Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management

Fourth National Report

2011

República Argentina

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

FOURTH NATIONAL REPORT

2011

República Argentina

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

FOURTH NATIONAL REPORT

On December 19, 1997, during the 41st Session of the General Conference of IAEA, the Argentine Republic executed the JOINT CONVENTION ON THE SAFETY OF SPENT FUEL MANAGEMENT AND ON THE SAFETY OF RADIOACTIVE WASTE MANAGEMENT, agreed upon in Vienna during the Diplomatic Conference conducted on September 15, 1997. On July 6, 2000, the Argentine Congress enacted Law No. 25279 therefore ratifying the terms of the Joint Convention which entered into force on June 18, 2001.

The present National Report was prepared in accordance with Section 32 of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management to be submitted in compliance with Section 30 of the aforementioned Convention.

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

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ACRONYMS

AECL	**Atomic Energy of Canada Ltd.**
AGE	**Ezeiza Radioactive Waste Management Area**
ALARA	**As Low As Reasonably Achievable**
ANSI	**American National Standards Institute**
APS	**Probabilistic Safety Analysis**
ARN	**Nuclear Regulatory Authority**
ASECQ	**Spent Fuel Dry Storage System**
ASME	**American Society of 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**
CMFSR	**San Rafael Mining and Milling Complex**
CNA I	**Atucha I Nuclear Power Plant**
CAN II	**Atucha II Nuclear Power Plant**
CNE	**Embalse Nuclear Power Plant**
CNEA	**Argentine 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**
RW	**Radioactive Wastes**
ENREN	**Nuclear Regulatory Entity (Former Nuclear Regulatory Body)**
FACIRI	**Storage Facility for Research Reactors Spent Fuel**
GRR	**Radioactive Waste Generators**
HEU	**High Enriched Uranium**
HLW	**High Level Waste**
ICRP	**International Commission on Radiological Protection**
ILW	**Intermediate Level Waste**
ISO	**International Standard Organization**
LUE	**Enriched Uranium Laboratory**
LLW	**Low Level Waste**
LILW	**Low and Intermediate Level Waste**
LWR	**Light Water Reactor**
MTR	**Material Testing Reactor**
MCNP	**Monte Carlo Neutron Particle Calculation Code**
NASA	**Nuclear Power Plant National Operator**
NEWMDB	**Net Enabled Waste Management Database, http://www-newmdb.iaea.org**
NPPs	**Nuclear Power Plants**
NORM	**Natural Occurring Radioactive Material**
NUSS	**IAEA Nuclear Safety Standards**
IAEA	**International Atomic Energy Agency**
OSART	**Operational Safety Review Team**
PEGRR	**Radioactive Waste Management Strategic Plan**
PHWR	**Pressure Heavy Water Reactor**
PNGRR	**Radioactive Waste Management National Program**
PFS	**Sealed Source Production Plant**
PPMo99	**Molybdenum-99 Production Plant**
PPR	**Radioisotope Production Plant**
PPRS	**Radiological Protection and Safety Program**

PPUO2	**Uranium Production Plant**
PRAMU	**Uranium Mining Environmental Restoration Project**
PTAMB	**Treatment and Conditioning Plant of liquid radioactive low level and medium level waste**
RA-0	**Argentine Reactor 0**
RA-1	**Argentine Reactor 1**
RA-2	**Argentine Reactor 2**
RA-3	**Argentine Reactor 3**
RA-6	**Argentine Reactor 6**
RADWASS	**IAEA Radioactive Waste Safety Standards**
RPS	**Safety Periodic Review**
RW	**Radioactive Wastes**
RRII	**Research Reactors**
SAC	**Quality Assurance System**
SIEN	**Nuclear Emergency Response System**
SF	**Spent Fuel**
SIER	**Radiological Emergency System**
SIFEM	**Emergency Federal System**
SPDIN	**Nuclear Facility Decommissioning Subprogram**
ULE	**Low Enriched Uranium**
VLLW	**Very Low Level Waste**
WANO	**World Association of Nuclear Operators**

GLOSSARY

- *“exempt 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 cannot 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 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 licenses;

- *"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.

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

FOURTH NATIONAL REPORT

SECTION A INTRODUCTION

A.1 Summary of the main topics of the Report

The structure of the Fourth National Report complies with the *Guidelines Regarding the Form and Structure of National Reports* (INFCIRC/604/Rev.1).

Section A describes the scope of the nuclear activity developed in Argentina since 1950 as well as the legal and regulatory framework. It also makes reference to the *Strategic Plan for Radioactive Waste Management* (*Strategic Plan*), which refers to 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 said policies.

Section C lays down the scope of application for Argentina of the terms of the Joint Convention, regarding spent fuels, naturally occurring radioactive materials (NORM) and disused sealed sources. The content of this section does not reflect modifications with respect to the declarations in the prior National Reports.

Section D describes the facilities destined for spent fuel management and radioactive waste management, including their respective inventories. Discharges and pertinent doses are included in Section F.

The Legislative as well as the Regulatory framework are 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 obligations foreseen with reference to the responsibilities of the license holder, human and financial resources, quality assurance, operational radiation protection, emergency preparedness and decommissioning.

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

- General safety requirements
- Existing facilities
- Siting of projected facilities
- Design and construction of facilities

- Safety Assessment of facilities
- Operation of facilities
- Final disposal of spent fuel

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

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

- General safety requirements
- Existing facilities and past practices
- Siting of projected facilities
- Design and construction of facilities
- Safety Assessment of facilities
- Operation of facilities
- Institutional measures after closing

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

In this Section, a summarized description of the situation of the Uranium mining waste has also been included.

It should be noted that the 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) and in Embalse Nuclear Power Plant (CNE), therefore the contents of Section G also apply to Section H equivalent responsibilities, except for those cases where the latter are specific.

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

Section J makes reference to disused sealed sources provided in article 28 of the Joint Convention.

Section K describes the activities planned to improve safety and specifies the measures that are foreseen to be adopted in the future.

Section L includes the Annex containing the list of National Conventions, Laws, Regulations, Standards and National Documents related to the nuclear activity of Argentina.

A.2 Overview

The present National Report describes the actions taken in Argentina on the safety of spent fuel (SF) management and on the safety of radioactive waste (RW) management, in

order to provide evidence of the fulfilment of the obligations derived from the Joint Convention. To facilitate the reading and a better understanding, it has been decided to include a summary of those parts of the prior National Reports that are considered necessary in order to comply with this objective.

Nuclear energy began its development to be used for different applications in Argentina in 1950, when the Argentine Atomic Energy Commission (CNEA) was created. Initially research and development activities were conducted in basic areas. In the following years, progress has been made with the development of nuclear technology, the operation of relevant facilities working on the production of radioisotopes for medical and industrial applications and the performance of tasks in connection with the nuclear fuel cycle, including mining and uranium processing activities, manufacturing of fuel elements for research and power reactors, production and generation of nuclear power, production of heavy water and the operation of two nuclear power plants. In the past, reprocessing programs were undertaken at demonstrative scale.

As a result of these activities and others performed in the nuclear field by other private and public entities, different types of radioactive waste have been generated, which are managed by applying the legal and regulatory provisions in force, in agreement with the obligations derived from the Joint Convention.

The legal framework applicable to radioactive waste management integrates with the provisions of the National Constitution and with the legislation adopted by the National Congress by Law No. 24804 which regulates the Nuclear Activity and Law No. 25018 which determines the Radioactive Waste Management Regime along with Law No. 25279 which approved the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, as well as different laws related to the nuclear activity in agreement with treaties, conventions, agreements and international conventions.

In addition, accordingly with the Federal Government adopted in Argentina, a number of provincial and municipal regulations are in force with a significant impact on radioactive waste management activities in the country.

The National Law of Nuclear Activity assigns CNEA the state ownership of spent fuel and the responsibility for the management of radioactive waste.

The same Law sets forth that the CNEA shall take full responsibility for the decommissioning of nuclear power plants and any other significant facility (Type I Facilities).

Furthermore, the same Act creates the *Nuclear Regulatory Authority* (ARN), successor to the Nuclear Regulatory Entity (ENREN), which is empowered to regulate and supervise the nuclear activity in all matters related to radiological and nuclear safety, physical protection and safeguards. Likewise, it authorizes the ARN to supervise the use of nuclear materials, the licensing of persons and facilities and the verification of international safeguards.

Likewise, Law No. 25018 appoints CNEA as the implementing authority to perform all the

activities related to radioactive waste management and sets up the *National Radioactive Waste Management Program* (PNGRR), responsible for the compliance with the *Radioactive Waste Management Strategic Plan* (PEGRR).

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

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

- **discharges**: liquid and gaseous effluents containing radioactive materials that originate from the normal operation of a facility and that due to their total activity may be discharged into the environment in a planned and controlled manner.

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

A.3 National Program for Spent Fuel Management and Radioactive Waste Management

As has already been mentioned, in 1998 CNEA was appointed through Law Nº 25018 as the application authority for matters related to radioactive waste management and determined the obligation to develop a *Strategic Plan for Radioactive Waste Management (PEGRR)*, subject to the approval of the National Congress.

This PEGRR 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 last update of the PEGRR includes Fourth Nuclear Power Plant construction and its commercial start up, the life extension of Embalse Nuclear Power Plant and start up of CAREM Prototype Reactor. These activities were declared to be a matter of national interest in the provisions of Law No. 26566.

Likewise, the Plan includes the relevant amendments to Atucha I and Atucha II NPP, current research and production and research reactors in operation and to be erected, facilities of the ARGENTINE ATOMIC ENERGY COMMISSION and the Argentine corporations CONUAR S.A. and DIOXITEK S.A.; as well as the changes related to URANIUM MINING ENVIRONMENTAL RESTORATION PROJECT (PRAMU) and PILCANIYEU TECHNOLOGICAL CENTRE and so on.

PEGRR establishes the mechanisms to manage in a safe manner all waste originated from the development of practices and also those generated in decontamination activities and decommissioning of nuclear facilities and radioactive installations. Moreover, it

proposes research and development plans associated with technologies elected for every management stage, suitable human resource training, availability of necessary funds in furtherance of the Plan and related social communication activities.

This document outlines technological solutions according with the state of art technology which enable radioactive waste and spent fuels generated in Argentina to be managed efficiently.

Although spent fuel is considered a potential energetic resource due to its fissile material content, the decision about including the reprocessing in spent fuel management has been postponed until 2030.

Every activity included in PEGRR that may imply a radiological risk is regulated by ARN. Standards and regulations issued by ARN are based on radiologic and nuclear safety criteria which accord with those internationally adopted.

On the other hand, PEGRR 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 Autonomous City of Buenos Aires. In this sense, Section 4 of Law No. 25018 sets forth that CNEA shall coordinate with the Provinces and the Autonomous City of Buenos Aires the enforcement of Radioactive Waste Management System, in order to make it possible to manage radioactive wastes produced in these places and set up cooperation and advisory systems for the competent organizations.

With reference to the sites where the future facilities for the final disposal of radioactive waste shall be located, Law No. 24804 sets forth that CNEA, in its role of Responsible Organization, shall propose the potential sites that may result from the studies performed. These sites will require the approval both of ARN from the radiological and nuclear safety point of view and of a Law issued by the Provincial Government where the proposed repository would be placed.

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SECTION B POLICIES AND PRACTICES

B.1 Spent fuel management policy

In Argentina, the Government exercises state ownership of special radioactive fission material contained in spent fuels from any origin: nuclear power plants and experimental, research and/or production reactors. (Section 2, Law Nº 24804).

In this sense, the decision whether to reuse fissile material contained in spent fuels or not has to be adopted before 2030. At such time, the installation of the underground laboratory must have been started, which allows a deep geological repository to be designed and constructed. Said repository must be operative by 2060 (Strategic Plan – Law Nº 25018).

With regard to spent fuels generated in the operation of research reactors or radioisotope production reactors and for which no further use is envisaged, the strategy considers two alternatives:

- Shipping to the country where the nuclear material was originally enriched, if possible.
- Treatment and conditioning for final disposal.

Here we may underline that the adhesion of Argentina to the RERTR Program (Reduced Enrichment for Research and Test Reactors) has determined that in December 2000, July 2006 and November 2007, all spent fuel from research and production reactors containing Highly Enriched Uranium (HEU) were exported to the Department of Energy of the USA (USDOE) in the frame of the *Spent Nuclear Fuels from Foreign Research Reactors Acceptance Program.*

B.2 Spent fuel management practice

The practice adopted in Argentina with reference to spent fuel management has been wet storage during the time necessary to allow for sufficient decay of the fission products and later interim dry storage.

In the case of CNE nuclear power plant, the spent fuel 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). (See G. 2.2. and G. 2.3).

At CNA I, spent fuel has been subject to wet storage at the power plant itself. During 2008, its execution of the compact storage project (“re-racking”) was concluded, whereby the available space for storage in pools will be 1808 positions. In December, 2010, 1167 locations were available in the storage pools, which implies the sufficient capacity to store spent fuel in CNA I until at least 2015.

A building annex to CNA I with vertical dry silos for interim storage of SF will be constructed with the aim of allowing the transfer from the pools building of those more decayed SF (see G.4 and K3.1).

The spent fuel originated by the operation of research and radioisotope production reactors is stored in a pool at the respective reactor site, until the fission products decay sufficiently and are later transferred to a temporary spent fuel wet storage facility (Central Deposit for Special Irradiated Fissionable Material - DCMFEI).

Nowadays a new facility is under construction for the temporary storage of SF originated in RRII (Irradiated Fuel Facility of Research Reactors – FACIRI) which will replace DCMFEI deposit and will count with safety improvements.

Currently all spent fuels from research and production reactors containing Highly Enriched Uranium (HEU) provided by the USA have been returned to the country of origin.

For the remaining low-enriched SF (20%), as mentioned above, there is a first cooling stage complementary wet which is then move to a stage of interim dry storage, where it the final destination remains to be defined.

Beyond the decision to be adopted, the Strategic Plan foresees the development of research and development activities related to the final disposition of spent fuels as well the high level waste contained therein.

B.3 Radioactive waste management policy

The policy to be applied to radioactive waste management is determined in the following assertions:

- The radioactive waste originated from all nuclear applications performed in the country, including waste derived from the decommissioning of related facilities, will be managed safely.

- The allocation of responsibility for the development of radioactive waste management, corresponds to the National State through CNEA having the generator the obligation of providing the necessary resources for such management.

- The management of radioactive waste will be performed safely, ensuring the protection and the rights of present and future generations and the environment.

- The PEGRR will be authorized, periodically reviewed and audited by the National Parliament.

- The establishment of a proper procedure to obtain and to manage the necessary financial resources in order to comply with the obligations arising from the performance of the assigned responsibilities with reference to this matter, considering that many of them imply costs deferred in time.

- A system for registry and preservation of information will be implemented,

to ensure total tracking of inventories of radioactive waste generated and to be generated from all nuclear activities in the country.

- A program for public communication program will be implemented.

In agreement with this policy, the following additional factors have been taken into account:

- The main responsibility for radioactive waste management corresponds to the National State through the *Argentine Atomic Energy Commission (CNEA*).
- The regulation and supervision of radioactive waste management are duties inherent to the National State performed by the *Nuclear Regulatory Authority (ARN).*
- The implementation of the policy on this matter will follow the guidelines of the *National Radioactive Waste Management Program*, with the responsibilities specified in Law Nº 25018, handling the radioactive waste management in the Republic of Argentina with an integrated perspective.

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

- Identification and assessment of accumulated and projected waste inventories
- Adoption of the appropriate technological solutions for the safe management of such waste, with scientific-technological support
- Definition of responsibilities and specification of obligations and interrelations of the involved parties, from the generation of waste to the final stage of management
- Definition of the required facilities for final disposal
- Communication of its activities to the public and provision of the required information
- Assessment of the costs associated to all these activities, determination of the financial sources and the financial and management methods

The establishment of the PEGRR implies the definition of the treatment methodology and the final disposal technological systems for the different types of waste. The review every three years of the *Strategic Plan* is conducted as set forth in the provisions of the Law and provides the opportunity to introduce the modifications originated by the optimisation of the management in its technological aspects derived from scientific advances, or from the development of innovative technologies and eventual changes in the strategic definitions relative to spent fuel treatment.

The communication and information program intended for the public will contribute the required information so that the population may value the scope of the proposed plans as well as the benefits, providing the adequate environment for public participation in subjects of their concern.

B.4 Radioactive waste management practice - Criteria

The following criteria are applied to radioactive waste management:

- The radioactive materials that on account of their activity concentration and/or total activity may be considered exempt will be released from regulatory control.
- The optimized discharges of liquid and gaseous radioactive materials may be released into the environment in compliance with the authorized discharge limitations determined by the corresponding operation license.
- Those radioactive materials that on account of their concentration of activity and/or total activity cannot be released into the environment will be treated and conditioned for their final disposal.

Regarding the first case, the Nuclear Regulatory Authority sets the exemption criteria that radioactive materials may be exempt in case the resulting effective dose for individuals most exposed does not exceed 10 µSv/ year and the effective collective dose does not exceed 1man-Sv / year.

The new regulatory guidelines GR6-Rev.0 sets general exemption levels for 300 radionucleides in values or concentration levels corresponding to those stated in Chart I-I of Annex I of IAEA Safety Standards 115, for moderate quantities of material.

Moreover, by means of a Resolution, ARN Board adopted a number of general values for clearance which may correspond to indicated values in IAEA Safety Guide Nº RS-G-1.7 and currently regulatory guidelines are under preparation to be applied.

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

- The release of radioactive material to the environment should be as low as must be possible.
- The effective annual dose in the critical group due to radioactive effluent discharge should not exceed 0.3 mSv.

The authorized discharge limits are defined for each facility.

Operating Licenses granted by ARN to the relevant facilities establish authorized discharge limits to conduct gaseous and liquid effluents.

Facilities count with storage and decay tanks of liquid effluents where they are controlled and stocked. These liquids are discharged into the environment in agreement with operating restrictions established in the relevant operating licenses.

In the case of gaseous discharges, its discharge is conducted in accordance with measurements of level and restrictions imposed in operating licenses.

The authorized discharge limits are defined for each facility and are included in the respective Operating Licenses.

Finally, the Standard AR 10.12.1 determines the general and particular criteria for waste generators and for those responsible for their management. This standard regulates the management of waste that on account of their nature and/or activity cannot be released into the environment.

B.4.1 Criteria applied to define and classify radioactive waste by categories.

The classification system previously applied in Argentina did not entail all the types of radioactive waste generated in Argentina, resulting in some difficulties relate to other classification categories used worldwide. Therefore, the new category proposed by IAEA has recently been adopted as a classification system which entails six classes of radioactive waste, mainly based on long term safety considerations and on the disposal of radioactive waste. While the generic relationship is entailed between different classes of waste and options, the acceptance of waste for a particular disposal facility requires to be proved by means of a safety analysis.

(1) Exempt waste (EW): Waste that meets the criteria for clearance, exemption or exclusion from regulatory control for radiation protection purposes
(2) Very short lived waste (VSLW): Waste that can be stored for decay over a limited period of up to a few years and subsequently cleared from regulatory control according to arrangements approved by the regulatory body, for uncontrolled disposal, use or discharge. This class includes waste containing primarily radionuclides with very short half-lives often used for research and medical purposes.
(3) Very low level waste (VLLW): Waste that does not necessarily meet the criteria of EW, but that does not need a high level of containment and isolation and, therefore, is suitable for disposal in near surface landfill type facilities with limited regulatory control. Such landfill type facilities may also contain other hazardous waste. Typical waste in this class includes soil and rubble with low levels of activity concentration. Concentrations of longer lived radionuclides in VLLW are generally very limited.
(4) Low level waste (LLW): Waste that is above clearance levels, but with limited amounts of long lived radionuclides. Such waste requires robust isolation and containment for periods of up to a few hundred years and is suitable for disposal in engineered near surface facilities. This class covers a very broad range of waste. LLW may include short lived radionuclides at higher levels of activity concentration, and also long lived radionuclides, but only at relatively low levels of activity concentration.
(5) Intermediate level waste (ILW): Waste that, because of its content, particularly of long lived radionuclides, requires a greater degree of containment and isolation than that provided by near surface disposal. However, ILW needs no provision, or only limited provision, for heat dissipation during its storage and disposal. ILW may contain long lived radionuclides, in particular, alpha emitting radionuclides that will not decay to a level of activity concentration acceptable for near surface disposal during the time for which institutional controls can be relied upon. Therefore, waste in this class requires disposal at greater depths, of the order of tens of metres to a few hundred metres.
(6) High level waste (HLW): Waste with levels of activity concentration high enough to generate significant quantities of heat by the radioactive decay process or waste

with large amounts of long lived radionuclides that need to be considered in the design of a disposal facility for such waste. Disposal in deep, stable geological formations usually several hundred metres or more below the surface is the generally recognized option for disposal of HLW

This classification is used only with the aim to providing information about radioactive waste inventories and to organize the information of this National Report. As regards the limits of content of level to each radioisotope, said limits will be established in accordance with safety assessment of the final disposal site once it has been selected.

B.4.2 Origin of radioactive waste

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

- EXEMPT WASTE: those originated in different activities. This waste shall not be considered radioactive waste once they have been released from regulatory control.
- VERY SHORT LIVED WASTE: Solid and liquid biological waste generated from research centres, medical applications, etc., containing radioisotopes with periods of disintegration under 100 days such as Ir 192, Tc 99m, I 131, Fe 59 which may be released from regulatory control after being stored until they decay below the authorized limits.
- VERY LOW LEVEL WASTE: They are included in the category of waste generated in extracting operations and processing of uranium. The remains of the material technically named as “mill tailings” is divided as sand, after extracting the biggest quantity of uranium.
- Mill tailings, along with mineral not economically exploitable and ores, are known as “mining waste”. Polluted soils and waste originated during the operation and decommissioning of nuclear facilities with activity levels slightly superior to the specified ones in the levels of exemption.
- LOW LEVEL WASTE: This waste may be separated in:

  a) Conditioned waste under procedures framed into a quality system, in metallic 200L drums specially designed in a safe way in authorized facilities. These waste include:

     - Solid and liquid waste originated in NPPs in radioisotope production facilities, in isotope production and research reactors and facilities related to the fuel cycle.
     - Incompressible waste non-compactable waste from the operation of both nuclear power plants conditioned directly in 200L drums;
     - Wet solid waste (sludge) originated in the treatment of liquids of CNAI, conditioned on site with cement matrices within 200L drums.
     - Short lived decayed sealed sources (τ<5 years), conditioned in industrial drums embedded in cement matrixes.
     - Liquid and solid biological waste generated in research centres, medical applications and so on, treated and conditioned by means specific techniques adequated to the type of waste.
     - Waste originated from decommissioning of nuclear power plants.

b) Non-conditioned waste stored in a safe manner, subject to characterization and test in order to define the treatment and management in accordance with the definition of acceptance criteria for its future disposal or prolonged store.

- Exhausted ionic resin Exchange and filters used in nuclear power plants and other nuclear facilities.
- Decayed sealed sources originated from medical and industrial applications.
- Contaminated and/or activated structural elements originated in decommissioning of nuclear facilities.
- Organic or watery liquids originated from radioisotope production and manufacture of nuclear fuels, stored in stainless steel containers.
- Solid wet waste. Sludge originated from fuel manufacture and resins depleted coming from radioisotope production reactors or research reactors.

- INTERMEDIATE LEVEL WASTE: This kind of waste consist of alpha emitters from the experimental development of mixed oxide fuel (MOX) and other materials containing long lived isotopes as those used in medicine (Radium-226 tubes, cells and needles, Pu238 pacemakers, etc.) and in industry (neutron sources) are also within this type of waste.

- HIGH LEVEL WASTE: These are fission products contained in spent fuel generated from the operation of nuclear power plants and spent fuel elements used in research and production reactors.

