.28E+04	3.03E+03	9.70E+01		48.9
	A3 or DS	1.55E+05	1.09E+06	8.52E+01	9.52E+03	0.00E+00	0.00E+00	2.06E+01	0.00E+00	0.00E+00		102.6
	A4 or IRWS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.36E+06	0.00E+00	0.00E+00	0.00E+00		11.5
	TOTAL	**1.12E+09**	**2.45E+07**	**1.81E+06**	**1.57E+08**	**1.92E+04**	**1.36E+06**	**1.39E+07**	**3.08E+05**	**2.54E+03**		**303.7**

(*) Records have been completed with estimates based on the processes.

SSRRS: Semi-containment System for Solid Radioactive Wastes
LLSWT: Low Level Solid Waste Trenches (abbreviation used in NEWMDB)
SSRRL: Semi-containment System for Liquid Radioactive Wastes
LLLWT: Low Level Liquid Waste Trenches (abbreviation used in NEWMDB)
SDFFSYRE: System for the Final Disposal of Structural Solid Radioactive Wastes and Sealed Sources
CP: Concrete Pits (abbreviation used in NEWMDB)
A1: Deposit for Temporary Storage of Radioactive Sources and Wastes
M1: (abbreviation used in NEWMDB)
A2: Handling Yard and Stowage of Packages
TN: (abbreviation used in NEWMDB)
A3: Drums Storage
DS: Drums Storage (abbreviation used in NEWMDB)
A4: Infected Radioactive Waste Storage (DRIR)
IRWS: Infected Radioactive Waste Storage.

D.5 Facilities in the process of being decommissioned

Up to the moment none of the SF and radioactive waste management facilities are in the process of being decommissioned. More information may be found in Section F.6

SECTION E LEGISLATIVE AND REGULATORY SYSTEM

E.1 Implementation of measures

A legislative, regulatory and administrative structure has been established in the country which covers the safety of nuclear and radioactive installations and includes radioactive waste management and spent fuel management. The structure is as follows:

- An Independent Regulatory Body
- A National Organization which is responsible for radioactive waste management and for determining the manner in which nuclear power plants and any other relevant installation shall be decommissioned and which holds the ownership of the special fissionable materials contained in irradiated fuel elements.
- An appropriate set of radiological and nuclear regulatory standards.
- A system to grant licenses.
- A surveillance system to verify compliance with the regulatory standards and radiological and nuclear safety requirements.
- A sanction system for cases of non-compliance of licenses, standards or other requirements.
- A clear assignation of responsibilities.

E.2 Legislative and Regulatory Framework

E.2.1 Legal Framework

No major changes have been made to the Legal System and Regulatory Framework depicted in the 1st National Report to the Joint Convention. For a better understanding of the subject, a summary of its background and a detail of its current state are provided.

E.2.1.1 Background

CNEA was created in 1950 by Decree 10936/50. One of CNEA's specific responsibilities was to control state and private nuclear research activities in Argentina.

Later, diverse legal rules defined CNEA's authority as the Regulatory Body for nuclear and radiological safety matters, specially on the protection of people and of the environment against exposure to the harmful effects of ionising radiation, safety of nuclear facilities and control of nuclear material. In this regard, the specific legislation were Decree Act 22498/56, ratified by Act 14467 and Decree 842/58.

Act 14467 set out CNEA's competence to issue the necessary regulations for the surveillance of the activities related to radioactive materials and to provide the necessary means to control the existence, marketing and use of materials related to peaceful applications of nuclear energy.

Furthermore, Decree 842/58 made effective the *Use of Radioisotopes and Ionising Radiation Regulation*, which governed the use and application of radioactive materials and their radiation, nuclear reactions and transmutations and made clear that CNEA should control its enforcement and sanction the non-observance of said regulation. The responsibility for the use of X Rays generators was excluded from this regulation, being the concern of the Ministry of Health.

The sustained development of nuclear activity in the country made it necessary to strengthen the independence of the Regulatory Body in the performance of its duties from other activities performed by CNEA. In 1994, by Decree 1540/94 the National Executive created the National Nuclear Regulatory Authority (ENREN), to perform the regulation and surveillance of nuclear activities and CNEA's regulatory branch personnel, equipment and facilities were transferred to ENREN.

E.2.1.2 Present situation

The National Constitution, treaties and conventions, laws and decrees on nuclear related matters constitute the present legal framework , as detailed below, as well as the regulatory standards described in E.2.2.1.

- **National Constitution**, specifically Art. 41 which sets out that:

  Art. 41.- *All inhabitants are entitled to the right to a healthy and balanced environment fit for human development and that in order that productive activities shall meet present needs without endangering those of future generations; and they have the duty to preserve it. As a first priority, environmental damage shall bring about the obligation to remediate it according to law.*

  The authorities shall provide for the protection of this right, the rational use of natural resources, the preservation of the natural and cultural heritage and of the biological diversity and shall also provide for environmental information and education.

  The Nation shall regulate the minimum protection standards and the provinces those necessary to reinforce them, without altering their local jurisdictions.

  The entry into the national territory of present or potentially dangerous wastes and of radioactive ones, is forbidden.

- **International Treaties and Conventions:** The Argentine Republic has adhered as contracting party, to a number of bilateral and multilateral international instruments, which imply a series of commitments and obligations in the nuclear field for the Argentine Government. They are specific commitments and obligations regarding the control of: **(a)** the non-proliferation of nuclear arms; **(b)** nuclear and radiological safety; **(c)** spent fuel and radioactive waste safe management; **(d)** physical protection of nuclear materials; and **(e)** cooperation in case of nuclear accidents and radiological

emergencies. A list of the treaties and conventions subscribed by the Argentine Republic is shown in Annex L.2.1.

- **The Nuclear Activity Law, Act 24804**, enacted in 1997, provides that concerning nuclear matters, the State will establish the policy and perform R&D activities through CNEA and regulatory and surveillance actions through the ARN, successor of ENREN. The law also provides that CNEA is the national organization which, among other duties, advises the National Executive on the definition of the nuclear policy, is responsible for radioactive waste management, determines the manner in which nuclear power plants and any other relevant facility shall be decommissioned and holds the ownership of the special radioactive fissionable materials contained in irradiated fuel elements.

- **Annex I to Decree 1390/98**, that regulates Act 24804.

- **Radioactive Waste Management Regime, Act 25018**, enacted in 1998, prescribes CNEA's responsibilities, as Responsible Organization for Radioactive Waste Management. This law also provides that CNEA shall perform the corresponding activities observing the restrictions established by the ARN, complying with national, provincial and local regulations. For the effective implementation of this Law the following are pending:

  a) The Law that approves the Radioactive Waste Management Strategic Plan (Art. 9°, Act 25018)
  b) The Law that regulates the management and control of the Fund for radioactive waste management and final disposal. (Art. 14°, Act 25018)

E.2.2 Regulatory Framework

E.2.2.1 National requirements and provisions on Radiological Safety

The Nuclear Regulatory Authority (ARN) was created by Act 24804. ARN is the organization responsible for regulating and controlling nuclear activities in order to:

- Provide an appropriate standard of protection for individuals against the harmful effects of ionising radiation and maintain a reasonable degree of radiological and nuclear safety in the nuclear activities performed in the Argentine Republic.

- Ensure that nuclear activities are not developed with purposes not authorized by the law and regulations resulting therefrom, as well as by international agreements and the non-proliferation policies adopted by the Argentine Republic.

- Prevent intentional actions which may either have severe radiological consequences or lead to the unauthorized withdrawal of nuclear material or other materials or equipment subject to control.

In this regard, Act 24.804, Art. 7°, establishes that the ARN is empowered to regulate and control the nuclear activity regarding radiation and nuclear safety, physical protection and nuclear non-proliferation issues. It must also advise the Executive on issues under its purview. Furthermore, Act 24804, Art. 10°, sets forth that the regulation and control of these aspects of the nuclear activity is subject to national jurisdiction and Art. 14°, establishes that the ARN shall act as an independent agency under the jurisdiction of the Presidency of the Nation. Besides, Act 24804, Art. 16, grants the ARN the following powers, among others: the power to issue regulatory standards in matters of its competence, grant licenses, permits or authorizations to facilities and persons, conduct regulatory inspections and assessments and impose sanctions (for further details see Section E.3 of this report).

To the date of this National Report ARN([1]) 57 regulatory standards and 7 regulatory guides were in force. ARN's regulatory standards include the licensing of radioactive nuclear installations and its personnel and several radiation protection, nuclear safety, use of radioactive sources, radioactive waste management, safeguards, physical protection and transport of radioactive materials requirements. The text of these regulatory standards is in http://www.arn.gov.ar web site.

Regulatory standards in Argentina have a performance basis: they are not prescriptive in nature, they define the accomplishment of safety objectives. How such objectives are achieved depends on good engineering judgement, on the qualifications of designers, constructors and operators and on the adequacy of the decisions taken by the Responsible Organization.

Regulatory Standard AR 10.1.1, Basic Radiation Safety Standard (Revision 3, 2001), whose first edition was in 1994, establishes the requirements and provisions on the matter which are consistent with the recommendations of the International Commission on Radiological Protection (specifically issue N° 60).

The regulatory system has not suffered major changes since the 1st National Report to the Joint Convention, nevertheless, the Regulatory Organization has continued updating current regulations and the following standards have been modified:

Table 1 - Updating of Regulatory Standards during 2003- 2004

CODE	NAME
AR 4.9.2	Research reactor operation (Rev.2)
AR 6.2.1	Radiation safety for design of industrial irradiation plants with a mobile underwater radioisotope source (Rev.2)
AR 6.9.1	Industrial irradiation plant operation with a mobile underwater radioisotope source (Rev.2)
AR 8.11.1	Individual licences for use of radioactive material or ionising radiation in human beings (Rev.2)

In addition a regulatory guide relative to the training of personnel of licensed installations has been incorporated:

([1]) called AR Standards

Table 2 - New Guides introduced during 2003- 2004

CODE	NAME
GR 10	Advanced education and specific training programs for the licensing of Type I radioactive installations personnel.

E.2.2.2 Licensing Systems

Below follows a summary of the essential criteria of the system, submitted in the 1st National Report to the Joint Convention.

In Argentina the licensing system is defined in Basic Standard AR 10.1.1. Radioactive waste management installations, spent fuel installations of nuclear power plants and spent fuel management installations of research reactors are categorized as Type I or significant installations. Therefore, AR 0.0.1 *Licensing of Type I installations* and AR 0.11.1 *Licensing of personnel of Type I installations* standards are applicable to the licensing stages of said installations and of its personnel.

The regulations establish that the construction, operation and decommissioning of Type I installations cannot be started without the appropriate licenses applied by the Responsible Organization and granted by the Regulatory Body. Licenses are granted after the ARN has made an independent assessment of the safety conditions to be adopted and submitted in the "Safety Report".

The validity of said licenses is subject to the compliance with the conditions set forth in these licenses and with the regulations and requirements of the Regulatory Body. Failure to comply with one or more of these regulations, conditions or requirements may cause the ARN to suspend or cancel the validity of the license, in accordance with the existing sanction system.

The personnel of a nuclear installation has to be properly trained and qualified in accordance with their duties. The ARN also requires that the personnel assigned to safety-related tasks is licensed and has specific authorization to perform the assigned duties. Regulatory Standards AR 0.11.1 and AR 0.11.2 establish the criteria and procedures to grant individual licenses and specific authorizations to the personnel that is going to perform licensable functions in nuclear power plants. They also set out the terms and conditions according to which the ARN, prior review and report from its advisory boards, grants these licenses and authorizations.

The system of licensing was modified in the period 2003 - 2004, regarding the validity of operation licenses, based on regulatory criteria, international experience and the recommendations made by the IAEA Gradually, the validity of the Operation Licenses of Type I installations is being changed from an indefinite or permanent period of time to a restricted time validity., in order to subject their renewal, among other requirements, to a global re-assessment of safety, at regular intervals (Periodic Safety Reviews) (PSR). This is an additional tool to the continuous safety assessment performed by the responsible of the installations and by the Regulatory Authority. The validity period is set on the Operation License.

E.2.2.3 System of prohibition to operate without a license

Act 24804, Art. 9 provides, that in order to develop a nuclear activity any natural or legal person shall, among other requirements, comply with ARN's regulations in its area of responsibility and apply the granting of the license, permit or authorization that will enable him to perform his activities; and comply with the obligations in safeguards or non-proliferation matters the Argentine Republic has subscribed or will subscribe in the future.

E.2.2.4 Safety control system

Since the commencement of nuclear activities in the country and in order to verify that nuclear and radioactive installations comply with current standards, licenses and requirements, the Regulatory Authority has established a safety control system. At present the control system includes regulatory assessments, inspections and audits. If necessary, the ARN requires the implementation of corrective measures, which if not implemented may lead, as a last step, to impose sanctions provided in the regulatory system.

E.2.2.4.1 Documentation and Reports

During the licensing process, the Responsible Organization has to submit to ARN the documentation it has produced related to radiological and nuclear safety. In the case of an Operation License for a nuclear power plant, which includes the management of the radioactive waste and the spent fuel generated, the main documents are:

- Safety Report
- Manual of Operation Policies and Principles.
- Quality Manual
- Operational Organization Chart and Manual of Tasks and Duties.
- Operation Manual
- Emergency Plan
- Manual of Radiological Safety, Waste Management and Environmental Monitoring.
- Maintenance Manual
- Probabilistic Safety Assessment.
- Program for the Management of Operational Experience.
- Personnel Training Manual.
- Education and training requirements for personnel that perform Specific Duties.
- Preliminary Plan for the Decommissioning of the Installation.
- Any other documentation related to radiological and nuclear safety, safeguards and physical protection.

The above documentation has to be kept updated and the proposals for its modification have to be forwarded to the Regulatory Authority.

The license and the above documentation are the Mandatory Documentation. Also, any other rule, requirement, recommendation, request of information or letter, issued by the Regulatory

Authority in connection with radiological or nuclear safety, safeguards and physical protection, is also mandatory.

In addition, the License granted by the ARN establishes the periodical reports that the responsible of the installation has to submit to the Regulatory Authority. In the case of an Operation License for a nuclear power plant, the communications related to Radiological and Nuclear Safety include, among other topics the following:

- Occurrence of an abnormal event
- List of non-relevant events occurred, in accordance with the provisions of the Program for the Management of Operational Experience.
- Activity of radionuclides discharged to the environment and result of environmental monitoring.
- Inventory of solid radioactive waste processed and stored
- Doses absorbed by personnel exposed to radiation
- Report on the Emergency Plan annual drill: development, results and experiences learnt.
- Any evidence or information which in the criteria of the Responsible Organization shows: Weakness or degradation in the quality of elements, equipment and systems which are important for safety or risks of a magnitude or nature different from those foreseen in the Final Safety Report or in the Probabilistic Safety Assessment.

In other nuclear and radioactive installations, requirements related to the Mandatory Documentation and Reports are graded in accordance with the hazard involved.

E.2.2.4.2 Regulatory inspections and audits

Act 24804 authorizes the ARN to make regulatory inspections and assessments, which are performed by its personnel since the beginning of regulatory activities in the country and which are performed by its personnel as follows:

- *Routine inspections*: are performed essentially by resident inspectors and other inspectors of the ARN. Their objective is to verify that the Responsible Organization complies with the limits and conditions laid down in the operating license.
- *Special inspections*: are performed by experts of the ARN on different matters (dosimetry, implementation and control, etc.) in coordination with resident inspectors. They have different purposes as, for example, to supervise preventive maintenance tasks during scheduled shutdowns.
- *Technical assessments*: consist in the analysis of data collected during inspections or from other sources. For example, assessments of the radiological safety of specific practices at nuclear or radioactive installations to detect their potential weaknesses and identify possible measures to reduce doses to personnel or improve safety conditions.

- *Regulatory audits*: are performed in accordance with written procedures and are scheduled to review organizational, operational and procedural aspects related to nuclear and radiological safety.

E.2.2.5 Specific Regulatory Actions

The regulatory actions that the ARN may take regarding a particular nuclear installation originate from:

- The results of regulatory inspections and assessments performed at the nuclear installation.

- The knowledge of abnormal events that have occurred at the installation or at a similar installation.

- The result of independent technical evaluations.

In such cases, the ARN sends a regulatory document to the Responsible Organization in the form of a requirement, recommendation or request for additional information, depending the case; in this document the ARN urges the Responsible Organization to take the required corrective measures within a specific period. The scope of this documentation is the following:

- *Requirement*: is a regulatory order or demand that the Responsible Organization has to comply with in the requested manner.

- *Recommendation*: is a regulatory order or demand which differs from a requirement in that the Responsible Organization has certain flexibility to comply with it by means of alternative solutions (i.e. engineering alternatives) which ensure, at least, the same result required by the recommendation. These alternative solutions must be proposed to the ARN for their assessment.

- *Request for additional information:* is a regulatory order or demand whereby more details of the documentation provided are required, for example, the explanation of an assertion, the demonstration of the result of calculations or additional documentation.

E.2.2.6 Sanction system

Non-compliance with the Regulatory Standards and requirements set out in the respective licenses or permits, authorizes the ARN to impose the appropriate Sanction System. Act 24804, Art. 16, authorizes the ARN to impose sanctions which shall be graded according to the importance of the fault as follows: warning, fines (which shall be proportional to the importance of the fault and the potential damage), suspension of the license, permit or authorization or its cancellation.

For sanction purposes, the ARN is authorized to lay down the relevant procedures to apply in case of violation of the regulatory requirements and standards, that may issue in the exercise of its competence, ensuring the constitutional guarantees of due process and the defence rights.

The sanction system represents the last link of the safety chain. The ARN considers that if the regulatory system is really effective and the Responsible Organizations exercise their responsibilities seriously, the application of sanctions and penalties should occur only in exceptional cases. The contrary would suggest, among other things, that there are errors in the taking of regulatory measures. Regarding this subject an informal ARN function is to make Responsible Organizations and Primary Responsible aware of their responsibility regarding safety, so that they become increasingly immersed in the safety culture.

E.2.2.7 Clear assignment of responsibilities

Act 24804, Art. 31, sets out that the responsibility for the radiological and nuclear safety of an installation rests with the holder of the license, permit or authorization. Its compliance with the provisions of this Law or with the regulatory standards or requirements resulting therefrom, do not exempt these holder from its responsibility or from making all that is reasonable or compatible with its possibilities in favour of radiological and nuclear safety, safeguards and physical protection. The holder of a license, permit or authorization may delegate totally or partially the execution of tasks, but it will be held legally responsible.

Concerning the responsibilities of the radioactive waste generator and their transfer to the Responsible Organization for Radioactive Waste Management, Act 25018, Art. 6°, establishes that the National Government, through the implementing authority (CNEA) shall assume the responsibility for radioactive waste management. The generators of this waste must provide the necessary resources to perform it as established by law. The generator is responsible for the conditioning and safe storage of waste generated by the installation he operates, in accordance with the conditions set out by the implementing authority (CNEA), until they are transferred to them. The generator must notify the ARN on any event which could result in an incident, accident or operation failure.

Act 25018, Art. 7, authorizes CNEA to lay down acceptance criteria and the transfer conditions for radioactive waste, that be necessary to assume its responsibility for further management. This article also requires the approval of ARN for these transfer conditions.

Art. 8° sets out that the transfer to CNEA of radioactive waste, specifically of irradiated fuel elements, shall be made at the time and in accordance with the procedures laid down by CNEA, with ARN's prior approval. In no event, shall the operator of the generating installation be exempted from its responsibility for contingent civil and/or environmental damages until the transfer of radioactive waste is completed. Therefore and in agreement with Decree 1390/98 which regulates the provisions of Act 24804, said transfer defines the limit of responsibility of the generator in radioactive and irradiated fuel elements matters.

E.3 Regulatory Body

E.3.1 Duties and competence of the Regulatory Body

No major changes have been made to the duties and competence of the Regulatory Body described in the 1st National Report to the Joint Convention, though there were changes in its

management. For a better understanding of this National Report, follows a revised and updated version of the significant sub-sections submitted in the previous report.

In Argentina nuclear development started in 1950. All nuclear activities developed in the country until 1994 were controlled by the National Atomic Energy Commission (CNEA) through its regulatory branch.

In 1994 the National Government, considering that the regulation and supervision of nuclear activities should be kept as activities inherent to the National Government, assigned to an independent agency the exclusive performance of these duties, in order to differentiate the role of the controller from that of the controlled parties. Thus, Decree Nº 1540/94 provided for the creation of the National Nuclear Regulatory Body (ENREN), to perform regulatory and control duties of the nuclear activity, transferring from CNEA's Regulatory Branch all its personnel, equipment and installations.

In 1997 the National Congress enacted, the National Law of Nuclear Activity (Act 24804), creating the NUCLEAR REGULATORY AUTHORITY (ARN) to regulate and control nuclear activity, transferring to it all ENREN's resources.

The Nuclear Regulatory Authority acts as an independent agency under the jurisdiction of the Presidency of the Nation and is subject to a public controlling system. As provided by Art. 7 of the law, it is responsible for the regulation and control of the nuclear activity on matters of radiological and nuclear safety, physical protection as well as control of the use of nuclear materials, licensing and supervision of nuclear installations and international safeguards. The Law sets out that these activities are subject to national jurisdiction. The ARN also acts as advisor to the National Executive in matters of its competence.

Act 24804 provides a detail of the powers and responsibilities vested on the ARN. Some of the most important are the following:

- Establish the regulatory standards for nuclear and radiological safety, physical protection and surveillance of the use of nuclear materials, licensing and supervision of nuclear installations, international safeguards and transport of nuclear materials regarding nuclear and radiological safety and physical protection;
- Grant, suspend and cancel licenses for the construction, commissioning, operation and decommissioning of nuclear power plants.
- Grant, suspend and cancel licenses, permits or authorizations for mining and uranium concentration matters, safety of research reactors, significant accelerators, major radioactive installations, including installations for radioactive waste management and nuclear applications in medical and industrial activities;
- Undertake inspections and regulatory assessments at the nuclear installations that are subject to ARN regulation, with the regularity that is deemed necessary.
- Impose sanctions, which shall be graded according to the importance of the fault and which may imply confiscating nuclear or radioactive materials, the preventive closure of the installations if nuclear activities are performed without the appropriate license, permit or authorization or if non-compliance of nuclear

and radiological safety and physical protection of materials and nuclear installations standards are detected.

- Establish, in accordance with international parameters, nuclear and radiological safety standards for the personnel working at the nuclear facility and grant the specific licenses, permits and authorizations to perform the function subject to license, permit or authorization.
- Assess the environmental impact of any licensed activity, by means of: monitoring activities, review and follow-up of any impact, evolution or possibility of harm, to the environment, as a result of the licensed nuclear activity.

It should be noted that Annex I to Decree N° 1390/98, that regulates said Law, provides that for a better compliance of its duties, the Nuclear Regulatory Authority shall approve contingency plans, for the case of nuclear accidents, programs to deal with emergencies and when necessary, give the relevant training to workers and neighbours. These plans must consider an active participation of the community. The Security Forces and the representatives of civil institutions of the area involved in these procedures shall report to the officials that for these purposes shall be appointed by the Nuclear Regulatory Authority. National, provincial and municipal authorities that have any involvement in the development of these plans must comply with the guidelines and criteria defined by the Nuclear Regulatory Authority organization which for these purposes shall exercise the powers established by the Convention on Nuclear Safety.

Thus, Act 24804 grants the ARN the necessary legal competence to establish, develop and implement a regulatory and supervisory system for nuclear activities performed in the country. In order to ensure an appropriate control, this legal competence is complemented by an adequate technical competence.

For this reason, since the beginning of regulatory activities in the country it was thought imperative to have qualified personnel, so that with their knowledge and experience the Regulatory Body could have the capacity of its own independent criteria in all aspects of nuclear and radiological safety, safety in the transport of radioactive materials and in radioactive waste management, safeguards and physical protection. For the same reason and as above stated, when the Regulatory Body was created all human resources and materials were transferred to it from CNEA’s regulatory branch.

Furthermore, the ARN is authorized to contract experts who may advise on aspects specifically related to the performance of its functions. Therefore, the global strategy of the Argentine regulatory system is based on the following aspects:

- Training of personnel involved in nuclear, radiological, transport and waste safety, safeguards and physical protection, either working at the ARN or at facilities performing practices subject to its control. The ARN also contributes to IAEA’s training programs.
- Establishing relevant standards and their periodic review.

- Undertaking of regulatory inspections and audits to verify the fulfilment of granted licenses and authorizations.
- Independent execution of studies and assessments related to the licensing of regulated installations.
- Development of scientific and technical aspects related to nuclear, radiological, transport and waste safety.

E.3.2 Nuclear Regulatory Authority Organizational Structure and Human Resources

The Nuclear Regulatory Authority is managed by a Board of Directors made up of three members, a Chairman, a 1st Vice-Chairman and a 2nd Vice-Chairman reporting to the General Secretariat of the Presidency of the Nation. In the 2004 a new Chairman of the Board was appointed, after the resignation of the previous Chairman was accepted. The positions of 1st Vice-Chairman and 2nd Vice-Chairman are exercised by the same officials as before. The partial change in management did not imply any modifications in the duties or competence of the Regulatory Authority.

ARN's organizational structure for the 2003-2004 period is shown in Figure 1. During 2004, possible modifications to this organizational structure were studied in order to implement a continued improvement process.

The Radiological and Nuclear Safety Department supervises the compliance of controlled installations with standards, licenses and requirements, conducting inspections and regulatory assessments relative to radiological, nuclear, transport and radioactive waste management safety. It is also responsible for technical assessments related to the licensing process of nuclear power plants and radioactive facilities.

The Technical and Scientific Support Department provides specialized technical support for regulatory inspections and assessments and is responsible for developments in matters related to radiological, nuclear and radioactive waste management safety.

The Institutional Relations and Non-Proliferation Department monitors, from a regulatory point of view, the use of materials, equipment and nuclear installations and verifies the compliance with international agreements regarding non-proliferation assurances. It oversees the compliance with the regulation on physical protection applicable to nuclear materials and installations. It also coordinates national and international relations and promotes cooperation or assistance agreements that may be of interest to the ARN.

Specific sectors dedicated to Regulatory Standards, Training, Technical Information and Computing report to the Board of Directors through the General Secretariat.

The Administrative Affairs Department provides administrative and accounting support to ARN's regulatory duties.

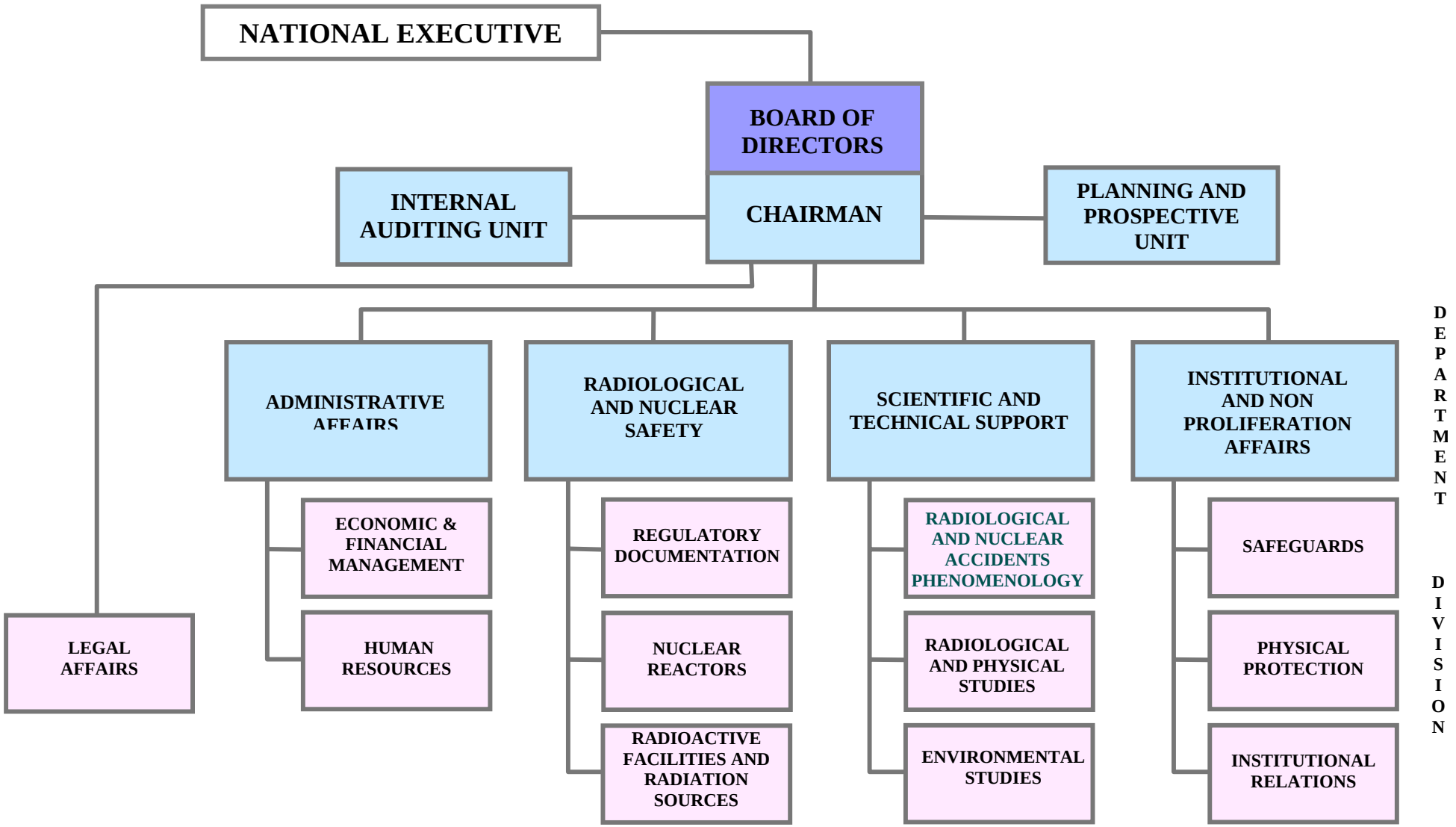
The Legal Department, Internal Auditing Unit and Planning and Prospective Unit advice the Board and the General Secretariat on legal aspects of regulatory management, on the use of financial resources for each activity or project and on the planning of ARN's activities.

To the date of completion of this National Report the organizational structure of the ARN is made up by 197 permanent posts and 3 posts for members of the Board. During 2004, 19 technical employment agreements were made and by the end of the year there were 29 fellowships

Out of the total staff 70% holds a university degree, 85% is engaged in specialized technical and scientific activities within the ARN's sphere of activities and 15% performs support and administrative work.

ARN total personnel is distributed geographically as follows: 71% work at ARN's main office in the city of Buenos Aires, 24% at ARN's laboratories at CAE. Five resident inspectors working at the nuclear power plants, two agents working at South delegation and six working abroad make up the remaining 5%. Of the latter, one works in the International Atomic Energy Agency and five at the *Brazilian-Argentine Agency for Accounting and Control of Nuclear Materials*, located in Rio de Janeiro, Brazil.

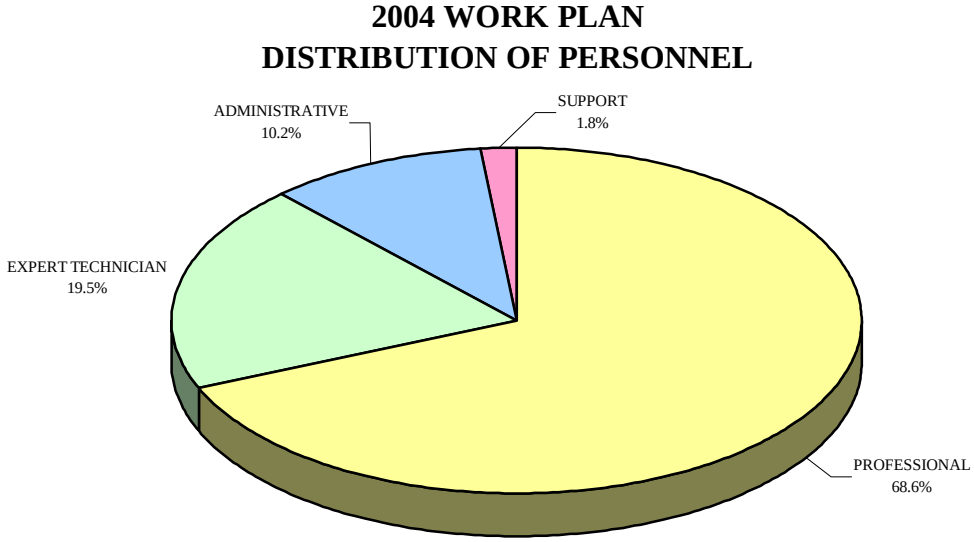
Figure I - ARN's organizational structure, 1999-2004 period



E.3.3 Resources assigned to regulatory control activities of nuclear installations under surveillance

The distribution of ARN workforce assigned to safety inspection and assessment tasks, directly related to the safety of regulated nuclear installations is described in the *Annual Work Plan*. This *Plan* discriminates efforts according to the different type of performed activities, which are directly or indirectly related to the safety of installations: inspections and assessment of nuclear, radiological, radioactive waste management and transport safety, safeguards and physical protection, scientific support, radiation measurement, environmental assessments, electronic, administrative, legal, computer, planning, training and institutional relations. Figure II shows the distribution of staff per type of activities: professional, technical, support and administrative work.