B.4.3 Practices applied for radioactive waste management

Radioactive waste management practices have been laid down in the PEGRR. These practices are based on the consideration of different alternatives for final disposal and take into account technical, operational and financial factors.

Parts of these practices include the minimization and segregation of waste at the same generator facilities. Based on the performed segregation, treatment and conditioning technologies are applied to each type of waste according to the final disposal alternative foreseen.

Low Level Waste

In the case of *compactible 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 L drums. *Non-compactible solids* such as metal parts, debris, etc. are stored in 200 L drums.

With reference to low level *liquid waste* generated from nuclear power plants, the management is different for each plant on account of the different technologies used. At CNA I, liquid waste generated from operation and maintenance activities are collected in tanks, characterized and concentrated by evaporation; concentrates as well as sludge from the cleanup of tanks are immobilized in cement matrixes and conditioned in 200 L drums.

In the case of CNE, liquid waste originated from operation and maintenance activities are treated in resin beds, discharging the low activity current into the environment on the basis of planned and controlled procedures, following pre-established procedures and within the frame of authorized constraints of discharges. Spent resin beds, classified as intermediate level radioactive waste, are stored at the facilities of each Power Plant, until their conditioning and final disposal.

Repository for low level radioactive waste

The practice applied until now for the final disposal of Low Level solid radioactive waste has consisted in the disposal of conditioned waste packages in engineering enhanced surface semi containment systems located in the premises Ezeiza Radioactive Waste Management Area (AGE), operated by Argentine Atomic Energy Commission (CNEA) as Management Organization. The system was developed considering a 50 year post-closure institutional control of the final disposal system. Due to the presence of historical waste, this period is under evaluation again.

In the case of *very short level liquid waste,* the practice at the AGE consists in the absorption of radionuclides by silt-calcareous soil beds with a high content of high retaining capacity clays, thus certain radionuclides with short half-life decayed to negligible levels during their permanence in the bed volume.

The disposition of *structural waste* which on account of its size cannot be conditioned in drums was made directly at the AGE's *Structural Material Final Disposal System*, conceived to handle low level specific activity waste (generally metal pieces coming from contaminated areas) which are periodically immobilized with a concrete casting in order to avoid dispersion.

In 2001, every final disposal activity of radioactive waste at AGE has been discontinued [See H.2.4] in order to conduct the re-evaluation of Radiological Safety already mentioned.

The Strategic Plan intends to build a new repository for very low and low level waste. Nowadays are being performed works related to the first stage to search for and select sites and areas to locate these repositories.

In the case of *Low Level* waste requiring a bigger level of isolation, the construction of final disposal systems near surface is foreseen, similar to those in operation in L'Aube, France and El Cabril, in Spain. This type of repository is based on the use of multiple and redundant barriers, completing the model with the application of approximately 300 years of institutional post-closure control. Waste will be immobilized in cement matrices and packed in 200 L drums and/or in special concrete containers

In the meantime, *low level solid waste* originated from operation and maintenance activities of both nuclear power plants are stored at the facilities of each Power Plant awaiting treatment and conditioning in accordance with compatible procedures in compliance with the waste acceptance requirements determined by the Managing Organization.

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

Conditioned packages with high doses of exposition are in special concrete containers which provide the adequate shield so that they can be safely handled.

High and Intermediate Level Waste

With respect to *High Level and/or Long Lived Waste* generated in the final stage of the nuclear fuel cycle, spent fuel is temporarily stored until a decision is adopted on its reprocessing or final disposal.

The PEGRR foresees to perform studies for the siting, construction and operation of a Deep Geological Repository. The deadline to adopt a decision on the possible reprocessing or final disposal of the SF is subject to the completion of the studies for the siting of the Deep Geological Repository which have to be concluded at the latest by 2030.

Duly treated and conditioned *Low and Intermediate Level of Long Lived Radioactive Waste* shall also be disposed of in the deep geological repository.

Deep Geological Repository

As already has been informed, the need to have a deep geological repository in Argentina is foreseen in the very long term, therefore the activities that are being performed are all included in the R+D Plan (see Section K.3.1.6 – R&D Activities).

If the reprocessing (closed cycle) option is adopted for waste generated from the last stage of the cycle, high level waste separated at that stage would be conditioned in especially designed glass matrices and containers and finally 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.

Until the projected Waste Repositories are available, waste awaiting final disposal are stored in buildings especially designed for this objective.

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SECTION C SCOPE OF APPLICATION

As in previous reports, this Fourth National Report deals with safety applied for the management of spent fuel and radioactive waste originated from all the uses of nuclear energy, both inside and outside the Fuel Cycle, including wastes originated from nuclear power generation, manufacturing of nuclear fuel, mining and uranium processing, production of radioisotopes for medical purposes, industrial uses, research and development activities, including controlled and planned radioactive discharges derived from the normal operation of the facilities where the above mentioned practices are performed.

The present National Report also deals with safety of disused sealed sources.

This National Report is not applicable to Naturally Occurring Radioactive Material (NORM) originated outside the fuel cycle since Law No. 25018, “Radioactive Waste Management Regime” in its section 2 defines those exclusively derived from the nuclear activity as scope of application conducted in the national territory of Argentina.

As has been stated in prior National Reports, Argentina has no reprocessing plants in operation and such plants are not included in near future plans.

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SECTION D LISTS AND INVENTORIES

D.1 Spent fuel management facilities

The current spent fuel management facilities are the following:

SITE	FACILITY
Atucha I Nuclear Power Plant	I & II Pool Building
Embalse Nuclear Power Plant	Storage pool
	Storage silos (ASECQ)
Ezeiza Radioactive Waste Management Area (AGE)	Central SF Storage Facility from research reactors (DCMFEI)

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

D.2 Spent fuel inventory

D.2.1 Atucha I Nuclear Power Plant

INVENTORY until Nov 11, 2010 (*)			
SYSTEM	QUANTITY	U total	Pu(**)
		t	t
Pools I	10,236	1552.9	5.6

D.2.2 Embalse Nuclear Power Plant

INVENTORY until Aug 31, 2010 (*)			
SYSTEM	QUANTITY	U Nat	Pu (**)
		t	t
Pool	41,117	770.7	2.8
Silos	84,540	1,574.59	5.8
TOTAL	125,657	2,345.1	8.6

D.2.3 Ezeiza Radioactive Waste Management Area (AGE)

INVENTORY until August 23, 2010 (*)		
TYPE	QUANTITY	Kg
MTR	156	179.45
PINS (***)	232	14.19
Total	534	193.64

(*) PIV Date (PIV: Physical Inventory Verification, IAEA safeguards)
(**) Estimates obtained by means of a calculus program, on the basis of SF burn-up, residence time, and position in the core.
(***) Pins: Research reactors pin type fuel

D.3 Radioactive waste management facilities

The existing radioactive waste management facilities at this date are the following:

SITE	FACILITY
Atucha I Nuclear Power Plant	Treatment & Conditioning of Liquid Radioactive Waste System
	Facility for Immobilization by Cementation of Liquid Radioactive Waste and Non-compactable and Structural Solid Radioactive Waste
	Treatment & Conditioning of Solid Radioactive Waste System
	Storage Facilities for Solid Radioactive Waste
	Storage System for Mechanical Filters from the Reactors Primary Circuit
	Storage System for Exhausted Ionic Exchange Resin Beds
	Discharge System for Gaseous Radioactive Waste
Embalse Nuclear Power Plant	System for the Treatment & Conditioning of Solid Radioactive Waste
	Storage Facilities for Solid Radioactive Waste
	Exhausted Resin Storage Tanks
	Liquid Radioactive Waste Treatment System
	Gaseous Radioactive Waste Treatment Facility
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)	Low Level Solid Radioactive Waste Treatment Facilities (**)
	Deposit for Interim Storage of Radioactive Sources and Waste
	Handling Yard and Stowage of Items
	Long Term Storage Deposit
	System for Final Disposal of Structural Solid Radioactive Waste and Sealed Sources (*)
	Semi Containment System for Solid Radioactive Waste (*)
	Semi Containment System for Very Low Level Liquid Radioactive Waste and Very Short Periods (*)

(*) These facilities have concluded their operations.
(**) This facility is in a state of partial dismantling in order to modify for expansion of operations.

A brief description of each facility is shown in *Section H.2 Existing Facilities and previous practices.*

D.3.1 List of facilities with Waste from Mining and Processing of Uranium Minerals

Mining waste and uranium minerals processing waste appear in the following facilities:

SITE	FACILITY
MALARGÜE (Mendoza Province)	Malargüe Former Industrial Mining Complex 1954 - 1986
HUEMUL (Mendoza Province)	Huemul Site Stopped operating in 1974.
CÓRDOBA (Córdoba Province)	Córdoba Mining Complex Began operating in 1982
LOS GIGANTES (Córdoba Province)	Former Industrial Mining Complex Los Gigantes 1982 - 1989
PICHIÑÁN (Chubut Province)	Former Industrial Mining Complex Pichiñan 1977 - 1981
TONCO (Salta Province)	Former Industrial Mining Complex Tonco 1964 - 1981
LA ESTELA (San Luis Province)	Former Industrial Mining Complex La Estela 1982 - 1990
LOS COLORADOS (La Rioja Province)	Former Industrial Mining Complex Los Colorados 1993 - 1997

A brief description of each one of these facilities is shown in *Section H.2.6 Waste from Mining and Processing of Uranium Minerals.*

D.4 Radioactive waste inventory.

The following is the radioactive waste inventory until December 31, 2010. The presentation of data has been prepared with information in accordance with the shape of NEWMDB of the International Atomic Energy Agency.

D.4.1 Atucha I NPP

ATUCHA I NUCLEAR POWER PLANT											
Type of waste	Place of facility	Processed	Est.	Volume (m^3)	RO %	FF/FE %	RP %	NA %	DF %	DC/RE %	ND %
LLW	Storage	No	Yes	147.4	100	0	0	0	0	0	0
LLW	Storage	Yes	Yes	356.2	100	0	0	0	0	0	0

D.4.2 Embalse Nuclear Power Plant

EMBALSE NUCLEAR POWER PLANT											
Type of Waste	Place of Facility	Processed	Est.	Volume (m^3)	RO %	FF/FE %	RP %	NA %	DF %	DC/RE %	ND %
LLW	Storage	No	Yes	440.2	100	0	0	0	0	0	0
LLW	Storage	Yes	Yes	514.2	100	0	0	0	0	0	0

Est=distribution is an estimate, Proc.=Is the waste processed (Yes/No)? RO=Reactor Operations, FF/FE=Fuel Fabrication/Fuel Enrichment, RP=Reprocessing, NA=Nuclear Applications, DF=Defence, DC/RE=Decommissioning/Remediation, ND=Not Determined

D.4.3 Technological Complex Pilcaniyeu

PILCANIYEU TECHNOLOGICAL COMPLEX	
Stored Waste (#)	**Vol (m^3)**
Process Waste	**3.6**
Structural Waste	**24**

D.4.4 Uranium Dioxide Production Plant

UO_2 Production Plant	
Stored Waste (#)	**Vol (m^3)**
Operational Waste	**51.2**

(#) Material contaminated with Natural Uranium

D.4.5 Ezeiza Radioactive Waste Management Area (AGE)

EZEIZA RADIOACTIVE WASTE MANAGEMENT AREA											
Type of waste	**Place of Facility**	**Processed**	**Est.**	**Volume (m^3)**	**RO %**	**FF/FE %**	**RP %**	**NA %**	**DF %**	**DC/RE %**	**ND %**
LLW	**Storage**	**No**	**Yes**	**225,4**	**8**	**43**	**0**	**49**	**0**	**0**	**0**
LLW	**Storage**	**Yes**	**Yes**	**685,9**	**61**	**17**	**0**	**22**	**0**	**0**	**0**
LLW	**Disposal**	**Yes**	**Yes**	**2397,3**	**66**	**1**	**0**	**33**	**0**	**0**	**0**
ILW	**Storage**	**No**	**Yes**	**4,3**	**0**	**28**	**0**	**72**	**0**	**0**	**0**
ILW	**Storage**	**Yes**	**Yes**	**23,0**	**0**	**43**	**0**	**57**	**0**	**0**	**0**
ILW	**Disposal**	**Yes**	**Yes**	**169,6**	**2**	**46**	**13**	**39**	**0**	**0**	**0**

Est=distribution is an estimate, Proc.=Is the waste processed (Yes/No)? RO=Reactor Operations, FF/FE=Fuel Fabrication/Fuel Enrichment, RP=Reprocessing, NA=Nuclear Applications, DF=Defence, DC/RE=Decommissioning/Remediation, ND=Not Determined

SECTION E LEGISLATIVE AND REGULATORY SYSTEM

E.1 Implementation of measures

Argentina has a legal framework that regulates all nuclear activity, including radioactive waste management and spent fuel management. The administrative and regulatory structure that has been implemented with reference to this issue is comprised in the following manner:

- An Independent Regulatory Body
- A National Organization which is responsible for radioactive waste management, for the determination of the manner in which nuclear power plants and any other relevant facility will be decommissioned and holds the ownership of the special fissionable materials contained in irradiated fuel elements
- An appropriate set of radiological and nuclear safety “regulatory standards”.
- A system to grant licenses
- A control system to verify the 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

After the Third National Report was presented, new regulations have been incorporated that will be detailed in the following paragraphs. Nevertheless and in order for the report to be self consistent, the legal background in areas of safety of spent fuel and radioactive waste management will be presented**.**

E.2.1.1 Background

CNEA (Argentine Atomic Energy Commission) was created in 1950 by Decree Nº 10936/50. One of CNEA’s specific responsibilities was the control of all public and private nuclear activities to be performed in the national territory.

Later, various legal regulations defined CNEA competence also as the Regulatory Body for nuclear and radiological safety matters, especially regarding the protection of individuals and of the environment against exposure to the harmful effects of ionising radiation, safety of nuclear facilities, and control of the destination of nuclear material. In this regard, the specific regulations were Decree Act Nº 22498/56, ratified by Law Nº 14467 and Decree Nº 842/58.

Law Nº 14467 determined CNEA’s competence to issue the necessary regulations for the permanent control of the activities related to radioactive substances and to provide the

necessary means to control the existence, marketing and use of materials related to peaceful applications of atomic energy.

Furthermore, Decree Nº 842/58 has approved the regulation for the *Use of Radioisotopes and Ionising Radiation Regulation* and made it effective to govern the use and application of radioactive materials and the radiations they emitted or which were originated by nuclear reactions and transmutations. The use of *X Rays* generators was excluded from the competence of the CNEA, and is of exclusive concern of the Ministry of Health.

The sustained growth of nuclear activity in the country made it necessary to strengthen the independence of the Regulatory Body with respect to the other activities carried out by CNEA. In 1994, by Decree Nº 1540/94 the National Executive Power created the National Nuclear Regulatory Body (ENREN) to perform the regulation and surveillance of nuclear activity, transferring the complete staff, equipment and facilities from CNEA's Regulatory Affairs Management to ENREN. As from 1997, ENREN adopted the present denomination of Nuclear Regulatory Authority (ARN).

E.2.1.2 Current situation

The present legal framework comprises the National Constitution, the treaties and conventions, laws and decrees as stated below and by 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 productive activities may 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 as determined by 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 the biological diversity and shall also provide for environmental information and education.

  The Nation shall issue the standards that include the minimum protection budgets and those complementary regulations required for the provinces, without altering their local jurisdictions.

  The admission into the national territory of actually or potentially dangerous waste and of radioactive waste 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 different commitments and obligations in the nuclear field for the State. These are strict commitments and obligations regarding the control of: **(a)** the non-proliferation of nuclear weapons; **(b)** nuclear 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 listed in Annex L.1.

- **Law Nº 24804**, enacted in 1997. This Act determines that the National State will establish the nuclear policy and perform research and development activities through the CNEA and regulatory and surveillance actions through the ARN, successor to the 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 Law Nº 24804.

- **Law Nº 25018**, enacted in 1998. It Determines CNEA's responsibilities, as Responsible Organization for Radioactive Waste Management. It also provides that CNEA shall perform the corresponding activities observing the restrictions established by the ARN, complying with all regulations, national, provincial and issued by the City of Buenos Aires.

E.2.2 Regulatory Framework

E.2.2.1 National requirements and provisions on Radiological Safety

The Nuclear Regulatory Authority (ARN) successor to ENREN was created by Law Nº 24804 and is the organization responsible for the regulation and control of nuclear activities in order to:

- Protect the individuals against the harmful effects of ionising radiations 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 performed with purposes not authorized by this Act and regulations resulting there from, 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 sense, Law Nº 24.804, Art. 7 determines that the ARN is in charge of the regulation and control of the nuclear activity in all aspects regarding radiological and nuclear safety, physical protection, control of the use of nuclear material, licensing and control of nuclear

facilities and international safeguards, as well as the advisory role to the National Executive Power in the corresponding matters. In addition, Law Nº 24804 in its Art. 10 sets forth that the regulation and control of nuclear activity in said aspects is subject to national jurisdiction, and Art. 14 provides that the ARN shall act as an independent agency under the jurisdiction of the Presidency of the Nation.

Besides Law Nº 24804, Art. 16 grants the ARN the following powers, among others: the power to issue regulatory standards in matters of its competence, to grant licenses, permits or authorizations to facilities and persons, to conduct regulatory inspections and assessments, and to impose sanctions in the corresponding cases (for further details see Section E.3 of this report).

The regulatory system of ARN[(1)] to the end of this National Report is composed of 62 regulations and 8 regulatory guidelines.

ARN regulations include licensing of nuclear facilities, radioactive facilities and their personnel, conjointly with different of radiological protection, nuclear safety and transport of radioactive materials requirements. In order to have access to these regulations, visit the following website: http://www.arn.gob.ar.

The basic regulatory approach of the regulatory standards is focused on performance, that is, they define the compliance of safety objectives, complementing with prescriptive requirements. In this sense, the manner to achieve said objectives is mainly based on good engineering judgement, on the qualifications of designers, constructors and operators and on the appropriate decisions taken by the Responsible Organization.

Standard AR 10.1.1, Basic Radiological Safety Standard (Revision 3, 2001), determines the requirements and provisions on the matter which are consistent with the recommendations of the International Commission on Radiological Protection (specifically with issue N°60).

Although the regulatory system has not undergone major changes since the 3rd National Report to the Joint Convention, the Regulatory Organization has continued updating current regulations, especially modifying the following standard:

Table 1 - Updating of Standards during 2008-2010

CODE	DENOMINATION
AR 7.9.1	Industrial gammagraphy equipment operation (Rev. 3)
AR 7.11.1	Individual permits for industrial gammagraphy equipment operators (Rev. 3)
AR 10.12.1	Radiactive Waste Management (Rev. 2)
Guía AR -5	General Recommendations to obtain and renew individual permits for industrial gammagraphy operators (Rev. 1)

(1) These are known as Normas AR (Standards AR).

In addition, the following regulatory standards and guides have been incorporated:

Table 2: New Standards and guides introduced during 2008-2010

CODE	DENOMINATION
Regulation AR 7.11.2 Revision 0	Individual permits for operators of radioactive sources for industrial applications.
Guideline AR - 6	Exemption Generic Levels

E.2.2.2 Licensing System

Hereinafter the fundamental concepts of the system presented at the 3rd National Report to the Joint Convention are summarized.

In Argentina the licensing system for radiological safety is defined in the Basic Standard AR 10.1.1. Radioactive waste management facilities, spent fuel facilities of nuclear power plants and spent fuel management facilities of research reactors are categorized by this standard as Type I or relevant. Therefore, in the licensing stage of these facilities as well as in the licensing of their staff, the standards *AR 0.0.1 Licensing of Type I Facilities* and *AR 0.11.1 Licensing of staff of Type I facilities* are applicable.

The regulatory standards (AR Standards) determine that the construction, operation and decommissioning of Type I facilities cannot be started without the corresponding licenses requested by the Responsible Organization and granted by the Regulatory Body. The licenses are granted after the ARN has performed an independent evaluation of the safety conditions foreseen and presented in the corresponding “Safety Report”.

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

The staff of a nuclear or radioactive facility has to be properly trained and qualified in accordance with their duties at the facility. The ARN requires that all staff assigned to significant safety-related tasks is licensed and has specific authorizations to perform the assigned duties. Standards AR 0.11.1 and AR 0.11.2 determine the criteria and procedures to grant individual licenses and specific authorizations to the staff that will perform tasks that require licenses in nuclear and radioactive facilities. Said standards also set out the terms and conditions according to which the ARN, prior review and report from its Advisory Boards, will grant these licenses and authorizations.

Based on regulatory criteria, international experience and the recommendations made by the IAEA, a gradual modification process for the validity of the Operation Licenses for Type I facilities has begun. They are being changed from an indefinite or permanent period of

time to an expiration term. In order to condition their renewal a limited term is determined, among other requirements, to a global re-assessment of safety at regular intervals (Periodic Safety Reviews) (PSR). This is a complementary tool to the continuous safety revision performed routinely by the persons responsible for the facilities and by the Regulatory Nuclear Authority. The validity period is made explicit in the Operation License itself.

E.2.2.3 Prohibition to operate without a license

Law Nº 24804, Section 9 provides that in order to develop a nuclear activity any natural or legal person shall, among other requirements, comply with ARN regulations in its scope of competence and request a license, permit or authorization that will enable him to perform his activities and comply with the obligations in safeguards or non-proliferation matters that Argentina has subscribed or will subscribe in the future.

E.2.2.4 Control system

Since the beginning of nuclear activities in the country and in order to verify that nuclear and radioactive facilities comply with the standards, licenses and requirements in force, the Regulatory Authority has determined a control system. At present the control system includes regulatory evaluations, inspections and audits. If necessary, the ARN requires the implementation of corrective measures, and in case they are not complied with may lead, as a last step, to impose the 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 the ARN the documentation related to radiological and nuclear safety it has created. The main components of said documentation 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 by said facility, are as the following:

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

The above documentation has to be kept permanently updated and the modification proposals must be forwarded to the Regulatory Authority.

The license and the above mentioned documentation constitute the Mandatory Documentation. On the other hand, any other standard, requirement, recommendation, request of information or letter, issued by the Nuclear Regulatory Authority in connection with radiological and nuclear safety, safeguards and physical protection, is also mandatory.

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

- Occurrence of an abnormal event.
- List of non-relevant events occurred, in accordance with the provisions of the Operational Experience Management Program.
- Activity values for each relevant radionuclide discharged to the environment and results of environmental monitoring sample tests.
- Inventory of processed and stored solid radioactive waste processed and stored.
- Values of the doses received by the staff exposed due to their work.
- Report on the annual Emergency Plan application drill: development, results and experiences learnt.
- All evidence or information which in the criteria of the Responsible Organization shows: weakness or degradation in the quality of components, equipment and systems which are important for safety or different risks in magnitude or nature, from those foreseen in the Final Safety Report or in the Probabilistic Safety Assessment.

In the other nuclear and radioactive facilities, 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

Law Nº 24804 authorizes the ARN to perform regulatory inspections and evaluations, carried out by their staff from the beginning of the regulatory activities in the country, in the following manner:

- *Routine inspections*: are performed essentially by inspectors. Their objective is to verify that the Responsible Organization complies with the restrictions and conditions determined in the operating license.

- *Special inspections*: are performed by experts in different matters (dosimetry, implementation and control, etc.) in coordination with the inspectors. They have different objectives as, for example, the supervision of preventive maintenance tasks during scheduled shutdowns.

- *Technical evaluations*: consist in the analysis of data collected during inspections or from other sources. For example, evaluations of the radiological safety of specific practices at nuclear or radioactive facilities to detect their potential weaknesses and identify possible measures to reduce doses of the staff or of the public or to improve the safety level.

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

E.2.2.5 Specific Regulatory Actions

The regulatory actions that may be taken by the ARN regarding a particular facility may originate from*:*

- The results of regulatory inspections and evaluations performed at the facility.

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

- The results 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, as the case may be; in this document the ARN urges the Responsible Organization to take the required corrective measures within a determined term. These documents have the following scopes:

- *Requirement*: is a regulatory order that the Responsible Organization must comply in the requested manner.

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

- *Request for additional information:* is a regulatory order whereby more details of the documentation provided are required, for example, the explanation of an assertion, and 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 ARN to impose the appropriate Sanction System. Article 16 of Law Nº 24804 authorizes 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 these purposes, ARN is authorized to lay down the relevant procedures that may apply in case of violation of the standards to be issued 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. ARN considers that if the regulatory system is really effective and the Responsible Organizations fully exercise their responsibilities, the application of sanctions and fines should occur only in exceptional cases.

In this sense, an informal ARN function is to make Responsible Organizations and Primary Responsibles aware of their responsibility regarding safety, in order to increase the communication of safety culture at all levels of the organization structure.

E.2.2.7 Clear assignment of responsibilities

Law Nº 24804, in its Art. 31, sets out that the responsibility for the radiological and nuclear safety of a facility rests without excuse on the holder of the license, permit or authorization. Its compliance with the provisions of the above mentioned Law or with the regulatory standards or requirements that may derive from it, do not exempt the holder from said 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, in whole or in part, the execution of tasks, but continues having the full responsibility determined by this Act.

Concerning the responsibilities of the radioactive waste generator and the transference of said waste to the managing organization, Law Nº 25018 in its Art. 6 states that the National State, through the authority in charge of the application of this Act (CNEA), shall assume the responsibility for radioactive waste management. The generators of this waste must provide the necessary resources to perform it in due time and manner.

The generator will be responsible for the conditioning and safe storage of waste generated by the facility he operates, in accordance with the conditions set out by the Regulatory Body, until they are transferred to CNEA, with the obligation to give immediate notice to ARN on any event which could result in an incident, accident or operation failure.

Article 7 of Law Nº 25018 authorizes CNEA to determine the acceptance criteria and the transference conditions for radioactive waste that may be necessary to assume the corresponding responsibility. This article also determines the approval requirement by the ARN for these transference conditions.

Article 8 sets out that the transference to the CNEA of radioactive waste, and in particular of irradiated fuel elements, shall be made at the time and in accordance with the

procedures laid down by the CNEA, with the prior approval by the ARN. In no event, shall the operator of the generating installation be exempted from the responsibility for contingent civil and/or environmental damages until the transference of the radioactive waste is completed.

Therefore and in agreement with Decree No. 1390/98 which regulates the provisions of Law Nº 24804, said transference defines the limit of responsibility of the operator of the generating facility, with reference to radioactive and irradiated fuel elements.

E.3 Regulatory Body

E.3.1 Duties and competence of the Regulatory Body

In Argentina nuclear development started in 1950. All nuclear activities performed in the country until the year 1994 were controlled by the Argentine Atomic Energy Commission (CNEA) through its regulatory branch: the Management of the Regulatory Branch. The applied regulatory system was defined by Law Nº 14467 and its Regulatory Decree Nº 842/58.

In 1994, the National Government, considering that the regulation and supervision of nuclear activities should be reserved to the National State, assigned the exclusive performance of these duties to an independent agency, in order to differentiate the role of the controller from that of the controlled parties.

Thus, Decree Nº 1540/94 creates the National Nuclear Regulatory Body (ENREN – Ente Nacional Regulador Nuclear), to perform regulatory and control duties of the nuclear activity, transferring the complete staff, equipment and facilities from CNEA's Regulatory Branch.

In 1997 the National Congress enacted the National Law of Nuclear Activity (Law Nº 24804), creating the NUCLEAR REGULATORY AUTHORITY (ARN) with the object to regulate and to control the nuclear activity, receiving the transference of 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 Section 7 of the Act, it is responsible for the regulation and control of the nuclear activity on matters of radiological and nuclear safety, physical protection as well as the control of the use of nuclear materials, licensing and supervision of nuclear facilities and international safeguards.

The above stated Law sets out that the regulation and control of nuclear activities are "subject to national jurisdiction". The ARN also acts as an advisory body to the National Executive Power in matters of its competence.

Law Nº 24804 assigns a wide set of faculties and responsibilities to the ARN. Among the most important are the following:

- Issue the regulatory standards with reference to nuclear and radiological safety, physical protection and control of the use of nuclear materials, licensing and

supervision of nuclear facilities, 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, relevant accelerators, and relevant radioactive facilities, including facilities for radioactive waste management and nuclear applications in medical and industrial activities.

- ❖ Undertake inspections and regulatory evaluations at the facilities subject to ARN regulation, with deemed necessary frequency.

- ❖ Impose sanctions, which shall be graded according to the seriousness of the fault and which may imply confiscating nuclear or radioactive materials, the preventive closure of the facilities subject to regulation if nuclear activities are performed without the appropriate license, permit or authorization or upon the detection of serious non-compliance of the nuclear and radiological safety and physical protection of materials and nuclear facilities.

- ❖ Create, in accordance with international parameters, nuclear and radiological safety standards for the staff working at nuclear and radioactive facilities and grant the specific licenses, permits and authorizations to perform the task subject to license, permit or authorization.

- ❖ Evaluate the environmental impact of any licensed activity, such as monitoring activities, review and follow-up of any impact, evolution or possibility of environmental harm that may result of the licensed nuclear activity.

It should also be noted that Annex I to Decree N° 1 390/98, that regulates the above mentioned Act, 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, offer the corresponding training to workers and neighbours.

These plans must foresee an active participation of the community. The Security Forces and the representatives of civil institutions of the area where these procedures take place shall report to the officer to be appointed by the Nuclear Regulatory Authority for said purpose. National, provincial and municipal authorities that may have any involvement in the creation 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 determined by the Convention on Nuclear Safety.

Law Nº 24804 and Annex I of regulatory Decree Nº 1390/98 grant the ARN the necessary legal competence to determine develop and apply a regulation and supervision system for

all nuclear activities performed in the country. In order to ensure an appropriate level of control, said legal competence is complemented by an adequate technical competence.

For this reason, as from the beginning of the regulatory activities in the country, it has been considered imperative to have qualified staff, so that with their level of knowledge and experience endow the Regulatory Body its own independent criteria in all aspects of nuclear and radiological safety, safety in the transport of radioactive materials and in radioactive waste management, as well as safeguards and physical protection.

For the same reason and as mentioned above, when the Regulatory Body was created, all human resources and materials were transferred to it from CNEA regulatory branch.

It is also worth highlighting that 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 concentrated on the following basic aspects:

- Training of staff involved in radiological, nuclear, transport and waste safety, safeguards and physical protection, either belonging to the ARN or at facilities performing practices subject to its control, also offering collaboration to IAEA's training programs.

- Periodical creation and revision of the corresponding standards.

- Undertaking of regulatory inspections and audits to verify the fulfilment of the granted licenses and authorizations.

- Independent execution of studies and tests related to the licensing of regulated installations.

- Development of scientific and technical aspects related to radiological, nuclear, transport and waste safety.

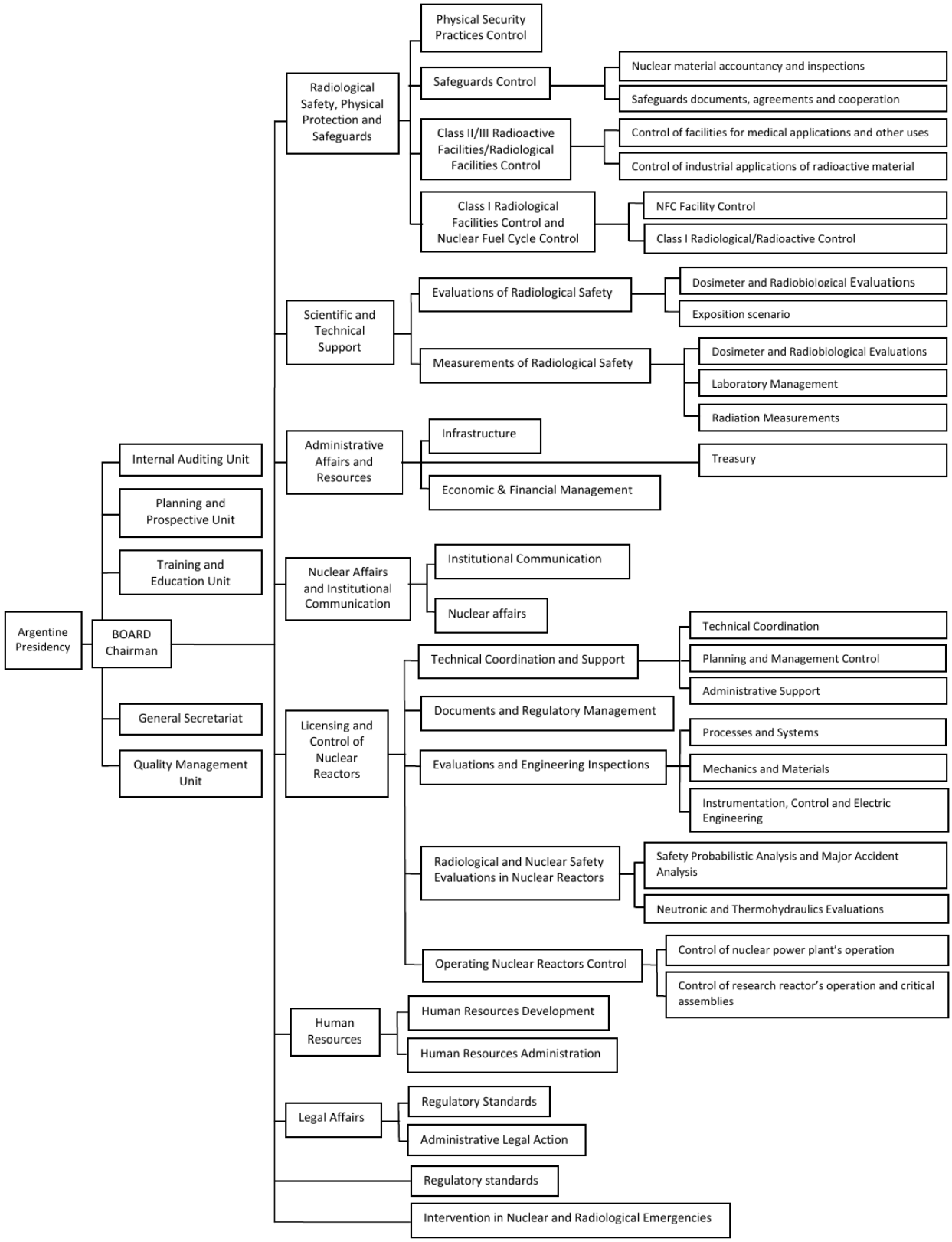
E.3.2 Nuclear Regulatory Authority Organizational Structure and Human Resources

The Nuclear Regulatory Authority is managed by a Board of Directors constituted by a Chairman, a 1st Vice-Chairman and a 2nd Vice-Chairman reporting to the General Secretariat of the Presidency of the Nation. The Chairman also performs ARN's executive duties.ARN's organic structure in force is shown in Figure I.

The main tasks performed by the *Radiological, Physical Protection and Safeguard Department* are the regulatory inspections and the evaluations concerning the Radiological Safety of Radioactive Facilities (medical, research and industrial facilities), Transport, Safeguard control and Nuclear Safety control.

The *Scientific and Technical Support Management* 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.

Chart 1: Organizational Chart ARN 2010



The *Nuclear Affairs and Institutional Communication Department* participates in the definition and implementation of the country's policies on regulatory issues at the corresponding national and international forum. It ensures the correct institutional relationship at national and international level, leading to a better compliance of ARN's regulatory functions. It promotes and communicates ARN's image and its regulatory institutional policy to the different publics and interested parties. Taking into account the ARN's role, it manages the solution of conflicts in the national nuclear area and institutional crisis that involve media or political aspects. In order to improve the regulatory actions it promotes internal and external communication.

The *Administrative Affairs and Resources Department* offers administrative and accounting support to ARN's regulatory tasks.

The *Licensing and Control of Nuclear Power Plants Department* is in charge of guaranteeing the control of radiological and nuclear safety of nuclear power plants, research reactors and critical assemblies during its operation, after its definite closure and during its decommissioning. It is also in charge of guaranteeing the licensing process of new nuclear power plants, research reactors and critical assemblies as well as the workers at these facilities who hold positions requiring a license of ARN. It also verifies licenses, regulations, requirements, agreements and international conventions in force and undertakes the corresponding regulatory actions.

ARN has increased its staff from 202 agents at the end of the year 2002 to 381 in December, 2010. The important increase of the staff, mainly young professionals, has been due to the need to cover positions left vacant by professionals that have retired and to cover the issues of the Licensing and Control of Nuclear Power Plants Management area.

Of the 381 persons working at ARN, 87% are professionals and technicians that perform technical tasks in their areas of competence or who are in training programs and the remaining 13% perform administrative tasks, 8% of ARN staff occupy high rank positions and counts with 20 or more years of training in regulatory activities.

The geographical distribution of all ARN employees is presented in Table 3:

Table 3 – Geographical Distribution of ARN employees

HEADQUARTERS	**66 %**
EZEIZA ATOMIC CENTER	**23 %**
ATUCHA II NUCLEAR POWER PLANT	**7 %**
NUCLEAR POWER STATIONS (CNA I AND CNE)	**2 %**
INTERNATIONAL ORGANIZATIONS (IAEA, ABACC, WHO)	**2 %**

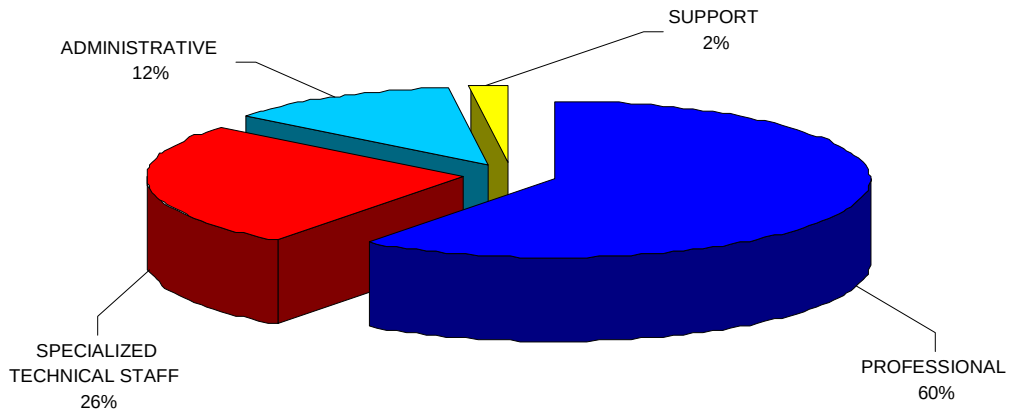
E.3.3 Resources assigned to the regulatory control of facilities under surveillance

The distribution of ARN's workforce assigned to safety inspection and evaluation tasks, directly related to the safety of regulated facilities is described in the *Annual Work Plans*.

This *Plan* discriminate efforts according to the different type of performed activities, directly or indirectly related to the safety of the facilities: inspections and evaluations of nuclear safety, radiological safety, radioactive waste management safety and transport of radioactive material safety, safeguards and physical protection, scientific support, radiation measurements, environmental studies, electronics, administration, legal, information technology, planning, training and institutional relations.

Figure II shows the distribution of staff per type of activities: professional, technical, administrative, and support.

Figura II – ARN Distribution of personnel in accordance with type of activities in 2010



The regulatory control of Spent Fuel Management and Radioactive Waste Management is performed as part of the global inspection and evaluation tasks of facilities controlled by ARN, estimated at a total load of approximately 3770 worker/day, where this activity represents 16% of all the activities of the involved sectors.

Measurement of drinking water in Ezeiza

In the previous Convention Report, the National Government required that different UN organizations and specialized International Scientific Institutions, coordinated by IAEA, conduct a peer review in the surroundings of the Ezeiza Atomic Center (CAE), with the following results:

"With reference to its objectives, the international expert's report has allowed to conclude as follows, with a high degree of certainty:

- ✓ *There is no anthropogenic (of human origin) contamination with radioactive elements in surface soil, in the subsoil, nor in the surface or underground waters used for the supply of water for human consumption in the area constituted by*

the districts of Ezeiza, Esteban Echeverría and La Matanza of the Province of Buenos Aires (Argentina). In particular, no presence of enriched or depleted uranium has been detected.

- ✓ *There is natural uranium in the Puelche acquiferous, as a result of natural geochemical processes.*
- ✓ *The radioactivity levels measured in the underground waters comply with the international standards of radiological protection and, therefore, do not represent any danger for human health.*
- ✓ *The water for consumption supplied to the population of the above mentioned neighbourhoods does not contain radioactive elements at levels that may be harmful for the health.*
- ✓ *Upon the results of the performed measurements of the water samples, no damaging sanitary effects are foreseen due to the exposure to ionizing radiation. Sanitary statistics back this conclusion.*
- ✓ *As there is no anthropogenic contamination with radioactive elements, no contamination whatsoever may be attributed from this type of activities that have been performed or that are being performed at the CAE site.*
- ✓ *The Argentine Nuclear Regulatory Authority adequately regulates the activities of the Ezeiza Atomic Centre.*

Apart from the radiological risk, uranium may also mean a chemical risk. The scientific basis to evaluate this danger is still in preparation and until now there is only a preliminary orientation level by the WHO. Although the international expert report was limited to the radiological aspects, it has been observed that in some water samples the concentration of natural uranium exceeds the preliminary orientation values determined by the WHO of natural uranium on the basis of its chemical toxicity. Some underground samples taken from the Puelche acquiferous have a uranium content that exceeds the preliminary orientation by the WHO, but comply with the reference level determined by the pertinent Argentine standards."

E.3.3.1 Qualification of the Nuclear Regulatory Authority Staff

ARN professional members of the staff have to pass a Postgraduate Course in Radiological Protection and / or a Course in Nuclear Safety as part of their initial training. This initial training is then complemented with on the job training as well as with the participation, both at national and international level, in specific courses, congresses, seminars and research projects.

E.3.3.2 Maintenance of the Regulatory Body's competence

ARN subscribed an Agreement Program with the Under – secretariat of Public Management in which a commitment matrix for Management Results is determined in order to develop an integral quality management system, the evaluation of the staff's performance and a plan to address the need of human resources.

E.3.3.3 Training activities

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

The Postgraduate course on Radiological Protection and Nuclear Safety started in 1977 and has 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, two postgraduate courses have been given: "Postgraduate Course in Radiological Protection and Security of Radiation Sources" and "Postgraduate Course on Nuclear Safety". The academic framework is provided, by means of an agreement, withthe 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 radiological 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.

ARN also offers Radiological Protection training courses for the technical staff of the ARN, of CNEA and of other public and private institutions that require them. In addition, the ARN provides national and international training courses in specific areas, such as: Safe transport of radioactive material, Safeguards for national inspectors of the IAEA and the ABACC and operators, Monitoring of aerosols for International Surveillance System operators, Physical protection of nuclear facilities and materials, Physical security of sources; Illicit traffic prevention and Medical response in case of accident by radiation

Chart 5: Postgraduate courses on Radiological Protection and Nuclear Safety. Participants between 1980 and 2010, ordered by country of origin

Algeria	4	**Argentina**	399	**Bolivia**	25
Brazil	41	**Colombia**	30	**Costa Rica**	18
Cuba	50	**Chile**	45	**Ecuador**	34
El Salvador	9	**Spain**	1	**The Philippines**	7
Guatemala	15	**Haiti**	6	**Morocco**	1
Mexico	30	**Nicaragua**	10	**Panama**	19
Paraguay	17	**Peru**	50	**Polonia**	1
Dominican Republic	7	**Romania**	1	**Uruguay**	23
Yugoslavia	1	**Venezuela**	47	**Vietnam**	1
Zaire	2	**Honduras**	2		
					Total: 896

E.3.3.4 Quality Management System

ARN has determined, documented and implemented a Quality Management System in agreement with the requirements determined in the IRAM-ISO 9001:2000 Standard. The facts and requirements of said system are described in the “Quality Manual of ARN”. In this document, the Board declares the Quality Policy, the commitment with the Quality Management System, the Management by Processes and Constant Improvement, among others.

Additionally, the Board has decided to start the discussion, interpretation and implementation of the IAEA Standard “GS–R-3 Management System for Facilities and Activities”.

The Quality Management System is implemented on the basis of the approach by processes. Therefore, seven (7) regulatory or main processes and four (4) support processes have been identified.

The analysis and follow up of these processes are performed through internal quality audits executed by persons who are independent from the process to be audited and who also have the adequate qualifications. During 2008 and 2010, seventeen (17) internal audits have been carried out, in which sixty nine (69) non conformities have been identified, forty five (45) observations and ninety eight (98) opportunities for improvement.

At present, ARN has certified Graduate Courses in Radiological Protection and Nuclear Safety under the IRAM-ISO 9001:2008 standards and the course for technicians will be also certified. ARN has credited Laboratory techniques under Standard IRAM_ISO 17025:2005.

The following processes have been added to ISO 9001: “Protection against Ionizing Radiations during the Transport of Radioactive Materials”, Management to Send and Receive Documentation from ARN, Class I Facility Personnel Licensing. The following are under the process of certification: Class I Radioactive Facility Control, Intervention in Nuclear and Radiological Emergencies, Planning and Prospecting, Regulatory Standards, Infrastructure and Technical and Scientific Support.

Documentation Management:

- Until December 2010, one hundred and one (101) documents have been approved and eighteen (18) documents are under preparation process.
- The ARN has a Document and Registry Control system and a system for Information Security.

Interest group Satisfaction

ARN performs the follow up and measurement of the satisfaction of the users by means of evaluations of the surveys and analysis of the complaints and suggestions. With respect to

other groups of interest, it analyzes the continuity and compliance of the agreements and accords and the participation of the staff in shared activities.

E.3.3.5 Financial resources

Besides an efficient structure and qualified staff, ARN requires the necessary financial resources for the effective compliance of the regulatory objectives. In this regard, Law Nº 24804 provides in its Section 25 that these resources shall originate mainly from:

- Annual regulatory fees
- Contributions from the National Treasury determined for the budget of each fiscal year, and
- Other funds, assets or resources that may be assigned according to applicable laws and regulations.

Art 26 of said Law determines 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 authorizing the ARN to determine the fees applicable to other regulated activities.

In this sense, ARN approved a "Licensing and Inspection Fee System" that sets out the respective fees for the issuance of licenses and permits in accordance with the facility or practice, as well as the annual fee for the operation of said facilities or practices.

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

The budget prepared by ARN for the 2010 fiscal year was AR$129,497,601 as shown in Chart 6.

Chart 6 ARN Budget of the fiscal year 2010

ITEM	VALUE IN AR$
1. Staff	**51,864,050**
2. Inputs	**3,195,405**
3. Services	**59,320,146**
4. Equipment	**6,069,000**
5.1 Scholarships	**800,000**
5.9 Transfers abroad	**6,449,000**
9. Figurative expenses	**1,800,000**
TOTAL	**129,497,601**

On a yearly basis, ARN prepares a budget project, which includes a list of the inflow provisions from regulatory fees and justifies request of funds to the National Treasury. This budget is published in the Official Bulletin in order to clearly indicate the manner in which the funds from persons and institutions which are bound to pay regulatory fees shall be used.

Below, several charts show the budgetary distributions of the execution of the work plan for 2010, of expenses according to different criteria. Figures III and IV show the budget distribution of regulatory tasks by type of inspection and by type of task, and Figure V shows budget distribution by item.