Figure II – Distribution of ARN's personnel by type of activities in 2004



The regulatory control of Spent Fuel Management and Radioactive Waste Management is performed as part of the general inspection and assessment tasks of installations controlled by the ARN. Notwithstanding, an estimate has been made of the load that this activity represents with respect to total human resources assigned to inspection, assessment and measuring tasks. A summary of control, assessment and measuring activities on spent fuel management and radioactive waste management discriminating the effort per activity performed in different ARN's sectors is shown below. Table 3 illustrates the mentioned estimates.

- Activity: Radioactive waste management Safety

Independent assessment of documentation on radioactive waste management sent by CNEA, assessment of reports on radioactive waste management sent by nuclear power plants, model for the assessment of radioactive waste exemption, drafting of regulatory standards for the stage prior to the final disposal of Type I, II and III installations for internal discussion, participation in

international committees and revision of documentation prepared for these committees, training activities, coordination and participation in revision activities of National Reports to the Joint Convention.

- Activity: Licensing and Control of Type I Installations

Verification of the compliance with: basic radiological and nuclear safety principles, applicable ARN regulatory standards, licenses and requirements, by conducting safety assessments and regulatory inspections, regarding the safe management of radioactive waste generated from the operation of installations as well as their safe management.

- Activity: Licensing and Control of Type II and III Installations

Verification of compliance with radiation protection regulations and work procedures for each practice, in particular with respect to the maintenance of radioactive waste within the installation, when necessary, until it is eliminated as conventional waste or managed through the Radioactive Waste Management Program or withdrawn by the supplier of sealed sources.

Maintenance of ARN's data base, supervising the transference of disused sealed sources from the installation to the Radioactive Waste Management Program or to the sealed sources supplier, as appropriate.

Granting of authorizations, to radioactive material users to transfer disused sources to the Radioactive Waste Management Program, in order to control that the transferred material corresponds to sources previously authorized to be used in the installation and declared in its inventory.

Verification of radioactive material final reception certificate by the Radioactive Waste Management Program, that this sector sends to the ARN and which provides evidence that it is managed as radioactive waste or entrusted in custody to the Program by the Installation.

- Activity: Nuclear Reactors Control

Verification of radiological aspects of radioactive waste generation and spent fuel generation as part of routine inspection activities.

- Activity: Physical Protection of nuclear materials and installations

In order to verify the compliance with the "Physical protection of nuclear materials and installations" regulatory standard (AR 10.13.1) and with the Convention for the Physical Protection of nuclear materials and installations, ratified by the Argentine Republic by Act N° 23620 (1988), the ARN assigns about 40 Days-Man in the year in domestic installations that store spent fuel elements.

- Activity: Inspections and assessments on Safeguards

With the purpose of verifying the compliance with "Assurances of non-diversion of nuclear materials and of material, installations and equipment of nuclear interest" regulatory standard (AR 10.14.1) and the international commitments assumed by the Argentine Republic, the ARN assigns about 380 Days-Man in the year in domestic installations that store spent fuel elements.

- Activities: Radiation and environmental radioactivity measurements

Measurements for the control of discharges of liquid and gaseous effluents from nuclear power plants.

Participation in technical audits necessary to control, discharges measuring and control systems in nuclear and radioactive installations, at the requirement of ARN's operative groups.

Developments for measuring radioactive waste generated from ARN's controlled installations.

Analysis of several calculation tools suitable to study the transport of solutes in porous media in two and three dimensions.

Table 3 - Estimate of Human Resources assigned annually to the ARN, for the regulatory control of radioactive waste management and spent fuel management[2]

Organizational Unit	DAYS – MAN (DM)		
	Total DM of activity	Specific DM in RWM/SFM	% of integrated total
1. Radioactive waste management Safety	440	420	2.3
2. Licensing and Control of Type I Installations	1,100	230	1.3
3. Licensing and Control of Type II and III Installations	2,420	260	1.4
4. Nuclear Reactors Control	5,720	50	0.3
5. Physical Protection of nuclear materials and installations	880	40	0.2
6. Inspections and assessments on Safeguards	1,660	380	2.1
7. Radiation and environmental radioactivity measurements	5,940	735	4.0
TOTAL	**18,160**	**2,115**	**11.6 (*)**

(*) The result represents an estimation of the dedication to Radioactive Waste Management and Spent Fuel Management control tasks. 11 % of total ARN's regulatory control effort is dedicated to controlling installations and related activities.

[2] Includes control of installation discharges

E.3.3.1 Qualification of ARN personnel

To the date of completion of this National Report, ARN's professional personnel has to approve a Postgraduate Course in Radiation Protection and/or a Course in Nuclear Safety as part of their initial training. In addition, professionals have on the job training and participate, both at national and international level, in specific courses, congresses, seminars and research projects.

E.3.3.2 Regulatory Body's competence

The ARN subscribed with the Public Management Undersecretariat an Agreement Program in which a commitment matrix for management results is established in order to develop an integral quality control system, the assessment of personnel's performance and a plan of human resources needs.

E.3.3.3 Training activities

The ARN organizes and coordinates courses, workshops and seminars in its area of competence. The teaching staff is mainly constituted by ARN experts and other associated institutions, with wide experience in their fields of expertise. These training activities are offered both to ARN's personnel and to the personnel of national and foreign institutions.

The Postgraduate course on Radiation protection and Nuclear Safety started in 1977 and has uninterruptedly taken place on a yearly basis between 1981 and 2002. It is organized in cooperation with the University of Buenos Aires, the Ministry of Public Health and the International Atomic Energy Agency.

Since 2003, the following two postgraduate courses take place: "Radiation Protection and Safety of Radiation Sources" and "Nuclear Safety". The academic framework is provided by the the School of Engineering of the University of Buenos Aires and sponsored by the International Atomic Energy Agency. The objective of the first mentioned course is the training of professionals in radiation protection and in regulatory aspects concerning their performance in national regulatory organizations. The second course is aimed at providing initial academic training for future experts in nuclear safety. Table 4 shows the professionals graduated between 1980 and 2004, discriminated by country of origin.

Table 4 - Postgraduate courses on Radiation Protection and Nuclear Safety. Participants between 1980 and 2004, discriminated by country of origin

Algeria	4	**Argentina**	306	**Bolivia**	24	**Brazil**	31
Colombia	27	**Costa Rica**	10	**Cuba**	41	**Chile**	27
Ecuador	26	**El Salvador**	6	**Spain**	1	**Philippine**	7
Guatemala	11	**Haiti**	5	**Morocco**	1	**México**	22
Nicaragua	8	**Panamá**	12	**Paraguay**	13	**Perú**	41
Poland	1	**Domin.Rep.**	6	**Romania**	1	**Uruguay**	20
Yugoslavia	1	**Venezuela**	31	**Vietnam**	1	**Zaire**	2
Total: 686							

ARN also provides Radiation Protection training courses to train technicians from ARN, CNEA and other public and private institutions. In addition, the ARN provides national and international training courses in specific areas, such as: “Safe transport of radioactive material”, “Safeguards” for local operators and inspectors of domestic installations from IAEA and from ABACC (Brazilian-Argentine Agency for Accounting and Control of Nuclear Materials); “Monitoring of aerosols for International Surveillance System operators”; “Physical protection of materials and nuclear installations”, “Physical safety of sources”; “Illicit trafficking Prevention”, “Medical response in case of accident by radiation”.

E.3.3.4 Quality Control System

In the 2002 it was decided to develop and implement a quality control plan for the organization. Although quality control activities have always been carried out at the ARN, it was decided to take a systematic approach in this area with the support of the National Technological University Buenos Aires (UTN-BA). With that purpose an agreement between the ARN and UTN-BA was signed. In the year 2004, the development of the Quality Control System (SGC) received an impetus when the new ARN Chairman took office. The new Chairman assumed personally the task of discussing the quality criteria in the organization and of managing the organization as a consistent set of processes.

The main documents developed to the end of 2004 are the following:

- ARN’s Quality Control Policy
- Goals, Objectives, duties and values
- Quality control structure
- Quality control implementation plan
- Quality Control Manual

Two projects are in the development stage:

- Certification of ARN-UBA-IAEA postgraduate courses
- Laboratory Accreditation (ISO 17025)

E.3.3.5 Financial resources

Further to an efficient structure and qualified personnel, the ARN requires the necessary financial resources for the effective fulfilment of the regulatory objectives. In this regard, Act 24804 provides in Art. 25 that these resources shall originate mainly from:

- Annual regulatory fees
- Contributions from the National Treasure determined for each budget year; and
- Other funds, property or resources that may be assigned according to applicable laws and regulations

Art. 26 of said Law establishes the annual regulatory fee payable by the holders of an authorization or permit or by corporate bodies whose activities are subject to ARN's surveillance, specifying the fees for nuclear power plants and empowering ARN to establish the fees applicable to other regulated activities.

In this respect the ARN approved a "Licensing and Inspection Fee Regime". This system sets out the fees for the issuance of licenses and permits in accordance with the installation or practice and the annual fee for the operation of said installations or practices.

The System establishes an annual fee during the operation of each installation or practice by means of a simple formula which considers two factors: the "Regulatory Effort" stated as the number of inspection hours / assessments that the ARN assigns to the regulatory control of the installation or practice and the cost of said effort based on the monetary value of the hour of inspection / assessment, which is determined on an annual basis.

On a yearly basis the ARN drafts a budget project with a detail of the provisions of collections from regulatory fees and sets out the reasons for the request of funds to the National Treasure. This budget is published in the Official Gazette in order to indicate clearly the manner in which the funds from persons and institutions bound to pay regulatory fees shall be used.

The Regulatory Body performed budget for the 2004 fiscal year was $19,426,366 as shown in the following Table. These resources are made up as follows: 81.1% by contributions from the National Treasury and 18.9% from self-financing.

ITEM	VALUE IN $
1 - Personnel	**10.710.347**
2 - Input	**484,848**
3 - Services	**2,130,745**
4 - Equipment	**829,388**
5 - Fellowships	**277,038**
5 - Transfers Abroad	**4,684,000**
6 - Other Expenses	**310,000**
TOTAL	**19,426,366**

Below, follow several charts showing budgetary distributions of the work plan for 2004 of expenses according to different criteria. Figure III shows budget distribution of regulatory tasks by type of inspection, Figure IV shows budget distribution by task and Figure V budget distribution by item.

Figure III - Budget distribution of regulatory tasks by type of inspection

BUDGET 2004
BUDGET DISTRIBUTION BY TYPE OF INSPECTION

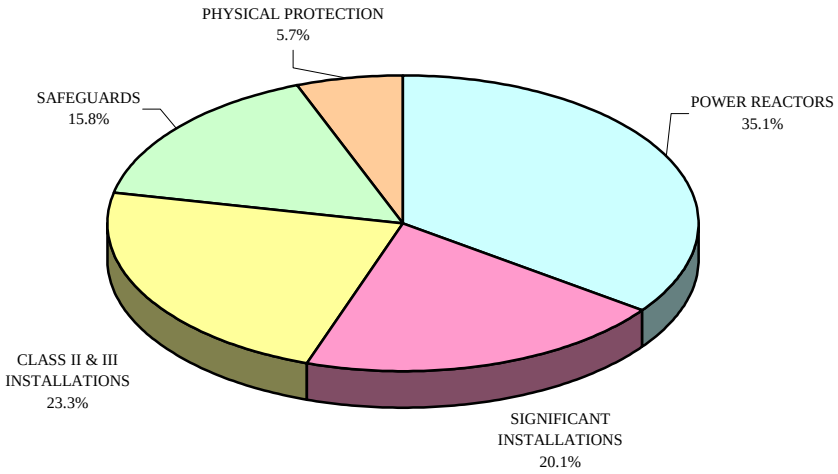


Figure IV - Budget distribution by task

BUDGET 2004
BUDGET DISTRIBUTION BY TYPE OF TASK

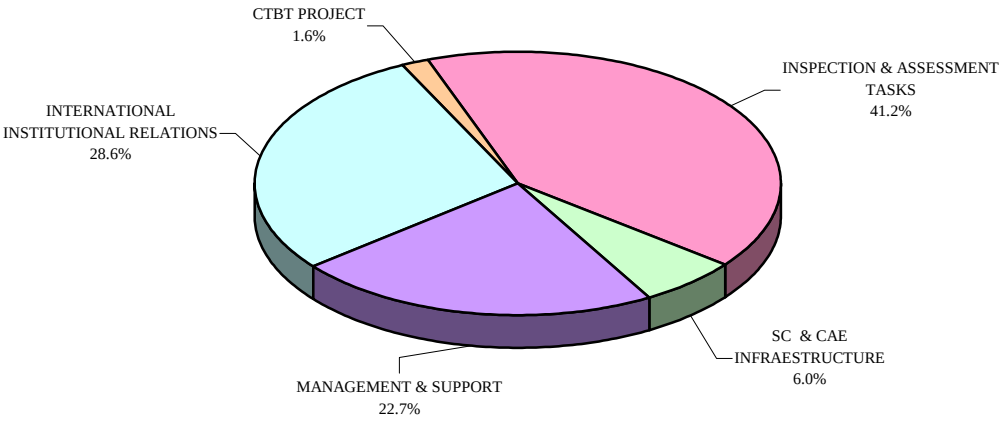
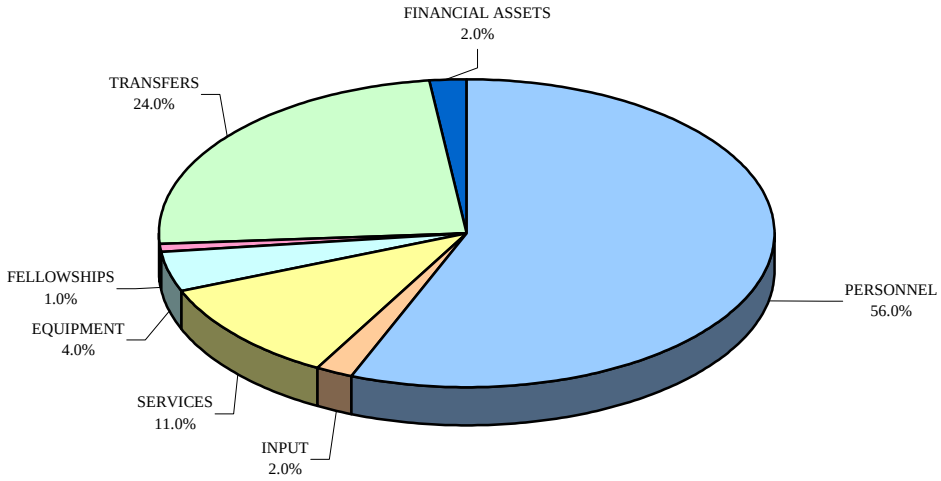


Figure V - Budget distribution by item

BUDGET 2004
BUDGET DISTRIBUTION BY ITEM



E.3.4 Relationship with other organizations

In compliance with its regulatory duties the ARN maintains an active interaction with national and international, governmental and non-governmental organizations in order to promote the exchange of experiences, information and technical cooperation. The participation in the Latin American Forum of Nuclear Regulatory Organizations and the Network of Regulators of Countries with Small Nuclear Programmes (NERS) should be noted.

In the 2003-2004 period the ARN kept its relations with other organizations as the other regulatory activities. ARN's activities have been particularly intensive in the Latin American Forum of Nuclear Regulatory Organizations. Within this framework the necessary steps have been taken to establish, with IAEA's participation, a Latin American radiation safety network, which will allow the exchange of information between regulatory organizations in the region that will contribute to the objective of attaining a high regional radiation safety level. At the end of 2003 the ARN participated in a joint activity of the Latin American Forum and the IAEA, held in the city of Montevideo (Republic of Uruguay), to promote the adherence to the Joint Convention among the countries of the region.

ARN's interaction with a broad range of recognized scientific national and foreign organizations, is established by agreements that lay down the rules relative to cooperation that, with an independent criteria, provide these organizations. A list of the national and international agreements subscribed is shown in ARN's Annual Reports.

In addition, ARN's specialists usually participate, as nominated experts, in the following international committees and programs:

- Commission on Safety Standards “CSS” (IAEA).
- Radiation Safety Standards Committee (RASSC) (IAEA).
- Nuclear Safety Standards Committee “NUSSC” (IAEA).
- Waste Management Safety Standards Committee “WASSC” (IAEA).
- Transport Safety Standards Committee “TRANSSC” (IAEA).
- Standing Advisory Group on Safeguards Implementation “SAGSI” (IAEA).
- United Nations Scientific Committee on the Effects of Atomic Radiation “UNSCEAR” (UN)
- International Commission on Radiological Protection (ICRP)
- Brazilian-Argentine Permanent Committee on Nuclear Policies

E.3.5 Annual reports

The ARN submits on a yearly basis to the National Executive and to the Congress a report of the activities performed the previous year, in accordance with Art. 16 of the National Law of Nuclear Activity.

Said Reports describe the main supervisory and regulatory activities performed by the ARN in nuclear and radiological matters, safeguards and physical protection during the previous year.

In order to give widespread coverage to the activity carried out and to the use of the assigned budgetary resources, the Report is also forwarded to public libraries, national universities, regulatory bodies, officials in health, energy and environmental areas and to the main users of radioactive material. Since 1998 the contents of the Annual Reports are published in the institutional page (www.arn.gov.ar).

SECTION F OTHER GENERAL SAFETY PROVISIONS

F.1 Responsibility of the license holder

F.1.1 Background

At the beginning of the nuclear activity in Argentina, the facilities did not have such magnitude and complexity as today. The responsibility for nuclear and radiological safety rested upon an individual, usually the head of the nuclear installation, who himself, with the assistance of his personnel or contracting the services of a third party, performed safety-related activities. The Regulatory Body verified that such a person had the appropriate training and granted him a license or authorization as evidence of this training. The facilities were licensed when they had the appropriate means and equipment, the personnel was trained and the responsible for the operation held a valid license.

Though such concepts are still essentially valid for small nuclear installations, as time went on, a number of improvements were introduced to the regulatory system. Thus, when the characteristics of operation of the nuclear facilities make it advisable, the Regulatory Body requires that the individuals who shall fill specific positions in the operation area must undergo special training and hold an individual license. Furthermore, training requirements for the operating personnel were increased. See Section E.2.2.2.

On the other hand, in the case of more important and complex nuclear facilities the Regulatory Body considered that in order to ensure their operation with a safety level similar to that originally conceived for them, just the necessary number of trained operating personnel was not enough to achieve it. Also, the technological progress forced to make periodic reviews of design and operational aspects of important facilities and to introduce, as appropriate, the modifications in terms of safety advised by state-of-the-art technology. In response to such considerations the Responsible Organization was established.

F.1.2 Responsible Organization and Primary Responsible

The ARN requires that each nuclear installation receives the necessary assistance from an organization which may provide the appropriate support to the personnel of the plant in tasks inherent to radiological, nuclear and radioactive waste management safety, as for example, the review of operating procedures, maintenance of safety systems, technical modifications to the plant, etc. This responsibility rests with the Responsible Organization, which in the case of nuclear power plants is Nucleoeléctrica Argentina S.A. (NASA), that is responsible for the operation of CNA I and CNE power plants including SF storage systems and the management of wastes generated from these installations. CNEA is the Responsible Organization for AGE's facilities and for CAE's Decaying, Pre-treatment and Controlled Discharge of Radioactive Effluents Plant as well as for a number of significant installations, among them several research reactors.

AR 0.0.1 and AR 10.1.1 regulatory standards establish their responsibilities, some of the most significant are the following:

- The Responsible Organization shall make all reasonable efforts in accordance with its possibilities to ensure safety, complying at least with ARN's regulatory standards. Such responsibility also includes design, construction, commissioning, operation and decommissioning of the facility.
- Fulfilment of the regulatory standards and procedures is a necessary but not sufficient condition concerning the responsibilities of the Responsible Organization, which shall make all reasonable efforts within its possibilities to ensure safety. The Responsible Organization shall also comply with the regulatory standards and requirements from other competent authorities that are not related to nuclear activities as for example the conditions relative to the release of chemical effluents. (see Section H.1)
- The Responsible Organization may be in charge of more than one nuclear installation and delegate totally or partially the execution of tasks, however, it will be fully responsible for them.
- The Responsible Organization shall nominate a person from its staff at each nuclear installation, as the Primary Responsible, who shall be in charge of the radiological and nuclear safety of the facility and of the compliance with the licenses and regulatory requirements of application. In the case of nuclear power plants in operation, their directors are the Primary Responsible.
- The Responsible Organization shall provide the necessary assistance to the Primary Responsible, so that the Primary Responsible may exercise its responsibilities and shall supervise the fulfilment of his safety-related responsibilities.
- The Responsible Organization shall submit to the Regulatory Body the necessary technical documentation to enable the safety assessment of the nuclear installation for which it applies for a license.
- No modification altering the design, operating characteristics or the mandatory documentation included in the operating license of a nuclear facility, may be made without the prior authorization of the ARN.
- The Responsible Organization and the Primary Responsible shall facilitate the inspections and audits required by the ARN.
- Any change in the organizational structure of the Responsible Organization that may impair the capacity to comply with its responsibilities shall require ARN's prior consent.

Besides the responsibilities of the Responsible Organization and of the Primary Responsible, the ARN has established the responsibilities of the employees who work at the facility. In this regard, regulatory standard AR 10.1.1 sets out that employees are responsible for their compliance with the procedures established to ensure their own protection as well as that of other employees and of the public. This condition is consistent with the recommendations of the International Atomic Energy Agency.

F.1.3 Regulatory control of license holder

Since its creation in 1958, the Regulatory Body controls the compliance with the standards, licenses and authorizations issued. In order to verify that licensees comply with their responsibilities, the ARN performs the following controls.

- The ARN is permanently updated about the operational organizational structure. The operating license establishes that any modification to it shall be reported to the ARN 30 days before its execution.
- Regulatory standard AR 0.11.1 establishes the requirements to be fulfilled by nuclear facilities personnel to obtain an individual license or specific authorization. See Section E.
- The procedure to grant individual licenses and specific authorizations allows the ARN to control the suitability of the persons that have to assume safety-related responsibilities. This suitability is re-assessed when the specific authorization is renewed.
- The individual license may be suspended or cancelled by the ARN if during the performance of the duties, non-compliance with any of the conditions required for its granting is demonstrated. Likewise, the specific authorization may be modified, suspended or cancelled in accordance with the terms of Section E.2.2.6. In addition, the ARN verifies regularly the compliance of the Primary Responsible with its obligations in respect of safety of the facility, particularly its compliance with the applicable standards, conditions of the operating license and any other requirement relative to radiological safety by means of regulatory inspections and audits by its resident inspectors and analysts and if necessary, with the assistance of external experts.
- The ARN has established a sanction system which shall be applicable in the case of non-compliance with any regulatory requirement as specified in Section E.2.2.6.

F.2 Human and Financial Resources

Introduction

Comisión Nacional de Energía Atómica (CNEA), as set forth in the 1st National Report to the Joint Convention, is the National Government responsible organization for SF Management as well as for any other radioactive waste generated in the national territory. With that purpose the *National Program for Radioactive Waste Management* was developed in accordance with the provisions of Act 25018, which established CNEA as the responsible authority for the development of a *Strategic Plan for Radioactive Waste Management*. This Act provides for the financial resources necessary for the implementation of the Strategic Plan through the setting up of a Fund for Radioactive Waste Management and Final Disposal. To date the fund has not been established as still the Law that will regulate its management and control has to be enacted, as provided by Article 14, Act 25018.

Besides financial resources, the availability of properly trained human resources is essential to ensure safety conditions of nuclear facilities. The Regulatory Body requires that all personnel working at SF and radioactive waste management facilities is properly trained and qualified in accordance with the tasks performed and that the personnel assigned to safety-related tasks is licensed.

In the case of SF and radioactive wastes generated by nuclear power plants NASA, the Responsible Organization that reports to the Regulatory Organization for the operation of Nuclear Power Plants, is responsible not only of having trained and qualified personnel in accordance with the current legal and regulatory framework, but also of providing the financial resources necessary for the development of operation activities, which include the disposal of radioactive wastes and the storage of SP fuel generated from the operation of power plants until those responsibilities are transferred to CNEA.

Financing of the National Program for Radioactive Waste Management

At present, the *Strategic Plan* has not been approved by the National Congress. Nevertheless, during the year 2004 the National Government decided to encourage the completion of Atucha II Power Plant, a decision which has far-reaching implications as it modifies the technical and economic equations of the *Strategic Plan*, extending the range of its application and scope, and this implies that the criteria for its development has to be reformulated. To make the *Strategic Plan* feasible, and essentially the setting up of the *Fund for Radioactive Waste Management and Final Disposal*, is a matter of great importance. It is considered that from an economic-financial point of view the existence and actual operation of the mentioned fund shall be favoured with the commissioning of the Atucha II nuclear plant. At the moment an updated version of the *Strategic Plan* is in preparation.

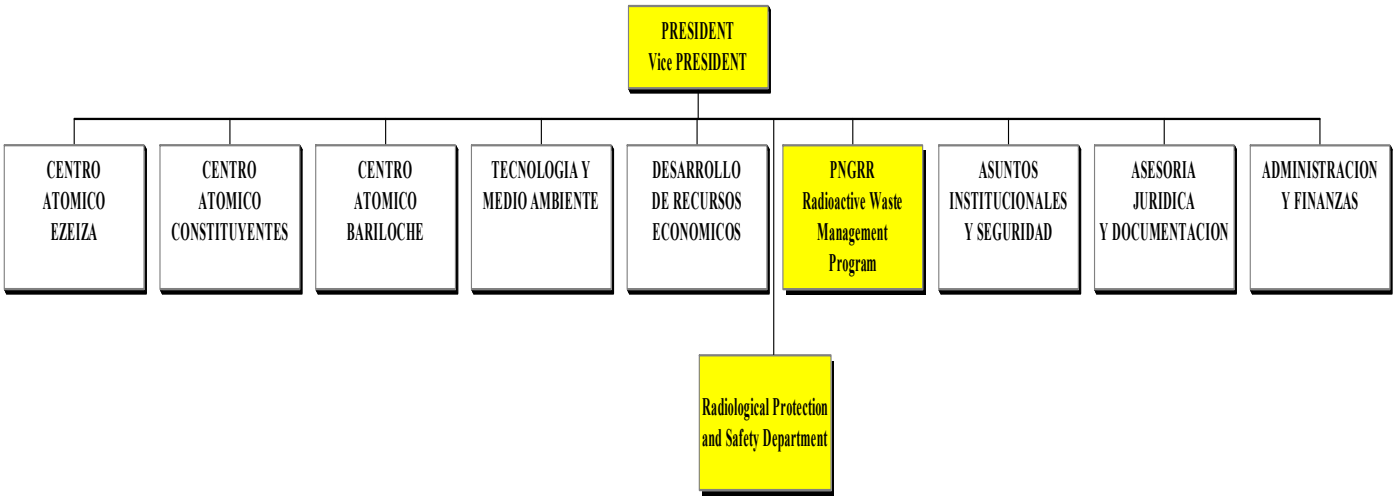
Until the *Strategic Plan* is not approved, CNEA puts a lot of effort to comply with its obligations under the PNGRR.

CNEA Organizational Structure and Human Resources

CNEAS's organizational structure has suffered some changes in respect of what was reported in the 1st National Report. The *National Program of Radioactive Waste Management* that was in the *Technology and Environment Department*, now reports directly to CNEA's Vice-presidency. PRAMU is no longer within PNGRR's area and reports directly to CNEA's Vice-presidency.

Other significant change was made in 2004, *Radiological Protection and Safeguards* area is now a Department, and reports directly to CNEA's Presidency.

Figure VI - NATIONAL ATOMIC ENERGY COMMISSION ORGANIZATIONAL CHART



The *National Program of Radioactive Waste Management (PNGRR)* takes full responsibility for the management of radioactive waste generated from CNEA's own installations, the installations of external generators -nuclear power plants and small generators- as well as of the management of SP from research reactors.

Here below follows *PNGRR* and *PRAMU* organizational structure.

Figure VII - RADIOACTIVE WASTE MANAGEMENT ORGANIZATION CHART

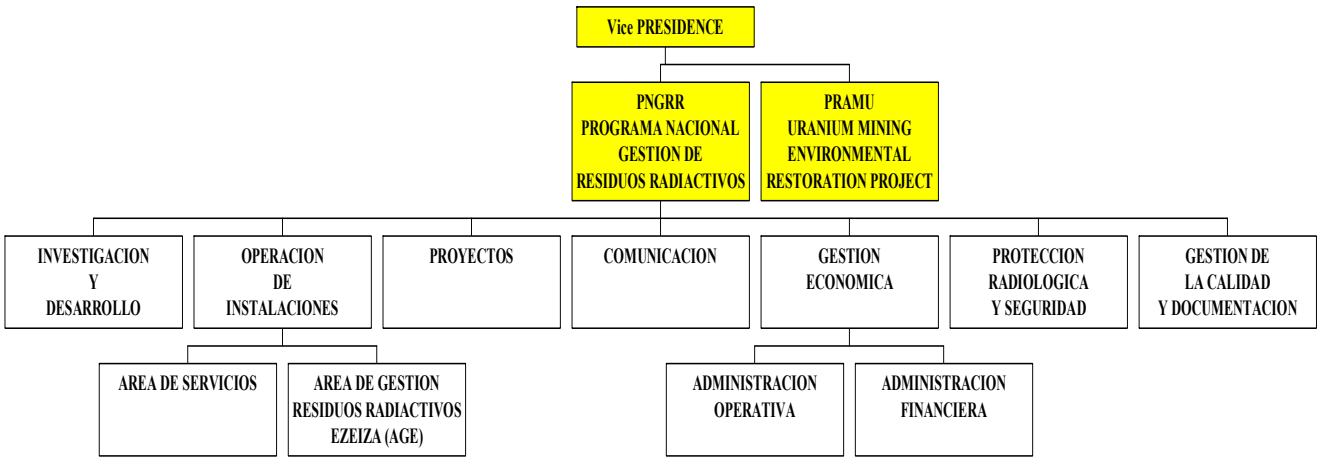
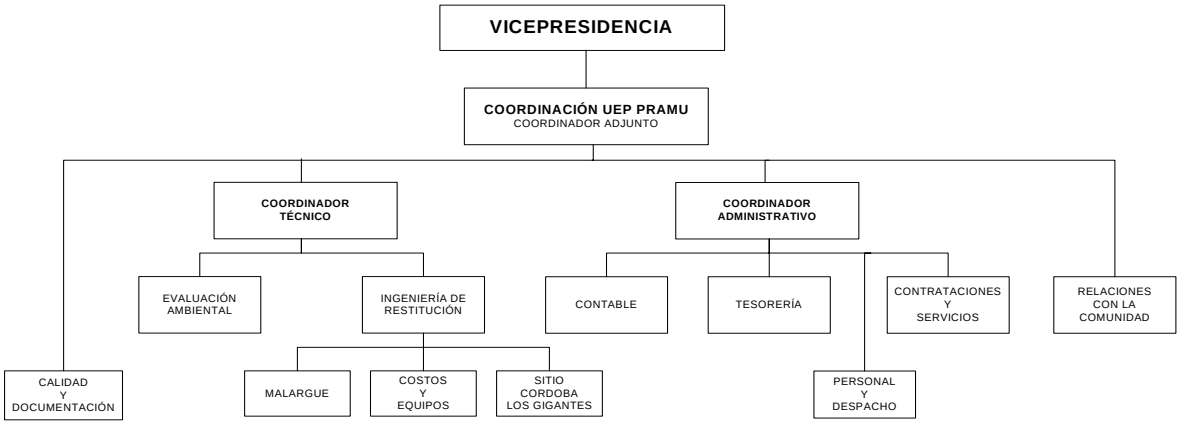


Figure VIII - Uranium Mining Environmental Restoration Project Organization Chart



The total number of CNEA employees assigned to SF and radioactive waste management reaches to 100 people. The following tables show the distribution of personnel by objectives and the assigned financial resources.

CNEA´s Financial Resources for RWM and SFM *

ITEM	RESOURCES ($)
Research & Development	288,000
SF and Radioactive Waste Management	319,000
Proposed Improvements	1,480,000
Personnel	2,813,000
Total	**4,900,000**

*** RWM: Radioactive Waste Management - SFM: Spent Fuel Management**

CNEA´s Human Resources for RWM and SFM *

RANK	QUANTITY
Professionals	50
Technicians	40
Fellowships	10
Total	**100**

Qualifications of Human Resources

Training of personnel is a permanent activity. PNGRR and NASA personnel devoted to SF and radioactive waste management is trained at courses, workshops and seminars. Most employees have taken a postgraduate course on Radiation Protection and Nuclear Safety for professionals or the Radiation Protection Course for technicians organised and directed by the ARN (For further

details, in the section corresponding to the Regulatory Body, the ARN specifies the training activities offered from the very beginning of its activities. See Section E.3.3.3

NASA's personnel who perform specific duties at nuclear power plants are retrained in accordance with the requirements of Regulatory Standard AR 0.11.3. In order to comply with those requirements, at the beginning of each calendar year the retraining program for that year is sent to the ARN. The program includes the courses of study for each specific duty, time schedule, list of topics, lecturers appointed and assessment of courses.