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

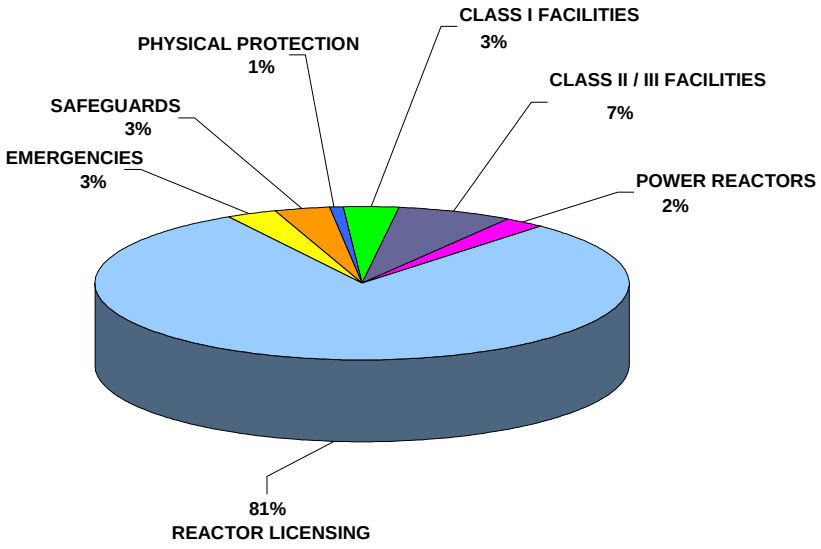


Figure IV - Budget distribution by type of task

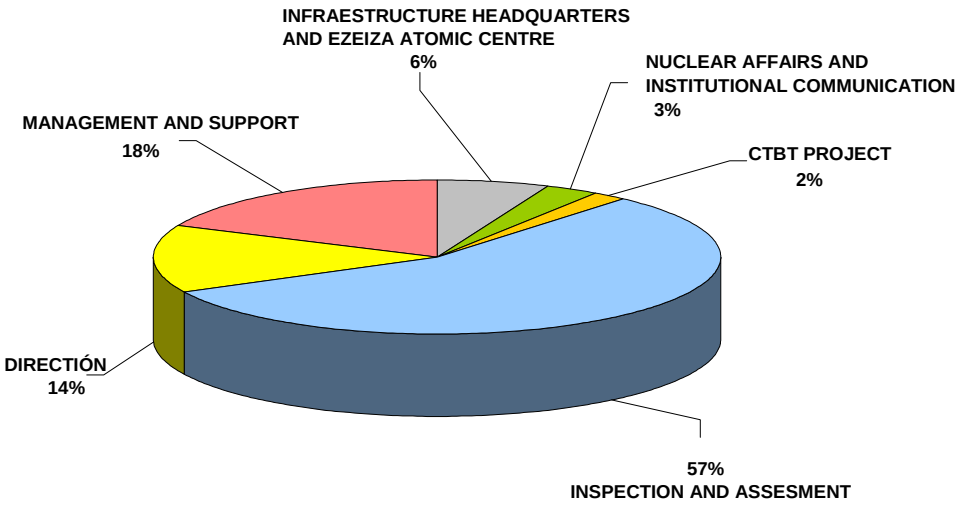
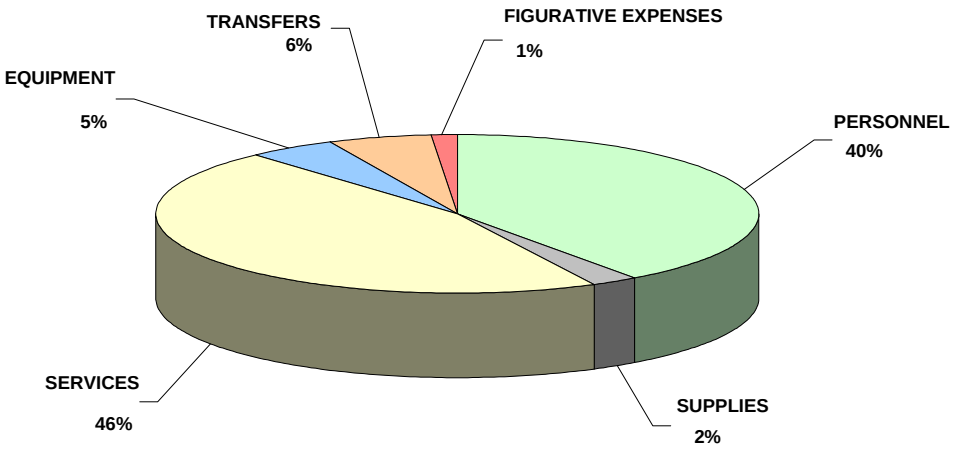


Figure V - Budget distribution by item



E.3.4 Relationship with other organizations

In the period 2008-2010, ARN continued with cooperative activities with other organizations, with agreements in force. Within this framework, with the Latin American Forum of the Radiological and Nuclear Regulatory Organizations, with IAEA participation, a Spanish American radiation safety network has been created, which allows the exchange of information between regulatory organizations in the region in order to contribute with the objective of attaining a high regional radiation safety level.

The national and international agreements and treaties are presented in ARN Annual Reports.

In addition, ARN 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).
- Permanent Advisory Group on Safeguards Implementation “SAGSI” (IAEA).
- United Nations Scientific Committee on the Effects of Atomic Radiations “UNSCEAR” (UN).
- International Commission on Radiological Protection (ICRP).
- Brazilian-Argentine Permanent Committee on Nuclear Policies.

E.3.5 Annual reports

Every year the ARN submits to the National Executive Power and to the Congress of the Nation a Report on the activities performed the previous year, in agreement with dispositions Art. 16 of the National Act of Nuclear Activity.

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

In order to give the widest possible coverage to the activities carried out and to the use of the assigned budget resources, the Report is also forwarded to public libraries, national universities, regulatory bodies, officers 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 web page, http://www.arn.gob.ar

SECTION F OTHER GENERAL SAFETY PROVISIONS

F.1 Responsibility of the license holder

F.1.1 Background

Nuclear activity started in Argentina in the 1950's. At that time the facilities did not have the magnitude and complexity they have nowadays. The responsibility for nuclear and radiological safety fell on an individual, usually the head of the nuclear facility who, assisted by his staff or by contracting third party services, performed all safety-related activities. When the facilities had the appropriate means and equipment, and the staff was trained, the Regulatory Body granted the person responsible for them the pertinent operation license.

Even though the above mentioned concepts are still essentially valid for small nuclear facilities, a number of improvements have been introduced to the regulatory system throughout the years. Thus, when operation characteristics of the nuclear facilities so require it, the Regulatory Body demands that the people who occupy specific positions in the operation staff undergo a special training and hold an individual license. Furthermore, training requirements for the operating staff 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, having the necessary number of trained operating staff is not sufficient by itself to ensure their operation with an appropriate safety level. Therefore, it was required to periodically review the design and operational aspects of important facilities and to introduce, whenever necessary, modifications in terms of safety as advised by state-of-the-art technology. In response to such considerations the Responsible Institution was formed.

F.1.2 Responsible Institution and Primary Responsible

ARN requires that each nuclear facility shall be supported by an organization able to provide the appropriate support to the staff of the plant in tasks inherent to radiological safety, nuclear safety, security, safeguards and radioactive waste management safety, such as the review of operating procedures, maintenance of safety systems, technical modifications to the plant, etc. This responsibility falls on the Responsible Institution, which in the case of nuclear power plants is Nucleoeléctrica Argentina S.A. (NA-SA), responsible for the operation of Atucha I Nuclear Power Plant (CNA I) and Embalse Nuclear Power Plant (CNE), including the nuclear fuels storage systems and the waste management generated in these facilities. CNEA is the Responsible Institution for the Ezeiza Waste Management facilities as well as for a number of significant facilities, including several research reactors.

AR 0.0.1 and AR 10.1.1 regulatory standards set the responsibilities of the Responsible Institution, amongst which the most significant are:

- The Responsible Institution shall make every reasonable effort 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 a sufficient condition concerning the responsibilities of the Responsible Institution, which shall make every reasonable effort, within its possibilities, to ensure safety. The Responsible Institution shall also comply with the regulatory standards and requirements set by other competent authorities that are not related to nuclear activities as for example the conditions concerning the release of chemical effluents. (see Section H.1)
- The Responsible Institution may be in charge of the operation of more than one nuclear facility and delegate totally or partially the execution of tasks, however, it remains fully responsible for them.
- In every nuclear facility the Responsible Institution shall appoint a person from its staff, called the Primary Responsible, who shall be directly in charge of the radiological and nuclear safety of the facility as well as the compliance with the licenses and regulatory requirements applicable thereto. In the case of nuclear power plants in operation, their directors are the Primary Responsible.
- The Responsible Institution shall provide the necessary assistance to the Primary Responsible so that the Primary Responsible may exercise its responsibilities. The Responsible Institution must supervise the Primary Responsible to verify that it complies with its safety-related responsibilities.
- The Responsible Institution shall submit to the ARN the necessary technical documentation to allow assessment of the safety of the nuclear facility whose license is required.
- No modification altering the design, operating characteristics or the mandatory documentation included in the operating license of a nuclear facility related to radiological or nuclear safety may be made without ARN´s prior authorization.
- The Responsible Institution and the Primary Responsible shall facilitate the inspections and audits required by the ARN.
- Any change in the organizational structure of the Responsible Institution that may affect its capacity to comply with its responsibilities shall require ARN's prior consent.

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

F.1.3 Regulatory control of fulfilment of license holder's responsibilities

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, ARN performs different types of controls as follows:

- ARN is permanently updated about the operational organizational structure. In case there is any modification, the Responsible Institution shall send to ARN a document stating the new operational organizational structure, the missions, functions and requirements of the staff. It is clear that every proposed change must be duly justified. ARN evaluates the documents and its corresponding justifications and, in the case of not finding any observations, the document enters in force when the facility has the capacity to cover all the posts to be licensed.
- Regulatory standard AR 0.11.1 determines the requirements to be fulfilled by nuclear facility staff to obtain an individual license or specific authorization. See Section E.
- The procedure to grant individual licenses and specific authorizations allows ARN to control the competence of the people that have to be in charge of safety-related responsibilities in the facility. Said competence is re-assessed whenever the specific authorization is renewed.
- The individual license may be cancelled or revoked by 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, cancelled or revoked in accordance with the terms of Section E.2.2.6. In addition, ARN regularly verifies the compliance of the Primary Responsible with its obligations regarding the safety of the facility, especially its compliance with the applicable standards, conditions of the operating license and any other requirement related to radiological safety, all of which is carried out through evaluations, regulatory inspections and audits performed by ARN's resident inspectors and analysts, and whenever necessary, with the assistance of external experts.
- Standards AR 10.14.1 and AR 10.13.1 state requirements to be fulfilled by facilities regarding Safeguards and Physical Protection.
- ARN has established a regime of sanctions to be applied in cases of noncompliance with any regulatory requirement, according to the terms in Section E.2.2.6.

F.2 Human and Financial Resources

Introduction

The National Commission of Atomic Energy (CNEA), as set forth in prior National Reports, is the State responsible organization for Spent Fuel (SF) Management as well as for any other radioactive waste generated in the national territory. For that purpose, the *National Program for Radioactive Waste Management* was developed through Law Nº 25018,

which set CNEA as the responsible authority for the development and periodic updating of a *Strategic Plan for Radioactive Waste Management* (PEGRR).

Both financial and human resources are essential for the assurance of safety conditions of nuclear facilities. Consequently, the Regulatory Body requires that all staff working at SF and radioactive waste management facilities shall be properly trained and qualified in accordance with the tasks performed, and that the staff assigned to safety-related tasks shall hold a license and the Specific Authorization permit.

In the case of SF and radioactive waste generated by nuclear power plants, the Responsible Institution that reports to the Regulatory Body for the operation of Nuclear Power Plants (NASA), has the responsibility not only to have trained and qualified personnel in accordance with the current legal and regulatory framework, but also to provide the financial resources necessary for the development of operation activities, which include the disposal of radioactive waste and the storage of SF until those responsibilities are transferred to the CNEA.

Financing of the National Program for Radioactive Waste Management

CNEA has updated and implemented the triennial PEGRR. Even though the Honorable National Congress did not approve the PEGRR or the establishment of the Fund for the Management and Disposal of Radioactive Waste, the PEGRR is supported by the National Treasury contributions included in the regular budget and approved by the Executive.

CNEA Organizational Structure and Human Resources

CNEA's organizational structure has suffered some changes regarding what was reported in the 3rd National Report. Under this new context both The *National Program of Radioactive Waste Management* and the *PRAMU* now report directly to the Nuclear Safety and Environment Management.

The Nuclear Safety and Environment Division undertake the following activities:

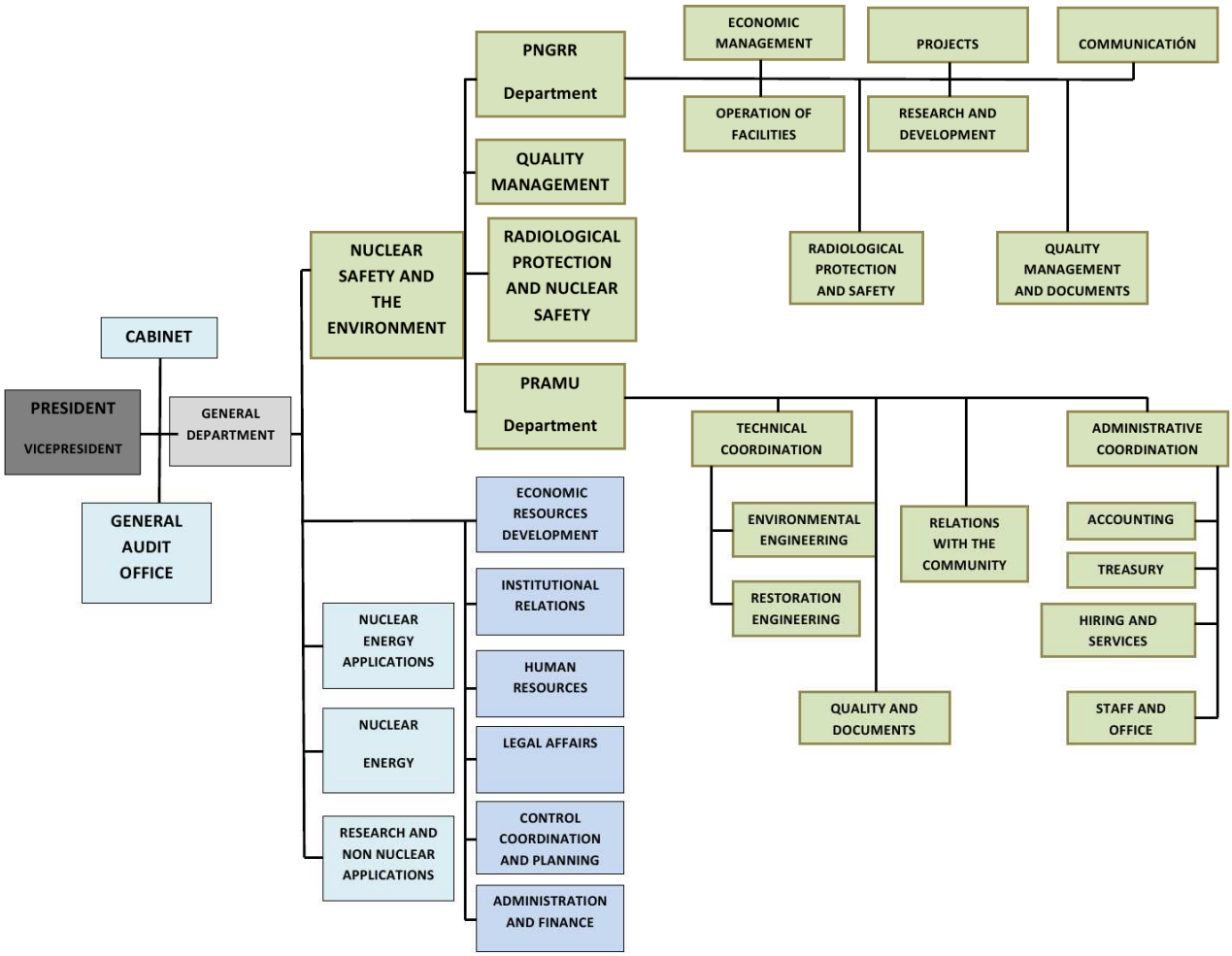
- To establish methodologies of management and criteria for Safety, Environment and Quality
- To conduct the follow-up of performance in Safety, Environment and Quality
- To coordinate, advise and provide other Managements and Sites with technical assistance on these topics

In order to achieve this, CNEA counts with the Department specialized in Radiological Protection and Safety, Quality and Environmental Activities.

As part of all this, in CNEA, a Quality Management, Safety and Environment Integrated System is implemented by applying the most prevalent standards related to this topic. This system, based on a policy of continuous improvement, is the most efficient methodology for complying with CNEA policies, through planning objectives and the necessary processes to obtain results according with that policy; the implementation of processes

established to meet the goals; monitoring of those processes concerning the policy; objectives and requirements established and the revision and decision-taking to improve its performance.

CNEA Organizational Structure



The main elements of this system are the identification of hazards, risk assessment and determination of controls, identification and control of environmental aspects, identification and compliance with legal requirements, establishment of programs and improvement objectives, determination of roles and responsibilities and assignation of resources, ensuring the competence of the personnel through its training, awareness and application of methodologies of communication and participation and response to emergencies, incident research, non-conformities, corrective and preventive actions and, internal auditing and systematic performance revision done by Departments in furtherance of their duties.

The PNGRR Department is responsible for conducting activities of the management radioactive waste originated in their facilities, in facilities which are external to CNEA, such as nuclear power plants and other small facilities, as well as SF management originated from research and production reactors.

The following charts show the assigned financial resources and distribution of personnel in accordance with the objectives.

Financial Resources of CNEA devoted to Radioactive Waste Management and Spent Fuel Management (2010)

ITEM	RESOURCES (AR$)
Research & Development	287,835
SF and RW Management	411,067
Foreseen Improvements	17,334,810
Personnel	13,597,308
TOTAL	**31,631,020**

Human Resources of CNEA devoted to Radioactive Waste Management and Spent Fuel Management (2010)

QUALIFICATION	Complete Dedication	Partial Dedication
Professionals	48	20
Technicians	48	9
Scholars	15	17
TOTAL	111	46

Training of Human Resources

Most employees devoted to RW and SF Management 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 see Section E.3.3.3, where the training activities which are carried out by ARN since its beginnings are explained).

NASA members of staff, who perform specific duties at nuclear power plants, are re-trained in accordance with the requirements set by Regulatory Standard AR 0.11.3. In order to comply with those requirements, at the beginning of each calendar year, NASA sends ARN the retraining program to be developed in each period. The program includes the courses of study for each specific duty, time schedule, list of topics, lecturers appointed, and assessment of courses.

In addition, the staff is encouraged to attend and participate in courses, seminars, and training at universities and other science and technical institutions. For some specific matters regarding nuclear issues, it has been possible to train them abroad through scientific and training visits and attendance to specialization courses and seminars.

Also, RW and SF personnel participates yearly in training courses on Radioactive Waste Management in the Postgraduate course in Radiochemistry and Specialization in Nuclear Reactors organized by CNEA's Dan Beninson Institute jointly with the National Technological University (UTN) and in the specialization course in Technological Applications of Nuclear Energy at CNEA's Balseiro Institute jointly with the University of Buenos Aires (UBA).

Training of fellowship holders

The PNGRR has a staff of fellowship holders devoted to the main lines of research and development carried out at CNEA three Atomic Centres and at CNEA's headquarters, all of them under the direction of specialized professionals in specific disciplines.

Some fellowship holders have completed postgraduate courses at CNEA Educational and Training Institutes; therefore, they have a supplementary training prior to their commitment to the assigned lines of research and development. Fellowships for professionals may include advanced courses or master or doctoral thesis. In the case of technical fellowship holders, they are researcher's assistants. Scholarships have also been granted to advanced students of other disciplines.

F.3 Quality Assurance

F.3.1 Introduction

In the Argentine Republic the application of an adequate quality management program during the design, construction, commissioning, operation and decommissioning stages of a nuclear facility is a regulatory requirement. With this purpose AR 3.6.1 regulatory standard "*Nuclear Power Plant Quality System"* issued by the ARN determines the quality system requirements applicable to Nuclear Power Plants which, with the appropriate modifications, also apply to other nuclear facilities that generate and manage radioactive waste.

Also, AR 3.7.1 regulatory standard "*Schedule for the Documentation to be submitted prior to the commissioning of a nuclear power plant*", and other related to other installations type, determines the time when the Responsible Institution has to submit the program and the quality manual to the Regulatory Body.

Furthermore, the licenses for the operation of facilities set that during said stage they shall have quality management programs; said quality management programs and manuals are mandatory for the facility.

The Regulatory Body controls the implementation of quality programs through the Responsible Institution.

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

F.3.2 Nucleoeléctrica Argentina Sociedad Anónima (NASA)

Since the Argentine corporation NA-SA was organized in 1994 (Decree Nº 1540/94), it has developed its nuclear activity in connection with the operation of both CNA I (Atucha I Nuclear Power Plant) and CNE (Embalse Nuclear Power Plant). It is also responsible for the construction, commissioning and operation of Atucha II Nuclear Power Plant (CNA II).

Law No. 26566 determined that NASA would build, start up and operate a fourth nuclear power plant and would conduct any and all acts in furtherance of extending the lifetime of the Embalse Nuclear Power Plant.

NA-SA, as the Responsible Institution, has a General Quality Assurance Program, which is the reference framework for specific quality assurance programs for each organizational unit. The program is described in the *General Quality Assurance Manual,* which was approved and made effective in November 1997*.* The Regulatory Body requirements and those established in IAEA 50-C-Q document and other applicable safety guides were taken into account to elaborate the General Quality Assurance Program.

Subsequently the *General Quality Assurance Manual* has been reviewed on different opportunities. Review 1 incorporates a new Quality Policy approved by the Board of the Responsible Institution.

Currently, Revision 2 of the Quality Assurance Manual is in force and includes implemented changes in the organization towards late 2009 along with the impact on projects to be executed at Atucha II NPP and Embalse NPP.

As mentioned above, the *General Quality Assurance Manual rev.2* complies with the requirements of AR 3.6.1 regulatory standard "*Nuclear Power Plant Quality System*" and IAEA Practice Code 50-C-Q.

Table 7 – NASA' Quality Assurance Program Status

ORGANIZATION UNIT	DOCUMENT	REVISION	NUMBER OF PROGRAMMING PROCEDURES
NA-SA	Quality Assurance General Manual	Revision 2	16
CNA I	Quality Assurance Manual for Operation	Revision 3	231
CNE	Quality Assurance Manual for Operation	Revision 5	134
CNA II	Quality Assurance Manual for Construction	Revision 4	633

F.3.3 Argentine Atomic Energy Commission

CNEA Quality Management System

CNEA has established a quality policy, whose current version has been approved by CNEA's authorities by Resolution 74/03-04-2009 (B.A.P.13/09).

The new Quality Management structure of CNEA is constituted by Quality Management Department, dependent from September 28, 2010 of the Nuclear Safety Management and Environment Division, which in turn depends on the General Manager.

The addition to the above Management Area was due to the need to generate in the CNEA appropriate conditions for the harmonization and integration of systems of quality management with nuclear safety and environment, thus allowing identifying, understand and manage interrelated processes, contributing to the effectiveness and efficiency of the organization in achieving its objectives. As provided in the Quality Policy of the CNEA.

The Quality Management Department responsibilities include coordinating the activities of quality management performed in CNEA and centralize information on this topic. Such coordination is done through a quality network, whose nodes are driven by those responsible for the areas of quality work in the respective levels of the structure.

In particular, in the Applications of Nuclear Technology and Nuclear Safety and Environment Divisions functioning units devoted to Quality Management to coordinate the implementation of systems for quality management of the sectors that compose them and conducting internal audits of quality management in each of them.