As at both power plants there are no full scale simulators, practical training is abroad, in the case of CNE training is in Gentilly-2 simulator, in Canada; and in the case of CNA I in Angra II, in Brazil.

In addition, the attendance and participation of personnel to courses, seminars and training at universities and other science and technical institutions is encouraged. For some specific matters it has been possible to train them abroad through scientific and training visits and their attendance to courses and seminar. See *Section L.4 Advanced Education and Training*

Besides, every year PNGRR's personnel participates teaching Training Courses on Radioactive Waste Management, at Radiochemical Master Course given at CNEAS's Institute of Nuclear Studies together with National Technological University, and in the Specialization on Nuclear Energy Technological Applications career at CNEA's Instituto Balseiro together with Buenos Aires National University

With the purpose of taking advantage of the experience gained by other countries, and national and international organization, several actions have been taken:

- Continuation of two international agreements: one with DOE-USA and the other with ENRESA-SPAIN. See *Section L.5.1 International Agreements*
- Execution of three new national agreements and continuation of two agreements. See *Section L.5.2 National Agreements*
  Execution of six projects within the framework of the Cooperation Programs jointly with the International Atomic Energy Agency. See *Section L.6 Joint projects with IAEA*
  Participation in Conferences, Seminars, Technical Meetings and Workshops; 9 national and 12 international. See *Section L.4.1 Conferences, Seminars, Technical Meetings and Workshops*

Training of fellowship holders

PNGRR has 16 fellowship holders devoted to the main lines of research and development that are taking place at CNEA´s three Atomic Centers, all of them under the direction of specialists in specific disciplines.
Some fellowship holders have completed postgraduate courses at CNEA´s Educational and Training Institutes, therefore, they have a supplementary training prior to their devotion to the assigned lines of research and development. Fellowships for professionals may be to take

advanced courses or for doctoral thesis. In the case of technical fellowship holders, they are researchers' assistants.

Works performed or being performed by fellowship holders during 2004 are about several aspects of Radioactive Waste and SP Management, and wastes generated from uranium mining; other research works are related to radiological and environmental protection and to the siting of nuclear facilities.

F.3 Quality Assurance

F.3.1 Introduction

In the Argentine Republic the application of adequate quality assurance programs in the design, construction, commissioning, operation and decommissioning stages of spent fuel management and of radioactive waste management is a regulatory requirement. With this purpose AR 3.6.1 regulatory standard "Nuclear Power Plant Quality System" issued by the Regulatory Authority establishes the quality system requirements applicable to Nuclear Power Plants and which, with the appropriate modifications, also apply to other *nuclear facilities that generate and manage radioactive wastes*. Also, AR 3.7.1. regulatory standard "Documentation to be submitted to the Regulatory Authority prior to the commissioning of a nuclear power plant" determines the time when the Responsible Organization has to submit the program and the quality assurance manual.

Furthermore, the facilities operation licenses establish that during that stage they shall have quality assurance programs.

In all cases quality assurance programs and manuals, among other documentation, are mandatory for the installation.

The Regulatory Body control the implementation of quality programs by the Responsible Organization by means of audits made in accordance with ordinary procedures.

In the case of spent fuel management and radioactive waste management facilities located within the siting of nuclear power plants they are subject to quality standards set for nuclear power plants in a General Quality Assurance Program.

F.3.2 Nucleoeléctrica Argentina Sociedad Anónima (NASA)

Since the organization of NASA state-company in 1994 (Decree 1540/94), it develops its nuclear activity in connection with CNA I and CNE operation, and the construction, commissioning and operation of Atucha II Nuclear Power Plant.

NASA, as Responsible Organization, considered it convenient to have a general quality assurance program which would be the reference framework for specific quality assurance programs of each organizational unit. The program is described in the *General Quality Assurance Manual* which was approved and made effective in November 1997. The

development of the General Quality Assurance Program included Regulatory Body requirements and those established in IAEA 50-C-Q document and other applicable safety guides.
Since then the *General Quality Assurance Manual* has been reviewed. Review 1 incorporates a new Quality Assurance Policy approved by the Board of the Responsible Organization.

At the moment, organizational units are adapting their specific manuals to said review.

The *General Quality Assurance Manual rev.1* complies with the requirements of AR 3.6.1 regulatory standard "Nuclear power plant quality system", review 2, 2002 and IAEA Practice Code 50-C-Q.

Table 5 shows the present status of the NASA's General Quality Assurance Program updated to December 2004.

Table 5 – NASA' Quality Assurance Program Status

ORGANIZATIONAL UNIT	DOCUMENT	REVIEW	Nº OF PROCEDURES
NASA	General Quality Assurance Manual	Review 1 Updated	14 General
CNA I	General Quality Assurance Manual for Operation	Review 2 Updated (under review)	5 for SP and 2 for Radioactive Waste
CNE	General Quality Assurance Manual for Operation	Review 4 Updated (under review)	8 for SP and 5 for Radioactive Waste
CNA II	General Quality Assurance Manual for Construction	Review 2 Updated (under review)	No operational procedures in connection with SP and Radioactive Waste
Engineering and Supporting Services	Service Dept. Quality Assurance Manual	Review 4 Updated (under review)	150
Engineering and Supporting Services	Engineering Dept. Quality Assurance Manual	Review 0 Updated (under review)	14

F.3.3 National Atomic Energy Commission (CNEA)

CNEA decided to lay down a Quality Policy and implement only one Quality System for all the Institution in order to manage quality matters efficiently and consistently. With this purpose CNEA's Quality Management Program was prepared as a necessary methodological instrument to assist and monitor the continuous improvement of all organizational activities. CNEA's Quality System documentation: manuals, procedures, standards and quality plans of CNEA's Projects, Installations and Laboratories, are developed in accordance with the applicable

standards, particularly ARN regulations and IAEA 50-C-Q , and at present, and as required by customers, is updated according to ISO 9001:2000.

CNEA is responsible for the management of radioactive waste (Law 24804/97) and also acts as implementing authority as provided by Law 25018, *"Radioactive Waste Management System"*. One of its responsibilities is to determine how a nuclear facility has to be decommissioned and the management of radioactive waste generated during the closing activities of nuclear and radioactive facilities.

The PNGRR, organization implemented by CNEA in order to comply with its waste management responsibilities, has designed a *Quality Assurance System* (SAC) for all radioactive waste management stages to ensure that the conditioned waste complies with the acceptance requirements both for its transport and for interim storage. Acceptance requirements are based on criteria established by the ARN.

SAC is within CNEA Quality Management standard policy. The responsibility for preparing SAC Quality Assurance procedures and its compatibility with CNEA's Quality Assurance Program is carried out by the Documentation and Quality Management Division which reports to PNGRR head. To date the SAC includes 52 operational procedures which correspond to several activities developed in the Program.

Also, in order to have an efficient access to documentation, a Data Base was implemented where, in addition to the procedures mentioned, specifications and layout of the facilities and the regulations and legislation issued by regulatory and other authorities, provide the frame for Radioactive Waste Management. At the moment the Data Base has 220 records.

In 2001 CNEA set up the *Nuclear Facilities Dismantling Subprogram* (SPDIN) which defines the organization and activities to be performed regarding dismantling activities. The Quality Management System developed by the SPDIN includes administrative, operational and safety areas. The procedures included are under review.

For restitution activities of uranium mining sites, CNEA developed in 2000 the *Uranium Mining Environmental Restitution Project* -PRAMU- which defines the organization and activities to be performed in the management of waste derived from uranium mining. The Quality Management System developed by PRAMU includes different project areas.

Table 6 shows the present status of the CNEA's General Quality Assurance Program updated to December 2004.

Table 6 - CNEA' Quality Assurance Program Status

ORGANIZATIONAL UNIT	DOCUMENT	Nº OF PROCEDURES
CNEA	General Quality Assurance Manual	14
UPRYS	Guidelines and Directives	2
PNGRR	Quality Assurance Manual (SAC)	52
PRAMU	Quality Assurance for Operation	in preparation
SPDIN	Quality Assurance Manual	25

F.4 Operational Radiological Protection

Since the presentation of the 1st National Report there have been no changes either in the general criteria and/or in Radiological Protection standards reported.

Basic radiological criteria applicable in the country establish that:

- Practices using radiation shall be justified
- Radiological protection has to be optimised
- Established limits and dose constraint levels shall be met
- Accidents shall be adequately envisaged, but if they occur their radiological consequences shall be mitigated

The criteria of the Regulatory Body concerning radiological safety in spent fuel and radioactive waste management facilities have been defined in the following standards:

AR 10.1.1 Basic Radiation Safety Standard
AR 10.12.1 Radioactive Waste Management
AR 3.1.1 Occupational Exposure in Nuclear Power Plants
AR 3.1.2 Limitation of Radioactive Effluents in Nuclear Power Plants
AR 4.1.1 Occupational Exposure in Nuclear Research Reactors
AR 4.1.2 Limitation of Radioactive Effluents from Nuclear Research Reactors
AR 6.1.1 Occupational Radiation Safety in Type I Radioactive Installations
AR 6.1.2 Limitation of Radioactive Effluents in Type I Radioactive Installations

Dose limits

The annual effective dose limit for members of the public is 1 mSv and is applicable to the average total effective dose to the critical group due to all facilities and practices. Equivalent annual dose limits are 15 mSv and 50 mSv for crystalline and skin, respectively.

Dose constraints

In order to consider the contribution of practices developed at regional and international level to the doses in the critical group and have an appropriate margin for future practices, the Regulatory Body has established the following constraints:

- The annual dose in the critical group shall not exceed of 0.3 mSv for all installations; and
- The effective collective dose shall not exceed:

  a) 15 Sv man by GW year of generated power for nuclear power plants, including radioactive waste management and spent fuel storage.
  b) 5 Sv man by GW year of generated thermal energy, for research reactors, including radioactive waste management and spent fuel storage.
  c) 1.5 Sv man by TBq year of the value of the annual integrated inventory for Type I radioactive facilities including radioactive waste and SF management systems.

In order to apply these constraints the Regulatory Body limits the authorized annual discharges into the environment (discharge restrictions). A 0.3 mSv year value is applicable when it is demonstrated that the effluent discharge system has been optimised. Otherwise, such value is more restrictive and must not exceed 0.1 mSv year by installation.

As regards Dose limits for occupational exposure, the Regulatory Body establishes that:

- The effective dose limit is 20 mSv year. This value shall be considered as the average in 5 consecutive years (100 mSv in 5 years), not exceeding 50 mSv in a single year.
- The equivalent dose limit is 150 mSv year for crystalline and 500 mSv year for skin.

The dose limit is applicable to the sum of the dose due to external exposure in the period under consideration plus the committed dose from intakes in that period.

These limits are in effect since January 1995 and since then the value of the accumulated effective dose for the five-year average dose control is computed.

F.4.1 Conditions for Radioactive Material release

In accordance with regulatory standards, the systems used at nuclear installations for the containment of radioactive effluents should be optimised.

When optimisation is made by means of a cost-benefit analysis, a 10,000 U.S. dollars per Sievert man constant value between the social cost and the collective dose is used.

The operation license issued by the Regulatory Body to nuclear installations which perform some steps of waste management, provide that the doses to the critical group due to discharges of radioactive effluents to the environment shall be as low as reasonably achievable and shall not exceed the restrictions established in terms of the following expression:

$$\sum_i \frac{A_i}{K_i} < L$$

where:

A_i is the activity of *i* nuclide discharged to the environment in the period under consideration

K_i is a constant value of activity, stipulated for *i* nuclide, for a given installation

L is the limit for this sum of fractions, with different values for the different periods considered; $L = 10^{-2}$ in a day, $L = 3 \times 10^{-1}$ in three months and $L = 1$ in a year.

K_i value is estimated for each installation, radionuclide and type of discharge (gaseous and liquid) using specific models to estimate the doses in the critical group, considering the characteristics of the sites and the location of critical groups.

This assessment method makes it possible to ensure that if compliance with the above mentioned formula is observed dose constraints to the public shall not be exceeded.

Gaseous and liquid discharges that occur during normal operation of the installations, are permanently controlled and monitored. If significant deviations from the historical averages or growing trends of the activities discharged on a yearly basis are detected, it must be duly analysed and justified.

In addition to the independent monitoring plan, the Regulatory Body performs environmental measures in the surroundings of the facilities which include activity measurements in water, sediment, vegetable, fish, milk and other samples of the surrounding biosphere.

Table 7 shows the annual average activity discharged to the environment with gaseous and liquid effluents during the last 2000-2004 five-year period, discriminated by type of discharge and group of radionuclides for the 13 facilities authorized to perform controlled and planned discharges (nuclear power plants, research reactors and Type I radioactive facilities). Also information on the annual dose constraint fraction that represented such liquid and gaseous discharges in the critical group is included.

Table 7 - Average Gaseous and Liquid Discharges in the 2000-2004 Period

ANNUAL AVERAGE CONTROLLED DISCHARGES IN THE PERIOD 2000-2004												
FACILITY	LIQUIDS					GASEOUS						
	TOTAL ACTIVITY (Bq)				% of	TOTAL ACTIVITY (Bq)						% of
	H 3	β/γ	total α	Nat uranium	DC (*)	Nob Gas	Aeros	H 3	Iodines	C 14	Nat uranium	DC (*)
CNA I	1,1E+15	4,0E+11	2,5E+07	-----	0,23	1,1E+14	6,4E+06	9,7E+14	7,7E+07	3,6E+11	-----	1,37
CNE	7,2E+13	1,6E+09	-----	-----	0,60	4,0E+13	1,2E+06	2,7E+14	1,1E+05	4,4E+11	-----	0,05
COMPLEJO FABRIL CORDOBA - CFC	-----	-----	-----	1,3E+09	0,07	-----	-----	-----	-----	-----	6,7E+06	0,05
RA3	-----	2,0E+08	-----	-----	3,67	1,2E+13	4,1E+08	-----	6,9E+07	-----	-----	1,63
PLANTA PROD RADIOISOTOPOS - PPR	-----	5,6E+06	-----	-----	0,07	-----	-----	-----	2,6E+09	-----	-----	7,67
PRODUCCION Mo 99 - PPMo 99	-----	-----	-----	-----	-----	4,0E+12	<DL	-----	2,0E+08	-----	-----	0,47
PRODUCCION FUENTES SELLADAS - PFS	-----	-----	-----	-----	-----	-----	5,2E+04	-----	-----	-----	-----	<0,01
CICLOTRON	-----	-----	-----	-----	-----	-----	1,6E+12	-----	-----	-----	-----	0,14
CONUAR	-----	-----	-----	1,3E+07	0,15	-----	-----	-----	-----	-----	7,0E+05	<0,01
LABORATORIO URANIO ENRIQUECIDO - LUE	-----	-----	-----	-----	-----	-----	3,4E+02	-----	-----	-----	-----	<0,01
RA1	-----	<DL	-----	-----	<0,01	-----	-----	-----	-----	-----	-----	-----
FACILIDAD ALFA - FAC ALFA	-----	-----	ND	-----	ND	-----	1,1E+02	-----	-----	-----	-----	<0,01
RA6	-----	4,3E+07	-----	-----	<0,01	<DL	<DL	-----	<DL	-----	-----	<0,01

(*) DC: Anual Dose Constraint = 0,3 mSv
DL = Detection Límit
ND = No Discharges
----- = Not Authorized
NOTE: The Anual Dose Constraint is set for all the installations in the Site

Section L.1.1 Radioactive Discharges to the environment includes a table with the annual values of radioactivity discharged into the environment of each of the 13 above mentioned facilities, discriminated by group of radionuclide and type of discharge, for the 1998/2002 five-year period. *Section L.1.2 Annual Doses to critical group* also includes a table with the annual dose value in the critical group for each installation and type of discharge for the last five-year period.

F.4.2 Occupational Exposure

Radiological Protection criteria adopted by the Regulatory Authority to control the dose to workers are consistent with ICRP's recommendations.

AR 3.1.1, AR 4.1.1 and AR 6.1.1 regulatory standards set different criteria to ensure that the occupational dose to workers is as low as reasonably achievable and lower than the established dose constraints and that the protection is optimised.

The Regulatory Body requires that whenever possible, radiological protection shall be achieved using installation systems rather than operational procedures.

Each nuclear power plant operation license sets the following conditions for workers:

1. Personnel working in a controlled area shall be subject to individual monitoring and medical surveillance on an annual basis.
2. Occupational doses due to any of the following shall be recorded on a monthly basis:
   a) External exposure
   b) Intake of radioactive material
3. These records shall contain the following information:
   a) Individual dose
   b) Collective effective dose, resulting from the performance of different

maintenance, repair and operating activities

4. The Primary Responsible for an installation shall keep the above mentioned records for at least thirty years after the end of service of the involved personnel.

In practice and according to what AR 10.1.1 regulatory standard establishes, it is considered that dose limit levels have not been exceeded when the following conditions are fulfilled:

$$\frac{H_p(d)}{L_{DT}} \leq 1$$

and

$$\frac{H_p(10)}{20mSv} + \sum_j \frac{I_j}{I_{L,j}} \leq 1$$

where:

$H_p(d)$ is the individual equivalent dose at a depth of 0,07 mm and 3 mm for skin and crystalline, respectively, integrated in a year

L_{DT} is the limit of equivalent dose in skin or crystalline, as appropriate

$H_p(10)$ is the individual equivalent dose at a depth of 10 mm from the skin surface integrated in one year.

I_J is the incorporation value of nuclide *j* during a year.

$I_{L,J}$ is the annual intake limit for nuclide *j*, resulting from the division of 20 mSv by the dosimetric factor of effective dose commitment for workers, per incorporation unit of the mentioned radionuclide.

Table 8 shows information on the occupational exposure for the 14 installations that have spent fuel and radioactive waste management facilities. The annual average collective dose and the average individual dose is shown for each installation for the 2000-2004 five-year period.

Occupational doses are global values that include the doses exposed to during operational and maintenance activities for all workers subject to individual monitoring; therefore, doses received during radioactive waste management and spent fuel storage activities are significantly lower. In the case of doses to AGE personnel, doses reported correspond exclusively to radioactive waste management activities.

Section L.1.3 Annual Collective Doses and individual average dose for workers includes tables with the annual values, for the 2000-2004 five-year period, of collective doses and individual average dose, for each of the 14 above mentioned installations.

Table 8 - Occupational Exposure at Radioactive Waste Management Installations

ANNUAL OCCUPATIONAL DOSES AVERAGED OVER THE PERIOD 2000-2004		
TYPE I INSTALLATION	**Collective (man Sv)**	**Average (mSv)**
CNA I	7,937	9,28
CNE	2,440	2,92
COMPLEJO FABRIL CORDOBA - CFC	0,000	0,00
RA3	0,077	1,86
PLANTA PRODUCCION RADIOISOTOPOS - PPR	0,061	1,43
PLANTA PRODUCCION Mo99 - PPMo99	0,027	2,27
PLANTA PRODUCCION FUENTES SELLADAS - PPFS	0,151	6,65
CICLOTRON	0,026	1,37
CONUAR	0,017	0,52
LABORATORIO URANIO ENRIQUECIDO - LUE	0,007	0,44
RA1	0,017	0,82
FACILIDAD ALFA	0,003	0,37
RA6	0,005	0,19
AREA GESTION RESIDUOS RADIACTIVOS - AGE	0,037	1,55

F.4.3 Radiological protection and nuclear safety at CNEA

The National Commission of Atomic Energy (CNEA) is responsible for the management of spent fuel and radioactive waste generated in the national territory. Also, it is the Responsible Organization for the operation of nuclear and radioactive installations at various Atomic Centers.

A significant event in connection with safety in CNEA's management activities was the implementation in 2004 of the Radiological Protection and Safety Program (PPRS).

The purpose of this *Program* is to provide an organization, an organic coordination of the activities related to radiological protection and safety that were developed in this institution, to strengthen the policies for strict compliance and the control of current legislation and regulations on this matter. This program reports directly to CNEA's Presidency.

Also and in connection with safety issues, the implementation of a *Safety and Security Review System* of safety during operation and performance activities is worth mentioning.

The objective of the *System* is to benefit from the operational experience and a continued improvement of quality and safety at all CNEA's installations.
Herebelow follows a brief description of the *PPRS* and the *Safety and Security Review System.*

F.4.4 Radiological Protection and Safety Program

It is made up by Permanent Programmatic Activities (AP) and by Subprograms.

Permanent Programmatic Activities are 7 as follows:

- *CNEA's Safety Committee*

Reviews and assesses safety conditions under which institutional activities are performed, recommending the pertinent actions in matters of Radiological Safety, Physical Protection and Safety and Health at Work.

- *Joint Convention*
  Includes the activities related to the fulfilment of obligations under the Joint Convention on the Safety of Spent Fuel Management and Radioactive Waste Management applicable in Argentina.

- The other five are: *Agreements, Relations with other Organizations and Institutions, Technical Assistance, Safeguards and Program Management*.

Subprograms are four. They deal with everything related to the involved areas, promoting studies, formulating optimisation actions and improving and monitoring the development and the results of activities inherent to it. They are the following:

- Radiological and Nuclear Safety
- Health and Safety at Work
- Emergences and Physical Protection
- Skilled Human Resources

F.4.5 Safety Review System

Its objective is to achieve a systematic improvement of safety reviewing and assessing safety conditions under which activities are performed, recommending the pertinent actions in matters of Radiological Safety, Physical Protection and Safety and Health at Work. See Figure IX.

The systems consists in the analysis and processing of information in connection with the safety of installations and their siting (Atomic Centers and buildings). The system is based on *Regular Operational Reports (IPO)* which allows for a technical review to a greater or lesser extent depending on the significance of events and their impact on operational safety.
IPOs contemplate, as necessary, one or all of the following:

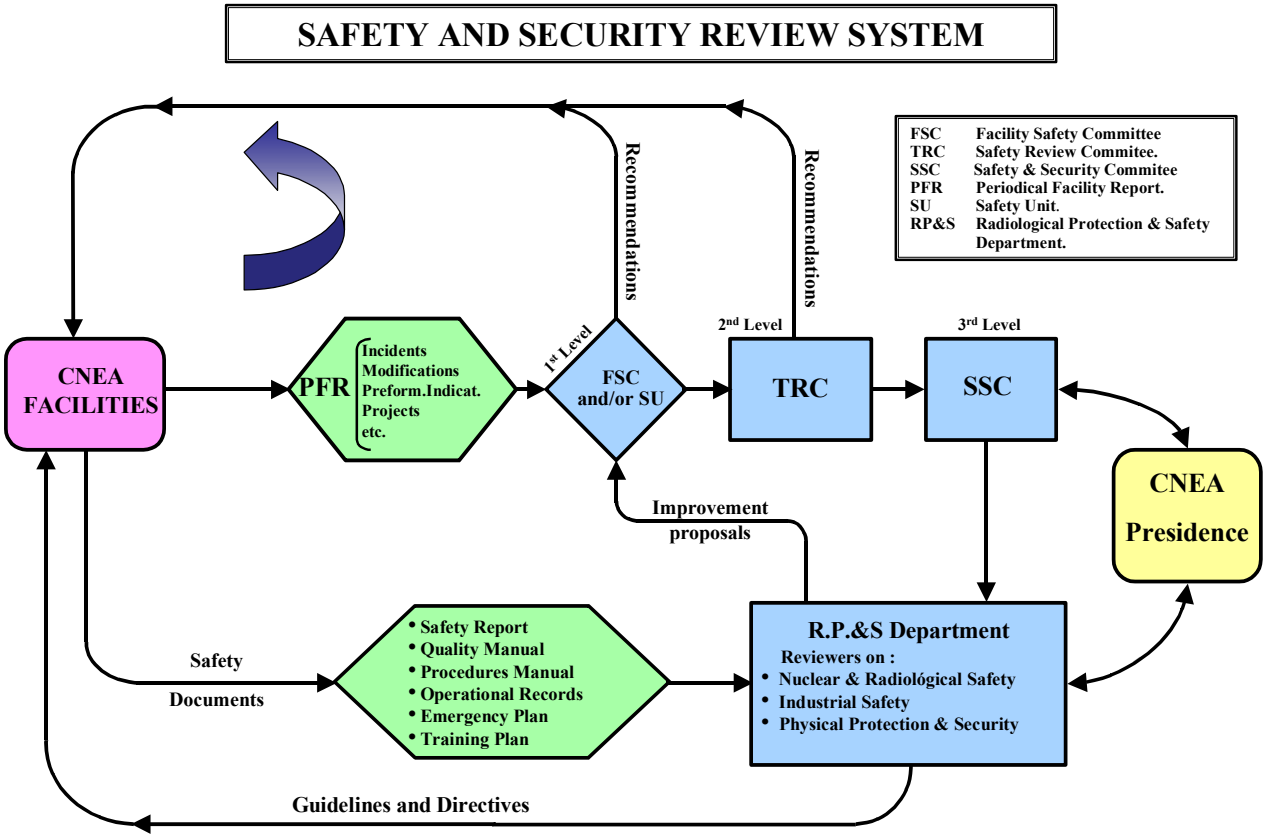
- Failures and deviations registered.
- Changes or modifications made.
- Operational experience.
- Innovations and future projects.
- Condition of the documentation of the facility.

The technical review of the operation, in accordance with the relevance of the material to be reviewed, may reach up to 3 levels or review instances. Below follows in ascending order said data review:

- *Facility Safety Committee* (FSC)
- *Technical Review Committee* (TRC) of the Atomic Center to which belongs the facility.

- *Safety & Security Committee* (SSC) of the National Commission of Atomic Energy (CNEA)

Figure IX - Safety and Security Review System



Regular information prepared by the facility is first reviewed by the *Facility Safety Committee*, which depending on the topic may issue a *Corrective Action*.

In the case of modifications, changes and innovations proposed by the facility which are significant for safety or in the case of topics which have to be assessed as a whole considering other facilities of the site, the information is reviewed by the *Technical Review Committee* (TRC) of the Atomic Center where the facility is located. Said TRC is independent from the Facility in question. In the second review *Recommendations* are issued and the corresponding authorization application is sent to the ARN together with TRC's report.

The CRT is presided over by the Atomic Center Manager and made up by the individuals responsible for Safety and Quality areas, the Primary Responsible for the facilities that operate installations in atomic center areas and by temporary members who provide assistance as experts in different fields of interest.

CNEA's Safety & Security Committee, whose objective is to assess safety performance levels at all CNEA's Facilities and recommend the pertinent actions in matters of Radiological Safety,

Physical Protection and Safety and Health at Work, makes the third review. This instance issues *Requirements.*

CNEA's Safety & Security Committee is made up by CNEA's Radiological Protection and Safety Department Head, by the individuals responsible for Radiological and Nuclear Safety, Safety and Health at Work, Emergencies and Physical Protection Subprograms and by the responsible for Atomic Centers Safety Units and uranium mining areas.

F.5 Emergency Preparedness

F.5.1 Introduction

As specified in the 1st National Report, the Regulatory Body requires the Responsible Organization to develop a response plan for radiological or nuclear emergencies. The Emergency Plan must contemplate the application of protective measures to prevent and/or mitigate the possible radiological consequences from nuclear accidents. The significance and scope of the plan depend on the nuclear installation. All nuclear facilities must have an internal emergency plan, and those facilities where an accidental situation may have radiological or nuclear consequences on nearby residents shall also have an external emergency plan.

The Regulatory Body has regulated the planning and preparation of the response in emergency situations, such as established by AR 10.1.1, AR 3.7.1 and AR 4.7.1 regulatory standards, in the operating licenses and in the requirements made to the Responsible Organization and to the Primary Responsible for the facilities.

F.5.2 Structure of the emergency plan at national level

There is nationwide legislation relative to passive defence systems. In this connection Act 14467/58 on *Passive Defence* and Act 17192/67 on *Civil Defence Services*, their amendments, and their respective regulatory decrees may be mentioned. These laws refer mainly to measures and non-aggressive activities aimed to prevent, cancel or diminish the effects of war actions, the forces of nature or disasters of any origin that could affect the population or their property. In the same way, Decrees 270/92 and 1041/95 refer to the preservation of life, the habitat and the property of the population threatened by natural or anthropogenic disasters.

The mentioned laws and decrees are effectively implemented all over the country by Civil Defence National Organization, that reports to the Interior Security Secretariat of the Argentine Ministry of Internal Affairs.

Through out the provinces and municipalities, Civil Defence is structured and organized by the Secretariat of Provincial Security, or directly by the Provincial Executive Power.

National Law on Nuclear Activity (N° 24804) and its regulatory Decree 1390 of November 1998 establishes in Article 16, paragraph "o", that:

"*For a better fulfilment of its duties the ARN shall approve contingency plans for cases of nuclear accidents, programs for emergencies and, when necessary, the training of workers and neighbours. Those plans shall include an active participation of the community. The Security Forces and the representatives of civil institutions of the area covered by said procedures shall report to the officer appointed by the ARN for such purpose. The ARN is considered the Regulatory Authority in accordance with the terms of Article 8 of the Convention on Nuclear Safety approved by Act 24776."*

Municipal, provincial and national authorities that could have any connection with said plans shall comply with the guidelines and principles defined by the ARN, which shall exercise all the power that the Convention on Nuclear Safety establishes for each Contracting Party.

In December 2002, the interim version of the National Nuclear Emergency Plan was approved within the purview of the Federal Emergency System (SIFEM) and the National Department of Civil Defence, updated in accordance with Nuclear Law requirements.

In December 2003 the Provincial Nuclear Emergency Plan was approved for Córdoba province, where Embalse Nuclear Power Plant is located. The approval of the Provincial Nuclear Emergency Plan for the Province of Buenos Aires, where Atucha I Power Plant and Ezeiza and Constituyentes atomic centers are located, is still pending.

In the case of Nuclear Power Plants, the Municipalities that could be directly affected by nuclear accidents within a range of 10 km have a Municipal Plan for Nuclear Emergencies. This is the case of the town of Lima and areas close to CNA I, and the towns of La Cruz, Embalse, Villa del Dique and Villa Rumipal, near CNE.

In the case of Atomic Centers, where most facilities operate with a relatively low radioactive inventory, potential accidents at each installation are assessed and characterized in safety reports (design base accidents). Their potential radiological consequences would affect only its own installations, and in extremely serious cases the Atomic Center.

Nevertheless and as previously mentioned, agreements have been signed with public authorities to implement protection measures, defining the responsibilities and functional relations of the organizations responsible for implementing the different protection measures.

The system used to communicate the protection measures to the public in case of accidents has been developed in the last years.

F.5.3 International agreements

In December 1986, the Federative Republic of Brazil and the Republic of Argentina signed the Argentine-Brazilian Cooperation Agreement. Annex II to Protocol 11 thereof includes the *Reciprocal Cooperation and Assistance in Case of Nuclear Accidents and Radiological Emergencies* program.

In February 1990, Argentina adhered to the *Convention on Early Notification of a Nuclear Accident* and the *Convention on Assistance in Case of a Nuclear Accident or Radiological Emergency*. The Regulatory Body is the *Contact* and the Competent Authority within the framework of both conventions.

Also, Argentina is a member and contact of the *Network for Medical Attention to Overexposed Persons* of the Pan-American Health Office.

F.5.4 Nuclear Power Plants Emergency Plans

In the case of spent fuel and radioactive waste management installations located in nuclear power plants, the emergency plans of the plants contemplate the application of protective measures to prevent and/or mitigate the possible radiological consequences from nuclear accidents that could occur in those installations. The emergency plans of nuclear power plants were described in the 1st National Report and have been prepared in accordance with the reports of the Convention on Nuclear Safety.

F.5.5 Atomic Centers Emergency Plans

The 1st National Report stated that CNEA, as responsible organization for the operation of nuclear and radioactive installations, set out a general procedure to develop Emergency Plans (*CNEA-PN00O01 Facilities Emergency and Evacuation Plan).* This document lays down the general guidelines which Atomic Centers and Principal Branch Offices under CNEA's jurisdiction shall adopt and comply with. At present Emergency and Evacuation Plan adapted to the specific characteristics of each Atomic Centers are in operation.

As an example, there follows a description of the Ezeiza Atomic Center Emergency Plan, where most of the activities described in Section H take place and which generate low and intermediate level radioactive waste.

F.5.5.1 CAE's Emergency and Evacuation Plan

The plan defines and assigns responsibilities to the personnel involved in the operation and foreseen an organization to face potential abnormal conditions, classifying them in accordance to its seriousness. It also sets out several activities for the implementation and development of the emergency.

Emergency levels
Abnormal situations were classified in three levels according to their complexity and the following definitions:

- Level I Emergency
  This level includes all emergencies localized in a building or installation which may be controlled without the involvement of external groups.

- Level II Emergency

Partial or total emergencies originated in CAE, without implications in its surrounding area, also including meteorological events and forest fires.

- Level III Emergency
  Includes the emergencies that affect all CAE and the surrounding area.

Organization and responsibilities

The organization of the sectors that participate in emergency activities is shown in the Figure X.