The Quality System of CNEA is documented through a Quality Management Program headed by the quality policy and regulatory procedures of Quality Management.

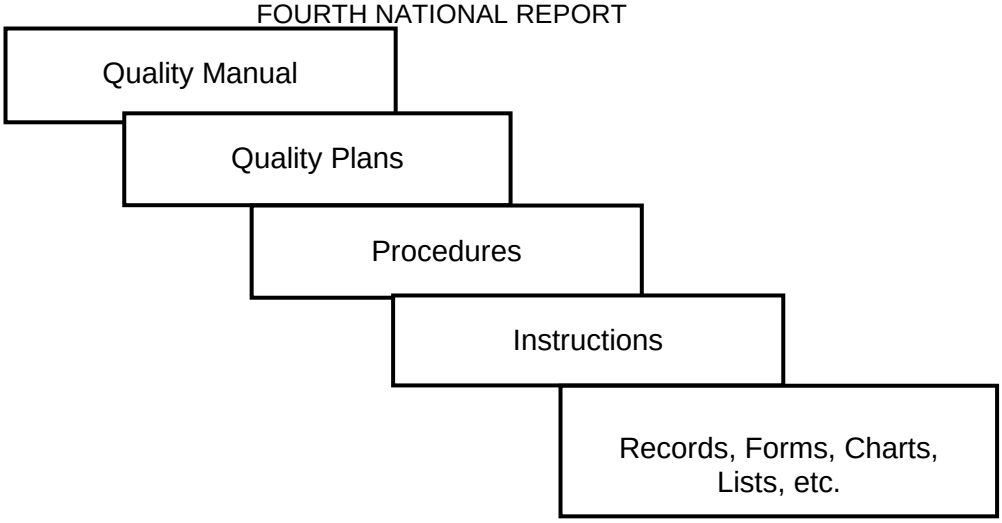
CNEA Quality System documentation is completed by the one issued at different levels of the organization, such as: general procedures, management system manuals, operative procedures standards and quality plans developed in accordance with CNEA's applicable standards, particularly ARN regulations and requirements.

The scope of the documents of the quality management system of each sector depends on several factors such as the size of the sector, types of activities carried out and their degree of complexity, and issues regarding regulatory requirements and safety.

Every sector having a management system forms their organizational structure with a board, which manages the sector and a quality responsible, who implements the system. In some situations, the quality responsible is part of the board.

Sectors that comply with management system standards, such as ISO 9001, ISO 17025, etc. are subject to an internal audit system in accordance with CNEA standards.

Each sector with a quality management system has a hierarchic structure similar to the following:



Quality Manual: Describes the pertinent activities of the sector, clarifying the scope of each one of them.

Quality Plans: They describe the special characteristics of the sector when manuals are used from another higher hierarchical sector, from which it depends; or when special projects are carried out within the quality management system.

Procedures: They describe the management system procedures. They can have different characteristics: standard, general, and operational and can be issued either by their own sector or by a higher hierarchical sector.

Instructions: They describe more specific activities than those stated in the procedures, either technical or managerial ones, issued by their own sector or by a higher hierarchical level.

Records: They are documents showing results obtained or supplying evidence of activities carried out.

CNEA sectors that generate and manage radioactive waste or spent fuels are subject to audits and inspections of different kinds, characteristics and origins which include technical aspects and management systems:

- Inspections by the Nuclear Regulatory Authority (ARN).
- Audits by the National General Audit. (AGN)
- Audits by the National Auditing Committee (SIGEN).

They are also subject to external audits by qualified or accredited laboratories; facilities are audited by clients and third parties.

Gradually, CNEA is trying to get qualification, peer evaluation, certification and accrediting of all its sectors. These activities are being carried out according to institutional priorities.

Internal qualifications are carried out by CNEA’s Qualification Committee of Laboratories and Nuclear Facilities (CoCaLIN), whose antecedents go back to the decade of the 1980’s

with the creation of the Qualification Committee for Fuel Cycle Management Processes. The Qualification Committee of Laboratories (CoCaLab) was created in 1995 and, later on, it broadened its scope by creating CoCaLIN. On October 12, 2007, through Provision Nº 144/07, the General Management Division updated CoCaLIN constituency to have it suited to the new organization.

To date, seven operation units have been accredited: Radioisotope Dosimetry and Radiation Dosimetry Lab, Nuclear Analytic Techniques Lab, Uranium Compounds Lab, Fuel Element Production Plant for Research Reactors, Materials Office and Control and Instrumentation Office.

In Argentina, accreditations are carried out by the Argentine Accreditation Agency (OAA) which has been recognized by international institutions as the International Laboratory Accreditation Cooperation (ILAC), International Accreditation Forum (IAF) and Inter American Accreditation Cooperation (IAAC).

Certifications are granted by Certifying Agencies accredited by the Argentine Accreditation Agency (OAA).

According to what was previously stated in the former Report, it is worth highlighting that the goals suggested by the Quality Management Department (GESCAL) related to lab certification, facilities and engineering services have been fulfilled in a satisfactory manner. Thus, by taking into account experience gained, planning on necessary activities will be undertaken so as to increase the number of certifications and authorizations/permits of other facilities and services.

National Program for Radioactive Waste Management (PNGRR).

The PNGRR, organization implemented by CNEA in order to comply with its waste management responsibilities, has designed a *Quality System* for all radioactive waste management stages to ensure that the conditioned waste complies with the acceptance requirements both for its transport and for its interim storage.

The *Quality System* lies within the framework of CNEAs Quality Management standard policy. The responsibility to prepare *Quality System* procedures and their compatibility with CNEA's Quality Management Program is carried out by the Documentation and Quality Management Section which reports to PNGRR's Head. To date, the *Quality System* includes 72 operational procedures and 2 work instructions which correspond to several activities developed in the Program.

This Section has 9 workers directly engaged in quality management and documentation without taking into account Project and Operation inspectors. Also, it should be noted that an auditory to the implemented quality management system is being planned.

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 are recorded. At the moment, the Data Base has 2510 records.

According to regulations issued by the Regulatory Body, all sectors managing radioactive waste must submit safety reports including the description of their management systems in order to obtain the pertinent operation licences.

Uranium Mining Environmental Restoration Project (PRAMU)

For restoration activities of uranium mining sites, in 2000, CNEA developed the *Uranium Mining Environmental Restoration 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. To date, a quality manual, 35 operating procedures, 16 general procedures and a work instruction are in force.

It is relevant to highlight the preparation of 7 new general procedures related to physical chemistry monitoring programs of underground water at the Córdoba site and with environmental and radiological monitoring of Córdoba and Los Gigantes sites and 3 operational procedures related to measurement of an equivalent dose rate and measurement of concentration levels of Rn 222 in air at the mentioned sites.

The following Chart shows the present status of CNEA's General Quality Management Program updated to December 2010.

CNEA Quality Management Program Status

ORGANIZATIONAL UNIT	DOCUMENT	No. of procedures
* CNEA	General Quality Program	58
**PNGRR (waste)	Quality Manual	72
***PRAMU	Quality Manual	61

* CNEA Quality Policy, CNEA regulatory procedures and general procedures of Divisions.
** Operating procedures.
*** Operating and general procedures.

F.4 Operational Radiological Protection

Basic radiological protection 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 emergency procedures must be implemented so that their radiological consequences can 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 in Nuclear Research Reactors
AR 6.1.1 Occupational Radiation Safety in Type I Radioactive Facilities
AR 6.1.2 Limitation of Radioactive Effluents in Type I Radioactive Facilities

Dose limits for the public

The annual effective dose limit for members of the public is 1 mSv in one year and is applicable to the total effective dose to a representative person due to all facilities and practices. Equivalent annual dose limits are 15 mSv and 50 mSv for crystalline and skin, respectively.

Dose constraints for the public

For design purposes, the Regulatory Body has established a constraint of 0.3 mSv for the annual effective dose of the critical group, due to the release of radioactive effluents.

Annual discharge limits for each facility are calculated in such a way as not to exceed the annual dose restriction value of 0.3, while keeping, at the same time, the concept of reducing discharges as much as it is reasonably possible.

When the annual dose in the critical group does not exceed 0.1 mSv and the annual collective dose does not exceed 10 man-Sv, a demonstration of optimization is not foreseen unless expressly required by the Regulatory Body.

Occupational dose limits

Dose limits for workers are as follows:

- ❖ 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 any 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 the same period.

F.4.1 Conditions for Radioactive Material release

In accordance with regulatory standards, the systems used for the retention of radioactive effluents shall be optimised.

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

According to a regulatory requirement, the Regulatory Body determines that, in addition to the operation License, the discharges of radioactive effluents to the environment shall be as low as it is reasonably achievable and shall not exceed the restrictions established in terms of the following “discharge formula”.

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

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 facility

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 facility, radionuclide and type of discharge (gaseous and liquid) using specific models which allow to estimate the doses in the critical group, taking into account the characteristics of the sites and the location of critical groups.

This assessment method makes it possible to ensure that, provided said inequality is respected, dose constraints to the public shall not be exceeded.

Gaseous and liquid discharges that occur during normal operation of the facilities are permanently controlled and monitored with the objective of detecting, and if necessary correct, any significant deviations from the historical averages or growing trends of the activities annually discharged.

The Regulatory Body performs independent audits of declared discharges made by the operator and an environmental monitoring in the surroundings of the facilities, which include measurements of activity in water, sediment, vegetable, fish and milk samples, and other samples of the surrounding biosphere.

Table 9 shows the annual average activity discharged to the environment with gaseous and liquid effluents corresponding to the 2006-2010 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).

Information on the annual dose constraint fraction is also included that represents such liquid and gaseous discharges in the critical group.

Chart 9 – Average Gaseous and Liquid Discharges 2006-2010

ANNUAL AVERAGE OF CONTROLLED AND PLANNED DISCHARGES – PERIOD 2006 - 2010												
FACILITY	LIQUIDS					GASEOUS						
	TOTAL ACTIVITY (Bq)				% de DC(*)	TOTAL ACTIVITY (Bq)						% de DC(*)
	H3	β/γ	α tot	Unat		Nob Gases	Aerosols	H3	Iodines	C14	Natural Uranium	
CNAI	1.5E15	2.9E11	2.1E09	---------	0.37	1.4E14	3.9E06	6.4E14	9.0E07	5.1E11	---------	1.53
CNE	1.5E14	5.9E09	---------	---------	1.37	3.8E13	5.0E07	3.4E14	1.3E06	4.3E11	---------	0.17
PPUO2	---------	---------	---------	1.4E09	0.08	---------	---------	---------	---------	---------	9.2E06	0.07
RA3	---------	8.1E07	---------	---------	0.90	3.2E13	1.9E09	---------	8.2E07	---------	---------	4.00
PPR	---------	ND	---------	---------	ND	---------	---------	---------	1.2E09	---------	---------	3.67
PPMo99	---------	---------	---------	---------	--------	8.0E12	<LD	---------	1.6E07	---------	---------	0.15
PFS	---------	---------	---------	---------	--------	---------	<LD	---------	---------	---------	---------	<0.01
CYCLOTRON	---------	---------	---------	---------	--------	---------	1.6E11	---------	---------	---------	---------	0.01
CONUAR	---------	---------	---------	5.9E06	0.07	---------	---------	---------	---------	---------	2.3E05	<0.01
LUE	---------	---------	---------	---------	--------	---------	<LD	---------	---------	---------	---------	<0.01
RA1	---------	<LD	---------	---------	<0.01	---------	---------	---------	---------	---------	---------	--------
FAC. ALFA	---------	---------	ND	---------	ND	---------	8.1E00	---------	---------	---------	---------	<0.01
RA6	---------	2.7E7	---------	---------	<0.01	1.8E09	<LD	---------	<LD	---------	---------	<0.01

(*) DC = Annual Dose Constraint = 0.3 mSv
DL = Detection Limit
ND = No Discharges
--- = Not Applicable
NOTE: The Dose Constraint is for every facility of the site

Disposal of solid materials

On September 21, 2009, ARN approved by the Board's the Resolution of the "Generic Values of Clearance " to release from the regulatory control the solid materials of very low level radioactivity. These levels were set in the Safety Guide No. RS-G-1.7 and derived from scenarios developed in the Safety Guide No. 44, both from the International Atomic Energy Agency.

Currently, Guide GR7-R0 is about to be published and corresponds to the application of generic levels of clearance. This guide may be used to facilitate the clearance application since it establishes the conditions for materials to be cleared, but they are not compulsory. Likewise, another guide is under development to apply generic level to practical cases. However, to date, clearance of material has not been given to any facility.

Exemption of practices

In Standard AR 10.1.1, ARN makes reference to exemption of practices and criteria of applicable doses, as follows:

> *"Provided the approval of ARN, every practice is exempted in which it can be demonstrated that it is not conceptually possible to originate during a year an*

effective dose in individuals exposed to a dose higher than 10 μSv or a collective effective dose higher than 1 man.Sv."

In 2010, Standard AR 6-Rev.0 on "Generic Levels of Exemption" was approved. These levels were derived from 3 scenarios established in the document Radiation Protection 65 which appear in the Basic Safety Regulation BSS115. These levels apply for those limited total activities or, when exemption occurs due to a level of 1 ton moderated masses of radioactive material. This implies that in case one does not overcome Generic Levels, exemption might occur automatically.

F.4.2 Occupational Exposure

The Radiological Protection criteria adopted by the Regulatory Body to control the dose received by workers is 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 stays as low as reasonably achievable and lower than the established dose constraints.

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

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

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 intake 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 intake unit of the mentioned radionuclide.

The occupational doses informed in Chart 10 are global values that include the doses received during operation and maintenance, for all the workers at the facilities subject to individual monitoring, therefore the doses received during radioactive waste management and spent fuel storage activities are significantly lower.

In the case of doses to AGE staff, the reported doses correspond exclusively to radioactive waste management activities.

Chart 10 – Occupational Exposure at Radioactive Waste Management Facilities

AVERAGE ANNUAL OCCUPATIONAL DOSE- PERIOD 2006-2010		
CLASS I FACILITY	**Collective (man.Sv)**	**Average (mSv)**
CNA I	**4.050**	**3.86**
CNE	**2.109**	**2.08**
RA-1	**0.011**	**0.60**
RA-3	**0.022**	**0.51**
RA-6	**0.006**	**0.19**
RADIOISOTOPE PRODUCTION PLANT – PPR	**0.073**	**1.54**
PRODUCTION PLANT Mo99 - PPMo99	**0.035**	**2.48**
PRODUCTION PLANT SEALED SOURCES – PPFS	**0.118**	**3.96**
CYCLOTRON	**0.004**	**0.13**
URANIUM DIOXIDE PRODUCTION PLANT– PPUO$_2$	**0.000**	**0.00**
CONUAR	**0.095**	**1.56**
LABORATORY ENRICHED URANIUM – LUE	**0.001**	**0.10**
ALFA FACILITY	**0.002**	**0.29**
RADIACTIVE WASTE MANAGEMENT AREA – AGE	**0.016**	**0.87**

F.4.3 Radiological and nuclear safety at CNEA

The Argentine Atomic Energy Commission (CNEA) responsible for the management of spent fuel and radioactive waste generated in the national territory is also the Responsible Institution for the operation of nuclear and radioactive facilities at several Atomic Centres.

In order to organise and coordinate organically the activities conducted at CNEA, related to radiological and nuclear safety, a Radiological and Nuclear Safety Department was created (GSR&N). This Department has goals, such as strengthen policies to supervise and comply with the legislation and regulations in force and coordinate the implementation of measures, actions and practices in major facilities of CNEA in accordance with regulatory standards in force in order to protect workers, population, the environment and the assets.

The main objective of the Radiological and Nuclear Safety Department is to strengthen the safety culture of CNEA in an integrated manner counting with qualified personnel to undertake this activity in an effective, efficient and transparent manner as a referent in this topic.

The Department coordinates the CNEA Safety Committee integrated along with the Heads of Safety Units of Atomic Centers where nuclear facilities are located.

This Committee evaluates the state of documentation of facilities, formation and training of operating personnel, the state of facilities, failures or recorded detours, changes or modifications, innovations and improvements and operating experience.

In order to achieve this objective, the Department has the following main activities:

Strengthen:

- Current capacity in CNEA in relation to safety topics.
- Control systems and support to facilities.

Optimise:

- Environmental radiological monitoring programs of CNEA sites and the communication of their results among the public.
- Optimize radiological monitoring programs of the personnel of radioactive facilities and neighboring areas.

Consolidate:

- A system of radiological public health medicine and optimization of the system of medicine at work.
- A net for supporting the licensing of facilities.
- A program of radiological protection for the patient at a national level.

The Department also participates in adaptating the regulations (standards) and other relevant legislation. This department is a national contact point and is in charge of ensuring the compliance with obligations of the Joint Convention on the Safety of Spent Fuel Management and the safety Radioactive Waste Management (Law No. 25279).

F.5 Preparation for emergency cases

F.5.1 Introduction

As presented in prior National Reports, the Nuclear Regulatory Authority requires that the responsible organization prepares a plan to answer in case of nuclear or radiological emergencies. This Emergency Plan includes the application of protective actions to prevent and/or mitigate eventual radiological consequences in accidental situations. The magnitude and scope of the plan are consistent with the type of facility. Every facility has an internal emergency plan as well as in those sites in which an accident may have consequences in neighboring inhabitants who also have an emergency external plan.

Regulatory standards AR 10.1.1, AR 3.7.1 and AR 4.7.1, operating licenses and requirements for responsible organizations and primary responsible of facilities, regulates planning and preparation of the response in case of emergencies.

F.5.2 Structure of the emergency plan in the national scope

The Law No. 24804 and its provisions through the Decree 1390 of November, 1998 provide ARN with the legal framework necessary to approve and intervene in contingency plans in case of nuclear accidents.

Municipal, provincial and national authorities that may be related to the preparation of these plans shall comply with guidelines and criteria defined by ARN, which shall have those powers conferred in the Convention on Nuclear Safety, approved by Law No. 24776.

In December 2002, an interim version of the National Plan of Nuclear Emergencies in the scope of the Federal Emergency System (SIFEM) and the National Office of Civil Protection which was updated in agreement with the Nuclear Activity Act. In 2003 a Provincial Plan on Nuclear Emergencies was approved in Córdoba Province where the Embalse NPP is located. The Provincial Plan on Nuclear Emergency is to be approved in Buenos Aires Province where the Atucha I NPP and the Ezeiza and Constituyentes Atomic Centres are located.

In the case of nuclear power plants, municipalities that might directly be affected by a nuclear accident within a 10-km radius count with a Municipal Plan for Nuclear Emergencies. This is the case of the town Lima and its neighboring areas surrounding NPP Atucha I as with the towns : La Cruz, Embalse, Villa del Dique and Villa Rumipal near CNE.

When considering of atomic centers, potential accidents in each facility are assessed and characterized in safety reports (design basis accidents). Most of these facilities have a low radioactive inventory, therefore their probable radiological consequence would only affect them, and extreme conditions the atomic centres where they are located.

Nevertheless, agreements with public authorities were made to implement protective measures, defining responsibilities and positions of organizations in charge of applying protective measures.

Over the last years, a system has been implemented to keep the public informed of protective measures in case of accidents.

F.5.3 International agreements

By the end of 1986, Brazil and 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 of both instruments.

In addition, Argentina is a member and contact of the The Radiation Emergency Medical Preparedness and Assistance Network (REMPAN) of the Health World Organization.

On the other hand, if an accident involving potential loss of nuclear material in spent fuels should occur, Argentina has assumed the commitment of reporting to international agencies, characteristics, causes and consequences of the accident in a special report.

F.5.4 Nuclear Power Plants Emergency Plans

In the case of spent fuel and radioactive waste management facilities 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 derived from nuclear accidents that might occur in those facilities. The emergency plans of nuclear power plants were described in the 1st National Report and have been fully developed in the reports of the Convention on Nuclear Safety.

F.5.5 Atomic Centres Emergency Plans

As discussed in previous reports, CNEA as the responsible entity for the operation of nuclear and radioactive facilities, established a general procedure for developing emergency plans (facilities emergency and evacuation plans CNEA-PN00O01). This document sets out general guidelines to which the Atomic Centres and Principal Branch Offices should adopt and comply under CNEA's jurisdiction

F.6 Decommissioning

F.6.1 Introduction

As expressed in D.5, there are no operating facilities in the process of being decommissioned. The conditions in which these activities should be planned and performed are presented in the following paragraphs.

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 facilities. Therefore, the criteria and radiological safety standards, waste management, quality and safety culture concepts are applied to the operation of the nuclear facilities.

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

Specifically, Law Nº 24804, Nuclear Activity Act, sets forth in section 16 (b) that the Nuclear Regulatory Authority is authorized to grant licenses for the decommissioning of nuclear facilities.

The abovementioned law and its regulating Decree determine, among other issues, CNEA's liability as responsible organization for the decommissioning of nuclear power plants and, also, the obligations of the agency that operates said facilities during that stage.

AR-0.0.1 regulatory standard "Licensing of Type I facilities" sets out that a license issued by the ARN is required in order to proceed to the decommissioning of nuclear facilities.

Also, AR-3.17.1 regulatory standard “Nuclear power plant decommissioning” determines the basic requirements for the decommissioning of those facilities. The main conditions are as follows:

- The Responsible Institution, 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 should 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 should include all necessary steps to ensure an appropriate radiological protection with minimum surveillance after decommissioning.

- The Responsible Institution will be able to delegate the decommissioning activities, either totally or partially, to third parties, but it will continue being responsible for them. During the decommissioning process, the Responsible Institution shall contemplate and submit to ARN’s consideration, the following:

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

F.6.3 Background

The dismantling of RA-2 Critical Facility at CNEA’s Constituyentes Atomic Center, 1984-1989 is a former milestone in terms of decommissioning. The building that housed the reactor is now open for unrestricted use.

As specified in prior National Reports, in compliance with the Nuclear Activity Act, Law Nº 24804, the responsibility for decommissioning activities and the way in which they are performed falls on CNEA.

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

As stated in the previous reports, even though there is no specific date on which any relevant nuclear facility in Argentina shall definitely end its operation, the planning of their dismantling and decommissioning is foreseen.

F.6.6 Financing

As stated in prior reports and as determined by Decree No. 1390/98, regulatory of Law No. 24804 regarding Nuclear Activity, the funds to meet decommissioning costs of each nuclear power plant would be set up with contributions of the company that would operate it if the nuclear power plant was to be privatised. If the operation of the nuclear power plants is not privatised, the responsibility for financing the decommissioning of Nuclear Power Plants, research reactors, and other significant nuclear facilities would be assumed by the National Government with its own funds.

SECTION G SAFETY IN SPENT FUEL MANAGEMENT

G.1 General Safety Requirements

We wish to underline that in general the contents of Section G are valid for Section H homologous requirements, except in cases in which the latter are specific.

The general safety requirements associated with spent fuel management have not been modified with respect to the requirements described in the previous National Reports. A summarized presentation of these requirements may be found in Section H – Safety in Radioactive Waste Management, as they do not reflect substantial differences.

G.2 Existing Facilities

As described in previous Reports, spent fuel (SF) management consists in wet or dry storage, depending on each case. Wet storage is performed in pools or tubes for the period required for the decay of the fission products in order to allow its subsequent temporary dry storage.

To date, the existing SF storage facilities are the following:

SITE	FACILITY
Atucha I Nuclear Power Plant (CNA I)	Pool Building I and II
Embalse Nuclear Power Plant (CNE)	Storage Pool
	Storage Silos (ASECQ)
Ezeiza Radioactive Waste Management Area (AGE)	Central Storage for Spent Fuel from research reactors (DCMFEI)

G.2.1 CNA I Spent Fuel Storage Pools

These spent fuels are originated at the CNA I Nuclear Power Plant, type PHWR, with an installed capacity of 357 MW (e) that started operating in 1974.