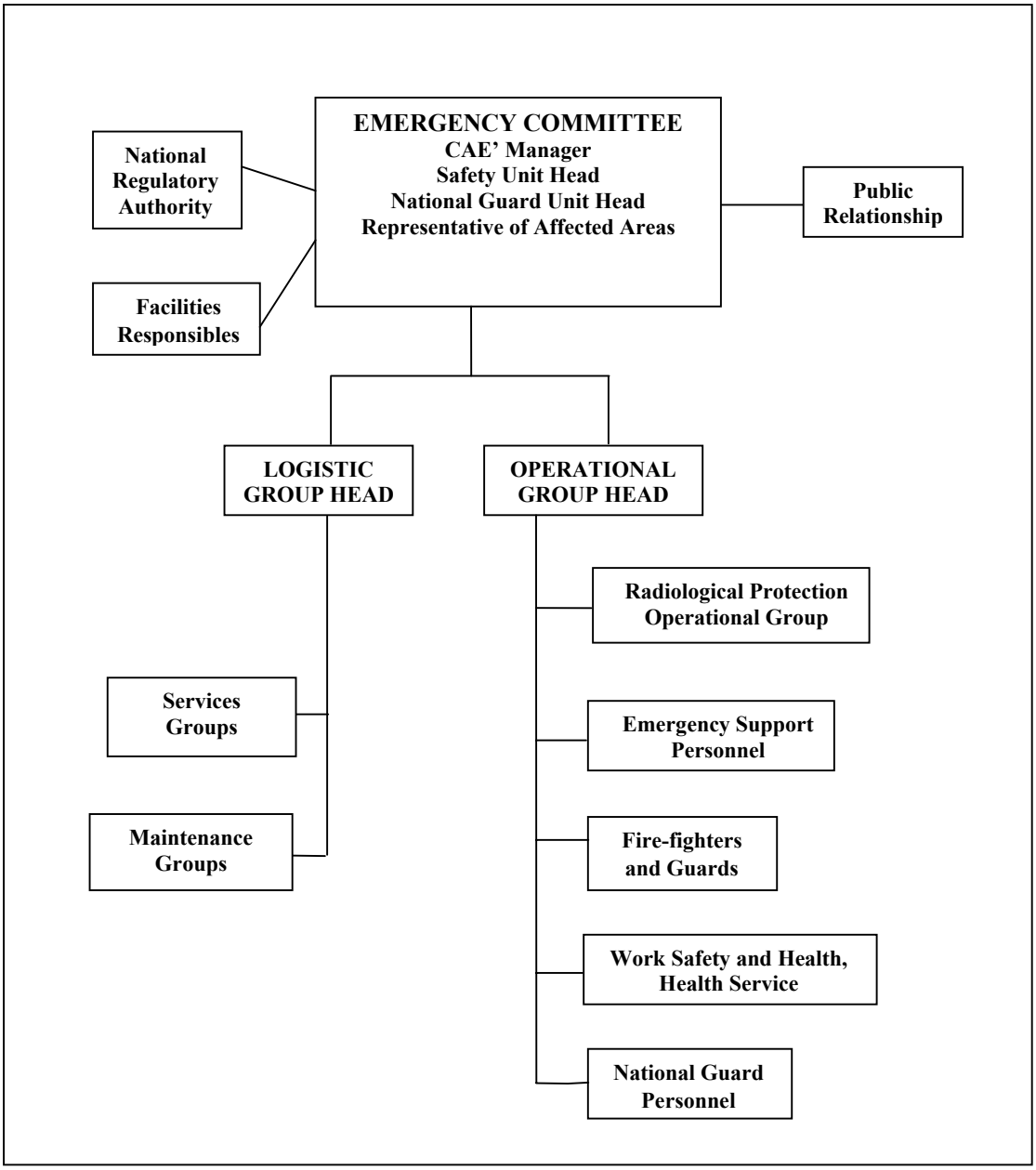
Organization of the Emergency

Emergency Coordinator
Such as established by the general procedure for Emergency Plans (*PN00O01)* the Atomic Center Manager, CAE's highest person in rank, shall be the emergency coordinator.

Emergency Committee (CE)
The emergency is assessed and conducted by a committee constituted by CAE's manager, the individuals responsible for the areas affected, CAE's Safety Unit Head, and the head of the National Guard (GNA) in charge of Ezeiza Safety Section.

Group of Advisors
In the case of accidents with possible radiological implications, level I and II accidents, advise shall be requested to the ARN, which together with representatives of Atomic Center Branch Offices, of CONUAR company and any other authority that may be required, shall act as advisors to the Emergency Coordinator .

Figure X - Organization of the Emergency



The *Head of the Operative Group* is responsible for the execution of tasks or direct actions to control the emergency. His responsibilities include the notification to operative groups and their coordination. The operative group is made up by five units that perform their duties in the areas of:

- Radiological Protection (Radioprotection Operative Group)
- Labour Medicine (Work Safety and Health, Health Service)
- Fire fighting (Fire-fighters and Guards)
- Emergency Assistance (Emergency Assistance Personnel)
- Security (National Guard Personnel)

The *Head of the Logistic Group* is responsible for taking care of communications, electrical and general services and shall participate in the evacuation, transport and temporary relocation of personnel to safe places and as well as ensure the transport of Emergency Assistance Personnel, Explosives Brigade and other services that may be necessary.

Emergency drills

The Emergencies and Evacuation Plan provides the regular performance of evacuation drills, in order to train personnel about the steps that have to be followed when there is an emergency and take them in a safe manner in the shortest period of time. To such effect informative meetings are organized to instruct CAE's personnel and the personnel of external organisations involved in the respective procedures.

F.6 Decommissioning

F.6.1 Introduction

The 1st National Report pointed out that none of the 28 nuclear installations in Argentina is undergoing decommissioning. Notwithstanding, planning stages prior to decommissioning have been started with the criterion of prioritising those that will probably generate the greatest volume of radioactive waste. Though there is no definite date for the decommissioning of the installations, the *Radioactive Waste Management Strategic Plan* has estimated decommissioning dates for nuclear power plants, installations that will generate the greatest volume of waste during their dismantling.

F.6.2 Regulatory aspects

The legal and regulatory framework of nuclear activities described in Section E of this National Report is applicable to decommissioning activities of nuclear installations, as it is an additional stage in the life cycle of the installation. Therefore, the criteria and radiological safety standards, waste management, quality and safety culture concepts, applied to the previous stages in the life-cycle of the installation, are applicable.

One of the main requirements of the regulatory system is that it is not possible to start the construction, commissioning, operation and decommissioning of a significant nuclear installation if it does not have the pertinent license, which is applied by the Responsible Organization and issued by the Regulatory Authority.

Specifically, Act 24804, Nuclear Activity Law, sets forth in article 16 (b) that the Nuclear Regulatory Authority is authorized to grant licenses for the decommissioning of nuclear activities.

The above mentioned law and Decree 1390/98, whose Annex I regulates said law, establish among other things, CNEA's liability as responsible organization for defining the manner in which nuclear power plants shall be decommissioned, and also the liability of the agency that operates such reactors.

AR-0.0.1 regulatory standard "Licensing of Type I installations", sets out that a license issued by the ARN is required in order to proceed to the decommissioning of nuclear installations. In addition, it requires the identification of the Responsible Organization for such stage and of the Primary Responsible, to which it assigns the direct responsibility for the radiological safety of the installation.

Also, AR-3.17.1 regulatory standard "Nuclear power plant decommissioning", establishes the basic requirements for the decommissioning of those installations. The main conditions are the following:

The **Responsible Organization**, holder of the Decommissioning License, is responsible for planning and providing the resources required for the safe decommissioning of the nuclear power plant.

The **Decommissioning Program** shall consider the necessary institutional arrangements and foresee appropriate radiological protection in each stage. The Regulatory Authority's prior approval is required to implement the Program.

The **Decommissioning Program** shall include all necessary steps to ensure an appropriate radiological protection with minimum surveillance after decommissioning.

The **Responsible Organization** will be able to delegate the decommissioning activities, either in whole or in part, to third parties, but it shall continue being responsible for them. During the decommissioning process, the **Responsible Organization** shall contemplate and submit to ARN's consideration, the following:

- Project management
- Site management
- Roles and responsibilities of involved organizations
- Radiological protection
- Quality assurance
- Segregation of wastes, conditioning, transport and final disposal
- Surveillance after partial decommissioning stages have concluded
- Physical protection
- Safeguards and non-proliferation commitments

Besides, the presentation of a plan for the decommissioning stage of the installation is required and shall be submitted by the Responsible Organization with the priority established by the ARN. This requirement is presently included in the renewals of operation licenses.

F.6.3 Background

All along the nuclear activity in Argentina dismantling and decommissioning activities have been performed, namely:

- Dismantling of RA-2 Critical Facility at CNEA Constituyentes Atomic Center, 1984-1989. The building that housed the reactor is now open for unrestricted use.
- Dismantling of the internal parts of the tank, nuclear and conventional instrumentation of RA-3 radioisotope production reactor at CNEA Ezeiza Atomic Center, 1988-1990. These tasks were part of the program to increase the power of said reactor which is at present in operation.
- Removal and repair of internal parts of CNA I reactor due to the breakage of R06 fuel channel in 1988. Removed elements have been stored at CNA I controlled area.
- Decontamination of several components, as for example, main pumps and heat exchangers at CNA I, as well as development and use of remote and cutting techniques.

The 1st National Report also specified that, in compliance with the Nuclear Activity Law, Act 24804, the responsibility for decommissioning activities and for the manner in which nuclear installations are decommissioned rests with CNEA. In order to comply with this mandate and carry out the necessary activities, CNEA developed in 2000 the *Nuclear Installations Dismantling Subprogram* (SPDIN).

The head of CNEA's *Nuclear Installations Dismantling Subprogram* is an advisory member of IAEA's *Technical Expert Group on Decommissioning - TEGDE-* since its organization in the year 2003.

F.6.4 Planning of Dismantling and Decommissioning of significant nuclear installations

Though there is no specific date on which any relevant nuclear installation in Argentina shall end its operation activities, the SPDIN has started planning their dismantling and decommissioning, prioritising the installations which shall generate the greater volume of radioactive waste during decommissioning.

The following tasks are currently in progress:

A) Planning and costing out the decommissioning of Argentine research reactors. Works have started with RA-1 reactor at Constituyentes Atomic Center. And they have included its radiological characterization and a first estimate of the radioactive wastes generated by its dismantling. An alternative for the management of its graphite reflector has been defined, which is also applicable to RA-3 y RA-6 reactors.

B) Decommissioning of Atucha I Nuclear Power Plant - planning and costing out.
The *Radioactive Waste Management Strategic Plan* has defined a differed dismantling strategy for Argentinean nuclear power plants. Together with Nucleoeléctrica Argentina S.A. (operator of the NPP) a preliminary transition and

preparation plan for the safe decommissioning of Atucha I Nuclear Power Plant has been completed. The IAEA has participated in this task.

C) Decommissioning of Embalse Nuclear Power Plant - planning and costing out. Works have started following the procedures defined for Atucha I Nuclear Power Plant.

D) Atucha II Nuclear Power Plant.
In view of the decision to complete the construction of this power plant, the preliminary plan for its Decommissioning is being developed in accordance with ARN's requirements.

F.6.5 Development of dismantling technology

The 1st National Report mentioned vibratory mechanical decontamination among the research and development projects in progress. To date, a laboratory equipment and another one at industrial scale for vibratory mechanical decontamination with metallic pieces and elements have been developed and built. Now, progress is made in the "cold" testing scheme of the industrial equipment. This activity received a subsidy of the U.S.A. Department of Energy within the terms of the "Science and Technology Implementing Arrangement for Cooperation on Radioactive and Mixed Waste Management" between DOE and CNEA.

Besides, the development of techniques to remove contaminated layers from existing concrete structures and the design of mechanisms to facilitate their easy removal from future structures is also in progress.

F.6.6 Financing

The Trust Fund to meet decommissioning expenses of each nuclear power plant would be set up in accordance with Decree 1390/98, regulatory of Act 24804, the Nuclear Activity Law, if the operation of the nuclear power plants is privatised and it would be funded with contributions of the operating company. Were the operation of the nuclear power plants not privatised, the responsibility to finance the decommissioning of nuclear installations is assumed by the National Government with its own funds. It should be noted that at present the privatisation of the operation of nuclear power plants is not contemplated.

F.6.7 Human resources

Several international cooperation agreements have been executed to train personnel for dismantling activities:

- International Atomic Energy Agency
  - The Technical Assistance Project with IAEA (ARG/9/010) was completed satisfactorily. Several CNEA and NASA professionals received formal training.
  - CNEA participates in IAEA's Coordinated Research Project "Disposal aspects of low and intermediate level decommissioning waste" and was responsible for

organizing the Second Meeting of this project, which was held at Constituyentes Atomic Center in Buenos Aires, in September 2004.

- Germany

  In the framework of the Argentine-German Cooperation Agreement in the nuclear area, the First CNEA-FZK Workshop was held in Buenos Aires on Radioactive Waste Management and Dismantling and Closure of Nuclear Installations.

- Belgium

  CNEA and SCK-CEN of Mol, Belgium have signed a cooperation agreement which includes in its scope, the dismantling of nuclear installations.

SECTION G SAFETY ON SPENT FUEL MANAGEMENT

G.1 General Safety Requirements

The aspects related to general requirements for management of spent fuels have not been changed since the 1st National Report was issued. In this report, those requirements are briefly presented in Section H - Safety on Radioactive Waste Management - because they are substantially identical.

Likewise, it should be noted that Section G contents are valid for Section H homologous requirements, except in cases where the latter are specific for the Section.

G.2 Existing Facilities

As described in the 1st National Report, the practice in Argentina for spent fuel (SF) management has been wet storage in pools or other facilities for the period necessary to obtain certain product decay and its subsequent temporary dry storage.

Up to date, the existing SF storage facilities are:

SITE	INSTALLATION
Atucha I Nuclear Power Plant (CNAI)	Pool building I and II
Embalse Nuclear Power Plant (CNE)	Storage Pool
	Spent Fuel Dry Storage System (ASECQ)
Ezeiza Radioactive Waste Management Area (AGE)	MTR Spent Fuel Central Storage Facility (DCMFEI)

G.2.1 CNA I Spent Fuel Storage Pools

These spent fuels are originated in the PHWR type CNA I Nuclear Power Plant, which has an installed capacity of 375 MW (e) and started operation in 1974.

All CNA I Spent Fuels are temporarily stored in water. The Nuclear Power Plant has two fuel storage areas known as Pool Buildings:

- Pool Building -1
  The Pool Building -1 comprises two decay pools P1 and P2, plus a handling pool or work area.
  Storage capacity: 3240 positions

- Pool Building -2
  The Pool Building -2 comprises four decay pools P4, P5, P6 and P7.
  Storage capacity: 6912 positions

Storage of fuel elements takes place in pools in a double tier arrangement. Fuel elements hang from stainless steel racks.

Pool walls are lined with 2 mm thick stainless steel plates while the bottom is lined with 3 mm thick stainless steel plates. Plates are welded to stainless steel structural shapes embedded in concrete.

In order to collect and transport possible water leaks through the welded seams and be able to locate their origin, small concrete channels were left below the steel lining. Prior to lining, the walls were coated with a waterproof paint.

Leaks are checked at the inspection station located at lowest building elevation. This leak detection system also covers the floor and gate sealing frames.

Handling of fuel within the pools is accomplished using an overhead travelling crane with a telescopic mast fitted with the fuel handling tool. By maneuvering the crane and/or the mast it is possible to reach any point inside the pool fitting the tool at the end of the mast.

As explained in the 1st National Report, the Responsible Organization (NASA) conducted in 1998 a Safety Review of the Power Plant on account of the changes introduced in the type of fuel and the resulting increase in the fuel burning rate. The Safety Review included the spent fuel handling and storing systems and the management of waste generated during operation of the Power Plant. The results of the Safety Review were presented in the 1st National Report. The ARN conducted an independent evaluation of spent fuel storage pools, in relation to criticality prevention and requested to NASA a detailed analysis on this aspect. On December 2004, NASA answered the request confirming that there are no criticality risks on account of the changes made.

With respect to the frequency at which the safety revisions are conducted, the ARN has adopted the *Periodic Safety Review* (PSR) methodology for Class I Facilities as well as the limitation of the period of validity for the Operation Licenses as was exposed in Section E.2.2.2.

G.2.2 CNE Spent Fuel Storage Pools

These spent fuels are originated in the CNE Nuclear Power Plant (CANDU 600) that started operations in 1984.

Storage of spent fuel elements is accomplished in an epoxy resin coated concrete pool. The original pool capacity represented 10 years of operation at 80% of the reactor power. This storage capacity was reduced to 8 years of operation (45144 positions) when the ***Dry Storage System*** worktable was installed.

Failed fuel elements are encapsulated and stored under water in the failed fuel storage pool. Unloading and transfer of spent fuel is remotely controlled. Other operations are carried out manually under water using long reach tools assisted by cranes and power hoists. Fuel elements are stored under water in stainless steel trays.

In November 2003, the Level I Revision-1 of the Probabilistic Safety Assessment (PSA) for CNE was concluded. The analysis conducted on other sources different from the reactor core and made at ARN request, contemplated the safety analysis of *Spent Fuel Element Management and Storage Systems*. The object of the analysis was to identify, through the generation of a Master Logic Diagram (DLM), the system failure or combination of failures that could lead to a possible uncontrolled emission of radioactive products, taking into consideration both the events that could affect the personnel as well as the events implying a discharge outside the Plant.

As result of the analysis, the events to be underlined in the *SF Transfer System at the Spare Part Machine* were: spillage of heavy water due to diverse failures in the machine but with no compromise for the spent fuel element cooling and failure in cooling due to jamming in air of two elements during their transfer to the spent fuel element port, with the resulting damage of cladding and release of radioactive material (this last event is very improbable).

In the case of *SF Transfer and Storage System*, the events to be underlined resulting from the analysis were: jamming of two spent fuel elements during transfer from the port to the discharge pool with damage of cladding due to lack of cooling and the resulting release of radioactive material; and damage in the pool coating due to failure of the water cooling system or for water temperature changes due to replenishment in case of reduction of water level.

With reference to the frequency of Safety Revisions, the ARN has adopted the *Periodic Safety Review* (PSR) program for Class I Facilities as well as limiting the period of validity for the Operating License as exposed in Section E.2.2.2. In the particular case of CNE, the implementation of the above mentioned limiting period will be effective when the new Operation License foreseen for the year 2006 will be granted.

G.2.3 Dry Storage System for CNE Spent Fuel (ASECQ)

The Spent Fuel Dry Storage System (ASECQ) is part of CNE facilities. It comprises a pool work table, SF handling tools, pool shield with its transport cart, cranes, transfer building including the operation cell, transport cart and tractor, fuel element baskets, flasks and a set of silos for storage of spent fuels after six years of cooling in pools. The capacity of each silo is 540 fuel elements housed in 9 baskets, with 60 fuel elements per baskets. This system is in operation since 1993. A total of 240 silos is foreseen to be built in stages to store the spent fuel generated during the Nuclear Power Plant’s lifetime. At present, 120 silos have been built and at the time of this Report (December 2004) negotiations are on the way to decide the building of a new battery of 64 silos.

The second stage of Level I, Revision 1, the CNE Probabilistic Safety Assessment (PSA)

conducted at the request of ARN and completed on November 2003, also contemplates the analysis of the Spent Fuel Dry Storage System (ASECQ).

System failure or combination of failures that could lead to a potential uncontrolled emission of radioactive products, taking into consideration the events that could affect the personnel as well as the events implying a discharge outside the Plant, were analyzed. For that purpose, the maneuvers performed in pools, in the operation cell as well as the accidental falling of transfer flasks during transfer movements to the silo storage area, were studied. Two significant potential events were identified: falling of a grid with 60 spent fuel elements with cladding cracking and the exposure of the pool operator when removing the shield while the operation cell gate is partially open.

It is also worth to mention that at ARN's request, the ASECQ system has been included in the "Aging Management Program for Power Plant Components and Systems Related to Nuclear Safety". Within the mentioned program framework the surveillance plan for baskets, external lining and concrete structure of all the ASECQ silos system was incorporated. In addition to this surveillance action, a periodic measurement of aerosol and noble gas content inside the silos is conducted.

G.2.4 Centralized Storage of Spent Fuel from Research Reactors (DCMFEI)

The DCMFI, located at the Ezeiza Radioactive Management Area (AGE) is the only facility in Argentina designed and built to store in a centralized way the SF from Argentine research reactors. It comprises an underground arrangement of 2.10 m long and 0.141 m diameter stainless steel tubes. Each tube can hold two MTR spent fuel elements or one control element. The tubes are closed with a lead filled steel plug and sealed for safeguarding reasons.

As described in the 1st National Report, the studies conducted to determine the overall deposit condition indicated the need and convenience to assure the integrity of the stored spent fuel with time, to look for alternatives to convert or replace this deposit. For this purpose, the Project for the *Storage Facility for Research Reactors Spent Fuel (FACIRI)* was set up, proposing a pool storage system to replace the present one in use.

This new storage system does not present the difficulties inherent to the tube system of the present facilities (DCMFEI) and will permit a better control of the SF conservation condition and proper monitoring of water quality.

The corresponding Preliminary Safety Report for this facilities was submitted to ARN together with the Construction License application. At present the documentation is being analyzed by ARN.

DESCRIPTION OF THE FACIRI PROJECT

The object of this facility is the temporary and centralized storage of aluminum based irradiated fuels as used in RA-0, RA-1, RA-3 and RA-6 reactors. The spent fuels showing failures will be

encapsulated for storage.

The FACIRI has been designed as a facility for temporary wet storage of spent fuels definitely unloaded from research reactors.

Being a wet storage facility, it facilitates the complementary cooling of spent fuels.

Description of the facility

The FACIRI storage facility will include a system of pools as well as associated areas and components necessary for their operation. These facilities were originally designed as part of a project that was deactivated before its construction was completed. The pools selected for operation of the FACIRI, basically for the same purposes as the original project, are: the storage pool itself and the pool of the transport container, operating the latter also as an ancillary pool for underwater complementary operations.

The FACIRI storage capacity will be based on the pool depth (16 m); therefore, the storage structure capacity will be based in the grid design that will pile one against the other forming a column of grids. The pool has a storage capacity of 552 SF's distributed in 2 columns, each one with 9 grids, 8 of which can hold 30 MTR fuel elements and the lower grid with capacity for 36 elements.

The water pools, where the fuel elements are stored, will have a double stainless steel lining: the external lining and the internal lining. This double contention wall will substantially increase the pools confining capacity. In addition, between both linings there is a space that will allow the facilities of a water detection and removal system in case of a leak. The analysis of the water collected will permit determination of its origin and allow the necessary corrective actions.

Demineralized water will be used for the pools and the facility will have a water treatment system to maintain its quality at the appropriate levels to preserve spent fuel integrity during storage. The typical parameters to be checked are: pH, conductivity, chloride and sulfate concentration, activity, etc.

The pool water will be the installations main radiological shield and will also allow removal of the heat generated by the irradiated fuels.

The facility will have a monitoring station within one of the pools where the stored SFs could be subject to visual inspection. This inspection will be carried out by a remote control underwater "pan-tilt-zoom" color camera with recording characteristics for subsequent evaluation.

Safety objectives in the design of the facility

The design of the FACIRI project shall ensure a safe temporary storage management of spent fuels (SF), that is, the SFs are to be received, handled, stored, inspected and removed without health risk and with maximum protection for the operators, the public and the environment. For

that purpose, the nuclear and radiological safety objectives to be attained by the facility are: maintenance of subcriticality, confinement of the radioactive material, provide radiation protection and dissipate the generated decay heat in compliance with conventional and physical safety regulations.

Criticality

Criticality prevention checks were conducted according to the KENOVI, MCNP4b and MONK 6.3 codes.

Confinement

The following confinement barriers were incorporated to prevent radionuclide migration to the underground aquifer in case the nuclides be dispersed in the pool water due to an eventual failure in stored SF's and to prevent the entrance into the pool of low quality water from the aquifer:

1) Aluminum cladding or encapsulation of SF.

2) Pool water that in addition to biological shielding acts as a dynamic confinement, allowing safe isolation of the radionuclides present in the water by the purification system.

3) First stainless steel lining (internal lining): this engineering barrier substantially increases the watertightness and pool confinement safety margin.

4) Second stainless steel lining (external lining).

5) Concrete Pool walls.

The results of the evaluation made show that the potential radionuclide migration occasionally leaked from SF storage would be the result of a scenario of very low probabilistic occurrence.

Dry storage of spent fuel from research reactors

As a subsequent stage to the wet storage FACIRI Project, the transfer of SFs from research reactors to a temporary dry storage system is being considered.

G.3 Siting of SF and Radioactive Waste Management Facilities

The Argentine safety requirements for a site to be used for spent fuel management have not been changed since the 1st National Report.

In the case of the FACIRI facilities, the construction will be made within deactivated facilities. These facilities are inside the Ezeiza Atomic Center and therefore, the evaluation of the site is the same as that for the mentioned Atomic Center.

G.4 Design and Construction of the Facilities

The Argentine design requirements for spent fuel management facilities have not been changed since the first National Report.

In the case of the research reactor spent fuel storage system (FACIRI) the design has fulfilled the ARN standards and IAEA guidelines for this type of facilities.

At the time this Report was written, the Responsible Organization sent the Preliminary Safety Report to the ARN together with the corresponding Construction License application. The documentation is being analyzed by ARN.

Furthermore, the *FACIRI Project* was presented to the IAEA and was accepted by the Agency as a technical cooperation project. In view of the present estimates, the facilities will be in operation by the second semester of the year 2006.

In this respect, in 2004 the project for the conceptual design of a dry storage system for spent fuel from Atucha I Nuclear Power Plant was initiated.

G.5 Safety Assessment of Facilities

The Argentine requirements for the safety assessment of spent fuel and radioactive waste management facilities have not been changed since the issuance of the 1st National Report, except as those expressed in section E.2.2.2.

G.6 Operation of Facilities

The Argentine requirements for the operation of spent fuel and radioactive waste management facilities have not suffered changes since the 1st National Report was issued.

G.7 Final Disposal of Spent Fuel

The safety requirements for final disposal of spent fuels, if declared Disposable Waste, have not changed since the 1st National Report was issued.

SECTION H SAFETY ON RADIOACTIVE WASTE MANAGEMENT

H.1 General safety requirements

The aspects related to safety requirements were described in the 1st National Report and they are summarised in paragraphs H.1.1 to H.1.7.

H.1.1 Criticality and removal of residual heat generated during radioactive waste management

Radioactive waste currently stored or disposed of in the Argentine Republic does not require any particular measure associated with heat removal or criticality factors on account of their radiological characteristics (half-life periods, type of radionuclide, energies and concentrations in disposable wastes) they are classified as low and intermediate-level disposable wastes.

H.1.2 Minimisation of radioactive waste generation

The minimisation of disposable radioactive waste in the Argentine Republic is based on the satisfaction of two conditions:

- Reduce radiation doses
- Reduce costs

For that purpose, the minimisation of generated disposable waste is considered, minimising the activity of different streams and their volumes. Also, as part of the minimisation strategy for waste management, the recycling and reuse of contaminated or active materials is envisaged. For example, the potential reutilization of stored radioactive sources is possible provided their use is justified according to regulatory criteria applied in the country.

All the practices involving radioactive material have ARN's approval. The approval criteria take into account the ALARA principle that also implies that radioactive waste generation has to be kept as low as reasonably achievable.

H.1.3 Interdependence between different radioactive waste management stages

Operational procedures established for each treatment and conditioning stage are based on their interdependence and on subsequent transport, interim and long term storage stages and, in some cases, final disposal.

Since the planning of waste management stages applicable to different types of disposable radioactive wastes, general and particular acceptance requirements have been established for each stage based on their interdependence, including collection of disposable wastes and subsequent treatment and conditioning technologies. Notwithstanding, taking into account the future improvement of existing treatment and conditioning facilities, additional measures have been foreseen to retain flexibility in acceptance conditions for subsequent management stages.

H.1.4 Efficient protection to individuals, the society and the environment

The objective of AR 10.12.1 regulatory standard *is to establish general requirements so that the management of disposable radioactive wastes is performed with an appropriate level of radiological protection of individuals and preservation of the environment for current and future generations*. The criteria to fulfil this objective are:

Dose and risk constraints : The main objective is to ensure that individual risks are below the appropriate levels (AR 10.1.1 regulatory standard) and that the radiological impact remains as low as reasonable achievable (ALARA).

Optimization of protection systems: Radiological protection systems used for radioactive waste management must be optimized taking into consideration reduction of the effective dose, cost of different options, uncertainties associated with long periods and, dose constraints as a limiting condition (AR 10.12.1 regulatory standard, criterion 20).

Responsibilities: disposable radioactive waste generators are responsible for the management of the waste generated by them with an appropriate level of protection for workers and for the public (regulatory standard AR 10.12.1, criterion 24).

Liquid and gaseous waste: In order to comply with the discharge limits established by the regulations in force, liquid and gaseous radioactive wastes shall be subject, if necessary, to temporarily storage for decaying or retention (AR 3.1.2 and AR 6.1.2 regulatory standards).

Solid wastes: The final disposal of solid radioactive wastes may be made using, when appropriate, a multiple barrier system (regulatory standard AR 10.12.1, criterion 19). The closure of a final disposal system for radioactive wastes or any associated system to such facility shall have ARN's previous authorization (regulatory standard AR 10.12.1, criterion 36). The operator of the facility shall be held liable until the final stages of closure, pos-closure and institutional control during the period established by the ARN (regulatory standard AR 10.12.1, criterion 37). When the Responsible Organization applies for the construction and operation licenses it shall provide evidence that the system can be satisfactorily closed and that for the period following the closure, appropriate measures to comply with safety requirements have been taken (regulatory standard AR 10.12.1, criterion 30 and 31).

Safety assessment of disposal systems: Safety assessment of final disposal systems shall cover the design, construction and operation stages, as well as their condition after closure and their future evolution. Safety assessment may be presented in terms of doses for normal evolution scenarios, in terms of risk for probabilistic events or by any other safety indicator considered appropriate for the confinement period required at ARN's satisfaction (AR 10.12.1, criteria 30 to 33).

Information to be supplied to the Nuclear Regulatory Authority: The responsible organization for the installation that generates the disposable wastes or for the waste management facility shall keep an updated inventory of the wastes during the operation stage and report on a regular basis to the ARN those inventories. Files with the inventories shall be submitted to the ARN at the end of their lifespan. (AR 10.12.1, criteria 27 and 35).

H.1.5 Biological, chemical and other risks associated with radioactive waste management

In accordance with the General Environmental Law, Act 25675, the Argentine Republic has a federal environmental legislation system. In line with said Law, the provinces establish specific requirements to be satisfied by industries established in their territory.

Each management facility complies with general and specific requirements of the competent implementing authority not related to radiological safety and which exercises jurisdiction over the site of the facility.

For example, Province of Córdoba has the Act 7343 on Guiding Principles for Preservation, Defence and Improvement of the Environment which has jurisdiction over CNE located in this province.

H.1.6 Avoid actions that impose impacts on future generations greater than those permitted for the present generation

Article 1 of Act 25018 contemplates explicitly the rights of future generations to safety.

ARN 10.12.1 Regulatory Standard, paragraph 32, lays down the criteria for radiological protection of future generations in connection with final disposal facilities, that is, that the doses estimated in safety assessments, shall not exceed dose constraints established at the beginning of the isolation period.

Furthermore, with the aim that technologies currently used in radioactive waste management do not imply a potential risk for future generations, diverse studies and assessments are made along with the activities during the pre-operational, operational and post-operational stages of the facilities which shall continue during the institutional control stage.

H.1.7 Avoid imposing undue burdens on future generations

The internationally accepted ethical principle whereby the beneficiaries of a practice should bear the total cost of the management and final disposal of generated wastes has been contemplated in Art. 13, Act 25018, which lays down the legal foundations for the setting up of a fund for the management and final disposal of radioactive waste with the contribution of the generators. The law also considers spent fuel and radioactive waste management deferred costs. In this respect, Art. 11, Act 25018, contemplates the recovery of sites affected by radioactive mining activities and the respective industrial installations.

The development of a Radioactive Waste Management Strategic Plan, in accordance with Act 25018, contemplates the legal, technical and financial requirements to avoid imposing undue burdens on future generations.

Although the legal framework provide for the creation of the funds already mentioned, at the date of preparing this National Report, such funds where not actually constituted.

H.2 Existing facilities and previous practices

H 2.1 Introduction

The 1st National Report provided details on some of the actions taken to assess the safety of radioactive waste management facilities that are located in the following sites:

1) Ezeiza Radioactive Waste Management Area (Ezeiza Atomic Center)
2) Waste Decay and Treatment Facility at the Radioisotopes Production Plant (Ezeiza Atomic Center)
3) Atucha I Nuclear Power Plant
4) Embalse Nuclear Power Plant
5) Mining Wastes (Section M, 1st National Report)

Here below follows a description of the present condition of said assessments, some of which have been completed and others are in progress.

H.2.2 Facilities of Atucha I Nuclear Power Plant

As stated in the 1st National Report, at ARN's request, the Responsible Organization carried out a Probabilistic Safety Assessment for Atucha I Nuclear Power Plant. The assessment also included the Management and Storage of Spent Fuel as specified in Section G of said report.

Through the construction of a Master Logical Diagram (DLM) the result of the studies (APS IT 911 of July 2000), concluded that the dose related to the mentioned events, is two orders of magnitude under the constraint dose value established as reference value.

The ARN has adopted the *Periodic Safety Review* (PSR) methodology for Type I installations and has limited the validity of operation licenses, as stated in E.2.2.2 of this National Report. These measures are effective for CNA I as of December 2003.

H.2.3 Facilities of Embalse Nuclear Power Plant

Presently, the probabilistic safety assessment (APS-IT.F001/ 002/003/004/005 and 006 Rev. 0) of CNE's radioactive waste management systems, which was underway at the time of the 1st National Report has been completed. This study was made at ARN's request and its purpose is to identify, through the construction of a DLM, the failures or failure combinations leading to uncontrolled emission of radioactive products, considering not only the events affecting the personnel but also those implying a discharge outside the plant.
The following systems were considered:

- *Liquid Wastes Management System*
- *Solid Wastes Management System*
- *Gaseous Wastes Management System*

In the study made on *Radioactive Liquid Waste Management System* and in the framework of the events mentioned in this assessment, the following may be underlined:

- Spillage in the radioactive liquid waste service building (S002) from failures in the collection, storage and discharge system. These are events which have consequences for the operator. The possibility of their occurrence is low and a combination of a detection failure and an omission error by personnel should occur.
- Uncontrolled emission of liquid wastes by error in measurements or during the discharge of tanks.
- Spillage in the concentrator enclosure due to pipe and control failures. In general it is not expected that these failures will have significant radiological consequences.
- Liquid waste emissions from the concentrator either by drops dragged by the gaseous emissions or from treatment of liquids with higher than acceptable radioactive content. The probability of occurrence and the study of consequences from these failures showed their scant relevance.

For the analysis of consequences from these events, their occurrence was considered during the normal operation of the plant and in case of operation with a damaged fuel element.

In the case of events presented for the study of *Disposable Solid Waste Management* that can lead to exposure accidents and in some cases of personnel contamination cases, the outstanding events were:

- Undue exposure of operators during handling of filtering element while the elements were introduced into the storage pit. The exposure would be the result of human errors.
- Resin spillage due to failure of the liquid transfer line.

It should be mentioned that according to the analysis made, it can be stated that the possible failures during processing, storage or management of solid wastes generated in the plant would not imply any risk to the public.

Finally, one of the outstanding events in the study conducted on *Disposable Solid Waste Management* that has to be mentioned within the postulates is:

- Tritium emission due to dryer failure. The possible leak of heavy water in the moderator enclosure would lead to a tritium content increase in the recovered water in the dryers belonging to the heavy water recuperation system.

With respect to the radioactive content in gaseous effluents, the operative experience obtained up to now shows that even under abnormal situations such as failure in fuel elements, the Daily Discharge Limit has not been exceeded.

At present, the safety analysis report of other sources different from the reactor core (CNE-APS-IT.F001/002/003/004/005 and 006 Rev. 0, of December of 2003) was presented to the ARN for its evaluation. At this time the document is being evaluated.

As exposed above, the ARN has adopted for Class I installations the *Periodic Safety Review (PSR)* as well as the limitation of the period of validity of the Operation Licenses, as mentioned in Section E.2.2.2 herein. For the particular case of CNE, the implementation of PSR will be effective when the new Operation License will be renewed, foreseen for the year 2006.

H.2.4 Ezeiza Radioactive Waste Management Area (AGE)

The AGE is the installation exclusively destined to treatment, conditioning and for the final disposal of low-level solid and liquid radioactive wastes. At present, the final disposal of wastes is suspended. In addition, the area is also used for temporary storage of medium-level wastes until the appropriate repository is built as foreseen in the PEGRR. In addition, the same installation is used to store disused sealed sources, as well as the SF from the RA3 Research and Production Reactor. The AGE is located in the Province of Buenos Aires within the Ezeiza Atomic Center in an area covering 8 hectares.

Safety Re-evaluation of the Ezeiza Radioactive Waste Management Area (AGE)

The changes that took place in the last years, in factors affecting the operational capacity of the Ezeiza Radioactive Management Area, were reported to the Joint Convention in the 1st National Report. Among these changes we can mention the consequences of climatic changes with intensified rainfalls in the Province of Buenos Aires, resulting in higher hydric load with the consequent elevation of the phreatic stratum in the area, resulting also from the higher positive pressure exerted by the underground aquifer. Social and economic changes resulting from higher demographic growth rates and the appearance of new developments in lands close to the AGE have added their effect to those of the new weather characteristics and soil and groundwater behaviour.

Taking these factors into consideration, the CNEA, as Responsible Agency, decided to suspend the final disposal system operation in 2001, until the AGE safety re-assessment has been completed. For this purpose it is necessary to conduct a complete environmental characterisation of the site and its surrounding areas. Even though the environmental monitoring and control requested by the Operation License has always been carried out, it was considered necessary to increase the number of monitoring points, improve the applied technologies and perform hydrogeological and geochemical surveys along the whole site.

In January of 2003, a project called “Site Characterisation, Monitoring and Modelling” was initiated with technological assistance from the US Department of Energy (US-DOE) under the auspices of the Joint Coordinating Committee for Radioactive and Mixed Waste Management operating within the framework of the Scientific and Technological Cooperation Agreement between CNEA and DOE.

Since the above mentioned date, a joint cooperation work plan is being implemented applying new environmental characterisation technologies aimed to study the possibility of implementing computer models to simulate underground water flows and the transport of potential contaminant substances.
With this information, the CNEA will produce the Safety Assessment which will be presented to the ARN. For this purpose, a work schedule, as requested by the ARN-1537/07 regulatory requirement, was designed, to be fulfilled by August of 2007. See *Section L.3 - Reassessment of Safety in the Ezeiza Radioactive Waste Management Area (AGE).*

AGE Installations for Treatment of Low-Level Radioactive Wastes

The status of the installations included in the AGE site till December 31st of 2004 in relation to the 1st National Report will be analysed as follows:

- **Installation for Treatment of Low-Level Solid Radioactive Waste**

As reported above, a decision was taken to repair and upgrade this Treatment Plant for Low-Level Solid Radioactive Wastes. Part of the works performed to this end included reconditioning the solid compacting equipment and improvements of services for its operation. The ARN authorised the use of the reconditioned compacting system.

In addition, a larger scope project is being carried out using the original plant building facilities, the object of which is to build a Treatment and Conditioning Plant for Medium-Level and Low-Level Liquid and Solid Radioactive Wastes (PTAMB) through which a large part of the stored unprocessed wastes volume will be conditioned. The Responsible Organization is preparing the corresponding Safety Report to apply for the Construction License to the ARN.

At present, the conceptual engineering stage is completed and it is estimated that the basic and detail engineering will be ready by the second semester of the year 2006.

- **Semi-containment System for Solid Radioactive Waste**

The 1st National Report indicated that the Semi-containment System comprises two trenches.

Trench 1 completed its useful life in 1988 when the closure cover was completed. **Trench 2** started its life in 1988 and closure was foreseen for the year 2005.

Since the year 2000 as a result of a claim widely echoed by the media,, there is a procedure in Court to investigate a presumed contamination of drinking water by AGE. The systematic controls and environmental monitoring carried out by ARN show that such contamination by the AGE does not exist.

In the period of the report (2003 - 2004) the Judge ordered an environmental study with participation of ARN as the laboratory for the measurement of radionuclide activities in samples provided by the Court. At the time this National Report was closed - December 31st, 2004 - there were no further news to report.

Drums that on account of their radioactive content exceed the established limits for operation of the installation were not incorporated in the **Trench 2**. ARN requested the temporary management of these drums. The Responsible Organization decided the temporary storage of the drums in transoceanic containers in a sector close to this Trench *(Drum Storage A3)*. These 200 dm^3 drums contain conditioned low-level radioactive wastes consisting of cemented liquids and compacted solids from Atucha I Nuclear Power Plant.

The Strategic Plan foresees the construction of a new repository for low-level wastes that will be located in the same area were the medium-level repository will be built. Works relative to the first stage to look for and select the site and areas to locate these repositories are under way.

❖ **Semi-containment System for Low-Level Radioactive Liquid Waste**

As informed in the 1st National Report, the system was licensed in 1995 to dispose of very low-level radioactive liquid wastes.

The system comprises three trenches having sand enhanced calcareous lime bed that allow the radionuclide concentration decay to non-significant levels before they reach an environment accessible to the public.

The liquid Radioactive Wastes generated at the Ezeiza Atomic Center production plants were piped to the AGE where they were unloaded into the trenches. In 2001, a decision was taken to replace this system for an alternative technique for these radioisotope production wastes.

Trenches started operation in 1971; two of them completed their useful life in 1986. On account of the regional weather changes that took place in the last years, the decision was taken to suspend the operation of the third trench. At the same time, the safety reassessment of AGE was commenced (See Section G.5.5.2 - National Report 2002).

❖ **System for Final Disposal of Structural Solid Radioactive Wastes and Sealed Sources**

The 1st National Report indicated the existence of two underground silos where contaminated metal parts are disposed of.

In addition, the existence of two extra silos shall also be indicated. One silo for structural and biological wastes and the other dedicated to wastes with transuranium elements. These two silos are not considered in the AGE Operation License because they were place out of operation before the License was issued.

The situation of the these disposal systems, aside from these notes, has not changed with relation to the description given in the 1st National Report.

❖ **Deposit for Interim Storage of Radioactive Sources and Wastes**

The situation of this deposit has not changed with relation to the description given in the 1st National Report even though it should be noted that in order to improve the operational doses and

optimise storage areas and volumes, relocation works were carried out during the year 2004. In addition, the inventory of Radioactive Waste and disused sources was increased.

❖ **Handling Yard and Stowage of Items**

The 1st National Report mentioned the existence of this reinforced concrete platform closed on two sides walls and semi-covered by a roof, designed for reception, control and administration of temporary stored radioactive wastes waiting to be characterised, treated and conditioned.

The platform was subsequently closed on the two remaining sides. This improvement allowed a better access control to the area. A re-arrangement of items was initiated, defining internal areas for stowage of wastes with similar characteristics and their transfer to the Temporary Deposit of Radioactive Sources and Wastes.

In addition and at the request of ARN, improvements were introduced in the low-level liquid radioactive wastes systems of transfer and reception from the Radioisotope Production Plant. These improvements were mainly related to replacement of the original liquid transfer system that used a method of pressurisation the Radioactive Waste container, for a new system using vacuum suction that gives the operation a higher degree of safety.

H.2.5 Facilities at the Ezeiza Atomic Center

Decay, Preliminary Treatment and Discharge Plant for Active Dischargeable Wastes from the Radioisotope Production Plant - PPR

The 1st National Report indicated the existence of this facility designed for decay of the Radioactive Wastes liquids generated in the Radioisotope Production Plant and the Reactor RA-3[1] that contains short half-life low-level radionuclides. This type of liquid Radioactive Wastes can be discharged to the environment if its level of activity does not exceed the discharge restrictions authorised by the Nuclear Regulatory Authority. Up to June of 2002, the Liquid Radioactive Wastes that couldn't be discharged were directed for disposal to the AGE Final Disposal System for Liquid Radioactive Wastes. Since then, changes were implemented in the production of PPR and in its waste management so that the decay time, in the storage decay tanks, is appropriate for their subsequent discharge into the environment.

H.2.6 Mining Wastes and Processing of Uranium Minerals

In uranium mineral exploitations, once the industrial treatment stage is completed, the mineral wastes left are called in the technical jargon "processing tailings" or more usually "mineral tailings". In general they are finely divided ores, similar to sand, from which the most possible amount of uranium was extracted. The mineral of very low grade with non economic value and the sterile materials originated while the mining field is uncovered are called "mining tailings".

[1] At present this facility does not transfer liquid effluents to the installation.

Argentina is committed on environmental restitution of the sites were uranium mining activities have taken place and the Argentine National Atomic Energy Commission is the responsible institution for carrying out studies and actions required in that sense. For that purpose, the *Uranium Mining Environmental Restoration Project* (PRAMU) was implemented and described in the 1st National Report.

The purpose is to obtain restoration of the environment, as much as possible in terms of economic and technical feasibility, in all those cases in which intrinsic uranium mining activities were carried out. For that purpose, studies are first conducted to identify each site potential and actual impacts, the possible contamination routes, the elements present, etc. Later, based on accepted international techniques the possible solutions to manage the tailings and the restoration of each site are developed.

As mentioned in the 1st National Report, the sites under study are:

- MALARGÜE (Prov. of Mendoza)
- HUEMUL (Prov. of Mendoza)
- CÓRDOBA (Prov. of Córdoba)
- LOS GIGANTES (Prov. of Córdoba)
- PICHIÑÁN (Prov. of Chubut)
- TONCO (Prov. of Salta)
- LA ESTELA (Prov. of San Luis)
- LOS COLORADOS (Prov. of La Rioja)
- SAN RAFAEL (Prov. of Mendoza).

The latter, due to its present “stand-by” situation, is not part of the PRAMU restitution, even though the PRAMU Engineering Group partially developed the management project for the liabilities generated in the past and the new tailings to be produced by the proposed reactivation.

These sites, are the result of the uranium mining activity that took place from 1951/52 through today, when Argentina decided to develop this energetic resource.

It should be noted that CNEA and ARN conduct periodic environmental surveys in the areas around the manufacturing mining complexes associated with uranium mineral production and processing.

Present situation of the various sites is summarised as follows:

MALARGÜE: The former Malargüe Manufacturing Complex was in operation from 1954 through 1986. 700,000 tons of uranium treatment tailings are deposited in the site, that shall be treated within the same location. Management in this case includes, relocation, neutralisation and encapsulation of mineral tailings with application of a multilayer cover using materials found in the area. The whole system is complemented with an underground draining system to prevent contact of the phreatic stratum with the bottom-engineering barrier, placed in the management area.

Restitution requires the following works to be done:

- Complementary works to those of the mineral tailings management such as: dismantling and demolition of existing installation; construction of surface drainage to contain and route the surface runoff water from part of the City of Malargüe; construction of an underground drainage to depress the phreatic water levels in order to maintain, in the long term, the wastes separated from the underground waters; concrete construction of offsets of the area irrigation system that contributed to maintain the phreatic level; decontamination of the contaminated area floors, previous to the encapsulation ; construction of an inspection camp and work control laboratory, including a new access road.

- Conditioning of the new site floor, including ground levelling and compacting, placement of a compacted alluvial material layer; placement of compacted soil layer and placement of a low permeability compacted clay layer that in addition has the capacity to fix radionuclides and other ions.

- Construction of the encapsulate cut off wall around the whole perimeter excavating a 1 m deep and 12 m wide trench backfilled with 0.10 to 0.70 m rock to prevent failure of the clay layer due to seismic action and also to facilitate compaction of the internal layers management floor.

- Tailing Management: mineral tailings, contaminated soils and demolition materials are placed on top of the compacted clay layer; neutralised with lime and compacted to Proctor density.

- Coverage of wastes by placing a compacted clay layer, a compacted soil layer and as a final cover a layer of rock which will be filled with limed soil before placing autochthonous pasture. The cover will reduce radon gas emissions and gamma radiation to acceptable values; it will prevent entrance of rainwater to the containment system and will act as a barrier against weathering.

- Area decontamination and rehabilitation by excavating the sectors affected by the industrial activity and backfilling with non contaminated vegetal soil in order to obtain exposure values below the established limits. Removed contaminated soils will be managed together with the mineral tailings.

- Reforestation and landscaping and establishment of limitations to assure the preservation of the implemented protection barriers.

- Verification period of 20 years. Surveillance will be maintained and if any change not acceptable for the system is detected, the solution adopted shall be reviewed. At the end of this period, a regular control plan without permanent surveillance will be implemented.

Till now, preliminary and base uranium mineral tailings management works were done and in the last months the management of the contaminated floor material has commenced in an area that included the first Site Pilot Plant, as well as the management of contaminated material from the dismantling of the installation and the demolished masonry.

In addition, the material free from contamination was used as an alluvial defence; a surface drainage and an underground drainage were built; irrigation offsets were rectified and cast in concrete and the Sector 1 encapsulation floor was conditioned.

An agreement was signed with the Argentine Army, that allows the extraction of various clean materials form its lands, to contribute towards the encapsulation; an access bridge to the rock quarry was built: a car-port deposit was built on the camp; the underground drainage piping clogged with tree roots was cleaned up and the trees following the alignment were removed; a cattle grid was built on the access road to the control area and 610 m of concrete irrigation offsets were rectified.

Of the complementary works made we can mention: decontamination of Sector 1 encapsulation floor; construction of the site inspection camp and control laboratories, including new access road; conditioning of Sector 1 floor; construction of the encapsulation cut off wall in the first encapsulate sector and finally, commencement of the treatment of contaminated materials.

SAN RAFAEL: the exploitation of the San Rafael Mining and Milling Complex (CMFSR) has stopped since 1995. CNEA is the operator and the Complex is now on stand-by waiting for a decision to restart operations. On June 2004 an Environmental Impact Evaluation document was presented as required by the Province Legislation. At present, studies aimed to restart activities as well as management of environmental liabilities, are being made. The rehabilitation project foresees the management of existing environmental liabilities that could be coordinated with management of liquids and solids that will be generated during mining operations.

The studies being made for reactivation of CMFSR contemplate the management of wastes, according to the following methodology:

Solid Wastes

- *Mineral Tailings*: dry type management would be used together with residual acidity lime neutralisation followed by compaction to minimise permeability and create, in the long run, stability in the containment system. A multilayer cover will be built on the tailings that in addition to prevent rainwater seepage will act as a radon emission and gamma radiation barrier. The construction of the cover during the operational stage at the same time as the mineral tailings are being deposited on the final management areas, will reduce to minimum the areas exposed to weathering.

- *Precipitation Sludge*: the precipitation sludge will be accumulated together with liquid effluents on waterproofed surfaces. When the operation is completed and liquids have been evaporated, the precipitate will be stabilised with rocks and

finally completed with the placement of a multilayer cover with the same purpose as described for mining tailings.

- *Marginal Ores*: marginal ores generated during mining operations will be managed during the operational stage, placing them in final management areas preventing temporary intermediate accumulations.

Liquid Effluents

- *Process Liquid Effluents:* the process liquid effluents will be lime neutralised, their ammonium will be removed and will then be returned to the process.

- *Quarry Water*: the quarry water generated from mining exploitation will be treated with anionic resins to remove U and precipitation to remove Ra-226 and As, to be then managed by filtration in a dumping field inside the site.

Environmental Liabilities

In relation to the actions to be taken related to the environmental liabilities accumulated in the site, the use of optimized processes is foreseen, to reduce contaminant emission to the possible minimum and perform management actions as reactivation works progress (with one or two years in advance), reducing at the same time the global exploitation costs.

- *Quarry Water*: the existing quarry water: 1,000,000 m^3 will be treated using the methodology already described.

- *Mineral Tailings*: their management is foreseen by hanging the present soil slopes to improve long term structural stability, placing a multilayer cover to prevent ingress of rain water into the system and attenuate radon emissions (1,895,000 tons of treatment tailings).

- *Marginal Ores*: their management is foreseen using them for stabilisation of existing precipitation dikes (411,000 ton of marginal ore).

- *Precipitation Sludge:* their stabilisation is foreseen using marginal ores. Later they will be covered with waterproof membranes on which new precipitate accumulation pools will be built. Other precipitate accumulation sectors will be used, after stabilisation and conditioning, to accumulate mineral tailings (265,000 m^3 of precipitation sludge).

Works Already Made

Some of the works made up to now within the framework of the mentioned management are:

- Definition of quarry water treatment.

- "Preliminary Project for liquid and solid effluents for the San Rafael Manufacturing Complex".
- Project for a spillage field to allow evaporation and infiltration of treated liquids.
- Analysis of the tailing dike area.
- Conduction of geotechnical surveys of the area envisaged for construction of the leaching pool.

HUEMUL: The mine has not been in operation since 1974. In the year 1976, after an inspection by the Mining Police, the Mining Authority admitted the mine was abandoned meaning the termination of operator exploitation rights and obligations. Nevertheless, the CNEA has the responsibility of managing the radioactive wastes according to the terms of the National Law for Nuclear Activity.

After the mine was abandoned, mining wastes, loads of gathered sterile material and low-assay value ore were left on the surface. Mine entrances and accesses were temporarily closed. The deposit building and infrastructure facilities, transferred to the Province of Mendoza, are in ruins, with parts destroyed and other parts dismantled. As result of the mining operation, 19,500 m^3 of exploitation sterile materials and 2,500 m^3 of marginal materials were left on the site.

In the year 2001, CNEA installed warning signs and built a 335 m long perimeter fence isolating a sector with incipient collapses and probability of mayor collapses.

CÓRDOBA: In the property were uranium concentration and development of associated processes took place, there is presently an operating UO_2 production plant and a CNEA group for geology and support of other activities. As result of the uranium concentration activities, the site was left with 57,600 tons of treatment tailings that have to be managed. If the tailings are moved and the site restored, it will be converted into a green recreation area. While the monthly phreatic monitoring and the sampling for analysis of the existing pit grid continues, a qualitative and quantitative monitoring of the results is being conducted.

LOS GIGANTES: The former Los Gigantes Mining and Manufacturing Complex started operations in the eighties and ended in 1990. Uranium exploitation and production were made by a third party through a Concession Agreement. The materials deposited on the site as exploitation products, are: 2,400,000 ton of tailings, 1,000,000 tons of sterile materials and 600,000 tons of marginal ore. Even though there are no nearby towns, the presence of the mentioned materials gives a particular character to the problem.

The works carried out are mainly related to treatment of liquid effluents left from the industrial activity. For this purpose, the Province Environmental Department authorised the construction of a 20,000 m^3 auxiliary dike the construction of which started in the year 2003 and ended in 2004.

TONCO: The former Tronco Mining and Manufacturing Complex supplied from nearby Don Otto, Berthos and M.M. de Güemes ore deposits, was in operation between 1960 and 1981. The treatment tailings left when the activity stopped, reach 500,000 tons. For its restitution, the site requires actions envisaged in third place after Malargüe (Mendoza) and Los Gigantes (Córdoba),

in relation to time and work magnitude. In the year 1996 part of Valle del Tonco was included in Los Cardones National Park and for this reason any remedial action acquires increased relevance. The low population, the weather conditions and the geographic characteristics contribute to an easier restoration of the Site

PICHIÑAN: A uranium concentration plant operated in this site with ore being supplied by Los Adobes and Cerro Condor mines, close to the site. The plant was in operation between 1976 and 1980 and upon its closure, a temporary management of the 145,000 tons of treatment tailings was made.

At present, the site is under administrative surveillance and environmental monitoring operations including sampling along the whole Chubut river.
For completion of the management works, certain low cost additional works would be necessary.

LA ESTELA: The former La Estrella Mining and Manufacturing Complex ended its activities in the year 1990 and the mine as well as the tailings were object of a temporary treatment. There are in the site 70,000 tons of tailings and 1,140,000 tons of sterile ore. Rationalisation and safety works were conducted in the mine by covering materials and changing slopes, while the tailings were covered and fenced in and the industrial facilities dismantled.

LOS COLORADOS: The former Los Colorados Mining and Manufacturing Complex was in operation between 1992 and 1996. When the operation ended, a total of 135,000 tons of tailings and 1,000,000 of sterile ores were left; temporary works for environmental repair were made with results acceptable to ARN. These works included: covering of the loads gangplank with silty argillaceous soil; dismantling and decontamination (chemical and radiological) of all facilities and topographic levelling with gentle slopes to prevent erosion.

Financing of the Uranium Mining Environmental Restitution Project

Initially CNEA, the institution responsible for the restitution project, started the work with resources from the National Treasure within the framework envisaged to finance public works. Nevertheless, the budgetary situation prevented the implementation at a work rhythm in accordance with the aspirations.

In the search for appropriate financial backing, the CNEA requested the assistance of the World Bank (WB) to finance the project and assure the backing of a plan that requires, among other things, continuity. On the other hand, it is necessary to enhance CNEA’s capacity to be able to lead the project, conduct the appropriate monitoring and develop engineering solutions in the sites still lacking them. To satisfy these objectives, the assistance of the WB is also important, for example, to develop the pertinent institutional strengthening and to provide the necessary financing for technical assistance and equipment.

The negotiation with the WB was initiated in 1997, with a prolonged interruption period due to the economic crisis of the last years. At present, the issue was reactivated and the stages of updated document presentations are being complied with, making possible the starting of negotiations aimed at obtaining the financial backing.

Presently, the works are being made at a rhythm permitted by the National Treasure financing.

H.3 Site of the Projected Facilities

The considerations related to this point, are the same as those developed in Section G.3.

H.4 Design and construction of the facilities

The considerations related to this point, are the same as those developed in Section G.4.

Installations at Atucha II Power Nuclear Plant

During the year 2004, the National Government announced its intention to approach, with the backing of the Argentine Nuclear Sector, the consolidation of the validity of the Nuclear-Power option for Argentina. Among these works, the completion and commissioning of Atucha II Power Nuclear Plant has been announced.

H.5 Assessment of safety of facilities

The considerations related to this point, are the same as those developed in Section G.4.

H.6 Operation of the Facilities

The considerations related to this point, are the same as those developed in Section G.6.

H.7 Institutional measures after closure

The 1st National Report described the institutional measures to be applied after the foreseen closure of the low-level radioactive waste disposal systems presently in operation in Argentina which are located in the Ezeiza Radioactive Waste Management Area (AGE).

Regulation AR.10.12.1 Radioactive Wastes Management establishes the safety criteria to be complied with in all phases of final disposal installations, including after their closure.

At present there are no Radioactive Wastes management installations under institutional control.

SECTION I TRANSBOUNDARY MOVEMENTS

In Argentina Regulatory Standard AR 10.16.1 - *Transport of Radioactive Materials*- governs radioactive waste and spent fuel transboundary movements. This standard agrees with *IAEA TS – R-1 Regulation for the Safe Transport of Radioactive Material*.

There are also domestic and international standards that regulate the transport of dangerous materials by land, air and water, and agree with IAEA Regulation in respect of radioactive materials. Transport by road and railway are governed by the Domestic Transport and Transit Regulation, Decree 692/92, Transit Law, Act 24449, regulated by Decree 779/95, Resolution 195/97, technical standards for the transport of dangerous goods by land and other regulations established by the National Transport Secretariat. For maritime, river and air transport, the Argentine Republic, the same as most countries, has adopted the regulations of the International Maritime Organization (IMO), of the International Civil Aviation Organization (ICAO) and of the International Air Transport Association (IATA), which with different transition periods have adopted during 2001 IAEA's 1996 Version (revised) of the "*Regulation for the Safe Transport of Radioactive Material "*.

The agreements signed by Argentina and ratified by law on transboundary movements are the following:

- The Chicago Agreement on Transport of Dangerous Goods by Air, in the framework of the International Civil Aviation Organization (ICAO).
- SOLAS Agreement, MARPOL, International Maritime Code, International Code for the Safe Carriage of Packaged Irradiated Nuclear Fuel, Plutonium and High-Level Radioactive Wastes on Board Ships (INF Code), under the International Maritime Organization (IMO).
- Convention on the Physical Protection of Nuclear Materials, in the framework of the International Atomic Energy Agency (IAEA).
- Agreement between the Argentine Republic and the Federative Republic of Brazil, the Brazilian-Argentine Agency for Accounting and Control of Nuclear Materials and the International Atomic Energy Agency for the application of Safeguards (Four Parties Agreement).

The objectives of the regulation for radioactive material transport are:

- Prevent the dispersion of material and its possible incorporation by the public in the surroundings
- Prevent the risk of radiation emitted by this material
- Avoid damages caused by heat generated by certain packages transported
- Avoid the possibility of a chain reaction (criticality) when fissionable materials are transported.

For such purpose some of the measures taken are the following:

- Assurance that the packaging of the radioactive material is the most appropriate to prevent its dispersion, for this purpose the mechanical endurance of the

packaging and the nature and radioactivity level of the material transported is considered

- Control of external radiation levels using shielding materials and warning about radiation levels in the pertinent labels
- Prevention of potential damages originated by heat, is based on the design of packaging and cargo securing arrangements
- Prevention of criticality is based on the design of packaging and on limiting the content of each package and the number of packages per shipment.

Transboundary movements of spent nuclear fuel are basically in connection with the reprocessing of fuel. As at the moment the national spent fuel management strategy does not contemplate the reprocessing of fuel and in Argentina there are no fuel reprocessing facilities, SF transboundary movements are not expected. For further details of the transport of radioactive sealed sources see Section J.

SECTION J DISUSED SEALED SOURCES

J.1 Introduction

Section E of this National Report describes the legal and regulatory framework of nuclear activities. This framework is generic and also applies to the use of radioactive sealed sources, and to enforcement requirements when the sources are in disuse.

Activities involving radioactive materials and sources are controlled since the 1950's. In this respect, Decree 842/58 approved and made effective the *Regulation for the Use of Radioisotopes and Ionising Radiation* which governs the use and application of radioactive materials and their radiation or nuclear reactions and transmutations. Now, this decree has been repealed and was replaced by the legal and regulatory framework described in Section E.2.

AR 10.1.1 regulatory standard, "Basic Radiation Safety Standard" lays down basic radiological safety requirements for nuclear activities performed both at installations and in use or disused sources. This standard categorizes three levels of installations according to the radiological hazards associated to practices with radioactive material, and assigns different types of control. In the case of low risk installations operation licenses are called registration.

The Nuclear Regulatory Authority, ARN, controls the compliance with standards, requirements, licenses, authorizations and permits issued, in order to verify that license holders fulfil with their responsibilities and avoid situation that may result in radiological accidents. Besides, the procedure to grant licenses to manage radioactive sources in any of the utilization cycles, allows the ARN to control the installations and guarantees that persons using radioactive sources are qualified and work in accordance with the responsibilities related to radiological safety or security of radioactive sources. These qualifications are reassessed when the license is renewed.

Operation licenses, individual licenses and permits are subject to the control and sanction system exposed in Sections E.2.2.5 and E.2.2.6. Therefore, the current regulatory system makes a preventive control of in use and disused sources, to prevent loss of control and the subsequent existence of orphan sources.

The Argentine Republic adhered to the "Code of Conduct on the Safety and Security of Radioactive Sources" in the 2003-2004 period. This event reinforces the determination of the country of exercising an effective control of radiation sources.

J.2 Basic requirements for radiological safety and physical protection

Licence or authorization holders for use of radioactive sources shall comply with the following ARN's basic requirements in order to reduce substantially any hazard due to radiological accidents:

- Radioactive sources cannot be purchased, transferred, stored, used or disposed of unless the source owner has a licence or is the holder of an authorization granted by the ARN for a specific purpose.

- Only installations having appropriate resources to manage radioactive sources and which, also have qualified and trained personnel can make use of radiation sources.
- Licence holders shall keep an updated and detailed inventory of radioactive sources and their movements, and the measures to prevent human intrusion in places where radioactive materials are stored shall be systematically verified.
- Specific requirements for storing radiation sources are shown in Section J.4.

J.3 Actions aimed at making an appropriate control of disused radioactive sources

The ARN requires to the radioactive sources licensees to store in a safe place disused radioactive sources, establishing for that purpose specific measures to prevent storage of radioactive sources for long periods of time. They are the following:

- Storage of disused radioactive sources, but in custody of a licensee, is allowed only *ad interim*, and when is able to demonstrate that he has a specific program to reuse the material or to use it instead of other source in the facility.

- In this case, the licensee shall assign a storage area as deposit over which he has appropriate control to prevent the access of non-authorized persons that could result in the theft of the radioactive source. The licensee shall keep an appropriate record of the regular controls made in the interim storage.

In any other situation or if the licensee does not have an appropriate place for temporary storage of the radioactive sources, they shall be sent directly to the facility managed by CNEA for this purpose, and specially licensed for this type of storage. See Section H.2.4. The ARN has a control system for radioactive sources in use and out of use.

J.4 Actions aimed at maintaining an appropriate control of radioactive sources

The ARN maintains active communications with security forces and with civil organizations responsible for controlling the borders of the country to prevent the entrance to, or exit from, the country of undeclared radioactive sources.

Within this framework, the Regulatory Body has executed agreements with customs authorities to guarantee that:

- Import or export of radioactive substances is exclusively done with ARN's authorization.
- Importers of industrial plants, measurement instruments and laboratory equipment that could include radioactive sources, shall previously submit a declaration stating the content of such type of sources. In this case, the importer shall present the pertinent ARN's authorization to customs officials.

- The agreement also establishes that in the case of radioactive sources deposited in custom premises for a period longer than 30 days, the ARN shall be notified to arrange for storage of the material at CNEA's authorized facilities.

Besides, the ARN promotes the installation of radiation monitors in border crossings and ports to prevent the illicit trafficking of radioactive sources, detect orphan sources and avoid the import of materials contaminated with radioactive substances. It also promotes, the installation of this type of monitors in industries engaged in metal founding in order to detect orphan sources, prior to the beginning of the founding process.