Every CNA I spent fuel is temporarily stored under water. The Power Plant has two fuel storage areas known as Pool Buildings:

- Pool Building I
  Constituted by two decay pools P1 and P2, plus a handling pool or work area.
  Designed Storage capacity: 3240 positions

- Pool Building II
  Constituted by four decay pools P4, P5, P6 and P7
  Designed Storage capacity: 6912 positions

The storage of spent fuel takes place in pools, which are lined in stainless steel with several millimeters thick, in a double tier arrangement. Fuel elements hang from stainless steel *racks*.

In order to collect and orient possible leaks through the welded seams and to be able to locate their origin, small concrete channels are left below the steel lining. Prior to lining, the walls are coated with an appropriate kind of waterproof paint.

In case leaks should exist, they are checked at the inspection station located at the lowest level of the building. This leak detection system includes the floor and gate sealing frames.

Handling of spent fuels within the pools is performed using an overhead travelling crane with a telescopic mast fitted with the fuel handling tools. By maneuvering the crane and/or the telescopic mast it is possible to reach all points inside the pool.

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

In order to optimize the wet storage of spent fuel, at the CNA I a *Spent Fuel Compact Storage* project has been concluded, which enabled an increase in the storage capacity to operate normally until 2015.

As a consequence of the mentioned project criticality evaluation studies have been performed, and the results are described in the following reports:

- “Calculation of the Sub-criticality Levels at the Irradiated Fuel Storage pool in Atucha I”. The performed study shows that in the pools of the CNA I there is no Criticality risk for Fuel Element LEU 0.85% and with additional conservative hypothesis of infinite fresh fuel elements of 37 bars.

- “Verification of the Criticality Calculations in Atucha I Pool performed with MCNP for a selection of experimental reference cases”. The study concluded that the safety margins for the pools, calculated in an extremely conservative manner, exceed 200 mk for normal situations and 50 mk for accidental situations.

It is worth mentioning that a new facility is under construction for the dry storage of SF after a period of wet storage in CAN I (See K.3.1.1).

G.2.2 CNE Spent Fuel Storage Pools

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

The storage of these spent fuels is performed in a concrete pool coated with epoxy resin. The original pool capacity represented 10 years of operation at 80% of the reactor power. When the worktable of the Dry Storage System (ASECQ) was installed the storage capacity was reduced to 45144 positions, corresponding to 8 years of operation.

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 fuel handling operations in the service building as well as in the storage pools are carried out manually under water using long reach tools assisted by cranes and power hoists. Spent Fuel elements are stored under water in stainless steel trays.

In November 2003, the Level I Revision-1 of the Probabilistic Safety Analysis (PSA) for CNE was concluded. The study conducted on other sources different from the reactor core contemplated the safety analysis of *Spent Fuel Elements Handling and Storage Systems*. The object of the analysis was to identify the system failure or combination of failures that could lead to a possible uncontrolled emission of radioactive products, with implications that may affect the staff and/or imply a discharge outside the Plant.

As a result of the analysis, the following events have been identified in the *SF Transfer System at the Spare Part Machine*: spillage of heavy water due to diverse failures in the machine, without 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 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 study were: jamming of two spent fuel elements during the 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 temperature variations due to replenishment in case of reduction of water level.

As has already been mentioned with reference to the frequency of Safety Revisions, the ARN has adopted the *Periodic Safety Reviews* (PSR) methodology for Class I Facilities as well as the limitation of the period of validity for the Operating Licenses. In the particular case of CNE, the implementation of the PSR and the above mentioned limitation were effective when the new Operation License issued by the ARN had been granted to the CNE by means of Resolution Nº 116/07 dated October 29, 2007.

G.2.3 Storage Silos for Spent Fuel (ASECQ), of the CNE.

The Dry Storage System (ASECQ) integrated to the CNE facilities, comprises a pool work table, SF handling tools, pool shield with its transport cart, cranes, transfer building (including the operation cell), the tractor vehicle for the transport to the silos field, the transport cart, spent fuel 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 spent fuel elements housed in 9 baskets, with 60 fuel elements per basket. This system is in operation since 1993. A total of 240 silos are planned to be built to store the spent fuel generated during the whole

lifetime of the power plant. At present, out of 216 silos already built, 160 are full (as at December 31, 2010).

The Probabilistic Safety Assessment (PSA) conducted at the request of ARN and completed in November 2003 also includes the study of the Spent Fuel Dry Storage System (ASECQ).

In this case, there have been studied possible failures or combinations of failures of said system that could lead to a potential uncontrolled emission of radioactive products, including the events that could affect the staff as well as the events implying a discharge outside the facility. 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 have been studied. Two events were considered relevant: 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.

Upon request of ARN, the (ASECQ) system has been included in the *"Ageing Management Program for Power Plant Components and Systems Related to Nuclear Safety".* As a consequence thereof, a surveillance plan for baskets, interior 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 gases content inside the silos is conducted.

The surveillance plan continues normally since it has been in force until the present date, no abnormality whatsoever has been observed in the analysis of the behavior of these components.

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

The "Central Storage of Special Irradiated Fissionable Material" DCMFEI is located at the Ezeiza Radioactive Waste Management Area (AGE) and is the only facility existing in Argentina designed and built to store the SF from its research reactors. It comprises underground storage of 2.10 m long and 0.141 m diameter stainless steel tubes, with capacity to hold two spent fuel elements type MTR or one control element in each tube. The tubes are closed with lead filled steel plugs and a sealing device for safeguarding reasons.

April 2003 was the formal beginning of the *Storage Facility for Irradiated Fuel from Research Reactors (FACIRI)* project described hereinafter. The object of this project is to have a temporary storage facility for irradiated fuels, incorporating important safety improvements compared with DCMFEI.

This new storage system was conceived in order to have a better control of the SF conservation condition and adequate monitoring of the water quality.

The documentation corresponding to the Preliminary Safety Report for this facility was submitted to ARN together with the Construction License application.

DESCRIPTION OF THE FACIRI PROJECT

The FACIRI has been conceived as a facility for temporary centralized wet storage of spent fuels definitively unloaded from the research reactors. The spent fuels showing failures will be encapsulated before being stored.

Wet storage will offer complementary cooling of the discharged spent fuels.

Description of the facility

The FACIRI storage capacity is of 552 SF. The design is based on grids pilled one upon the other, forming 2 columns of grids located on the depth of a 16 m pool.

The pools will have a double stainless steel lining containing the water where the fuels are stored. This double contention will substantially increase the confining capacity of the pools.

The design includes a treatment system that will allow the maintenance of the quality of deionized water at adequate levels in order to preserve the integrity of the spent fuels during their storage.

A monitoring station composes by a monitoring station and an underwater camera placed in one of the pools will allow visual inspection of the stored spent fuels.

Safety objectives in the design of the facility

The design of the FACIRI will ensure that the spent fuels are received, handled, stored, inspected and removed in a safe manner, maintaining sub criticality, confining the radioactive material, offering protection against radiation and dissipating the heat generated by decay, complying, additionally, with the requirements concerning conventional safety safeguards and physical security.

Confinement

The confinement barriers are formed by aluminum cladding or encapsulation of SF, the pool water, the interior stainless steel lining, the exterior stainless steel lining and the concrete pool walls, to prevent the migration to ground waters in case the radionuclides should 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 underground waters.

Dry storage of spent fuel from research reactors

As has already been mentioned, a subsequent stage to the wet storage (FACIRI Project) is the transfer of SFs from research reactors to a temporary dry storage system.

G.3 Siting of SF and Radioactive Waste Management Facilities

As mentioned in the previous National Reports, the safety requirements for a site to be

used for spent fuel management have not been modified.

Considering that the FACIRI is emplaced inside the Ezeiza Atomic Center and, therefore, the evaluation of the site is identical to the one corresponding to the mentioned atomic center.

G.4 Design and Construction of new Facilities

As mentioned above, the design requirements for spent fuel management facilities have not been changed.

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

The *FACIRI Project* was presented to the IAEA and was accepted by said Organization as a technical cooperation project.

NASA is planning a modification to Atucha I NPP to include a dry storage facility for Burned fuel elements. This project foresees spent fuels transfer with a major decay deposited in the Pool Building I to an annex which will be the Transitory Dry Storage Building. This building will have vertical subterranean silos (subterranean silos in an upright position) and will be an extension of the controlled area. See Point K 3.1.

The conceptual engineering of the ongoing Project was concluded in June 2010 the conceptual engineering, but it has not been presented to ARN for its analysis and approval. Within this framework, soil studies are conducted within the area of the building site. At present, offers for updating, starting up and certification of the Crane of the Pool Building I, are under analysis.

Facilities in Atucha II NPP

As presented in previous National Reports, the National Government announced the consolidation of the nuclear electric option for our country, which includes the finalization of construction and startup of Atucha II NPP.

General description of the NPP

Atucha II is a nuclear power plant of 745 MWe (2160 MWt), supplied with natural uranium, moderated and cooled with heavy water with a design of pressure vessel. The reactor is refilled while in operation.

It was designed by Krafwerk Unión Siemens AG. Its construction and commissioning process is under the responsibility of the state corporation Nucleoeléctrica Argentina Sociedad Anónima (NA-SA), as the owner organization.

It is located 110 km to the northwest of the City of Buenos Aires, in the southern riverbank of Paraná de las Palmas, 9 km from Lima, Zárate, Province of Buenos Aires. The nuclear power plant is next to the eastern part of Atucha I NPP.

Storage and handling of fresh fuel

Fuel Storage building

The fuel elements storage building is connected with the auxiliary building of the reactor and has access from there. It contains new and spent fuel storage, auxiliary necessary systems and is related to the reactor building by means of the fuel transfer channel.

A controlled access in the ground floor is used for a truck access to transport containers of fresh fuel.

The storage of fuel elements building is protected against external events: earthquakes, explosion pressure waves, tornadoes and entry of explosive gases.

Storage of fresh fuel and design bases

New fuel elements, individually packaged in transport tubes, are transferred to the site in transport containers with a capacity of 65 fresh fuel elements and then transferred to the new fuel storage where the suspension beams are hung.

Before inserted in the reactor, fuel elements are completed with end plugs of the cooling channel and backfill to conform complete fuel column.

The column of the new fuel is transported to the reactor by the transfer channel, the inclination mechanism, and the machine that refuels the fuel element.

The purpose to store fresh fuel is to keep an adequate stock of new fuel elements reserve in a dry deposit to guarantee the reactor continuous operation. The total storage capacity is 375 positions, which supplies 6 months of operation.

Subcriticality is guaranteed since new fuel elements are stored in safe geometric configurations which remain stable, even after postulated accidents. Moreover, fuel element contains slightly enriched uranium which shall not reach critical levels in the conditions in which it is stored and handled.

Store of spent fuel and design basis

After its transport through the fuel transfer channel from the reactor building, spent fuels are placed in a vertical position by means of the tilter system and is separated the fillback body and the end plug in the bottom nozzle and suspension beams contained in pools.

The purpose of the spent fuel pools is to store irradiated fuel elements once it has been removed from the reactor. Fuel elements hang from suspension beams, are stored in cooled demineralized water until the stored policy is defined in the long term.

Each fuel pool has a 1232 fuel element capacity. The decay heat of stored fuel elements in the pool is extracted from the pool through a cooling system.

In the pools, there is room to place a transport vessel of irradiated fuel elements and load it to transport it outside the site. Pools are reinforced concrete structures with stainless steel jacket. The design is such that no damages can occur to the concrete at a water temperature of 60℃.

One of the pools is maintained free so that a complete reactor core is placed if the discharge were necessary.

Subcriticality is guaranteed due to the fact that new fuel elements are stored in safe geometric configurations which are stable, even after postulated accidents. Likewise, they contain depleted uranium which is less reactive than the new fuel. It cannot reach the critical levels in the conditions in which it is stored and handled.

Cooling system and cleaning of spent fuel pool – Design Bases

The cooling system of spent fuel pool removes residual heat generated by stored irradiated fuel elements in fuel pools and dissipates it with the “guaranteed service cooling water system”. Certain average temperatures cannot be overcome during plant operation or during decommissioning, including shutdown with the stored core in fuel pools and after accidents or failure conditions.

Fuel pool water flow in the cooling system is demineralized pure water without dopes. In consequence, the cooling system of the fuel pool is made out of austenitic steel in order to avoid corrosion. The cooling system of the fuel pool is designed for a 10 bar pressure and a temperature of 80ºC corresponding to a quality class Nº3.

Tasks of the cleaning system of the fuel pool are: disposal of solid impurities to guarantee the transparency of the water of the pool, disposal of fissile products and activation products and if necessary, disposal of solid impurities of the reactor.

In order to comply with the requirements to eliminate solid impurities and of fission products and activation products, the purification system of the fuel pool is designed for a dose rate per hour of 1/30 of the total content of fuel pool water and transfer water.

In case of an impurity concentration, it is possible to increase the depuration dose for the affected pool through disconnection of other pools. The capacity of the mixed filter, it is proper to reduce long life fissile products which may come out from a failed fuel element in fuel pools to insignificant fractions within the first week since fuel has been removed from the core. The purification system of the fuel pool consists essentially of two bombs, a mixed bed filter and a resin trap.

The purification system of the fuel pool does not have important functions for the reactor safety. In case it does not work properly, it may be turned off and repair before potentially inacceptable conditions are reached. These dysfunctions may be caused by failures in components or by violation of differential pressure limits of the mixed bed filter.

Components with relatively high radioactive content, such as the mixed bed filter and resin

trap, appear in separated and shielded rooms, pipes and valves are separated in valve room located among components rooms and operation. Fresh resin backfill head is located in the upper room of the resin tank.

G.5 Safety Evaluation of Facilities

The requirements for the safety evaluation of spent fuel and radioactive waste management facilities have not been changed since the presentation of the previous National Reports, except with reference to those expressed in section E.2.2.2 of the present National Report.

G.6 Operation of the Facilities

As mentioned above, the safety requirements applied to the operation of spent fuel and radioactive waste management facilities have not been modified with respect to the previous National Reports.

G.7 Final Disposal of Spent Fuel

At present, the safety requirements stated in the 1st National Report continue in force, as long as spent fuels are stored in facilities specifically designed and operated for that purpose.

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SECTION H SAFETY IN RADIOACTIVE WASTE MANAGEMENT

H.1 General safety requirements

The following paragraphs summarize the scope of the general safety requirements for the management of radioactive waste generated in Argentina.

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

The radioactive waste stored or disposed of in the Argentine Republic does not require any particular measures associated with heat removal or criticality factors because they are classified as low and intermediate level on account of their radiological characteristics (half-life periods, radionuclides, energies and activity concentrations).

H.1.2 Minimisation of radioactive waste generation

In Argentina, minimisation of radioactive waste must comply with two conditions:

- Reduce radiation doses
- Reduce costs

For that purpose, the minimisation of generated waste is taken into account and in consequence the contents of activity and volume from the different streams. Also, as part of the minimisation strategy of waste management, the recycling and reuse of contaminated or active materials is envisaged. One example is the reutilization of stored radioactive sources, provided their use is justified according to regulatory criteria applied in the country.

H.1.3 Interdependence between different radioactive waste management stages

Operational procedures associated with the treatment and conditioning stages take into account the interdependence between the different management stages (e.g. transport, temporary and long term storage and, in some cases, final disposal).

In the planning of the management stages of different types of radioactive waste, various acceptation requirements based on their interdependence have been set forth for each one of said stages.

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

The standard AR 10.12.1 – “Radioactive Waste Management” determines general requirements in order that the management activities are performed with an appropriate level of radiological protection for individuals and for the preservation of the environment for current and future generations. The criteria to achieve this objective are:

Dose and risk restrictions: The main objective is to ensure that individual risks are below the appropriate applicable levels (Standard AR 10.1.1) 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 account the reduction of the effective dose, the cost of different options, uncertainties associated with long periods and dose restrictions as limiting condition (Standard AR-10.12.1, criterion 20).

Responsibilities: Radioactive waste generators (operators of nuclear facilities and users of radioactive material) are responsible for the management of the waste generated by them including an appropriate level of protection for workers and for the public (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 waste must be treated by decay or retention, if necessary (Standards AR-3.1.2 and AR-6.1.2).

Solid waste: The final disposal of solid radioactive waste has to be performed using, when appropriate, a multiple barrier system (Standard AR-10.12.1, criterion 19). The closure of a final disposal facility for radioactive waste or any system related to such facility must have ARN's prior authorization (Standard AR-10.12.1, criterion 36). The responsibility of the operator's facility extends until the final stages of closure, post-closure and institutional control during the period determined by the ARN (Standard AR-10.12.1, criterion 37). When the Responsible Organization applies for the construction and operation licenses, it must provide evidence that the necessary steps have been taken in order that the system complies with the safety requirements in all its stages, including closure and subsequent stages (Standard AR-10.12.1, criterion 30 and 31).

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

Information to be supplied to the Nuclear Regulatory Authority: The responsible organization of the facility that generates the waste or for the waste management facility shall keep an updated inventory of the waste during the operation stage and forward regular reports on those inventories to the ARN. Files with the inventories must be submitted to the ARN at the end of their activities. (Standard AR-10.12.1, criteria 27 and 35).

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

In agreement with the General Environmental Act Nº 25675 of the Argentine Republic the provinces determine the specific requirements to be satisfied by all industries located in their territory.

Each management facility must comply with general and specific requirements determined by the competent application authority in environmental matters, with jurisdiction over the site of the facility.

For example, the Province of Córdoba has Act Nº 7343 on *Guiding Principles for Preservation*, *Defence and Improvement of the Environment* which has jurisdiction over the Embalse Nuclear Power Plant (CNE) located in this province.

H.1.6 Avoid actions with greater impact on future generations than permitted for the present generation

Section 1 of Law Nº 25018 determines the rights to safety of future generations (see L.1.3.2.).

The standard ARN 10.12.1, in its criterion 32, determines that the estimate doses to be received by future generations in connection with the final disposal facilities shall not exceed the dose restrictions determined at the beginning of the isolation period.

On the other hand, and by foreseeing that the present technologies used for radioactive waste management do not imply a potential risk for future generations, diverse studies and evaluations are carried out 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 waste has been contemplated in Law Nº 25018. In its Section 13, this Law provides the legal foundations for the existence of a fund for the management and final disposal of radioactive waste based on the contribution of the generators, taking also into account the deferred costs of spent fuel and radioactive waste management. In this sense, Section 11 of the same Act considers the recovery of sites affected by industrial mining activities of Uranium minerals.

In this sense, Section 11 of the same Act considers the recovery of sites affected by industrial mining activities of Uranium minerals.

The creation of the radioactive waste management *Strategic Plan* determined by Law Nº 25018 establishes the legal, technical and financial requirements to avoid imposing undue burdens on future generations.

H.2 Existing facilities and previous practices

H.2.1 Introduction

In previous National Reports details of relevant actions taken into consideration for the safety evaluation of radioactive waste management facilities that are located in the following sites were provided:

- Ezeiza Radioactive Waste Management Area (Ezeiza Atomic Centre)
- Waste Decay and Treatment Facility corresponding to the Radioisotopes Production Plant (Ezeiza Atomic Centre)
- Atucha I Nuclear Power Plant
- Embalse Nuclear Power Plant
- Mining Waste
- Pilcaniyeu Technological Complex

Hereinafter follows a description of the present condition of such evaluations, some of which have been completed and others are still in progress.

H.2.2 Facilities of Atucha I Nuclear Power Plant

As stated in the previous reports, the execution frequency of the safety revisions for Type I facilities responds to the *Periodic Safety Review - PSR* methodology. Moreover, the ARN has determined the limitation of the validity period of the operation licenses as stated in Section E.2.2.2 of this National Report. The application of these measures is effective for CNA I since December 2003.

Within this framework and as part of the Probabilistic Safety Analysis for Atucha I Nuclear Power Plant (APS IT 911), performed by means of the construction of a Master Logical Diagram in July 2000, it has been concluded that the doses associated to the events related to the safety of the radioactive waste management systems, is two order of magnitude below the dose constraint value determined as reference value. In such report the Handling and Storage System for Spent Fuels were also included.

H.2.3 Facilities of Embalse Nuclear Power Plant

Due to a request from the ARN, a probabilistic safety analysis of the radioactive waste management of the CNE (APS-IT.F001/ 002/003/004/005 and 006 Rev. 0) has been carried out, with the object to identify, by means of the construction of a Master Logical Diagram (MLD), the failures or combinations of failures of the systems that might lead to an uncontrolled potential emission of radioactive products, including events affecting the staff and/ or that may imply a discharge outside the plant.

The following systems were considered:

- *Liquid Radioactive Waste Management System*
- *Solid Waste Management System*
- *Gaseous Waste Management System*

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

- Spillage of the radioactive liquid waste service building due to failures in the collection, storage and discharge system. These events have consequences for the operator, with low occurrence probability, as a combination of detection failures and omission errors by the staff must take place.
- Uncontrolled emissions of liquid waste due to errors in measurements or during the discharge operations of tanks.
- Spillage in the concentrator enclosure due to pipe and/or control failures. These failures are not expected to have significant radiological consequences.
- Liquid waste emissions from the concentrator either by drops dragged by the gaseous emission or from treatment of liquids with radioactive content higher than acceptable. The probability of occurrence and the study of the consequences from these failures showed their scant relevance.

The study has considered the occurrence of the events during the normal operation of the plant and in case of operation with a damaged fuel element.

The events considered in the study of ***Solid Waste Management*** that might lead to exposure accidents and / or staff contamination cases, were:

- Undue exposure of operators during handling of filtering elements while the elements were introduced into the storage pit, caused by human errors.
- Resin spillage due to failure of a transfer line.

According to the analysis results it was concluded that the failures during processing, storage or management of solid waste generated in the plant will not imply any risk to the public.

One of the outstanding events in the study on ***Gaseous Waste Management*** to be mentioned is: Tritium emission due to dryer failure. A 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.

The operative experience concerning the radioactive content in gaseous effluents shows that even under abnormal situations such as fuel elements failure, the Daily Discharge Limit has not been exceeded.

As stated above, ARN has adopted the *Periodic Safety Review (PSR)* methodology for Type I facilities as well as the limitation of the period of validity of the operation licenses, as mentioned in Section E.2.2.2 of this National Report. For the particular case of CNE, the implementation of the PSR and the above mentioned limitation is effective since the date of

issue of new operation license by the ARN, awarded by Resolution 116/07 dated October 29, 2007.

H.2.4 Ezeiza Radioactive Waste Management Area (AGE)

The Ezeiza Management Area (Area de Gestión Ezeiza – AGE) is the facility exclusively destined for the treatment, conditioning and final disposal of low level solid and liquid radioactive waste. In the year 2006 CNEA decided the permanent suspension of the operation of the final disposal systems as these systems had already concluded their operative stage, independently from the results of the safety evaluation (see Section K.3.1). In addition, the interim storage of all low and medium level conditioned waste is performed, awaiting the construction of an appropriate repository as foreseen in PEGRR. The same facility is also used to store disused sealed sources, as well as the remaining nuclear material of Mo-99 production and SF from the RA3 Research and Production Reactor.

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

In previous Joint Convention Reports, changes in factors related to hydrology, meteorology and demography that might affect Ezeiza Management Area's operativeness were given.

Taking these factors into consideration, the CNEA, as the Responsible Organization, who had already decided to suspend the final disposal system operation for solids in 1999, decided during 2001 to do the same with the Final Disposal systems for liquids and structural waste, with the object to start with the safety re-evaluation of the AGE.

Currently, CNEA is preparing a new Safety Report of AGE to submit to ARN, which will also include a schedule with activities in order to apply, in the future, the final closure license of the facility.

Special effort has been made to increase the physical safety and early intrusion detection measures, as the interior facilities of the AGE (among others, the storage of SF from research reactors and disused sealed sources).