The ARN pays special attention to cases where it is not possible to guarantee the control of radiation sources, for example, when companies that have radiation sources go bankrupt. In those cases the ARN and the Courts act together in order to make a safe dismantling of said sources, which are left at Court's disposal to prevent accidents.

In the case of export of radioactive sources, the ARN is establishing more strict controls and in certain cases, interacts with the Regulatory Authorities of other countries before granting the export authorization.

J.5 Security of in use or disused sealed sources

As shown in previous sections, radioactive sources are historically subject to a Radiological Safety system, that includes their control and follow-up, and also some Security measures. Thus, this system would prevent acts that imply the loss of control of radiation sources. In case such acts are not prevented, the system would be able to perceive them and implement the pertinent corrective actions promptly.

The Security measures contemplated in Radiological Safety Systems were not conceived to prevent third parties malicious intentional acts. For such reason, the following measures are under review:

- For the case of installations with high radioactive inventory (from the threshold mentioned for Type I, in accordance with IAEA-TECDOC 1344 "Categorization of radioactive sources"), the possibility to establish a Security System similar to the physical protection currently implemented in installations with nuclear material is contemplated. In Argentina, the requirements of these systems are set forth in AR 10.13.1 regulatory standard "Basic standard on the physical protection of nuclear materials and installations".

- For the case of radioactive sources not contemplated in IAEA TECDOC 1344 as Type I, the ARN has provided the adoption of Security measures to guarantee the early detection or awareness of those events, in order to place said radioactive sources or materials under its regulatory control system. Such Security measures are mentioned in IAEA TECDOC-1355 "Security of radioactive Sources". Most of them have been implemented in Argentina as radiological safety measures.

- Concerning the transport of sources, the convenience of enforcing security measures additional to radiological safety measures to prevent or adopt corrective actions in case a fraudulent act is committed in transports involving sources with activities above a reference value.

- On the other hand, since many years ago, and prior to IAEA-INFCIRC 225/Rev. 4, the ARN is paying special attention not only to the possibility of early detection of potential sabotages to installations containing nuclear materials, but also of potential attacks against installations with radioactive sources, or the early detection of the commission of fraudulent acts through them.

In this regard, the ARN is carrying out different activities in the prevention, legislation, response, training and exchange of information; including not only the control of nuclear material but also the security of radioactive sources.

The ARN has concluded that the most effective security measures for early prevention or detection are the permanent exchange of information and contact between the ARN and the organizations responsible for controlling the borders, intelligence services and security forces as essential elements of a systemic process that implies full knowledge and the assumption of responsibilities by the organizations that make up the "Control System". Equally important is the coordination of monitoring activities, that include discouraging and electronic measures, which are analysed and considered in accordance with a case-by-case assessment, as well as the prompt action of the radiological emergency system and the training of non-specialized organizations involved.

Until the above mentioned studies are completed, the ARN requires, on a case-by-case basis, the application of specific Security measures in installations with high inventories or in the transport of radioactive sealed sources with high activity level. These measures are similar to physical protection measures for the transport of nuclear materials. ARN also requires to users of said sources the adoption of prudent management measures.

In order to cover all above mentioned safety aspects and within the framework of the ***Categorization of Radioactive Sources***, the ***Security of Radioactive Sources***, the ***Code of Conduct on the Safety and Security of Radioactive Sources*** and the ***Regulatory Standard AR 10.13.1- Physical Protection of Nuclear Material and Installation***, in October 2003 CNEA issued ***Directive PF-02 – Radioactive Sources Security,*** which is mandatory for those CNEA's facilities whose practices include the use, storage of in use or disused radioactive sources, and which provides the enforcement of physical security measures to avoid intentional acts with the purpose of robbery, steal, sabotage or undue dispersion of radioactive material.

J.6 Enforcement system

Sections E.2.2.5 and E.2.2.6 show the regulatory actions and the applicable sanction system for the use of radiation sources.

J.7 Abnormal events and emergencies

Argentina's regulations set forth that persons or organizations using radiation sources shall implement emergency plans or procedures. The ARN establishes the criteria applicable in case of emergencies and assesses scenarios for situations such as: theft or loss of radioactive sources, breakage of radioactive source shielding, fire, explosions or any other event that could affect the safety of the radiation source.

The ARN also verifies that all organizations intervening in case of radiological emergency are able to assume their responsibilities.

The ARN has a highly trained Intervention System providing around the clock assistance during 365 days of the year in case of Radiological Emergencies. The team is properly equipped to perform its duties and has the necessary funds to finance its activities, carrying out periodic tests to check the proper operation of all parts of the System.

At the same time, the ARN has executed cooperation agreements with all civil or military authorities that could assist the ARN in the actions to be taken in case of a radiological emergency.

J.8 Readmission to the Country of sealed decayed sources

The import of sealed decayed sources is considered on a case-by-case basis. The ARN only authorizes the import of decayed radioactive sources if its use is properly justified by the importer according to radiological safety criteria set forth in the applicable regulations in compliance with current legislation.

SECTION K PLANNED ACTIVITIES TO IMPROVE SAFETY

K.1 Introduction

This section describes the actions taken by Argentina to enhance safety in matters related to SF and radioactive waste management. The concept of continuous improvement of spent fuel and radioactive waste management includes activities that are common to all management installations and others, used to advance in the knowledge and definition of new solutions, which may be applicable to different management stages either under process or which have been completed in the period since the presentation of the 1st National Report.

K.2 Regular activities

Regular activities are common to all management facilities and include:

- Updating of documentation
- Updating of the organization
- Inspection program
- Emergency Plan
- Training of operating personnel
- Quality assurance program
- Preventive, predictable and corrective maintenance program

K.3 Efforts to Improve Safety

In addition to safety improvements as a result of the above activities, projects and modifications are implemented, which also contribute to improve safety. The following are some of them:

K3.1 Activities completed or in progress

Atucha I Nuclear Power Plant

Within the framework of the Strategic Plan for Atucha I Nuclear Power Plant spent fuel management, in 2004 the work plan for the conceptual design of a dry interim storage facility was started. The construction of this facility is foreseen for 2012 and it would become operational in 2017. At that time the spent fuel temporarily in wet storage would be gradually transferred in accordance with its decay time.

Other changes or improvements introduced to this Nuclear Power Plant have been an extension for the temporary storage of used filters. The project was also mentioned in the 1st National Report. Additionally, an area next to the Plant premises for the interim storage of Class B (low level) disposable waste became operational. This area shall remain operational until the relevant repository is available.

Embalse Nuclear Power Plant

The spent fuel dry storage system in silos (ASECQ) has been included, at ARN's request, within the "Aging Management Program for Elements and Systems of the Nuclear Power Plant Associated to Nuclear Safety". The surveillance plan of canisters, internal cladding and concrete bunker structure of all ASECQ System silos was incorporated in the framework of this program.

Ezeiza Radioactive Waste Management Area

- **Low and Intermediate Level Solid and Liquid Waste Treatment and Conditioning Plant (PTAMB)**

At present a project is in progress with the purpose of constructing a Low and Intermediate Level Solid and Liquid Waste Treatment and Conditioning Plant (PTAMB).

Conceptual engineering has been completed and it is estimated that the basic engineering shall be completed during the first quarter of 2006. The Preliminary Safety Report is being prepared to apply its Construction License to ARN.

- **Storage Facility for Research Reactors Spent Fuel (FACIRI)**

As specified in Section G the construction of a facility for wet interim storage of research reactors spent fuel, definitely discharged, is foreseen, as reported in the 1st National Report. The construction of this facility is in response to the need, , of replacing the present storage of research reactors spent fuel (DCMFEI).

In accordance with present estimates, the facility should be in operation in the second semester of 2006. See Section G.

- **Safety Reassessment of Ezeiza Radioactive Waste Management Area (AGE)**

As specified in the 1st National Report, a reassessment of AGE's safety is in progress. Part of the studies are made under a CNEA-USDOE cooperation agreement initiated in January 2003.

The task schedule foresees that it will be completed by August 2007, when the final report shall be submitted to the Nuclear Regulatory Authority. See Section L.3.

- **Repository for intermediate level radioactive waste**

As mentioned in the 1st National Report, Argentina adopted the decision to build a near-surface monolithic repository with engineered barriers for intermediate level radioactive waste. At the moment selection and characterization activities of an adequate site to locate the repository are under way, which should be operational by 2020.

Final disposal of Class M, intermediate level radioactive waste from different interim storage facilities and from the decommissioning of existing nuclear plants shall be made at this repository.

In the same site a new low level radioactive waste final disposal near-surface system shall be built, which should be operational by 2014 and which shall replace the present system located in AGE .

Therefore, with the achievement of these goals, some of the actions taken since the drafting of the 1st National Report follow below:

- Works corresponding to the final part of the first stage for the search and selection of sites and areas to locate an intermediate level radioactive waste repository were carried on. The first level of study qualified prima facie as suitable was concluded and data of an area surveyed in the 1990's was updated. Finally, a first selection of the factors (and their relative weight) to be considered for the objective assessment of different selected areas was made.

- The studies to assess the long-term performance of a specifically formulated concrete container to be used in different applications associated to intermediate level waste management still continue.

- R&D projects are in progress to complete the studies on the performance of a concrete container to be used in intermediate level radioactive waste repositories and on the immobilization of exhausted resins in cement matrices.

- Necessary tasks for the presentation of Argentina's superficial water system, with data provided by the Water National Institute (INA), are carried on.

- The modelling of water circulation in fractured crystalline rock and of survey of fractures with the objective of validating the postulated model is in the early stage of preparation.

The implementation of this improvement action is subject, after the site is chosen, to ARN's approval with respect to radiological and nuclear safety and the approval by law of the provincial government in the province selected for its location (Art.12, Act 24804). Besides, a public hearing shall be called, in order to provide the pertinent information related to the future siting, in accordance with the terms of Art. 12, Act 25018.

❖ **Deep geological repository**

As stated in the 1st National Report, it is foreseen that disposable high level waste that will be generated at the end of the fuel cycle in Argentina will be temporarily stored until a repository for its final disposal is available. The Strategic Plan provides the studies for the siting and construction of a Deep Geological Repository which shall be in operation by 2050.

Current R&D activities in connection with this matter are taking place, specifically studies related to the first of the stages here below described:

- The Geographic Information System is in the development stage. Progress has been made in the digitisation of geological information of several regions of the

country, hydro geological data, granitic rocks, geological structures, data on quaternary and active volcanism and application of exclusion criteria, as well as distribution of the population in the country.

- Completion in 2003 of a study on quaternary volcanism in Argentina to exclude volcanic areas. A data base was prepared with the coordinates of "active" and "holocene" volcanoes, both in Argentina and Chile, to cover the volcanic arc of the Andean range and define exclusion areas .

- A national inventory of geological formations suitable for the siting of deep geological repositories for high level disposable wastes is in preparation.

- The study of different composites of ferrous phosphate glasses and determination of the effect of presence of uranium oxides, for the immobilization of disposable high level wastes contained in research reactors spent fuel is under progress.

- The conversion of radioactive elements into a ceramic form with sintered uranium, as an alternative process for the immobilization of disposable high level waste contained in research reactor spent fuel (CERUS Process) is also in progress.

- Preparation of the work plan for the execution as of 2005 of a research line on bentonite, to define the availability in the country of clayey material to be used as backfill in radioactive waste repositories.

K.3.2 Commitments made in the 1st Review Meeting

In the first Review Meeting, Argentina agreed to report in future meetings to the parties to the Convention on the progress made on the following matters:

- Reassessment of Ezeiza Radioactive Waste Management Area (AGE).
- Approval of the Radioactive Waste Management Strategic Plan.
- Setting up of the Fund for Waste Management, Dismantling and Closure.
- Coordination, between nation and provinces the legislation about the movement of waste in the national territory.
- Dedication of ARN's personnel to regulatory aspects of spent fuel management and radioactive waste management.

A description of the present condition of these matters is in what follows:

Reassessment of the Ezeiza Radioactive Management Area (AGE).

As specified in the 1st National Report, a number of activities leading to AGE's reassessment are taking place. For that purpose it is necessary to perform a new and full environmental characterization of the site and surrounding areas.

Though the systematic environmental control and monitoring required by the operation license was performed, it was considered convenient to increase the monitoring locations, improve the technologies applied and make hydro geological and geochemical studies of all the site.

Accordingly, in January 2003 the "Characterization, Monitoring and Modelling of Sites" project started with US-DOE technical assistance, under the auspices of the Joint Coordinating Committee for Radioactive and Mixed Waste Management (JCCRM) that operates within the framework of the Technological and Scientific Cooperation Agreement between CNEA and US-DOE.

Since the above mentioned date a joint cooperation work plan is under way in order to implement computer simulation models of underground water flows and transport of potential contaminants, applying new environmental characterization technologies that may contribute to the development of final disposal systems Safety Assessment.

With this information CNEA, AGE's Responsible Organization, should carry out a Safety Assessment, in order to satisfy ARN-1537/04 regulatory requirement. To such purpose a schedule of tasks was prepared, which shall expire in August 2007, when the final report shall be submitted to the Nuclear Regulatory Authority. See Section H.5

Approval of the Radioactive Waste Management Strategic Plan and Setting up of the Fund for Waste Management, Dismantling and Decommissioning.

The *Radioactive Waste Management Strategic Plan* shall enter into force upon approval of the National Congress. Up to the date of this National Report (December 2004) it was not approved. The *Strategic Plan* is developed as required by Act 25018. This Plan will reflect all actions that will be taken by Argentina on SF fuel management and radioactive waste management. The plan describes the steps to be followed and a detail of estimated expenses, covering an effective period from 2003 to 2076. The proposed strategy offers a number of technological solutions that in the light of current knowledge allows an efficient and safe compliance with the obligations imposed by Law.

In the period elapsed since the first Review Meeting a significant decision has made necessary to reformulate the activity associated to spent fuel management and radioactive waste management. During 2004 the National Government decided to encourage the completion of Atucha II Nuclear Power Plant and this implies the need for a total restructuring of the criteria to develop the Radioactive Waste Management Strategic Plan (PEGRR).

Consequently, the development of a new Strategic Plan has started and is in progress to the date of presentation of this report, which considers the operation of Atucha II nuclear power plant in a near future.

As already stated in the 1st National Report, until the *Strategic Plan* is approved, the organizations responsible for management activities implement the necessary safety measures, in the terms established by AR-10.12.1 regulatory standard.

The necessary inclusion of Atucha II Nuclear Power Plant in the PEGRR modifies the technical and economic equations of the *Plan* extending the range of applications and its scope and facilitating at the same time its financing.

Also, the setting up of the Fund for the Management and Final Disposal of Radioactive Waste has been postponed because, according to Article 14, Act 25018, no Law regulates its management and control.

Coordination, between nation and provinces, the legislation about the movement of waste in the national territory.

To the date of this report no progress has been made in respect of the coordination at national and provincial levels of the legislation about the movement of waste within the national territory.

Dedication of ARN's personnel to the surveillance of spent fuel management and radioactive waste management.

Dedication of ARN's personnel to the surveillance of spent fuel management and radioactive waste management have been described in detail in section E.3.3 of this National Report.

SECTION L ANNEXES

L.1 Facilities authorized to perform controlled and planned discharges

- Atucha I Nuclear Power Plant (CNA I)
- Embalse Nuclear Power Plant (CNE)
- Argentine Reactor 1 (RA 1)
- Argentine Reactor 3 (RA 3)
- Argentine Reactor 6 (RA 6)
- Radioisotope Production Plant (PPR)
- Mo^{99} by Fission Production Plant ($PPMo^{99}$)
- Co^{60} Sealed Sources Production Plant (PFS)
- Radioisotope Production Cyclotron
- Córdoba Manufacturing Complex (CFC)
- Nuclear Fuel Fabrication Plant (CONUAR)
- Enriched Uranium Laboratory (LUE)
- Alfa Facility (FAC ALFA)

L.1.1 Radioactive Discharges to the environment

Includes tables with values of annual radioactivity discharged into the environment during the last five years for each of the installations mentioned in L.1.

ATUCHA I NUCLEAR POWER PLANT (CNA I)								
YEAR	TOTAL ACTIVITY (Bq)							
	LIQUID			GASES				
	H^3	β/γ	α total	NOB GAS	AEROS	H^3	IODINE	C 14
2000	8.4E+14	3.3E+11	2.7E+07	7.4E+13	5.5E+06	1.2E+15	6.5E+07	3.4E+11
2001	1.5E+15	5.3E+11	1.7E+07	4.9E+13	9.2E+06	8.5E+14	2.8E+07	2.9E+11
2002	8.7E+14	3.9E+11	1.8E+07	2.1E+13	6.3E+06	9.7E+14	1.2E+07	2.1E+11
2003	1.3E+15	4.8E+11	3.8E+07	2.3E+14	5.6E+06	1.3E+15	1.3E+08	4.1E+11
2004	1.1E+15	2.6E+11	2.8E+07	1.8E+14	5.4E+06	5.5E+14	1.5E+08	5.6E+11

EMBALSE NUCLEAR POWER PLANT (CNE)							
YEAR	TOTAL ACTIVITY (Bq)						
	LIQUID		GASES				
	H^3	β/γ	NOB GAS	AEROS	H^3	IODINE	C 14
2000	2.0E+13	1.6E+09	1.4E+13	5.1E+06	2.7E+14	< DL	3.9E+11
2001	8.0E+13	1.2E+09	4.6E+13	< DL	2.4E+14	< DL	4.9E+11
2002	6.9E+13	1.6E+09	2.4E+13	< DL	2.7E+14	< DL	4.2E+11
2003	1.1E+14	1.8E+09	7.2E+13	< DL	2.6E+14	< DL	4.8E+11
2004	8.3E+13	1.9E+09	4.5E+13	8.3E+05	3.3E+14	5.3E+05	4.4E+11

DL = Detection limit

ARGENTINE REACTOR 1 (RA 1)	
YEAR	TOTAL ACTIVITY (Bq)
	LIQUIDS
	β/γ
2000	< DL
2001	< DL
2002	< DL
2003	< DL
2004	< DL

DL = Detection limit

ARGENTINE REACTOR 3 (RA 3)				
YEAR	TOTAL ACTIVITY (Bq)			
	LIQUID	GASES		
	β/γ	NOB GAS	AEROS	IODINE
2000	1.5E+08	1.2E+08	7.8E+07	3.7E+06
2001	<DL	1.2E+08	8.5E+07	3.8E+06
2002	9.8E+07	7.2E+10	1.7E+08	5.0E+07
2003	6.6E+08	3.7E+13	7.9E+08	1.9E+08
2004	1.1E+08	2.6E+13	9.3E+08	9.3E+07

DL = Detection Limit

Note: In 2003 authorization was given to increase the nominal power capacity from 5 to 10 MW. Also in 2003 Ar-41 measurement in Noble Gases was started.

ARGENTINE REACTOR 6 (RA 6)				
YEAR	TOTAL ACTIVITY (Bq)			
	LIQUIDS	GASES		
	β/γ	NOB GAS	AEROS	IODINE
2000	1.8E+07	< DL	< DL	< DL
2001	2.0E+07	< DL	< DL	< DL
2002	4.8E+07	< DL	< DL	< DL
2003	3.1E+07	< DL	< DL	< DL
2004	1.0E+08	< DL	< DL	< DL

DL = Detection limit

RADIOISOTOPE PRODUCTION PLANT (PPR)		
YEAR	TOTAL ACTIVITY (Bq)	
	LIQUIDS	GASES
	β/γ	IODINE
2000	ND	1.8E+09
2001	ND	3.7E+09
2002	2.8E+07	3.6E+09
2003	ND	2.2E+09
2004	ND	1.8E+09

ND = No discharges

Mo^{99} PRODUCTION PLANT ($PPMo^{99}$)			
YEAR	GASES		
	TOTAL ACTIVITY (Bq)		
	NOB GAS	AEROS	IODINE
2000	1.7E+12	< DL	6.2E+08
2001	3.2E+12	< DL	1.5E+08
2002	5.7E+12	< DL	2.2E+08
2003	4.6E+12	< DL	< DL
2004	4.6E+12	< DL	< DL

DL = Detection Limit

Co^{60} SEALED SOURCES PRODUCTION PLANT (PFS)	
YEAR	TOTAL ACTIVITY (Bq)
	GASES
	AEROS
2000	< DL
2001	1.4E+05
2002	1.2E+05
2003	< DL
2004	< DL

DL = Detection Limit

RADIOISOTOPE PRODUCTION CYCLOTRON	
YEAR	TOTAL ACTIVITY (Bq)
	GASES
	AEROS
2000	ND
2001	ND
2002	ND
2003	ND
2004	1,6E+12

ND = No discharges
NOTE: Radioisotope production began in 2004

NUCLEAR FUEL FARICATION PLANT (CONUAR)		
YEAR	TOTAL ACTIVITY (Bq)	
	LIQUIDS	GASES
	Nat Uranium	Nat Uranium
2000	2.6E+07	7.9E+05
2001	1.7E+07	1.4E+06
2002	1.0E+07	5.1E+05
2003	4.5E+06	4.8E+05
2004	5.3E+06	3.4E+05

CORDOBA MANUFACTURING COMPLEX (CFC)		
YEAR	TOTAL ACTIVITY (Bq)	
	LIQUID	GASES
	Nat Uranium	Nat Uranium
2000	1.2E+09	6.4E+06
2001	1.3E+09	6.6E+06
2002	1.3E+09	7.1E+06
2003	1.1E+09	6.3E+06
2004	1.4E+09	7.3E+06

ENRICHED URANIUM LABORATORY (LUE)	
YEAR	TOTAL ACTIVITY (Bq)
	GASES
	AEROS
2000	< DL
2001	< DL
2002	< DL
2003	1.7E+03
2004	< DL

DL = Detection limit

ALFA FACILITY (FAC ALFA)		
YEAR	TOTAL ACTIVITY (Bq)	
	LIQUIDS	GASES
	α total	AEROS
2000	ND	2.8E+02
2001	ND	2.1E+02
2002	ND	6.8E+01
2003	ND	5.0E+00
2004	ND	8.1E+00

ND = No discharges

L.1.2 Annual Doses to critical group

Tables with annual values of doses to members of the most exposed individuals of the public (critical group) for each installation and type of discharge during the last five years follow.

ATUCHA I NUCLEAR POWER PLANT (CNA I)			
CRITICAL GROUP DOSES DUE TO DISCHARGES (mSv)			
YEAR	**LIQUIDS**	**GASES**	**TOTAL**
2000	4.1E-04	4.5E-03	4.9E-03
2001	7.2E-04	3.2E-03	3.9E-03
2002	3.9E-04	3.8E-03	4.2E-03
2003	7.1E-04	6.1E-03	6.8E-03
2004	1.2E-03	2.9E-03	4.1E-03

EMBALSE NUCLEAR POWER PLANT (CNE)			
CRITICAL GROUP DOSES DUE TO DISCHARGES (mSv)			
YEAR	**LIQUIDS**	**GASES**	**TOTAL**
2000	9.5E-04	1.6E-04	1.1E-03
2001	1.9E-03	1.3E-04	2.0E-03
2002	1.7E-03	1.4E-04	1.8E-03
2003	2.3E-03	1.9E-04	2.5E-03
2004	2.3E-03	1.9E-04	2.5E-03

ARGENTINE REACTOR 1 (RA 1)			
CRITICAL GROUP DOSES DUE TO DISCHARGES (mSv)			
YEAR	**LIQUIDS**	**GASES**	**TOTAL**
2000	<1,0E-05	- - - - -	<1,0E-05
2001	<1,0E-05	- - - - -	<1,0E-05
2002	<1,0E-05	- - - - -	<1,0E-05
2003	<1,0E-05	- - - - -	<1,0E-05
2004	<1,0E-05	- - - - -	<1,0E-05

- - - - = Not Authorized

ARGENTINE REACTOR 3 (RA 3)			
CRITICAL GROUP DOSES DUE TO DISCHARGES (mSv)			
YEAR	**LIQUIDS**	**GASES**	**TOTAL**
2000	1.4E-02	2.0E-05	1.4E-02
2001	<1,0E-05	4.0E-05	4.0E-05
2002	7.6E-03	4.8E-04	8.1E-03
2003	1.1E-02	1.5E-02	2.5E-02
2004	2.2E-02	9.7E-03	3.2E-02

ARGENTINE REACTOR 6 (RA 6)			
CRITICAL GROUP DOSES DUE TO DISCHARGES (mSv)			
YEAR	**LIQUIDS**	**GASES**	**TOTAL**
2000	<1,0E-05	<1,0E-05	<1,0E-05
2001	<1,0E-05	<1,0E-05	<1,0E-05
2002	<1,0E-05	<1,0E-05	<1,0E-05
2003	<1,0E-05	<1,0E-05	<1,0E-05
2004	<1,0E-05	<1,0E-05	<1,0E-05

RADIOISOTOPE PRODUCTION PLANT (PPR)			
CRITICAL GROUP DOSES DUE TO DISCHARGES (mSv)			
YEAR	**LIQUIDS**	**GASES**	**TOTAL**
2000	ND	8.7E-03	8.7E-03
2001	ND	3.5E-02	3.5E-02
2002	1.0E-03	3.4E-02	3.5E-02
2003	ND	2.1E-02	2.1E-02
2004	ND	1.7E-02	1.7E-02

ND = No Discharges

Mo^{99} PRODUCTION PLANT ($PPMo^{99}$)			
CRITICAL GROUP DOSES DUE TO DISCHARGES (mSv)			
YEAR	**LIQUIDS**	**GASES**	**TOTAL**
2000	- - - - -	3.0E-03	3.0E-03
2001	- - - - -	1.6E-03	1.6E-03
2002	- - - - -	2.3E-03	2.3E-03
2003	- - - - -	1.7E-04	1.7E-04
2004	- - - - -	1.5E-04	1.5E-04

- - - - = Not Authorized

SEALED SOURCES PRODUCTION PLANT (PFS)			
CRITICAL GROUP DOSES DUE TO DISCHARGES (mSv)			
YEAR	**LIQUIDS**	**GASES**	**TOTAL**
2000	- - - - -	<1,0E-05	<1,0E-05
2001	- - - - -	<1,0E-05	<1,0E-05
2002	- - - - -	<1,0E-05	<1,0E-05
2003	- - - - -	<1,0E-05	<1,0E-05
2004	- - - - -	<1,0E-05	<1,0E-05

- - - - = Not Authorized

RADIOISOTOPE PRODUCTION CYCLOTRON			
CRITICAL GROUP DOSES DUE TO DISCHARGES (mSv)			
YEAR	**LIQUIDS**	**GASES**	**TOTAL**
2000	- - - - -	ND	ND
2001	- - - - -	ND	ND
2002	- - - - -	ND	ND
2003	- - - - -	ND	ND
2004	- - - - -	4,1E-04	4,1E-04

ND = No Discharges

CORDOBA MANUFACTURING COMPLEX (CFC)			
CRITICAL GROUP DOSES DUE TO DISCHARGES (mSv)			
YEAR	**LIQUIDS**	**GASES**	**TOTAL**
2000	2.1E-04	1.4E-04	3.5E-04
2001	2.3E-04	1.4E-04	3.7E-04
2002	2.3E-04	1.6E-04	3.9E-04
2003	1.9E-04	1.4E-04	3.3E-04
2004	2.5E-04	1.6E-04	4.1E-04

NUCLEAR FUEL FABRICATION PLANT (CONUAR)			
CRITICAL GROUP DOSES DUE TO DISCHARGES (mSv)			
YEAR	**LIQUIDS**	**GASES**	**TOTAL**
2000	9.4E-04	5.0E-06	9.5E-04
2001	5.9E-04	2.0E-05	6.1E-04
2002	3.7E-04	1.0E-05	3.8E-04
2003	1.6E-04	1.0E-05	1.7E-04
2004	1.9E-04	<1,0E-05	1.9E-04

ENRICHED URANIUM LABORATORY (LUE)			
CRITICAL GROUP DOSES DUE TO DISCHARGES (mSv)			
YEAR	**LIQUIDS**	**GASES**	**TOTAL**
2000	- - - - -	<1,0E-05	<1,0E-05
2001	- - - - -	<1,0E-05	<1,0E-05
2002	- - - - -	<1,0E-05	<1,0E-05
2003	- - - - -	<1,0E-05	<1,0E-05
2004	- - - - -	<1,0E-05	<1,0E-05

- - - - = Not Authorized

ALFA FACILITY (FAC ALFA)			
CRITICAL GROUP DOSES DUE TO DISCHARGES (mSv)			
YEAR	**LIQUIDS**	**GASES**	**TOTAL**
2000	ND	<1,0E-05	<1,0E-05
2001	ND	<1,0E-05	<1,0E-05
2002	ND	<1,0E-05	<1,0E-05
2003	ND	<1,0E-05	<1,0E-05
2004	ND	<1,0E-05	<1,0E-05

ND = No Discharges

L.1.3 Annual Collective Doses and individual average dose for workers

Tables with the annual value for the last five year period of collective doses and individual average dose for workers are included.

ANNUAL OCCUPATIONAL DOSES			
TYPE I INSTALLATION	**YEAR**	**Collective Sv man)**	**Average (mSv)**
ATUCHA I NUCLEAR POWER PLANT (CNA I)	**2000**	11.967	15.85
	2001	11.770	11.88
	2002	11.295	10.47
	2003	2.785	4.60
	2004	1.868	3.60

ANNUAL OCCUPATIONAL DOSES			
TYPE I INSTALLATION	**YEAR**	**Collective Sv man)**	**Average (mSv)**
EMBALSE NUCLEAR POWER PLANT (CNE)	**2000**	2.865	3.54
	2001	0.515	0.96
	2002	4.588	5.01
	2003	1.284	1.94
	2004	2.950	3.16

ANNUAL OCCUPATIONAL DOSES			
TYPE I INSTALLATION	**YEAR**	**Collective Sv man)**	**Average (mSv)**
CORDOBA MANUFACTURING COMPLEX (CFC)	**2000**	0.000	0.00
	2001	0.000	0.00
	2002	0.000	0.00
	2003	0.000	0.00
	2004	0.000	0.00

ANNUAL OCCUPATIONAL DOSES			
TYPE I INSTALLATION	**YEAR**	**Collective Sv man)**	**Average (mSv)**
ARGENTINE REACTOR 1 (RA 1)	**2000**	0.040	1.98
	2001	0.030	1.50
	2002	0.010	0.44
	2003	0.002	0.10
	2004	0.001	0.06

ANNUAL OCCUPATIONAL DOSES			
TYPE I INSTALLATION	**YEAR**	**Collective Sv man)**	**Average (mSv)**
ARGENTINE REACTOR 3 (RA 3)	**2000**	0.115	2.45
	2001	0.090	2.20
	2002	0.040	1.08
	2003	0.080	2.11
	2004	0.058	1.45

ANNUAL OCCUPATIONAL DOSES			
TYPE I INSTALLATION	**YEAR**	**Collective Sv man)**	**Average (mSv)**
ARGENTINE REACTOR 6 (RA 6)	**2000**	0.006	0.19
	2001	0.005	0.18
	2002	0.005	0.20
	2003	0.005	0.17
	2004	0.006	0.21

ANNUAL OCCUPATIONAL DOSES			
TYPE I INSTALLATION	**YEAR**	**Collective Sv man)**	**Average (mSv)**
RADIOISOTOPE PRODUCTION PLANT (PPR)	**2000**	0.073	1.59
	2001	0.082	1.95
	2002	0.044	1.13
	2003	0.056	1.27
	2004	0.050	1.22

ANNUAL OCCUPATIONAL DOSES			
TYPE I INSTALLATION	**YEAR**	**Collective Sv man)**	**Average (mSv)**
Mo^{99} BY FISSION PRODUCTION PLANT ($PPMo^{99}$)	**2000**	0.021	1.76
	2001	0.039	3.02
	2002	0.027	2.41
	2003	0.025	2.08
	2004	0.023	2.09

ANNUAL OCCUPATIONAL DOSES			
TYPE I INSTALLATION	**YEAR**	**Collective Sv man)**	**Average (mSv)**
Co^{60} SEALED SOURCES PRODUCTION PLANT (PPF)	**2000**	0.117	4.88
	2001	0.142	5.90
	2002	0.152	7.59
	2003	0.128	5.57
	2004	0.214	9.30

ANNUAL OCCUPATIONAL DOSES			
TYPE I INSTALLATION	**YEAR**	**Collective Sv man)**	**Average (mSv)**
RADIOSOTOPE PRODUCTION CYCLOTRON	**2000**	0,016	0,96
	2001	0,035	2,32
	2002	0,011	0,57
	2003	0,048	2,08
	2004	0,020	0,91

ANNUAL OCCUPATIONAL DOSES			
TYPE I INSTALLATION	**YEAR**	**Collective Sv man)**	**Average (mSv)**
NUCLEAR FUEL FABRICATION PLANT (CONUAR)	**2000**	0.031	0.83
	2001	0.015	0.54
	2002	0.007	0.23
	2003	0.017	0.57
	2004	0.015	0.42

ANNUAL OCCUPATIONAL DOSES			
TYPE I INSTALLATION	**YEAR**	**Collective Sv man)**	**Average (mSv)**
ENRICHED URANIUM LABORATORY (LUE)	**2000**	0.004	0.30
	2001	0.018	1.17
	2002	0.005	0.26
	2003	0.003	0.16
	2004	0.006	0.32

ANNUAL OCCUPATIONAL DOSES			
TYPE I INSTALLATION	**YEAR**	**Collective Sv man)**	**Average (mSv)**
ALFA FACILITY (FAC ALFA)	**2000**	0.006	0.61
	2001	0.011	1.20
	2002	0.000	0.03
	2003	0.000	0.00
	2004	0.000	0.00

ANNUAL OCCUPATIONAL DOSES			
TYPE I INSTALLATION	**YEAR**	**Collective Sv man)**	**Average (mSv)**
EZEIZA RADIOACTIVE WASTE MANAGEMNT AREA (AGE)	**2000**	0.044	1.38
	2001	0.052	2.15
	2002	0.025	1.19
	2003	0.022	1.00
	2004	0.043	2.05

L.2 Conventions, Laws, Regulatory Standards and National Documents

L.2.1 Treaties on nuclear matters subscribed by the Argentine Republic

- Statute of the International Atomic Energy Agency. Approved by Decree-Act 5011 of 15 May 1957.
- Vienna convention on civil liability for nuclear damage, approved by Act 17048 of 15 July 1965.
- "Agreement between the Argentine Republic and the Federative Republic of Brazil for the Exclusively Peaceful Use of Nuclear Energy", established by the "Brazilean- Argentine Agency for Accounting and Control of Nuclear Materials" (ABACC), approved by Act 24046 of 12 December 1991.
- Treaty for the prohibition of nuclear weapons in Latin America and the Caribbean (Tlatelolco Treaty), approved by Act 24272 of 18 January 1994.
- Treaty on the non-proliferation of nuclear weapons (TNP). Approved by Act 24448.
- Comprenhensive nuclear test-ban treaty, approved by Act 25022 of 23 September 1998.
- Agreement between the Argentine Republic, the Federative Republic of Brazil, the "Brazilean- Argentine Agency for Accounting and Control of Nuclear Materials" (ABACC) and the International Atomic Energy Agency for the application of safeguards (Quadripartite Agreement). approved by Act 24113 of 4 March 1994.
- Convention on the physical protection of nuclear materials, approved by Act 23620 of 6 April 1989.
- Convention on early notification of a nuclear accident, approved by Act 23731.
- Convention on assistance in the case of nuclear accident or radiological emergency, approved by Act 23731.
- Convention on nuclear safety, approved by Act 24776 of 17 April 1998.

- Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damages and the Convention on Supplementary Compensation for Nuclear Damages, approved by Act 24313 of 7 September 2000.

- Joint convention on the safety of spent fuel management and on the safety of radioactive waste management, approved by Act 25279 of 14 November 2000.

- Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, as amended (1994). On 2 December 1979, the National Congress enacted Act 21947, approving the Convention

L.2.2 Laws

L.2.2.1 Act 24804/97 National Law of Nuclear Activity

CAPITULO I
Actividad nuclear. Funciones del Estado.
Criterio de regulación. Jurisdicción

ARTÍCULO 1°.- En materia nuclear el Estado nacional fijará la política y ejercerá las funciones de investigación y desarrollo, regulación y fiscalización, a través de la Comisión Nacional de Energía Atómica y de la Autoridad Regulatoria Nuclear.

Toda actividad nuclear de índole productiva y de investigación y desarrollo que pueda ser organizada comercialmente, será desarrollada tanto por el Estado Nacional como por el sector privado.

En la ejecución de la política nuclear se observarán estrictamente las obligaciones asumidas por la República Argentina en virtud del Tratado para la Proscripción de las Armas Nucleares en América Latina y el Caribe (Tratado de Tlatelolco); el Tratado de no Proliferación de Armas Nucleares; el Acuerdo entre la República Argentina, la República Federativa del Brasil, la Agencia Brasileño-Argentina de Contabilidad y Control de Materiales Nucleares, y el Organismo Internacional de Energía Atómica para la Aplicación de Salvaguardias, así como también los compromisos asumidos en virtud de la pertenencia al Grupo de Países Proveedores Nucleares y el Régimen Nacional de Control de Exportaciones Sensitivas (Decreto 603/92).

ARTÍCULO 2°.- La Comisión Nacional de Energía Atómica creada por decreto 10936 del 31 de mayo de 1950 y reorganizada por decreto ley 22.498/56, ratificado por ley 14467, continuará funcionando como ente autárquico en jurisdicción de la Presidencia de la Nación y tendrá a su cargo:

a. Asesorar al Poder Ejecutivo en la definición de la política nuclear;
b. Promover la formación de recursos humanos de alta especialización y el desarrollo de ciencia y tecnología en materia nuclear, comprendida la realización de programas de desarrollo y promoción de emprendimientos de innovación tecnológica.
c. Propender a la transferencia de tecnologías adquiridas, desarrolladas y patentadas por el organismo, observando los compromisos de no proliferación asumidos por la República Argentina;

d. Ejercer la responsabilidad de la gestión de los residuos radiactivos cumpliendo las funciones que le asigne la legislación específica;

e. Determinar la forma de retiro de servicio de centrales de generación nucleoeléctrica y de toda otra instalación radiactiva relevante;

f. Prestar los servicios que le sean requeridos por las centrales de generación nucleoeléctrica u otra instalación nuclear;

g. Ejercer la propiedad estatal de los materiales radiactivos fisionables especiales contenidos en los elementos combustibles irradiados;

h. Ejercer la propiedad estatal de los materiales fusionables especiales que pudieren ser introducidos o desarrollados en el país;

i. Desarrollar, construir y operar reactores nucleares experimentales;

j. Desarrollar aplicaciones de radioisótopos y radiaciones en biología, medicina e industria;

k. Efectuar la prospección de minerales de uso nuclear, sin que ello implique excluir al sector privado en tal actividad;

l. Efectuar el desarrollo de materiales y procesos de fabricación de elementos combustibles para su aplicación en ciclos avanzados;

ll. Implementar programas de investigación básica y aplicada en las ciencias base de la tecnología nuclear;

m. Establecer programas de cooperación con terceros países para los programas enunciados en el inciso precedente y para la investigación y el desarrollo de la tecnología de fusión a través del Ministerio de Relaciones Exteriores, Comercio Internacional y Culto;

n. Promover y realizar todo otro estudio y aplicación científica de las transmutaciones y reacciones nucleares;

ñ Actualizar en forma permanente la información tecnológica de las centrales nucleares en todas sus etapas y disponer del aprovechamiento óptimo de la misma;

o. Establecer relaciones directas con otras instituciones extranjeras con objetivos afines;

p. Celebrar convenios con los operadores de reactores nucleares de potencia, a los fines de realizar trabajos de investigación.

ARTÍCULO 3°.- La Comisión Nacional de Energía Atómica se regirá en su gestión administrativa, financiera, patrimonial y contable por las disposiciones de la presente ley y los reglamentos que a tal fin establezca el directorio de la Comisión. Estará sujeta al régimen de contralor público.

El personal de la Comisión estará sometido al régimen de la Ley de Contrato de Trabajo y a las condiciones especiales que se establezcan en la reglamentación.

ARTÍCULO 4°.- Las funciones del directorio de la Comisión Nacional de Energía Atómica serán:

a. Realizar las acciones necesarias para cumplir con los objetivos y las funciones determinadas por la presente ley;

b. Aprobar los planes de trabajo generales, los proyectos estratégicos y el presupuesto anual a ser elevado al Poder Ejecutivo nacional;

c. Aprobar el informe anual de actividades;

d. Asesorar al Poder Ejecutivo nacional sobre los asuntos relacionados con la energía atómica y sus aplicaciones;

e. Establecer relaciones con instituciones extranjeras u organismos regionales o internacionales que tengan objetivos afines, con la participación del Ministerio de Relaciones Exteriores, Comercio Internacional y Culto;

f. Aceptar bienes y donaciones;

g. Concertar acuerdos con entidades públicas o privadas para la realización de los planes que concurran a los fines de la institución;

h. Proponer al Poder Ejecutivo nacional la estructura del organismo.

ARTÍCULO 5°.- El presidente del directorio de la Comisión Nacional de Energía Atómica tendrá todas las atribuciones ejecutivas necesarias para el cumplimiento de las leyes y reglamentos que conciernen a la institución y de las resoluciones de directorio. Le compete:

a. Asumir la representación legal de la Comisión Nacional de Energía Atómica, tanto administrativa, judicial como extrajudicialmente;

b. Ejercer la dirección y administración de la institución;

c. Convocar y presidir las reuniones del directorio;

d. Someter al directorio los planes de trabajo generales, los proyectos estratégicos y el proyecto de presupuesto anual a ser elevado al Poder Ejecutivo nacional;

e. Otorgar mandatos generales y especiales;

f. Integrar por sí o por medio de representantes comisiones nacionales, provinciales y sectoriales en materia de competencia del organismo, incluyendo los aspectos ambientales;

g. Informar al directorio la distribución general del presupuesto anual otorgado;

h. nformar al directorio acerca del cumplimiento de los planes, proyectos y otras actividades previstas;

i. Proponer al directorio la estructura del organismo en los niveles no definidos por el Poder Ejecutivo;

j. Designar, promover, sancionar y remover al personal en conformidad con las leyes y reglamentos aplicados;

k. Designar y promover al personal que cumplirá funciones jerárquicas y de coordinación;

l. Designar y enviar representantes y destacar en comisión a personal idóneo a conferencias, reuniones o congresos regionales o internacionales;

m. Delegar parcialmente en los órganos internos que determine las facultades que esta ley le atribuye.

ARTÍCULO 6°.- Los recursos de la Comisión Nacional de Energía Atómica se formarán con los siguientes ingresos:

a. Los aportes del Tesoro nacional que se determinen en cada ejercicio presupuestario y por leyes especiales;

b. El producido de su actividad en el campo de la producción y la prestación de servicios;

c. Los subsidios, legados, herencias, donaciones y transferencias que reciba bajo cualquier título;

d. Un canon que determine el Poder Ejecutivo nacional destinado a financiar las funciones de investigación y desarrollo que realiza la Comisión Nacional de Energía Atómica, y que será un porcentaje de los ingresos provenientes de la venta de energía eléctrica generada por las centrales nucleares a cargo de Nucleoeléctrica Argentina Sociedad Anónima o quien la sustituya legalmente;

e. Los intereses y beneficios resultantes de la gestión de sus propios fondos.

ARTÍCULO 7°.- La Autoridad Regulatoria Nuclear tendrá a su cargo la función de regulación y fiscalización de la actividad nuclear en todo lo referente a los temas de seguridad radiológica y nuclear, protección física y fiscalización del uso de materiales nucleares, licenciamiento y fiscalización de instalaciones nucleares y salvaguardias internacionales, así como también asesorar al Poder Ejecutivo nacional en las materias de su competencia.

ARTÍCULO 8°.- La Autoridad Regulatoria Nuclear deberá desarrollar las funciones de regulación y control que le atribuye esta ley con los siguientes fines:

a. Proteger a las personas contra los efectos nocivos de las radiaciones ionizantes;

b. Velar por la seguridad radiológica y nuclear en las actividades nucleares desarrolladas en la República Argentina;

c. Asegurar que las actividades nucleares no sean desarrolladas con fines no autorizados por esta ley, las normas que en su consecuencia se dicten, los compromisos internacionales y las políticas de no proliferación nuclear, asumidas por la República Argentina;

d. Prevenir la comisión de actos intencionales que puedan conducir a consecuencia radiológicas severas o al retiro no autorizado de materiales nucleares u otros materiales o equipos sujetos a regulación y control en virtud de lo dispuesto en la presente ley.

ARTÍCULO 9°.- Toda persona física o jurídica para desarrollar una actividad nuclear deberá:

a. Ajustarse a las regulaciones que imparta la Autoridad Regulatoria Nuclear en el ámbito de su competencia y solicitar el otorgamiento de la licencia, permiso o autorización que lo habilite para su ejercicio;

b. Cumplir todas las obligaciones que en materia de salvaguardias y no proliferación haya suscrito o suscriba en el futuro la República Argentina;

c. Asumir la responsabilidad civil que para el explotador de una instalación nuclear determina la Convención de Viena sobre Responsabilidad Civil por Daños Nucleares, ratificada por ley 17.048, por la suma de ochenta millones de dólares estadounidenses (U$S 80.000.000) por accidente nuclear en cada instalación nuclear. La misma deberá ser cubierta mediante un seguro o garantía financiera a satisfacción del Poder Ejecutivo nacional o de quien éste designe, asumiendo el Estado nacional la responsabilidad remanente.

Facúltase al Poder Ejecutivo nacional a ajustar la suma establecida como límite de responsabilidad en el párrafo anterior, en el caso de que se revisaran los términos de la Convención de Viena sobre Responsabilidad Civil por Daño Nuclear, una vez que la modificación sea ratificada por ley.

Entiéndase por daño nuclear, conforme lo define la Convención de Viena sobre Responsabilidad Civil por Daño Nuclear, ratificada por ley 17.048 la pérdida de

vidas humanas, las lesiones corporales y los daños y perjuicios materiales que se produzcan como resultado directo o indirecto de las propiedades radiactivas o de su combinación con las propiedades tóxicas, explosivas u otras propiedades peligrosas de los combustibles nucleares o de los productos o desechos radiactivos que se encuentren en una instalación nuclear o de las sustancias nucleares que procedan de ella, se originen en ella o se envíen a ella; o de otras radiaciones ionizantes que emanen de cualquier otra fuente de radiaciones que se encuentren dentro de una instalación nuclear.

Se considera comprendido en el concepto de responsabilidad de daño nuclear, a cargo de un explotador de una instalación nuclear lo relativo a:

i) Los daños que se produjeren sobre el personal del explotador así como sobre el personal de sus contratistas y subcontratistas con motivo del accidente nuclear de una instalación nuclear que opere dicha sociedad;
ii) Los perjuicios que se causen con motivo del accidente nuclear a los funcionarios del Organismo Internacional de Energía Atómica que se encontraren desarrollando tareas referentes a la aplicación de salvaguardias previstas en acuerdos internacionales suscritos por la República Argentina;
iii) Los accidentes que se produjeren con sustancias nucleares fuera del sitio de la instalación o fuera del transporte, cuando al momento de ocurrir el accidente nuclear tales sustancias hubieren sido objeto de robo, pérdida, echazón o abandono.

A su vez, todo explotador de una central de generación nucleoeléctrica deberá aportar a un fondo para retiro de servicio de centrales nucleares. La forma de constitución, administración y contralor de este fondo será determinada por el Poder Ejecutivo nacional.

ARTÍCULO 10º.- Declárase sujeta a jurisdicción nacional la regulación y fiscalización de la actividad nuclear, en los aspectos definidos en el artículo 7°, conforme lo establecido por el artículo 11 º de la presente ley.

ARTÍCULO 11º.- Todo nuevo emplazamiento de una instalación nuclear relevante deberá contar con la licencia de construcción que autorice su localización, otorgada por la Autoridad Regulatoria Nuclear con la aprobación del Estado provincial donde se proyecte instalar el mismo.

ARTÍCULO 12º.- Para definir la ubicación de un repositorio para residuos de alta, media y baja actividad, la Comisión Nacional de Energía Atómica propondrá un lugar de emplazamiento. Este deberá contar con la aprobación de la Autoridad Regulatoria Nuclear en lo referente a seguridad radiológica y nuclear y la aprobación por ley del Estado provincial donde se ha propuesto la localización. Tales requisitos son previos y esenciales a cualquier trámite.

ARTÍCULO 13º.- Los lugares de emplazamiento de las plantas de tratamiento de los residuos radiactivos y de los correspondientes repositorios temporarios y definitivos que la Comisión Nacional de Energía Atómica o Nucleoeléctrica Argentina Sociedad Anónima tengan en funcionamiento al momento de sancionarse la presente ley, así como sus ampliaciones, y sus vías de acceso terrestre, marítimo, aéreo o fluviales no requieren para continuar en operación o para viabilizar el acceso o retiro de los residuos de los repositorios de tal índole, autorización especial legislativa ni

autorización de las municipalidades o provincias en cuyo territorio se encuentre localizado el repositorio o sus vías de acceso.

CAPÍTULO II
Autoridad Regulatoria Nuclear

ARTÍCULO 14º.- La Autoridad Regulatoria Nuclear actuará como entidad autárquica en jurisdicción de la Presidencia de la Nación. Dicha autoridad será la sucesora del Ente Nacional Regulador Nuclear.

ARTÍCULO 15º.- La Autoridad Regulatoria Nuclear gozará de autarquía y tendrá plena capacidad jurídica para actuar en los ámbitos del derecho público y privado.

Su patrimonio estará constituido por los bienes que se le transfieran al Ente Nacional Regulador Nuclear, y por los que adquiera en el futuro por cualquier título. Tendrá su sede en la ciudad de Buenos Aires. La autoridad aprobará su estructura orgánica, previa intervención de la Secretaría de la Función Pública de la Presidencia de la Nación.

ARTÍCULO 16º.- La Autoridad Regulatoria Nuclear tendrá las siguientes funciones, facultades y obligaciones:

a. Dictar las normas regulatorias referidas a seguridad radiológica y nuclear, protección física y fiscalización del uso de materiales nucleares, Iicenciamiento y fiscalización de instalaciones nucleares, salvaguardias internacionales y transporte de materiales nucleares en su aspecto de seguridad radiológica y nuclear y protección física;
b. Otorgar, suspender y revocar las licencias de construcción, puesta en marcha y operación y retiro de centrales de generación nucleoeléctrica;
c. Otorgar, suspender y revocar licencias, permisos o autorizaciones en materia de minería y concentración de uranio, de seguridad de reactores de investigación, de aceleradores relevantes, de instalaciones radiactivas relevantes, incluyendo las instalaciones para la gestión de desechos o residuos radiactivos y de aplicaciones nucleares a las actividades médicas e industriales;
d. Realizar inspecciones y evaluaciones regulatorias en las instalaciones sujetas a la regulación de la Autoridad Regulatoria Nuclear, con la periodicidad que estime necesaria;
e. Proponer ante el Poder Ejecutivo nacional la cesión, prórroga o reemplazo de una concesión de uso de una instalación nuclear de propiedad estatal cuando hubiese elementos que así lo aconsejen, o su caducidad cuando se motive en incumplimientos de las normas que dicte en materia de seguridad radiológica y nuclear;
f. Promover acciones civiles o penales ante los tribunales competentes frente al incumplimiento de los licenciatarios o titulares de una autorización o permiso reglados por la presente ley, así como también solicitar órdenes de allanamiento y requerir el auxilio de la fuerza pública cuando ello fuera necesario para el debido ejercicio de las facultades otorgadas por esta norma;
g. Aplicar sanciones, las que deberán graduarse según la gravedad de la falta en: apercibimiento, multa que deberá ser aplicada en forma proporcional a la severidad de la infracción y en función de la potencialidad del daño, suspensión de una licencia, permiso o autorización o su revocación. Dichas sanciones serán

apelables al solo efecto devolutivo por ante la Cámara Nacional de Apelaciones en lo Contencioso Administrativo Federal;

h. Establecer los procedimientos para la aplicación de sanciones que correspondan por la violación de normas que dicte en ejercicio de su competencia, asegurando el principio del debido proceso;

i. Disponer el decomiso de los materiales nucleares o radiactivos, así como también clausurar preventivamente las instalaciones sujetas a la regulación de la Autoridad Regulatoria Nuclear, cuando se desarrollen sin la debida licencia, permiso o autorización o ante la detección de faltas graves a las normas de seguridad radiológica y nuclear y de protección de instalaciones.

A tales efectos, se entiende por falta grave al incumplimiento que implique una seria amenaza para la seguridad de la población o la protección del ambiente o cuando no pueda garantizarse la aplicación de las medidas de protección física o de salvaguardias;

j. Proteger la información restringida con el fin de asegurar la debida preservación de secretos tecnológicos, comerciales o industriales y la adecuada aplicación de salvaguardias y medidas de protección física;

k. Establecer, de acuerdo con parámetros internacionales, normas de seguridad radiológica y nuclear para el transporte terrestre, fluvial, marítimo o aéreo de material nuclear y radiactivo y de protección física del material transportado;

l. Establecer, de acuerdo con parámetros internacionales, normas de seguridad radiológica y nuclear referidas al personal que se desempeñe en instalaciones nucleares y otorgar las licencias, permisos y autorizaciones específicas habilitantes para el desempeño de la función sujeta a licencia, permiso o autorización;

ll. Determinar un procedimiento de consultas con los titulares de licencias para instalaciones nucleares relevantes toda vez que se propongan nuevas normas regulatorias o se modifiquen las existentes. Dentro de dicho procedimiento deberá prever que las modificaciones de normas existentes o el dictado de nuevas normas se fundamenten en un criterio de evaluación basado en la relación basado beneficio/costo de la aplicación de la nueva regulación;

m. Evaluar el impacto ambiental de toda actividad que licencie, entendiéndose por tal a aquellas actividades de monitoreo, estudio y seguimiento de la incidencia, evolución o posibilidad de daño ambiental que pueda provenir de la actividad nuclear licenciada;

n. Someter anualmente al Poder Ejecutivo nacional y al Honorable Congreso de la Nación un informe sobre las actividades del año y sugerencias sobre medidas a adoptar en beneficio del interés público;

ñ) Solicitar información a todo titular de licencia, permiso o autorización sobre los temas sujetos a regulación;

o. En general, toda otra acción dirigida al mejor cumplimiento de sus funciones y de los fines de esta ley y su reglamentación.

ARTÍCULO 17º.- La Autoridad Regulatoria Nuclear estará dirigida y administrada por un directorio integrado por seis (6) miembros, uno de los cuales será el presidente, otro el vicepresidente y los restantes, vocales.

ARTÍCULO 18º.- Los miembros del directorio de la Autoridad Regulatoria Nuclear serán designados por el Poder Ejecutivo nacional, dos de los cuales a propuesta de la Cámara de Senadores y de Diputados respectivamente, debiendo contar con

antecedentes técnicos y profesionales en la materia. Su mandato tendrá una duración de seis (6) años debiendo renovarse por tercios cada dos (2) años. Sólo podrán ser removidos por acto fundado del Poder Ejecutivo nacional y pueden ser sucesivamente designados en forma indefinida.

En el caso de la primera designación el Poder Ejecutivo nacional deberá determinar la duración de los mandatos por sorteo.

ARTÍCULO 19º.- Los miembros del directorio de la Autoridad Regulatoria Nuclear tendrán dedicación exclusiva, alcanzándoles las incompatibilidades para funcionarios públicos previstas por la legislación vigente. No podrá ser designado integrante del directorio de tal Autoridad Regulatoria Nuclear quien sea titular de una licencia, permiso o autorización reglada por la presente ley, o tenga algún interés directo vinculado a dicha materia.

ARTÍCULO 20º.- El presidente del directorio durará seis (6) años en sus funciones, pudiendo ser designado sucesiva e indefinidamente por períodos de ley. Ejercerá la representación legal de la Autoridad Regulatoria Nuclear. En caso de impedimento o ausencia transitoria será reemplazado por el vicepresidente.

ARTÍCULO 21º.- El directorio formará quórum con la presencia de cuatro (4) de sus miembros, uno de los cuales debe ser el presidente o el vicepresidente en su caso. Sus resoluciones se adoptarán por mayoría simple.

En caso de empate el presidente o quien lo reemplace tendrá doble voto.

ARTÍCULO 22º.- Son funciones del Directorio de la Autoridad Regulatoria Nuclear:

a. Aplicar y fiscalizar el cumplimiento de las normas legales y reglamentarias que rigen la actividad de la autoridad;
b. Dictar el reglamento de funcionamiento del directorio;
c. Entender en todas las cuestiones referidas al personal de la autoridad;
d. Formular el presupuesto anual y cálculo de recursos que elevará por intermedio del Poder Ejecutivo nacional al Honorable Congreso de la Nación para su aprobación junto con el presupuesto general de la Nación;
e. En general, toda otra acción dirigida al mejor cumplimiento de sus funciones y de los fines de esta ley y su reglamentación.

ARTÍCULO 23º.- La Autoridad Regulatoria Nuclear se regirá en su gestión administrativa, financiera, patrimonial y contable por las disposiciones de la presente ley y los reglamentos que a tal fin establezca la autoridad. Estará sujeta al régimen de contralor público.

ARTÍCULO 24º.- La Autoridad Regulatoria Nuclear confeccionará anualmente un proyecto de presupuesto que será publicado y del cual se le dará vista a los sujetos obligados al pago de la tasa regulatoria prevista en el artículo 26 de la presente ley, quienes podrán formular objeciones fundadas dentro del plazo de treinta (30) días hábiles de tal publicación.

ARTÍCULO 25º.- Los recursos de la Autoridad Regulatoria Nuclear se formarán con los siguientes ingresos:

a. La tasa regulatoria que se crea en el artículo 26 de la presente ley;

b. Los subsidios, herencias, legados, donaciones o transferencias que bajo cualquier título reciba;
c. Los intereses y beneficios resultantes de la Gestión de sus propios fondos;
d. Los aportes del Tesoro nacional que se determinen en cada ejercicio presupuestario;
e. Los demás fondos, bienes o recursos que puedan serle asignados en virtud de leyes y reglamentaciones aplicables.

ARTÍCULO 26º.- Los licenciatarios titulares de una autorización o permiso, o personas jurídicas cuyas actividades están sujetas a la fiscalización de la autoridad abonarán anualmente y por adelantado, una tasa regulatoria a ser aprobada a través del presupuesto general de la Nación.

Para el caso de centrales de generación nucleoeléctrica esta tasa regulatoria anual no podrá ser superior al valor equivalente al precio promedio anual de cien megavatios hora (100 MW/h) en el Mercado Eléctrico Mayorista determinado en función de los precios vigentes en dicho mercado el año inmediato anterior. Dicha suma deberá abonarse por megavatio de potencia nominal instalada nuclear hasta que finalicen las tareas de retiro de combustible irradiado del reactor en la etapa de retiro de servicio a cargo del explotador de dicha instalación.

Las nuevas centrales nucleoeléctricas deberán además abonar, también anualmente y por adelantado, las tasas regulatorias correspondientes a la construcción y el proceso de licenciamiento, las que serán aprobadas por el Poder Ejecutivo nacional.

Para el resto de los licenciatarios titulares de una autorización o permiso sujetos a regulación, la Autoridad Regulatoria Nuclear dictará el correspondiente régimen de tasas por licenciamiento e inspección, el que no podrá exceder el cero con cinco por ciento (0,5%) de los ingresos o indicador equivalente de la actividad sujeta a regulación del año fiscal anterior.

La mora en el pago de la tasa o de las multas previstas en el artículo 16, inciso g) será automática y devengará los intereses punitorios que determine la autoridad de aplicación. El certificado de deuda por falta de pago expedido por la Autoridad Regulatoria Nuclear será título suficiente para habilitar el procedimiento ejecutivo ante los tribunales federales en lo civil y comercial.

ARTÍCULO 27º.- El personal de la Autoridad Regulatoria Nuclear estará sometido al régimen de la Ley de Contrato de Trabajo y a las condiciones especiales que se establezcan en la reglamentación, no siendo de aplicación el Régimen Jurídico Básico de la Función Pública.

ARTÍCULO 28º.- En sus relaciones con los particulares y con la administración pública la Autoridad Regulatoria Nuclear se regirá por los procedimientos establecidos en la Ley de Procedimientos Administrativos y sus disposiciones reglamentarias.

ARTÍCULO 29º.- Cuando como consecuencia de procedimientos iniciados de oficio o por denuncia de terceros, la Autoridad Regulatoria Nuclear considerase que cualquier acto de un licenciatario de instalación nuclear, de un titular de una autorización o permiso o de una persona física o jurídica que se encuentre en algún aspecto sujeto a regulación y control, así como de quienes utilicen o produzcan tecnología nuclear o gestionen residuos radiactivos, es violatorio de la presente ley, de su reglamentación, o de las resoluciones que dicte la Autoridad Regulatoria

Nuclear, notificará a todas las partes interesadas, estando facultada para, previo a resolver sobre la existencia de la violación, disponer las medidas preventivas que estime convenientes.

CAPÍTULO III
Definiciones

ARTÍCULO 30º.- A los fines de la presente ley entiéndase por:

a. *Actividades nucleares*, los usos de las transmutaciones nucleares a escala macroscópica;

b. *Material nuclear*, el plutonio 239, uranio 233, uranio 235, uranio enriquecido en los isótopos 235 ó 233, uranio conteniendo una mezcla isotópica igual a la encontrada en la naturaleza, uranio empobrecido en el isótopo 235, torio con pureza nuclear o cualquier material que contenga uno o más de los anteriores;

c. *Instalación nuclear*, concepto entendido en los términos definidos en el artículo 1°, inciso j) de la Convención de Viena de Responsabilidad Civil por Daños Nucleares aprobada por ley 17048;

d. *Instalación nuclear relevante*, incluye reactor nuclear, instalación crítica, instalación radiactiva relevante y acelerador relevante, de acuerdo a las definiciones establecidas o establecer por la Autoridad Regulatoria Nuclear;

e. *Información restringida*, toda información que un solicitante o titular de una licencia, permiso o autorización entregue a la Autoridad Regulatoria Nuclear y que deba ser tratada de manera confidencial en virtud de obligaciones legales o contractuales de dicho titular, o la que esté relacionada con:

   ii. Los procesos y tecnologías para la producción de material fisionable especial.

   iii. La aplicación específica de salvaguardias.

   iv. Los sistemas de protección física implementados en instalaciones nucleares.

f. *Material fisionable especial*, el plutonio, el uranio 233, el uranio enriquecido en los isótopos 235 ó 233 y cualquier material que contenga uno o varios de los elementos citados;

g. *Producción de material fisionable especial*, la separación química del material fisionable especial de otras sustancias o la producción por métodos de separación isotópica de materiales fisionables especiales.

CAPÍTULO IV
Disposiciones generales

ARTÍCULO 31º.- La responsabilidad por la seguridad radiológica y nuclear, salvaguardias y protección física recae inexcusablemente en el poseedor de la licencia, permiso o autorización. El cumplimiento de lo establecido en esta ley, y en las normas y requerimientos que de ellas se deriven, no lo exime de tal responsabilidad ni de hacer todo lo razonable y compatible con sus posibilidades en favor de la seguridad radiológica y nuclear, la salvaguardia y la protección física.

El titular de una licencia, permiso o autorización puede delegar total o parcialmente la ejecución de tareas, pero mantiene integralmente la responsabilidad establecida en este artículo.

ARTÍCULO 32º.- El Estado nacional será el único propietario de los materiales fisionables especiales contenidos en los elementos combustibles irradiados al

ejecutarse una actividad abarcada por la presente ley así como de los materiales fusionables especiales que pudieren ser introducidos o desarrollados en el país.

ARTÍCULO 33º.- Derógase el artículo 2°, el artículo 5°, el artículo 9°, el artículo 11, el artículo 16 y el artículo 17 del decreto ley 22498 del 19 de diciembre de 1956.

CAPITULO V
Privatizaciones

ARTÍCULO 34º.- Declárase sujeta a privatización la actividad de generación nucleoeléctrica que desarrolla Nucleoeléctrica Argentina Sociedad Anónima (Nucleoeléctrica Argentina S.A.), como una unidad productiva indivisible, en forma directa o asociada con otras entidades, en sus distintos aspectos (construcción, puesta en marcha, operación, mantenimiento, retiro de servicio de centrales nucleares), así como la de dirección y ejecución de obra de centrales nucleares que desarrolla la Empresa Nuclear Argentina de Centrales Eléctricas Sociedad Anónima (ENACE S.A.).

Esta privatización deberá asegurar la terminación de la Central Nucleoeléctrica en construcción en un plazo no mayor de seis (6) años a partir de la sanción de la presente ley.

ARTÍCULO 35º.- Nucleoeléctrica Argentina Sociedad Anónima (Nucleoeléctrica Argentina S.A.) o la sociedad que se constituya con el objeto de ejecutar la privatización autorizada por el artículo precedente mantendrá hasta un veinte por ciento (20%) de su capital y una (1) acción como mínimo en poder del Estado nacional, correspondiendo su tenencia así como el ejercicio de los derechos societarios al Ministerio de Economía y Obras y Servicios Públicos de la Nación.

De dicho capital se asignará a los trabajadores en relación de dependencia de la empresa, el porcentaje que se determine en el marco del programa de propiedad participada previsto en la ley 23.696.

El Estado nacional será titular permanente de una (1) acción de la sociedad y se requerirá ineludiblemente su voto afirmativo para la toma de decisiones que signifiquen:

a. La ampliación de capacidad de una central de generación nucleoeléctrica existente y/o la construcción de una nueva;
b. La salida de servicio por motivos no técnicos, ya sea temporal o definitiva, de una central de generación nucleoeléctrica.

ARTÍCULO 36º.- Declárase sujeta a privatización la actividad vinculada al ciclo de combustible nuclear con destino a la generación nucleoeléctrica a escala industrial o de investigación, y a la producción y aplicaciones de radioisótopos y radiaciones que desarrolla la Comisión Nacional de Energía Atómica, en forma directa o asociada con otras entidades, considerado ello tanto en su totalidad como en cualquiera de sus partes componentes.

ARTÍCULO 37º.- A los fines de las privatizaciones señaladas en el artículo 36, se constituirán sociedades anónimas, de las cuales el Estado nacional tendrá una (1) acción como mínimo con derecho a veto en las decisiones que impliquen el cierre de la actividad.

ARTÍCULO 38°.- El licenciatario de las centrales nucleoeléctricas o la sociedad que se constituya con el objeto de la privatización autorizada en el artículo 34°, contratará su provisión de agua pesada a la Planta Industrial de Agua Pesada instalada en el país y deberá responsabilizarse de la devolución de agua pesada alquilada para la Central Nuclear Embalse, conforme a las características técnicas de calidad y precio internacional.

ARTÍCULO 39°.- Los procesos de privatización autorizados en el presente capítulo se regirán por la ley 23696, el artículo 96° de la ley 2. 065, el artículo 14 de la ley 24629 y por lo dispuesto en esta ley.
ARTÍCULO 40º.- Las centrales nucleoeléctricas deberán utilizar combustibles nucleares procedente o elaborado de minerales radiactivos de yacimientos ubicados en el país.

ARTÍCULO 41º.- La presente ley comenzará a regir a partir de la fecha de publicación en el Boletín Oficial.

ARTÍCULO 42º.- Comuníquese al Poder Ejecutivo.

L.2.2.2 Act 25018/98 National Law on Radioactive Waste Management Regime

Disposiciones Generales

ARTÍCULO 1°.- Por la presente ley se establecen los instrumentos básicos para la gestión adecuada de los residuos radiactivos, que garanticen en este aspecto la protección del ambiente, la salud pública y los derechos de la posteridad.

ARTÍCULO 2°.- A efectos de la presente ley se entiende por Gestión de Residuos Radiactivos, el conjunto de actividades necesarias para aislar los residuos radiactivos de la biosfera derivados exclusivamente de la actividad nuclear efectuada en el territorio de la Nación Argentina, el tiempo necesario para que su radiactividad haya decaído a un nivel tal, que su eventual reingreso a la misma no implique riesgos para el hombre y su ambiente. Dichas actividades deberán realizarse en un todo de acuerdo con los límites establecidos por la AUTORIDAD REGULATORIA NUCLEAR y con todas aquellas regulaciones nacionales, provinciales y de la Ciudad de Buenos Aires y acuerdos internacionales que correspondan.

ARTÍCULO 3°.- A efectos de la presente ley se entiende por residuo radiactivo todo material radiactivo, combinado o no con material no radiactivo, que haya sido utilizado en procesos productivos o aplicaciones, para los cuales no se prevean usos inmediatos posteriores en la misma instalación, y que, por sus características radiológicas no puedan ser dispersados en el ambiente de acuerdo con los límites establecidos por la AUTORIDAD REGULATORIA NUCLEAR.

ARTÍCULO 4°.- La COMISION NACIONAL DE ENERGIA ATOMICA (CNEA) es la autoridad de aplicación de la presente ley y coordinará con las provincias o la Ciudad de Buenos Aires, según corresponda, todo lo relativo a su aplicación.

ARTÍCULO 5°.- En todas las actividades de gestión de residuos radiactivos la COMISION NACIONAL DE ENERGIA ATOMICA deberá cumplir con las normas regulatorias referidas a la seguridad radiológica y nuclear, de protección física y ambiental y de salvaguardias internacionales que establezca la AUTORIDAD

REGULATORIA NUCLEAR y con todas aquellas regulaciones nacionales, provinciales y de la Ciudad de Buenos Aires, que correspondan.

Responsabilidad y transferencia

ARTÍCULO 6°.- El Estado Nacional, a través del organismo de aplicación de la presente Ley, deberá asumir la responsabilidad de la gestión de los residuos radiactivos. Los generadores de los mismos deberán proveer, los recursos necesarios, para llevarla a cabo en tiempo y forma. El generador será responsable del acondicionamiento y almacenamiento seguro de los residuos generados por la instalación que él opera, según las condiciones que establezca la Autoridad de Aplicación, hasta su transferencia a la COMISION NACIONAL DE ENERGIA ATOMICA, debiendo notificar en forma inmediata a la AUTORIDAD REGULATORIA NUCLEAR sobre cualquier situación que pudiera derivar en incidente, accidente o falla de operación.

ARTÍCULO 7°.- La COMISION NACIONAL DE ENERGIA ATOMICA establecerá los criterios de aceptación y las condiciones de transferencia de los residuos radiactivos que sean necesarios para asumir la responsabilidad que le compete, los que deberán ser aprobados por la AUTORIDAD REGULATORIA NUCLEAR.

ARTÍCULO 8°.- La transferencia a la COMISION NACIONAL DE ENERGIA ATOMICA de los residuos radiactivos, en particular los elementos combustibles irradiados, se efectuará en el momento y de acuerdo a los procedimientos que establezca la COMISION NACIONAL DE ENERGIA ATOMICA previamente aprobados por la AUTORIDAD REGULATORIA NUCLEAR. En ningún caso quedará desvinculado el operador de la instalación generadora de su responsabilidad por eventuales daños civiles y/o ambientales hasta tanto se haya efectuado la transferencia de los residuos radiactivos.

ARTÍCULO 9°.- La COMISION NACIONAL DE ENERGIA ATOMICA, deberá elaborar en un plazo de SEIS (6) meses a partir de la promulgación de la presente Ley y actualizar cada TRES (3) años, un Plan Estratégico de Gestión de Residuos Radiactivos que incluirá el Programa Nacional de Gestión de Residuos Radiactivos que se crea en el Artículo 10 de esta Ley. Este plan y sus actualizaciones serán enviados al PODER EJECUTIVO NACIONAL, quien previa consulta a la AUTORIDAD REGULATORIA NUCLEAR, lo enviará al CONGRESO DE LA NACION para su aprobación por ley.

Deberá asimismo presentar anualmente ante el Congreso de la Nación un informe de las tareas realizadas, de la marcha del plan estratégico y en su caso, de la necesidad de su actualización.

Programa Nacional de Gestión de Residuos Radiactivos

ARTÍCULO 10°.- La COMISION NACIONAL DE ENERGIA ATOMICA a través del Programa Nacional de Gestión de Residuos Radiactivos que se crea por esta Ley, deberá:

a. Diseñar la estrategia de gestión de residuos radiactivos para la República Argentina y lugares sometidos a su jurisdicción.
b. Proponer las líneas de investigación y desarrollo referentes a tecnologías y métodos de gestión de residuos radiactivos de alta, media y baja actividad.

c. Planificar, coordinar, ejecutar, asignar los fondos necesarios, y controlar la realización de los proyectos de investigación y desarrollo inherentes a la gestión de residuos radiactivos.

d. Estudiar la necesidad de establecer repositorios o instalaciones para la gestión de residuos de alta, media y baja actividad generados por la actividad nuclear estatal o privada.

e. Promover estudios sobre seguridad y preservación del ambiente.

f. Proyectar y operar los sistemas, equipos, instalaciones y repositorios para la gestión de residuos de alta, media y baja actividad generados por la actividad nuclear estatal o privada.

g. Construir, por si o por terceros, los sistemas, equipos, instalaciones y repositorios para la gestión de residuos de alta, media y baja actividad generados por la actividad nuclear estatal o privada.

h. Proponer los criterios de aceptación y condiciones de transferencia de residuos radiactivos para los repositorios de alta, media y baja actividad.

i. Establecer los procedimientos para la colección, segregación, caracterización, tratamiento, acondicionamiento, transporte, almacenamiento y disposición final de los residuos radiactivos.

j. Gestionar los residuos provenientes de la actividad nuclear estatal o privada incluyendo los generados en la clausura de las instalaciones, los derivados de la minería del uranio, y los que provengan de yacimientos mineros abandonados o establecimientos fabriles fuera de servicio.

k. Implementar, mantener y operar un sistema de información y registro que contenga la documentación que permita identificar en forma fehaciente y continuada a los generadores y transportistas de residuos y a los demás participantes en toda la etapa de la gestión. Deberá asimismo contener el inventario de todos los residuos radiactivos existentes en el país. Copias de la documentación, en lo correspondiente a sus respectivas jurisdicciones, deberán ser enviadas a las autoridades competentes de las provincias y de la Ciudad de Buenos Aires, para su conocimiento.

l. Elaborar planes de contingencia para incidentes, accidentes o fallas de operación y programas de evacuación ante emergencias.

m. Informar en forma permanente a la comunidad sobre los aspectos científicos y tecnológicos de la gestión de los residuos radiactivos.

n. Ejercer la responsabilidad a largo plazo sobre los repositorios de residuos radiactivos.

o. Actuar en caso de emergencia nuclear como apoyo a los servicios de protección civil en la forma y circunstancia que se le requieran.

p. Efectuar los estudios técnicos y económicos financieros necesarios, teniendo en cuenta los costos diferidos derivados de la gestión de los residuos radiactivos, con el objeto de establecer la política económica adecuada.

q. Realizar cualquier otra actividad necesaria para cumplir con los objetivos de la gestión.

ARTÍCULO 11°.- El Programa Nacional de Gestión de Residuos Radiactivos incorporará la recuperación de los sitios afectados por la actividad de extracción, molienda, concentración, tratamiento y elaboración de minerales radiactivos procedentes de yacimientos en explotación y sus respectivos establecimientos

fabriles, así como de yacimientos mineros abandonados o establecimientos fabriles fuera de servicio.

La aplicación del principio "impacto ambiental tan bajo como sea posible" deberá ser integrado con programas complementarios de desarrollo sustentable para las comunidades directamente afectadas y quedará sometido a los procedimientos de evaluación de impacto ambiental que dispongan las provincias o la Ciudad de Buenos Aires, según corresponda.

ARTÍCULO 12°.- En el caso que la COMISION NACIONAL DE ENERGIA ATÓMICA proponga la necesidad de emplazamiento de instalaciones para la disposición final de residuos radiactivos de alta, media o baja actividad, las localizaciones deberán ser aprobadas previamente como requisito esencial por ley de la provincia o de la Ciudad de Buenos Aires, según corresponda con acuerdo de la AUTORIDAD REGULATORIA NUCLEAR.

A tal fin, deberán realizarse los correspondientes estudios de factibilidad ambiental que contendrán una descripción de la propuesta y de los efectos potenciales, directos e indirectos que la misma pueda causar en el ambiente indicando, en su caso, las medidas adecuadas para evitar o minimizar los riesgos y/o consecuencias negativas e informando sobre los alcances, riesgos y beneficios del proyecto.

Deberá convocarse a una audiencia pública con una anticipación no menor a DIEZ (10) días hábiles, en un medio de circulación zonal brindándose la información pertinente vinculada al futuro emplazamiento.

Financiación de la Gestión de los Residuos Radiactivos

ARTÍCULO 13°.- Créase el Fondo para la Gestión y Disposición Final de los Residuos Radiactivos que se constituirá a partir de la promulgación de esta Ley y cuyo destino exclusivo será el financiamiento del Programa Nacional de Gestión de Residuos Radiactivos, a cargo de la COMISIÓN NACIONAL DE ENERGÍA ATÓMICA.

Dicho fondo se conformará con los aportes de los generadores de residuos radiactivos en la forma que establezca la reglamentación, conforme el artículo 10, inciso p) de la presente y con arreglo a principios de equidad y equilibrio según la naturaleza, volumen y otras características de la generación. Dichos aportes se integrarán en el plazo más breve a partir de la generación de los residuos correspondientes.

ARTÍCULO 14°.- Teniendo en cuenta la existencia de costos diferidos en la gestión de los residuos radiactivos, el Congreso de la Nación dictará una ley que regule la administración y control del fondo previsto en el artículo 13 de esta ley.

ARTÍCULO 15°.- Derógase el Fondo de Repositorios Finales de Residuos Nucleares de Alto Nivel creado por el Decreto Nº 1540/94. Los recursos existentes serán transferidos al Fondo constituido por la presente ley.

ARTÍCULO 16°.- Comuníquese al Poder Ejecutivo.

L.2.2.3 National Regulatory Standards

ARN's Regulatory Standards mentioned in the National Report

AR 0.0.1. Regulatory Standard Revision 3
Licensing of Type I installations

AR 0.11.1. Regulatory Standard Revision 3
Licensing of personnel of Type I installations

AR 0.11.2. Regulatory Standard Revision 2
Psychophysical aptitude requirements for specific authorizations

AR 0.11.3. Regulatory Standard Revision 1
Retraining of personnel of Type I installations

AR 3.1.1. Regulatory Standard Revision 2
Occupational exposure in nuclear power plants

AR 3.1.2. Regulatory Standard Revision 2
Limitation of radioactive effluents in nuclear power plants

AR 3.1.3 Regulatory Standard Revision 2
Radiological criteria related to accidents in nuclear power plants

AR 3.2.1. Regulatory Standard Revision 2
General safety criteria in the design of nuclear power plants

AR 3.2.3. Regulatory Standard Revision 2
Nuclear power plant fire protection

AR 3.3.4. Regulatory Standard Revision 1
Nuclear power plant fuel performance

AR 3.6.1. Regulatory Standard Revision 2
Nuclear Power Plant Quality System

AR 3.8.1. Regulatory Standard Revision 1
Pre-nuclear commissioning

AR 3.9.1. Regulatory Standard Revision 1
General criteria for operation safety in nuclear power plants

AR 3.17.1. Regulatory Standard Revision 1
Nuclear power plant decommissioning

AR 4.1.1. Regulatory Standard Revision 0
Occupational exposure in nuclear research reactors

AR 4.1.2. Regulatory Standard Revision 1
Limitation of radioactive effluents from nuclear research reactors

AR 4.8.1. Regulatory Standard Revision 1
Commissioning of critical assemblies

AR 4.8.2. Regulatory Standard Revision 1
Commissioning of research reactors

AR 4.9.1. Regulatory Standard Revision 1
Critical assembly operation

AR 4.9.2. Regulatory Standard Revision 1
Research reactor operation

AR 6.1.1. Regulatory Standard Revision 1
Occupational radiation safety in Type I radioactive installations

AR 6.1.2. Regulatory Standard Revision 1
Limitation of radioactive effluents in Type I radioactive installations

AR 10.1.1. Regulatory Standard Revision 3
Basic Radiation Safety Standard

AR 10.12.1. Regulatory Standard Revision 1
Radioactive waste management

AR 10.13.1. Regulatory Standard Revision 1
Basic standard on the physical protection of nuclear materials and installations

AR 10.14.1. Regulatory Standard Revision 0
Assurances of non-diversion of nuclear materials and of material, installations and equipment of nuclear interest

AR 10.16.1. Regulatory Standard Revision 1
Transport of radioactive materials

L.2.3 Quality Assurance Manual

Out of the 52 PNGRR quality assurance system procedures mentioned in *Table 6 - CNEA' Quality Assurance Program Status* , the identification code, title and a summary of 28 operating procedures are listed.

GR-IC-PN-020 Revision 1 Advanced Education and Training Plan for the licensing of personnel of Ezeiza Atomic Center Radioactive Waste Management Area (AGE)

Indicates the Training Plan for personnel that has to occupy licensable positions in the operation of installations, equipment and devices at Ezeiza Radioactive Waste Management Area.

GR-IC-CP-021 Revision 1 Ezeiza Atomic Center Radioactive Waste Management Area (AGE) Practice Code

Lays down the responsibilities, powers and obligations of personnel working at Ezeiza radioactive waste management area, as well as the general procedures to be followed in the operation of the area.

GR-IC-PN-022 Revision 1 Ezeiza Atomic Center Radioactive Waste Management Area (AGE) Monitoring Plan

Establishes the routines for making measurements and assessments to verify the isolation of radionuclides and the protection of personnel, the public in general and the environment.

GR-IC-PN-023 Revision 0 Emergency procedures applicable to Ezeiza Atomic Center Radioactive Waste Management Area (AGE) activities.

Specifies anomalous situations envisaged at different AGE's installations and establishes the respective countermeasures for their mitigation.

GR-IS-IF-024 Revision 1 Description of Ezeiza Atomic Center Radioactive Waste Management Area (AGE)

Describes AGE's different installations, their location and operation capacity.

IS-14-RZ-50 Revision 1 Final Safety Report of Ezeiza Atomic Center Radioactive Waste Management Area (AGE) Deposit for Interim Storage of Radioactive Sources and Wastes.

Lays down the safety criteria followed to design, build and operate the interim storage warehouse for sealed sources and radioactive waste.

GR-IS-PO-052 Revision 0 Procedure to operate the Semi-containment System for Solid Radioactive Waste.

Establishes the procedure for the final disposal of low level solid radioactive waste packages.

GR-IS-PO-053 Revision 0 Procedure to operate the Semi-containment System for Low-Level Radioactive Liquid Waste.

Sets up the procedure to discharge low level radioactive liquids in AGE's liquid radioactive waste semicontainment system.

GR-IS-PO-054 Revision 0 Procedure to operate the System for Final Disposal of Structural Solid Radioactive Wastes and Sealed Sources.

Establishes the procedure for the final disposal of low level structural, solid radioactive waste into AGE's low level liquids final disposal system for structural radioactive waste and sealed sources

GR-IS-PO-055 Revision 1 Procedure for the final disposal of biological radioactive waste subject to conditioned deregulation.

Lays down the practical methodology followed in the final disposal of biological solid radioactive waste considered as released from regulatory control under certain conditions.

GR-IS-PO-057 Revision 1 Procedure to condition disused sealed sources.

Sets up the practical methodology to condition sealed sources, from their reception up to their interim storage or final disposal, as appropriate.

GR-IC-IF-060 Revision 0 Report on the protection against fire at Ezeiza Atomic Center Radioactive Waste Management Area (AGE)

Reviews AGE's different installations in connection with the presence of flammable materials and their fire load and determines the characteristics of mitigation systems.

GR-IC-IF-062 Revision 1 Characterization of Ezeiza Atomic Center Radioactive Waste Management Area (AGE) site.

Describes Ezeiza Atomic Center Radioactive Waste Management Area (AGE) site.

GR-IS-PO-064 Revision 1 Procedure to operate the Handling Yard and Stowage of Items.

Establishes the mechanism for the verification, entry, handling of packages in AGE's Handling and Stowage Yard for Waste Packages.

PO-14-RZ-26 Revision 2 Procedure for inspections and control assays associated to AGE's radioactive waste management.

Lays down the procedures for inspections and control assays to verify the acceptance requirements established for non-conditioned and conditioned packages of low and medium level radioactive waste in different management stages.

PO-14-RZ-27 Revision 1 Request of service and acceptance requirements for low and medium level radioactive waste management at AGE.

Establishes the guidelines to request the radioactive waste management service and the requirements for the acceptance of low and medium level radioactive wastes packages for their further management at AGE.

PO-14-RZ-28 Revision 0 Procedure for the radiological monitoring of trucks loaded with urban waste.

Sets up the activities to perform the radiological monitoring of trucks loaded with urban waste.

PO-14-RZ-29 Revision 2 Expediting of documentation originated in the radioactive waste and disused sealed sources management that enter into AGE.

Lays down the system for expediting the documentation originated during the rendering of collection services as well as in treatment, conditioning and location operations of radioactive wastes that enter into AGE.

PO-14-RZ-30 Revision 1 Procedure for the collection, internal transport and transfer of liquid radioactive waste generated by the Radioisotope Production Plant, called *tellurites.*

Establishes the procedure for the collection, internal transport and transfer of liquid radioactive wastes generated by the Radioisotope Production Plant, called *tellurites* .

GR-IS-PR-007 Revision 1 Procedure for the Transfer of spent fuel and irradiated control rods between RA 3 reactor and the MTR Spent Fuel Central Storage Facility.

Describes the conditions, operations and documentation required at the time of transferring spent fuel and control rods.

GR-IS-RQ-008 Revision 3 Acceptance conditions for the transport of solid radioactive waste.

Establishes the acceptance conditions for the transport of solid radioactive waste packages.

GR-IS-IN-015 Revision 1 Instructions for the access of persons and vehicles to Ezeiza Atomic Center Radioactive Waste Management Area (AGE)

Sets up acceptance conditions: identification of persons and vehicles, equipment for the transport of radioactive material, record and file, to gain access to AGE.

PO-14-RZ-16 Revision 2 Procedure for low level solid radioactive waste compactation.

Establishes the conditions and requirements of activities for low level solid radioactive waste compactation.

PO-14-RZ-17 Revision 2 Requirements to cover licensable positions of AGE's operative structure.

Lays down the conditions and requirements that shall be satisfied by AGE's operation personnel that performs tasks that require a license.

PO-14-RZ-18 Revision 2 Tasks and Duties of AGE's Functional Structure personnel.

Sets up the tasks and duties of different licensable and non-licensable positions of AGE's functional structure.

PO-14-RZ-19 Revision 2 Procedure for the conditioning and long-term storage of disused Radon 226 sources.

Establishes the requirements and conditions that shall be satisfied during the conditioning and long-term storage of disused Radon 226 sources that enter into AGE.

L.2.4 Emergency Plans

PN 00O011 Revision 0 Emergency Plan and evacuation of CNEA's facilities.

Establishes the system and requirements for CNEAS's nuclear installations to control emergency situations and protect lives and properties, mitigate consequences and minimize the unavailability of installations.

PG 14 OZ 15 Revision 0 Ezeiza Atomic Center emergency and evacuation plan

Sets the guidelines to organize and standardize the behaviour of sectors and personnel so that in emergency situations they are prepared to act in a proper and specific manner.

L.3 Reassessment of Safety in the Ezeiza Radioactive Waste Management Area (AGE)

A. Re-assessment activites carried out up to date are the following:

- Compilation of existing information in AGE and surrounding areas.

- Election of a suitable computer software (MODFLOW) to generate a three dimensional model of the transport of potential contaminant substances and forecast the destination of potential contaminants and possible means of exposure which shall be used to assess the associated risk.

- Training of CNEA's personnel in the application of the selected computer model.

- Election and acquisition of equipment for hydrogeological and geochemical characterization of the site's environmental conditions (Continuous phreatic level meters, Peristaltic pump, Rotary drill, Water quality monitoring system, etc.) and of instruments for the radiochemical laboratory and field measurements.

- Geophysical prospective of the area by means of non-destructive technologies (Vertical electric drilling, electromagnetometer and georadar. The final report is ready).

B. Current tasks in progress are the following:

- Characterization of geochemical and hydrogeological conditions of the area to get data on the structure, stratigraphy and mineralogy of the area by means of drillings and taking of samples.

- Analysis of soil and sediment samplings to get parameters that influence underground water flow and the transport of contaminant substances.

- Installation of new piezometers with monitoring equipment to observe the temporal and spatial variability of the levels of multiple aquifers to get data on regional flow patterns.

- Design and performance of pumping tests to determine the hydraulic conductivity and the transmission and storage capacity of underground material.

- Chemical Analysis of underground water samplings, including pH, electric conductivity, temperature, dissolved oxygen, etc.

The above data shall be used to develop an underground flow and transport process conceptual model that shall be incorporated to the computer model.

C. The remaining activities, which will facilitate the attainment of the proposed objectives, shall be performed in accordance with the following schedule:

YEAR 2005

a. Throughout 2005:

b. Monthly monitoring of new and pre-existing wells to measure their natural uranium, tritium and gamma total content.

c. Installation of continuous level meters in the three aquifers. A measurement with portable instruments shall be made on a monthly basis.

d. Acquisition of monthly meteorological data by means of AGE's meteorological cabin.

e. Monthly measurement on site of parameters such as pH, temperature and underground water conductivity.

f. Chemical analyses shall be made to check Kd existing data of different radionuclides according to pH and concentration of activity. The work shall be performed with a tracer and a carrier. In the first stage (first half) the performance of uranium, caesium, strontium and cobalt shall be analyzed. In the second stage (second half) the performance of plutonium shall be analyzed following the same methodology (simulation shall be with cerium or other similar isotope).
Special care shall be taken in Kd determination (static method) in the prior moistening of samplings, as it has been noted that the rainfall pattern is of great significance for the modification of Kd predicted in the laboratory. The results obtained, all of them certified, shall be final for upcoming transport estimates.

g. Construction of new monitoring wells of the aquifier (with own drill) to increase the density of data improving the evaluation of a potential contaminant plume and to sample sediments to obtain stratigraphic characteristics.

h. Construction of the flow model and of the transport of radionuclides. The performance of the hydrological system and the potential movement of involved species shall be assessed.

i. A demographic projection shall be made for a 10 km area around AGE. This study will take approximately one year and shall be made in two stages. In the first stage, a drawing with existing population and its characteristics shall be made. Said map shall include also current

public works and a survey of the records of the area for the last twenty years. In the second stage, a five year projective review of said population shall be made (as in longer periods projections are not so accurate), including potential public works that could affect the area and analyzing their impact and other fifty years projection with less accuracy.

YEARS 2006 AND 2007

Throughout 2006 and first half 2007

Idem year 2005 a, b, c and d.

First half 2006

Application of the water flow numerical model (Visual MODFLOW) incorporating the results obtained in AGE's environmental characterization and in the monitoring of measured variables. The concentration and spatial and temporal distribution of radionuclides under study shall be quantified.

Second half 2006 and first half 2007

AGE's safety assessment:
Characterization of radioactive waste final disposal systems, determination of the source term, development of scenarios and means of exposure, interpretation of results and analysis of their consequences.

L. 4 Advanced Education and Training

- Training Course at IAEA Network of Centres of Excellence in Underground Research Laboratories in the United States: Methodologies of Radioactive Waste Deep Geological Management in the United States.

- Training Course at IAEA Network of Centres of Excellence in Underground Research Laboratories in the Czech Republic: Location of Deep Geological Repositories and in Switzerland: Foundations of Radioactive Waste Deep Geological Management.

- Training visit (IAEA two-month scholarship in the framework of RLA/4/018 Regional Project) at Institute for Transuranium Elements on "Preparation of samplings, performance of tests and interpretation of nuclear fuel postirradiation results", Karlsruhe, Germany

- Training visit (IAEA scientific visit in the framework of RLA/4/018 Technical Cooperation Regional Project) at Institute for Transuranium Elements, European Commission, Karlsruhe, Germany, "Hot cells technology: mass spectometry, process control and quality control", Karlsruhe, Germany.

In addition, the personnel has been encouraged to participate in training courses given in the country such as:

- Geotectonic foundations based on argentine examples. Training course organized by *Asociación Geológica Argentina*, given by Dr. Victor Ramos from 3 to 7 May 2004.

- SIG's Basic Program Operation Course, given by *Compañía de Inteligencia Geográfica - Ejército Argentino – IGM* from 17 to 19 May 2004.

- Second Congress of Cartographic Science, held at SEGEMAR from 22 to 25 June 2004.

- Seminar "Restoration Techniques and Conservation of Heritage", 16 September 2004, Lemit, La Plata.

- XVII Latin American Congress and X Argentine Microbiology Congress from 17 to 21 October 2004, *Centro Cultural San Martín*, Buenos Aires.

- Seminar "Special Concretes", given by *Asociación Argentina de Tecnología del Hormigón*, from 21 to 22 October 2004, in the city of Buenos Aires.

- Course "Concrete Technology", given at *Instituto Nacional de Tecnología Industrial*, from 25 to 27 October 2004.

L.4.1 Conferences, Seminars, Technical Meetings and Workshops

To facilitate the exchange of information and keep updated on different disciplines related to a specific matter, CNEA's personnel participated in the following events:

L.4.1.1 National

Ist Conference on the Commemoration of Wetlands World Day, *Dirección de Ambiente y Desarrollo Sustentable de la Municipalidad de Malargüe*, Mendoza, February 2004.
"Malargüe Site Contamination. Mineral Tailings Management", Nolberto L. Giordano

Seminar on "Nuclear Cooperation Agreements with Australia", held at *Academia Nacional de Ciencias de Buenos Aires*, 20 April 2004. "Conditioning of research reactors spent fuel", Miguel A. Audero

Conference on Mining and Environment, Malargüe. Organized by *Dirección de Minería de la Prov. de Mendoza*, May 2004. "Uranium tailings management. Work progress", Juan Carlos Meza

Seminar on Substainable Mining, June 2004. "CMFSR Reactivation Project – Quarry water treatment", Armando Asenjo

Briefing to COFEMIN (Mine Federal Council), August 2004. "CMFSR Reactivation Project – Quarry water treatment". Armando Asenjo

XXV Argentine Congress on Chemistry. Dr. Eduardo Bottani, held at Olavarría, Buenos Aires, September 2004. "C-22 alloy corrosion in presence of halides". R.M. Carranza, R.B. Rebak, M.A. Rodríguez

XII Seminar on the Pacific Uses of Nuclear Energy, *Universidad Nacional de Córdoba*, Córdoba, September 2004. "Radioactive Waste and Spent Fuel Management", E. Maset

CNEA for Patquía town, La Rioja, September 2004. "General environmental conditions and specifically results of samplings of water consumed by the population", Juan Carlos Meza

Participation in the XXXI Annual Meeting of the Argentine Association of Nuclear Technology, city of Buenos Aires (November 2004) where 5 works on several aspects of radioactive waste and spent fuel management were submitted.

L.4.1.2 International

Corrosion NACExpo 2004, 59th Annual Conference, NACE International, The Corrosion Society
New Orleans, U.S.A., March 2004.
"Effect of fluoride ions on the anodic behavior of mill annealed and thermally aged Alloy 22"
M.A. Rodríguez, R.M. Carranza, R.B. Rebak

4th IAEA Research Coordination Meeting on Chemical Durability and Performance Assessment of Spent Fuel and High-Level Waste Forms under Simulated Repository Conditions
Vienna, Austria, April 2004
"Iron Based Glasses for Immobilisation of Uranium Containing Nuclear Wastes". Annual Report of Activities IAEA/CNEA-CAB Research Agreement Nº 10643
D.O. Russo, D. Rodríguez, M.E. Sterba, A.D. Heredia, M. Sanfilippo, S. Prastalo

Second Research Coordinating Meeting (RCM) on Corrosion of research reactor aluminium-clad spent fuel in water organizaded by the IAEA
Almaty, Kazakhstan, June 2004.
"Basic studies related to corrosion of aluminum alloys in pure water: behaviour of precipitates and effect of sediments"
L. Lanzani

Conference on Computational Mechanics
Sociedad Chilena de Mecánica Computacional y Universidad de Santiago de Chile, Santiago de Chile, Chile, August 2004.
"Constituent models for unsaturated flows in fractured rocks"
F. Quintana, L. Guarracino, D. Millán

L.5 Agreements

Two international agreements are in force, which were subscribed to gain access to experience developed in other countries. In Argentina 5 national agreements are in force.

L.5.1 International Agreements

Agreement with the United States Department of Energy for technical exchange and cooperation in radioactive and mixed wastes management area.

Said agreement entered into force in May 1996 and shall remain in force for ten years. During this period several actions have been taken. Work is in progress on the Ezeiza Management Area environmental characterization project to reassess the safety of the site. The R&D project for the separation of caesium from low level waste current of Mo^{99} production for medicinal use was completed.

Agreement with *Empresa de Residuos Radiactivos S.A (ENRESA),* Kingdom of Spain, for cooperation in the radioactive waste storage and management field.

Said agreement entered into force in December 2001, shall remain in force for three years and has been renewed in December 2004.

L.5.2 National Agreements

Agreement with the Argentine Army for the operation of rock quarries for Malargüe site restoration project.

Frame agreement with the Province of Mendoza and the Municipality of Malargüe associated to Malargue restoration project (approved by Provincial Decree 1386/03).

Also in the 2004 the following agreements were subscribed:

CNEA Execution Agreement with *Centro de Inteligencia Geográfica (CIG) del Ejército Argentino*, (Geographic Intelligence Center of the Argentine Army) for the application and use of the technology: Geographic Information Systems applied to nuclear installations, geology and environmental studies.

CNEA-*Instituto Nacional de Tecnología Industrial* Specific Agreement on Technological Cooperation, corresponding to R&D Projects “Immobilization of Exhausted Ionic Exchange Resin Beds Generated by Nuclear Power Plants” and “Study of Long Term Performance of Engineering Barriers to be used in Respositories for Intermediate Level Radioactive Wastes”.

Frame agreement with Province of La Rioja, through *Dirección General de Minería*, approved by Provincial Decree 1312/04, to contribute to Los Colorados Environmental Restoration Project, former Los Colorados mineral deposit, Patquía Department.

L.6 Joint Projects with IAEA

1) “Corrosion of Aluminum-clad Research Reactor Spent Fuels in Wet Storage – Phase II”
IAEA Coordinated Research Project

2) “New Development in Treatment and Conditioning of Spent Ion Exchange Resins”
IAEA Research Contract Nº 12428

3) “Chemical Durability and Performance Assessment of Spent Fuels and HLW Glass Blocks under Simulated Repository Conditions”
Coordinated Research Project – Completed in 2004

4) “Spent Fuel Management from Research Reactors”
Regional Project IAEA RLA/4/018

5) Participation in IAEA´s “New Enabled Waste Management Data Base”

6) “Training in and Demonstration of Waste Disposal Technologies in Underground Research Facilities – An IAEA Network of Centres of Excellence”
IAEA INT/9/173

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