The situation of the AGE facilities until the end of 2010 is described in the following paragraphs.

AGE Facilities for treatment, conditioning and storage

- **Treatment of Low Radioactive Level Waste Plant**

  As from July 2001, a project is being carried out using the original plant building facilities, which will allow for the use of the necessary infrastructure for the treatment and conditioning of liquid and solid low and medium level radioactive waste (PTAMB project). In 2010, as a first stage of this project, the partial decommissioning of original facilities was authorized.

The PTAMB will allow for the treatment and conditioning of the all solid and liquid low and medium level waste, generated by the country in productive activities, medical applications and research and development, verifying the compliance of the acceptance criteria specified for each facility and the quality of the conditioned product.

The waste originated in the nuclear power plants will continue being treated and conditioned at their facilities.

The main processes to be performed at the PTAMB will be:

- Compacting
- Cementation
- Volume reduction (filters, compactable containers, etc.)
- Sludge Process
- Resin Process
- Transfer of Liquid Waste from the transport containers to the Cementation premises tanks.
- Activated Coal Waste Process
- Organic Liquid Waste Process
- Adjustment process of liquid waste
- Cemented Waste Test Tube Preparation
- Solids cuts
- Liquid reduction (evaporator)
- Characterization and adjustment tasks
- Washing of the facilities to pass from processing medium level waste to low level waste.

The infrastructure of the plant includes cells with the necessary equipment to perform the main waste treatment and conditioning processes, including process cells for the storage of liquid waste, for the cementing of solids, crushing, volume reduction and for the cementing of liquids.

It also has a volume reduction press by means of compaction of low density solid matrices, a processed drum decontamination cabin and facilities, a solid cut cabin and an evaporator cell.

❖ **Deposit for Temporary Storage of Radioactive Sources and Waste**

The operation conditions of this deposit have not changed with relation to the description given in previous National Reports. In order to improve the operational doses and optimise storage areas, the stowage of items yards are divided into sectors. The stored inventories of Radioactive Waste and disused sources have also been increased.

The achieved improvements regarding the control systems of the access to the AGE in general may be underlined, as well as the physical storage safety of sources in particular.

❖ **Handling Yard and Stowage of Items**

In the previous National Reports this reinforced concrete platform has been described, designed for the reception, control and management of temporary stored radioactive waste waiting to be characterised, treated and conditioned.

Originally it was used as planned. Currently it is being used as a transitory deposit of liquid and structural contaminated radioactive waste, which is to be dismantled when PTAMB and the decontamination facility be operative.

From this area, the transfers to the Deposit for Temporary Storage of Radioactive Sources and Waste are performed.

AGE final disposal facilities

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

In the previous National Reports, it has been informed that the Semi-containment System is constituted by two trenches, according to the following details:

Trench Nº 1 completed its useful life in 1988 when the closure cover was completed. **Trench Nº 2** started operating in 1988 and its closure had been foreseen for the year 2005, but its operation was suspended in 1999.

Since the year 2000, as a result of a claim, widely echoed by the media, court proceedings have been filed to investigate a presumed contamination of underground drinking water sources produced by the AGE facilities. The permanent controls and monitoring carried out by the ARN show that such contamination does not exist (See *Ezeiza drinking water measurement* – Section E.3.3).

In early 2010, tasks to remove the drums placed in sectors S and T of T2 (not covered) concluded of T2 in compliance with what the Judge involved in the claim had stated.

These drums were encapsulated again and are located in the Long Term Storage Deposit especially built for this purpose. Said deposit is sited in Ezeiza Atomic Centre, and will stay there until a new repository is built.

❖ **Semi-containment System for very low level Radioactive Liquid Waste**

The system comprises three trenches with 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 Waste generated at the Ezeiza Atomic Centre production plants were piped to AGE where they were unloaded into the trenches.

Trenches started operation in 1971; two of them completed their useful life in 1986.

As has been described in the previous reports, the issue of the Operation License in 1994 determined to consider all liquid waste previously transferred as historical.

On account of the factors that have affected the area in the last years, in June 2001 the decision was taken to suspend the operation of the third trench.

- **System for the Disposal of Structural Solid Radioactive Waste and Disused Sealed Sources.**

In the previous reports the existence of two underground silos were mentioned, where structural parts from contaminated areas and some types of disused sealed sources were disposed of.

To date, the situation of these disposal systems has not been modified with relation to the descriptions in the previous National Reports.

H.2.5 Facilities at the Ezeiza Atomic Centre

Decay, Pre-Treatment and Discharge Plant for Active Liquids from the Radioisotope Production Plant

This facility has been conceived to provide easier decay of the Radioactive Liquid Waste generated in the Radioisotope Production Plant and the Reactor RA-3[1] containing short periods and low activity radionuclides. This type of liquid Radioactive Waste may be discharged to the environment if its level of activity does not exceed the discharge restrictions authorised by the Nuclear Regulatory Authority (ARN). Until June 2001, the liquid Radioactive Waste that could not be discharged was directed for disposal to the AGE Semi Containment System for Liquid Radioactive Waste. Since then changes have been implemented in the processes of the Radioisotope Production Plant and in the radioactive waste management of the plants, so that the residence time in the storage decay tanks is sufficient for their subsequent discharge into the environment.

H.2.6 Mining Waste and Processing of Uranium Minerals

Once the industrial treatment stage of uranium mineral for the production of the commercial concentrate (yellow cake) is completed, the left over mineral waste are called “processing tailings” or more usually “mineral tailings”. They consist of divided ores, from which the uranium they contained was extracted. They constitute the “mining waste”, the mineral of very low grade, not economically apt for exploitation (marginal mineral) and the sterile materials originated when the mining fields are uncovered.

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

Argentina is committed to the environmental restoration of the sites where uranium mining activities have taken place and the National Commission of Atomic Energy has implemented the *Uranium Mining Environmental Restitution Project* (PRAMU), widely described in previous National Reports.

Its purpose is that in all sites in which uranium mining activities were carried out the environment may be the object of the best possible restitution in terms of economic and technical feasibility. In the first place, studies are conducted to identify the problem of each site, determining the potential and actual impacts, the possible contamination routes, the elements present, etc. On the basis of internationally accepted techniques, the possible specific solutions to manage the tailings and the restoration of each site are developed.

As mentioned in the previous National Reports, 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)

These sites are the result of the uranium mining activity that took place from 1951/52 until 1996. Their situation was described in the Third National Report once tasks to keep their radiological conditions had been performed. Both CNEA and ARN conduct periodic environmental surveys in the areas around the industrial mining complexes that process uranium mineral.

By means of Decree No. 72 on January 14, 2010, the Argentine President approved the modelling Contract of Loan No. 1583-AR to be entered into by and between the ARGENTINE REPUBLIC and the INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT (IBRF) for THIRTY MILLON AMERICAN DOLLARS (USD 30,000,000) and the modelling Subsidiary Execution Agreement between the MINISTRY OF ECONOMY AND PRODUCTION and the ARGENTINE ATOMIC ENERGY COMMISSION. This agreement was executed by the parties on March, 30 and the loan was ratified by the World Bank on April 28, 2010.

On December 21, 2010, international bidding was called for in order to perform construction works to conclude canning/encapsulating of mining tailings in Marlagüe site.

The objectives are intended to ensure the environment protection, health and other rights of current and future generations making a rational use of resources. As part of this, PRAMU intends to improve current conditions of uranium mining tail deposits, considering that although those sites are currently controlled, in the long term different remediation actions have to be performed so as to ensure the protection of the environment and the citizens.

The project development entails different stages. The first one includes the continuity of building works at the Malargüe site and the studies necessary for environmental restitution engineering of the following sites: Córdoba and Los Gigantes, Tonco (Salta Province), Pichiñán (Chubut Province), La Estela (San Luis Province), Los Colorados (La Rioja Province) and Huemul (Mendoza Province).

SAN RAFAEL: The San Rafael Mining and Industrial Complex (CMFSR – Complejo Minero Fabril San Rafael) is in a stand-by situation, out of operation since 1995, because of this it is not one of the sites considered for PRAMU. CNEA, as operator, presented in June 2004 an Environmental Impact Evaluation document (EIA) as required by the Province Legislation in order to restart its productive activity.

In response to this, current authorities ask CNEA to present a new Environmental Impact Evaluation related to the “Management of Waste in Interim Disposal” taking into account the treatment of quarry water and solid waste management. The possibility of starting production again is under evaluation.

This study was submitted in 2006 and the suggestion was technically approved through reports from different sectors without attaining the Environmental Impact Declaration (DIA) since the Public Hearing required by law was not conducted.

Later on, the authorization to rebuild effluent dikes DN8 and 9 was granted to enable safe and environmentally correct handling of effluents, even in these non-operational conditions. Also a permit was obtained to seal off an auxiliary dike of effluent evaporation of effluents DN 3b.

Currently, advisory services to update EIA for the Management of Waste in Interim Disposal is under the process of public bidding in order to complete the environmental evaluation process and obtain the DIA. This will allow starting quarry water and uranium purification solid waste management tasks.

In order to manage the rest of interim disposal of waste, another EIA has to be conducted or the current one has to be updated.

The studies involve the management of waste, according to the following methodology:

- ***Quarry Water*****:** the quarry water accumulated due to inactivity will be processed as soon as said management is authorized, treated with anionic resins to remove U and precipitation to remove Ra and As. Then it will be managed by filtration in a dumping field inside the site. The quarry water to be generated during future production will be used as process water.
- ***Solid waste during uranium purification stage:*** the waste is stored in drums during the uranium purification. They are transitorily disposed in trenches.

This waste basically contains inert materials with small quantities of uranium. Its treatment consists of uranium concentration and dissolution through ionic exchange resins. While effluents are neutralized and placed in effluent dikes so that they are vaporized, drums are cleaned and managed as solid waste.

In the following paragraphs, other types of waste are mentioned which are under interim disposal:

Mining Solid Waste

- *Mineral Tailings*: dry management is foreseen together with residual acidity lime neutralisation followed by compaction to minimise permeability and create, in the long term, stability in the containment system. A multilayer cover will be built over the tailings that, in addition to prevent rainwater seepage, will act as a radon emission and gamma radiation barrier.
- *Precipitation Sludge*: the precipitation sludge resulting from the above operation will be remediated by the maintenance and dam reconstruction works which are being performed; the sludge generated in the future will be accumulated together with liquid effluents on waterproofed surfaces. When the operation is completed and the 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 and Mill Tailings*: existing marginal ores plus those generated during mining operations will be used mostly during mechanical stabilization of precipitation sludge so that new effluent dikes are placed again on these. They will be used to construct closing causeway of these.

Remediation of other mining passives

- **Depleted quarry:** Once quarry water treatment has concluded, it is intended to manage, in these cavities, part of mill tailings and marginal ores and therefore avoid new water accumulation.

Works already completed

Some of the completed tasks to date within the framework of the above mentioned management are:

- Definition of quarry water treatment.
- Definition of the solid waste treatment.
- Project of an area to be reused to facilitate evaporation and infiltration of treated liquid waste.

- Studies of natural water-proof barrier modelling on the tailing dike area.
- New hydrogeological study of the Industrial Mining Complex San Rafael and areas of influence.
- Mechanical stabilization of precipitation sludge of most effluent dikes.
- Construction of closing causeway of effluent dikes DN8 and 9, authorized as a maintenance work, to avoid non foreseeable weather caused events.
- Project, rectification and reconstruction of the DN3b dike effluent evaporation.
- Water-proofing of the DN3b dike effluent evaporation with geo-membrane of high density polyethylene of 1500- micron thick of.
- Improvement of effluent neutralization facilities in relation to conventional, radiological and operational safety conditions.
- Laying of piping interconnection net to lead effluents through quarries, the industrial area and effluent treatment.

H.3 Site of the Projected Facilities

The considerations corresponding to this point are the same as those that have been described in Section G.3.

H.4 Design and construction of facilities

The considerations corresponding to this point are the same as those described in Section G.4.

Facilities at Atucha II Power Nuclear Plant

As stated in the Third National Report, in 2004 the National Government announced the validity of the nuclear-electric option for our country. Among the works contemplated, is the completion and start up of Atucha II Nuclear Power Plant.

Detailed information on the design and construction characteristics of said Nuclear Power Plant, including the management systems for spent fuel and radioactive waste, has been presented to the Nuclear Safety Convention in 2010.

H.5 Evaluation of the safety of the facilities

The considerations corresponding to this point are the same as those that have been described in Section G.5.

H.6 Operation of the Facilities

The considerations corresponding to this point are the same as those that have been described in Section G.6.

H.7 Institutional measures after closure

The institutional measures to be applied after the foreseen closure of the low level radioactive waste disposal systems have been described in the previous National Reports.

The Standard AR-10.12.1 Radioactive Waste Management describes the safety criteria to be complied with by the facilities in all phases of disposal, including after their closure.

At present, there are no Radioactive Waste management facilities under Institutional Control.

SECTION I TRANSBOUNDARY MOVEMENTS

In Argentina the Standard AR 10.16.1 *Transport of Radioactive Materials* agrees with the *IAEA (TS –R-1) Regulation for the Safe Transport of Radioactive Materials*. This standard determines the regulations with reference to the transboundary movements of radioactive wastes and spent fuel.

There are also national and international standards in force that regulate the transport of dangerous materials by land, air and water. The transport by road and railway is governed by the following legal instruments:

- *National Transport and Transit Regulation*, enacted by Decree Nº 692/92
- *Transit Law*, Nº 24449, regulated by Decree Nº 779/95
- Resolution Nº 195/97, on *Technical Standards for the Transport of Dangerous Goods by Road*
- Other regulations determined by the National Transport Secretariat

For maritime, river and air transport, the Argentine Republic 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),* incorporating the *Regulation for the Safe Transport of Radioactive Materials* of the IAEA, edition 1996 (revised).

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 Safety in the Transport of Irradiated Nuclear Fuel, Plutonium and High Activity Wastes in Packages on Board of Vessels (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).

As previously mentioned (see Section B.1) the only transboundary movements that have taken place were associated with exports of SF containing HEU to the United States of America in the framework of the A*cceptance Program of Spent Nuclear Fuels from Foreign Research Reactors.*

As at the moment the Argentine Republic does not contemplate the reprocessing of spent fuel, no transboundary movements are expected in connection with said process.

For the case of the transport of radioactive sealed sources, see further details in Section J.

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SECTION J DISUSED SEALED SOURCES

J.1 Introduction

Although the activities involving radioactive materials and sources start at the beginning of the fifties, it was Decree Nº 842/58 that has approved the *Regulation for the Use of Radioisotopes and Ionising Radiations* and made it effective to govern the use and application of radioactive substances and the radiations providing from them or from nuclear reactions and transmutations. At present, this decree has been replaced by the legal and regulatory framework described in Section E.2.

The Standard AR-10.1.1, “Basic Radiological Safety Standard” determines the basic radiological safety requirements for nuclear activities performed in the country, including the sealed sources, both in use or in disuse. This standard classifies the facilities in three levels, according to the radiological hazards associated to the practices with radioactive material and assigns different degrees of control.

The Regulation determines that the license holder is responsible for complying with regulations, requirements, licenses, authorizations and permits issued by ARN. The operation authorizations issued by ARN expressly include conditions of Operation Authorization. Some of them state that the Operation Authorization Holder is responsible for radioactive waste management (which is the case of disused sealed sources in some facilities).

Likewise, the license holder, when applying to obtain an authorization to operate, states and signs the way in which radioactive waste management will be conducted. ARN performs regulatory inspections and audits to verify that license holders comply with their responsibilities/fulfill their duties in order to detect failures to comply with the standard and situations that might derive in radiological accidents.

On the other side, the procedure to grant licenses for the management of radioactive sources in any of the utilization cycles, allows the ARN to control that the persons using radiation sources have the necessary qualifications and work in accordance with the responsibilities related to radiological safety or physical security of the radioactive sources. These qualifications are re-evaluated with regulatory inspections and audits and each time the corresponding license is renewed.

Therefore, the existing regulatory system for the control of radioactive sources, in use as well as in disuse, acts preventively to avoid the loss of control thereon and subsequently, minimizing the existence of orphan sources.

It may be underlined that the Argentine Republic has adhered to the “*Code of Conduct on Technological and Security of the 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

The basic radiological safety requirements for the use of radioactive sources are described in the standard AR-10.1.1. Additionally, the ARN determines that:

- Radioactive sources cannot be purchased, imported, owned, transferred, stored, used, sold, exported or disposed of unless the source owner has previously obtained a licence or authorization granted by the ARN for this purpose.
- Only facilities having appropriate resources may handle radioactive sources and the members of staff require adequate knowledge and training.
- Licence holders shall keep a detailed and updated inventory of radioactive sources and their movements, systematically verifying the measures to prevent human intrusion in storage sites of radioactive sources.

The specific requirements for the storage of radiation sources are shown in Section J.4.

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

The criteria determined by ARN for radioactive disused sources for long periods of time are the following:

- The storage of radioactive disused sources is allowed only *ad interim*, as long as the holder of the license is able to demonstrate that he has a specific program for its reuse or to use it in replacement of another source existing at the facility.

- In this case, the holder of the license must define a temporary storage area as deposit over which he has adequate control to prevent non-authorized access and physical protection measures to avoid the theft thereof. On the other hand, he must keep adequate records of the regular controls made in the temporary place of storage.

In case the holder of the license does not have an adequate place for temporary storage of the radioactive sources or in case of any other situation determined by ARN, the sources must be sent to a facility especially licensed and operated by the CNEA for this purpose, for its storage in custody. See Section H.2.4

J.4 Special actions aimed at maintaining an appropriate control of the radioactive sources

ARN has agreements with security forces and with organizations responsible for the control of the borders and airports to prevent the entrance to or exit from the country of undeclared radioactive sources.

Within this context, ARN has entered agreements with the customs authorities to ensure that:

- The imports or exports of radioactive materials are performed with ARN's authorization.
- Importers of industrial plants, measurement instruments and laboratory equipment that could include radioactive sources must previously submit a declaration stating the content of such type of sources, presenting the corresponding authorization by ARN to the customs authorities.
- In the case that radioactive sources are deposited in custom premises for more than 30 days, ARN must be notified to arrange for the storage at CNEA's authorized facilities.

The ARN pays special attention to cases where it is not possible to ensure the control of radiation sources, as for example, in the case of bankruptcy of companies that have sources and a legal action orders an attachment on their assets. In those cases the ARN and the Justice act together to confiscate the involved sources and send them to a safe storage, to prevent accidental situations. This safe storage may derive in radioactive waste management of confiscated material provided the custody storage period exceeds the given time.

In the case of exports of radioactive sources and before granting the authorization for the pertinent export, the ARN interacts with the Regulatory Authorities of the countries involved. In the case of sources of Type I and II, the procedures recommended by the *Guidelines on Imports and Exports of Radioactive Sources* by the IAEA are applied. In the case of sources of other categories, the procedures issued by the Regulatory Authorities of the importing countries are taken into account.

J.5 Security of sealed sources in use or in disuse

The security systems for radioactive sealed sources include physical security measures. These measures are destined to prevent intentional acts conducting to the loss of control of these radiation sources.

In January 2007, the ARN has issued the Standard AR-10.13.2 "Security Standard for Sealed Sources" Rev. 0, which at present is under implementation. In said standard the following measures are contemplated or implicit:

- In the case of a facility with high radioactive inventory (from the threshold mentioned for Type I, in accordance with the IAEA Safety Guide, Nº RS-G-1.9 “Categorization of radioactive sources”), the possibility to create a Physical Security System similar to the physical protection systems currently implemented in facilities with nuclear material is contemplated.

- In the case of radioactive sources not contemplated in the Type I Security Guide by IAEA Nº RS-G-1.9, the ARN has provided the adoption of physical security measures to ensure the early detection or awareness of those events, in order to place said radioactive sources or materials under its regulatory control system. Such physical security measures are mentioned in IAEA TECDOC-1355 “Security of Radioactive Sources”.

- For the transport of sources, extra physical security measures are applied, in addition to the radiological safety measures, to prevent or adopt corrective actions in case of fraudulent acts involving sources with activities above a reference value.

- Since 1991 and prior to IAEA-INFCIRC 225 / Rev. 5, the ARN is paying special attention not only to the early detection of potential sabotages to facilities containing nuclear materials, but also in case of robbery and theft of radioactive sources and the early detection of the generated fraudulent acts.

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

At the end of the year 2007, within the ARN a “Security Committee” has been created, with the object to define global policies and strategic guidelines for the country and for the region, analyzing and performing evaluations with respect to the different national and international instruments and initiatives related with the regulatory activities.

ARN has concluded that the most effective security measures for early prevention or detection are the permanent contact and exchange of information between the ARN and the border control organizations, intelligence services and security forces, as essential elements of a systemic process that implies full knowledge and the assumption of responsibilities by all organizations that constitute the “Control System”.

Equally important is the coordination of monitoring activities including explicitly discouraging and electronic measures, which are analysed and considered in accordance with a case-by-case evaluation, as well as the prompt action of the radiological emergency system and the training of the non-specialized organizations involved.

In facilities with high inventories or in the cases of transport of radioactive sealed sources with high activities and until the above mentioned studies are concluded, the ARN requires, on a case-by-case basis, the application of specific physical security measures.

These measures are equivalent to the physical protection measures for the transport of nuclear materials, requiring that the users of said sources adopt prudent management measures.

In 2003, CNEA has issued Directive PF-02 – *Physical Security of Radioactive Sources*, which determined the dispositions of said Standard, being mandatory for all facilities under its responsibility where practices are performed that include the use and/or storage of radioactive sources in use or in disuse.

J.6 Penalty system

The sections E.2.2.5 and E.2.2.6 describe the regulatory actions and the applicable penalty system for the use of radiation sources.

J.7 Abnormal events and emergencies

The Argentine regulations determine that the persons or organizations using radiation sources must implement emergency plans or procedures. The criteria determined by the ARN to be used in case of emergencies, includes the evaluation of scenarios for situations such as: theft or loss of the source, breakage of the integrity of the shielding containing the radioactive source, fire, explosions or any other event that could affect the safety of the radiation source.

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

ARN operates the *Intervention System in case of Radiological Emergencies* providing permanent assistance during the 24 hours of the day and is highly prepared to comply with their tasks. This team is adequately equipped to perform its duties, carrying out periodic tests to check the correct operation of all parts of the System.

ARN has cooperation agreements with other organizations that would intervene in case of an emergency, mainly with the Federal Emergency System (SIFEM) and with the National Gendarmerie.

J.8 Readmission to the country of decayed sealed sources

The import of decayed radioactive sources is only authorized by the ARN on a case-by-case basis, when the importer duly justifies its use, in agreement with the radiological security criteria determined by the applicable regulations and the compliance with the legal obligations in force.

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SECTION K PLANNED ACTIVITIES TO IMPROVE SAFETY

K.1 Introduction

This section describes the safety improvement actions in matters related to SF and radioactive waste management, in regular activities as well as for those that are in execution stage or for those that have been completed in the period between the presentation of the 3rd National Report and the present date.

K.2 Regular activities

The permanent activities for the improvement of safety are common to all management facilities and include the following topics:

- Updating of documentation
- Updating of the organization
- Operative inspection programs
- Emergency Plans
- Education, training and re-training of operating staff
- Quality assurance program
- Preventive, predictable and corrective maintenance program

K.3 Management Safety Improvements

In addition to regular activity projects mentioned above, other projects and modifications have been developed and put into practice, which contribute to improve safety. Some of them are:

K3.1 Activities completed or in progress

K.3.1.1 ATUCHA I NUCLEAR POWER PLANT

Activities related with spent fuel

According to the scenery projected by NASA, the storage capacity of fuel elements in decay pools would be used up by 2015, its end of life stipulated by design of the facility in 2017.

Therefore, the Division Special Projects of CNA I and CNEA are developing the conceptual engineering of the Project.

This Project foresees the transfer of Spent Fuels with more time of decay deposited in Pool Building I to an annex which will be the Transitory Dry Storage Building, in which upright underground silos are suggested to be installed and will be an extension of the controlled area which will count with the same services of the current area of buildings.

Therefore, not only it is expected to reach the end of life but also to extend the operation of the NPP for over 5 years of full power, enough time to implement another new system of dry storage compatible with both plants (CNAI and CNAII).

In the Project under development, the fuel will be placed in a canister made out of stainless steel with a capacity of nine SF. Said unit shall be hung from a grid in the upper part.

In order to handle the canisters with burned fuel elements, a device shall be built (shield for transport and hoist) which shall lodge canisters during their transport and will provide an adequate level of shield for operators during their transfer.

Each silo will be made out of stainless steel with a capacity of two canisters with nine Spent Fuel Elements each.

Some silos shall have instruments to obtain information on the temperature of rods of spent fuel elements as well as the state of dosimeter radio state.

A hundred underground silos are to be installed in order to diminish the inventory of the pool and provide the required storage capacity for the useful life extension of the facility.

The new building will count with the services of the Pool Building which is an extensión of the Controlled Area.

Activities related with radioactive wastes

The following are the new management and relevant facilities performed since 2008 to 2010 which are related with radioactive wastes:

a. Second transitory storage deposit for compactable and non compactable radioactive wastes.

This deposit is operational since August 2010 and their sizes. It is built under the corresponding requirements of physical security and radiological protection and counts with a capacity of over 3000 drums of 200 litres each.

b. Extension of the current capacity of the transitory storage deposit of filters of process.

In 2009, the construction of a new well concluded. It is recognized as No. 11, widening the capacity of storage in response to the operational demand of the plant.

c. New deposit of transitory storage for filters in process.

This Project was suggested by PNGRR and is under development. It is a new concept in the transitory disposal of these wastes. This concept enables the safe storage for individuals and the environment and recovers them easily with a mechanized facility to increase the radiological protection of the operator.

Currently a civil building work of the storehouse is completed and the internal structure concrete pool, with mechanical facilities still pending, for the future beginning of operation.

d. New room to store resin of exhausted ion exchange.

During the third quarter of 2010, new room has been authorized to store exhausted ion exchange resins. Said room is located in the controlled area which counts with a net capacity to store 60 m3.

K.3.1.2 EMBALSE NUCLEAR POWER PLANT

The spent fuel dry storage system in silos (ASECQ) has been included, at ARN request, in the “Ageing Management Program for Components and Systems of the Nuclear Power Plant Associated to Nuclear Safety”.

The surveillance plan of canisters, internal cladding and concrete structure of all ASECQ System silos was incorporated in the framework of this program.

The performance of the surveillance, since it has been in force, continues normally until this date; no abnormality has been observed in the behaviour analysis of these components. The extension of the capacity of ACECQ system continues by foreseeing the construction of 32 silos during 2011-2012.

The construction of new deposits is also planned for wastes generated from the plant life extension. Particularly, 5 silos to store high rate exposure wastes and 7 vaults for low and medium level wastes.

K.3.1.3 EZEIZA RADIOACTIVE WASTE MANAGEMENT AREA

a) Intermediate and Low Level Solid and Liquid Radioactive Waste Treatment and Conditioning Plant (PTAMB)

A tender offer was called for so that this plant was remodeled so as to adapt it to current needs and technologies and treat and condition other wastes stored in Management Area deposits.

b) Storage Facility for Irradiated Fuel from Research Reactors (FACIRI)

The main objective of this project is to have a new interim storage facility for spent fuel named “Storage Facility for Irradiated Fuel Elements from Research Reactors” (FACIRI), that will replace the present “Central Deposit for Special Irradiated Fissionable Material” (DCMFEI) improving the safety conditions of this facility substantially.

Over the last period, activities were completed related with internal storage and anchor systems, surveillance cameras, cover pool and accessories, electric installation and so on. Moreover, mandatory documentation was finished during 2011 to manage the corresponding License of the Facility Start Up.

Also, the construction of the new system of spent fuel element transfer in the supplier workshop was completed, once acceptance evaluations were done. The shielded channel was received to place down the fuel (descenso de combustible) in the auxiliary pool, with its support structure already installed in FACIRI.

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

At present, CNEA is preparing an operating Safety Report of AGE which will include a schedule of activities to request a closing license of the facility in the future.

K.3.1.4 REPOSITORY FOR INTERMEDIATE LEVEL WASTE

As mentioned in previous reports, Argentina decided to build a near-surface monolithic repository with engineered barriers for intermediate level radioactive waste management. At present, selection and characterization activities of an adequate site to locate the repository are being carried out, which should be operational by the year 2023, in agreement with the schedule proposed in the last version of the *Strategic Plan*, prepared in March 2006.

In the same site, a new low level radioactive waste final disposal near-surface system shall be built, which should be operational by 2020 and which shall replace the present systems located in AGE. At the same site, it is also projected to dispose of very low activity wastes, mainly originated from the dismantling of nuclear facilities; therefore it has been decided to opt for surface systems with engineering improvements.

Some of the actions taken since the Third National Report until this date, consistent with the proposed objectives, are the following:

- Geological data were concluded on areas fit for the sites of radioactive wastes repositories, selected at a national level and continued with the development of the geographic information system, advancing in the digitalization of geological information of different regions of Argentina.

- The development of activities of mathematical modeling continued of water flow in sedimentary and granitic means by taking into account different types of rock which may be involved in a future repository.

- In order to continue with the search stage and selection of sites and areas to locate the repository near the surface, the need to elaborate a Program on Social Communication was identified to inform population and decision makers on different aspects of the project.

As marked in Section 12 of Law Nº 24804, once the site is chosen, on one hand, it must be analyzed by ARN with the object to issue the corresponding construction license, and on the other hand, it requires the approval by the provincial government of the location selected, by means of a respective law. Besides, a public hearing must be called, in order to provide the pertinent information related to the future location of the repository, in agreement with the terms of Section 12 of Law Nº 25018.

Since studies conducive to determine the defined sites continue, they imply a regional public acceptance, CNEA develops a plan on public communication of national scope which makes the understanding of the population easier on peaceful uses of nuclear energy and particularly in what refers to the final management of wastes and spent fuels as a stage prior to the formal acceptance of municipalities and provinces where new facilities could be located.

In order to select communication strategies, CNEA counted with IAEA assistance and other organizations in order to gain experiences of the field at an international level on the basis of a communication plan to a middle and long term to be coordinated for a new specific department created for such purposes.

K.3.1.5 DEEP GEOLOGICAL REPOSITORY

According to PEGRR, the need to count with this type of repository is foreseen by 2060. Thus, the activities performed with reference to this topic have been included in the Research and Development activities described further on.

Most of said activities constitute permanent lines, some have already been started in the past, and informed in due time, and others must be performed in the future. For each new issue the internal capacities of the CNEA and of the other science and technical organizations and universities must be evaluated, to other research groups through specific and cooperation agreements.

In order to know the advances in these topics, young professionals of PNGRR participate in activities organized by International Atomic Energy Agency through the excelling Underground Research Laboratories Network.

K.3.1.6 PLAN OF ACTIVITIES FOR RESEARCH AND DEVELOPMENT

The activities and working lines, necessary and identified to meet the goals of PNGRR have been organized in thematic areas: stages prior to final disposal and spent fuels.

Some activities have been started in the past and must be continued in the coming years in order to achieve the expected results. Others started in 2008 and 2009. Others are analysed so as to create projects or to be included in other projects, estimating the necessary costs, time and human resources, taking into account the appropriate capacities of CNEA and other organizations.

The results of the activities will be used in order to use technical data as a stage prior to the beginning and performance of inversion activities or with the aim of improving the technologies of radioactive waste management.

The ongoing activities of research and development by the end of 2010 are listed as follows:

- Studies and the selection of radiochemistry techniques to a precise characterization of radioactive wastes and verification of the quality of the conditioned wastes.
- Development of equipment to verify the quality of conditioned wastes.
- Development of a process for the treatment and conditioning of exhausted ion Exchange resins, generated during the operation of research and power reactors stored in Atucha I NPP, Embalse NPP and AGE.
- Development of a process for decontamination/solidification of oils generated in CONUAR during the manufacture of fuel elements.
- Development of new materials for immobilization of low and medium level wastes.
- Studies on the behavior in the long term of engineering barriers for their use in repositories for medium level radioactive wastes. This activity entails the development of new lasting concrete, their characterization and evaluation, through destructive and non-destructive assays as well as their behavior in the long term as an engineering barrier for isolation of radioactive wastes in conditions of final disposal.
- Study of speed of corrosion of steel frameworks and transport parameters in armed concrete of intermediate level waste containers.
- Study to determine the rate of corrosion of steel drums containing solid radioactive wastes (ion exchange resins and ashes coming from an incinerator) immobilized by cementation.
- Studies of corrosion of high level radioactive waste containers.
- Studies of a differred break induced by hydrogen of zircaloy clads of fuels of nuclear power plants in operation and spent fuels during the long interim storage.
- Studies to monitor the conservation state of spent fuel of research reactors located in the interim wet storage systems and study of involved degradation processes.
- The study of different compositions of ferrous phosphate glasses and the determination of the effect of the presence of uranium oxides, for the immobilization of high level wastes contained in spent fuel of nuclear reactors.
- The study for the conversion of radioactive elements into a ceramic form with sintered uranium, as an alternative process for the immobilization of high level wastes contained in research reactor spent fuels is also in progress.
- Geologic environmental study fit for repository site for final disposal of low, intermediate and high level radioactive wastes.
- Modeling of water circulation in fractured crystalline rocky means.
- Modeling of water circulation in sedimentary rocky environment.
- Study of environmental characterization of sedimentary rocky environment as Ezeiza Management Area, whose knowledge will be also applied in the determination of the environmental base line of new possible sites of interest.

- The Geographic Information System continues and progress has been made in the digitalization of geological information of several regions of the country.
- Conceptual design of an interim dry storage system of the spent fuels from the Atucha I Nuclear Power Plant.

K.3.1.7 PNGRR Knowledge Management

Over the last years, a Project known as CONRRAD (Radioactive Waste Knowledge) has been developed with the aim of developing and implementing Knowledge Management able to preserve and transfer information and technology necessary for ensuring that future generations optimize waste management by protecting the environment and the public health.

The Knowledge Portal of the Project CONRRAD was strongly boosted which became a work platform for PNGRR participants along with other professionals from CNEA related with the activities of the program.

On this site, information related to facilities is recorded. These facilities are dedicated to radioactive waste management and spent fuels, technical reports and studies, reports and documents from PNGRR, applicable regulations and codes, reports on practices and every other element related with radioactive waste management in the country of interest for the development of PNGRR activities.

K.3.2 Commitments of previous Revision Meetings

The commitments adopted by Argentina in previous meetings on progress referred to:

a) approval of the Radioactive Waste Management Strategic Plan,
b) harmonization at provincial and national levels of the legislation related with the movement of wastes in the national territory,
c) obtain public acceptance for the site for a repository,
d) Involve stakeholders in the program of radioactive waste management,
e) take the decision on reprocessing before 2030,
f) implement a program to improve the characterization of radioactive wastes generated and stored in nuclear power plants as well as improve its record system.
g) Construction/operation of a new final disposal site of low and intermediate level wastes.
h) Dry storage for SF of CNA I
i) Establishment of a new facility to store RRII SF
j) Need for more trained personnel than for managing radioactive wastes to be generated during CNA II operation
k) Restoration of uranium mining sites
l) Complete environmental studies for the environmental reevaluation of AGE.

As follows, their status is:

a) Approval of the Radioactive Waste Management Strategic Plan and Integration of the Funds for Waste Management, Dismantling and Closure.

The *Radioactive Waste Management Strategic Plan* will be in force upon approval by the National Parliament. This approval has not been issued until the conclusion date of the present National Report (December 2010). The *Strategic Plan* has been prepared as determined by Law Nº 25018. This Plan will reflect the different stages of the strategy adopted in Argentina on SF fuel management and radioactive waste management.

The plan describes the steps to be followed and the estimated costs, covering the period from 2007 to 2095. The strategy presents a set of technological solutions that in the light of current knowledge make it possible to comply with the objectives determined by Law efficient and safely.

As stated in the previous report, with the decision to encourage the completion of Atucha II Nuclear Power the terms of the Radioactive Waste Management Strategic Plan (PEGRR) had to be analyzed.

In consequence, a revised version of PEGRR, approved by the President of the CNEA in 2006, has been submitted to the consideration of the authorities of the Executive.

Since then, CNEA proceed to take the actions of said plan. These actions were contemplated in annual and triennial programs of CNEA and their performance and finance approved by the Executive.

In October, 2010, it was decided to update PEGRR, which will be conducted during 2011, since over three years passed since the last version was edited and it is necessary to add important decisions taken in the nuclear scoped in this period.

b) Coordination at national and provincial levels of the legislation about the transport of waste in the national territory.

Coordination of legislation dealing with transport as well as general legislation. It basically depends on positions of decision takers in relation to the topic and also to the perception of the public opinion about the nuclear activity in general.

CNEA has planned and executed a plan of public communication at a national level focused both on the internal public and community in general.

Some of the actions on planning, CNEA participated in the Project of Technical Cooperation ARG/0/012, “Strengthening Institutional Communication”, sponsored by IAEA with a view to strengthen the plan on communication of the organization, particularly on the most sensitive topics as the environmental remediation and

waste management. The project counted with the assistance of four international specialists in nuclear communication.

The World Bank granted the loan BIRF AR-7583 to CNEA in order to remedy those sites where mining activities were conducted related with uranium. Within this context, a technical assistance meeting with its specialist in communications with the aim of drafting communication planning guidelines has been conducted.

Among these actions, the development of visual means, models and other mass media. The intervention in newspapers and audiovisual means specialized and none specialized along with the active participation in important social and cultural events.

The development of the communication plan is at a medium and long term. Therefore, CNEA created a management dependence composed personnel dedicated to communications. It is expected to evaluate the result of the chosen strategies and adjust it in accordance with its evolution during the following years.

c) Obtain public acceptance for the site of a repository

In order to meet this goal, the initiatives described in K3.2.b have to be fulfilled.

d) Involve stakeholders in the radioactive waste management,

In order to meet this goal, the initiatives described in K3.2.b have to be fulfilled.

e) Take the decision on reprocessing before 2030

This aims is to be fulfilled within the stated term.

f) Implement a program to improve radioactive waste characterization generated and stored in nuclear power plants as well as improve its record system/registry system.

As regards improving waste management, and in furtherance of the ARN, actions are performed to implement a system of radiochemistry characterization of RW generated in Argentine NPP in order to elaborate a complete radiological inventory of these wastes, acquire a greater level of knowledge not only of operational wastes but also of those wastes generated from tasks of maintenance, repair and those from the NPP life extension.

g) Construction/operation of a new site for the final disposal of low and medium level wastes.

In accordance with what was stated in K.3.1.4, the first phases are developed conducive to fulfill this Project.

h) Dry storage of CNAI SF.

The Division Special Projects of CNAI and CNEA work on the concept engineering of dry storage project for SF in Atucha I NPP (see K.3.1.1).

i) Establishment of a new facility for RRII SF storage.

The facility is implemented at an advanced level/is at an advanced level of implementation (see K.3.1.3.b).

j) Need for more personnel trained for managing radioactive wastes generated during the operation of CNAII NPP.

By means of Law No. 493, the Board of NASA presented the organization chart of the Management of Atucha NPP (Unit I and II) Revision 4, which was approved by ARN at the end of 2010, where appear human resources to manage waste management of both Units.

The Division of RW Management is made up of 14 persons, 4 of whom have responsibilities which are common to both units (Cemented Plant Operator and RW Record) and the remaining persons are assigned to Waste Supervisor activities, RW Technician and RW Auxiliary, with 5 persons per facility. This Division is part of the Radioprotection Office which depends on the Safety Department which is part of the offices under the charge of the Department of the Site.

k) Restoration of uranium mining sites

In section H.2.6, ongoing tasks are described conducive to fulfill this aim.

l) Complete environmental studies and safety studies for AGE reevaluation.

AGE environmental studies were concluded. Currently the Safety Report is rewritten of trenches T1 and T2 from AGE.

K.4 Synoptic Summary

In agreement with the determinations of the document *Guidelines relative to the Form and Structure of the National Report (item 12, part II of Annex to INFCIRC 604/Rev1)*, a synopsis of the Present Conditions in Argentina in relation to the contents of this Fourth National Report is included in the next page.

ARGENTINA FOURTH NATIONAL REPORT – OVERVIEW

Type of Liability	Long Term Management Policy	Funding of Liabilities	Current Practice/ Facilities	Planned Facilities
Spent Fuel	▪ Reprocessing decision deferred (dead line 2030) ▪ Final disposal	▪ Facility Operator	▪ CNA I: NPP Wet Storage ▪ CNE: NPP 6 years Wet Storage ▪ CNE: NPP Dry Storage ▪ RRII: Wet Storage (DCMFEI)	▪ CNA I: Dry Storage ▪ RRII: Wet Storage (FACIRI)
Nuclear Fuel Cycle Waste	▪ Disposal	▪ Facility Operator	▪ LLW: Storage + Disposal ▪ LLW: Management Facility ▪ ILW: Storage	▪ LLW: Centralized Repository ▪ ILW & HLW: Deep Geological Repository (feasibility) ▪ LLW: Management Facility (PTAMB)
Non Power Wastes	▪ Disposal	▪ Waste Generator	▪ LLW: Storage + Disposal ▪ ILW: Storage	▪ LLW: Centralized Repository ▪ LLW: Mangement Facility (PTAMB)
Decommissioning Liabilities	▪ Decommissining Plan (regulatory requirement)	▪ NPP, RRII and other State owner Facilities: National State ▪ Facility operator when it is private owner.	▪ None Facility in closure process	▪ LLW: Centralized Repository ▪ VLLW: Centralized Repository
Disused Sealed Sources	▪ Reuse ▪ Disposal	▪ Source User	▪ Reencapsulation: Sealed Sources Plant ▪ Storage + Disposición (short lived) ▪ Storage (long lived)	▪ LLW: Centralized Repository ▪ ILW & HLW: Deep Geological Repository

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SECTION L ANNEXES: Legal Regulations related to the Nuclear Activity in the Argentine Republic

L.1 International Agreements, Conventions and Treaties

Decree-Law Nº 5071	**15 May 1957**. Ratification of the IAEA (Official Bulletin of the Argentine Republic of 22 May 1957)
Law Nº 15802	**25 April 1961 - 5 May 1961** Ratification of the Antarctic Treaty. (Official Bulletin of the Argentine Republic of 16 May 1961)
Law Nº 17048	**2 December 1966**. Approval of the Vienna Convention on Liability for Nuclear Damage,1963. (This Convention was modified and Complemented by a Protocol and a Supplementary Convention approved by **Law Nº 25313**) (Official Bulletin of the Argentine Republic of 16 December 1966)
Law Nº 21947	**6 March 1979**. Approval of the Convention on Prevention of Marine Pollution by Dumping of Wastes and Other Matters. (Official Bulletin of the Argentine Republic of 9 March 1979)
Law Nº 22455	**27 March 1981**. Approval of the agreement related to civil liability within the sphere of nuclear sea transport. (Official Bulletin of the Argentine Republic of 6 April 1981)
Law Nº 22507	**7 October 1981**. Approval of the treaty concerning the prohibition of placing nuclear weapons and other weapons of massive destruction on sea and ocean beds, and their underground, which was signed in London, Moscow, and Washington on 11 February 1971. (Official Bulletin of the Argentine Republic of 13 October 1981)
Law Nº 23340	**30 July 1986 - 19 August 1986.** Approval of the treaty regarding nuclear weapons test-ban in the atmosphere, in the outer space and in submarine waters. (Official Bulletin of the Argentine Republic of 25 February 1987)
Law Nº 23620	**28 September 1988 - 20 October 1988**. Approval of the Convention on the Physical Protection of Nuclear Materials. (Official Bulletin of the Argentine Republic of 2 November1988)
Law Nº 23731	**13 September 1989 - 6 October 1989.** Approval of the Conventions on Early Notification of a nuclear accident and on assistance in the case of nuclear accident or radiological emergency. (Official Bulletin of the Argentine Republic of 13 October 1989)
Law Nº 24272	**10 November 1993 - 7 December 1993.** Approval of the treaty for the prohibition of nuclear weapons in Latin America and the Caribbean (TLATELOLCO Treaty) (Official Bulletin of the Argentine Republic of 14 December 1993)
Law Nº 24448	**23 December 1994 - 13 January 1995.** Approval of the Treaty on Non-Proliferation of Nuclear Weapons (TNP). (Official Bulletin of the Argentine Republic of 20 January 1995)

Law Nº 24776	**19 February 1997 - 4 April 1997.** Approval of the Convention on Nuclear Safety adopted in Vienna, Republic of Austria, on 20 September 1994. (Official Bulletin of the Argentine Republic of 11 April 1997)
Law Nº 25022	**23 September 1998 - 23 September 1998.** Approval of the Comprehensive Nuclear Test-ban Treaty adopted by the General Assembly of the United Nations. (Official Bulletin of the Argentine Republic of 28 October 1998)
Law Nº 25279	**6 July 2000 - 31 July 2000.** Approval of the Joint Convention on the safety of spent fuel management and on the safety of radioactive waste management adopted in Vienna. (Official Bulletin of the Argentine Republic of 4 August 2000)
Law Nº 25313	**7 September 2000 - 6 October 2000.** Approval of the Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damages and the Convention on Supplementary Compensation for Nuclear Damages, as adopted in Vienna (Modifies and complements the Vienna Convention approved by **Law Nº 17048**) (Official Bulletin of the Argentine Republic of 18 October 2000)
Law Nº 25837	**26 November 2003 - 19 February 2004**. Approval of an agreement subscribed with the Provisional Technical Secretariat of the Preparatory Commission of the Organization for the Comprehensive Nuclear Test-ban Treaty regarding the Activities with International Surveillance Facilities at the Service of the Above Treaty. (Official Bulletin of the Argentine Republic of 20 February 2004)
Law Nº 26.640	**October 13, 2010 – November 16, 2010**. Approval of the amendment to the Convention on the Physical Protection of Nuclear Materials on October, 26. Approved in Vienna in the Conference held from July 4 to July 8, 2005. (Official Bulletin of the Argentine Republic. November 17, 2010)

L.2 COOPERATION AGREEMENT ON PEACEFUL USES OF THE NUCLEAR ENERGY

LAW Nº 17938 — **October 21, 1968.**
Cooperation Agreement on peaceful uses of the nuclear energy between the Republic of Argentina and the Eastern Republic of Uruguay. Executed on July 8, 1968.
(Official Bulletin of the Argentine Republic October 25, 1968)

LAW Nº 18255 — **June 10, 1969.**
Cooperation Agreement on peaceful uses of nuclear energy between the Argentine Republic and the **Republic of Peru**.
(Official Bulletin of the Argentine Republic July 18, 1969)

LAW Nº 18436 — **November 7, 1969.**
Cooperation Agreement on the peaceful uses of nuclear energy between the **Republic of Paraguay** and the Republic of Argentina.
(Official Bulletin of the Argentine Republic November 19, 1969)

LAW Nº 18.814 — **October 14, 1970.**
Approval of the cooperation agreement on peaceful uses of nuclear energy between the Argentine Republic and the **Republic of Bolivia**.
(Official Bulletin of the Argentine Republic October 23, 1970)

LAW Nº 19.505 — **February 23, 1972.**
Cooperation agreement on peaceful uses of the Argentine Republic with the **Republic of Colombia.**
(Official Bulletin of the Argentine Republic July 18, 1972)

LAW Nº 21.896 — **October 30, 1978.**
Approval of the cooperation agreement on peaceful uses of nuclear energy with the government of the **Republic of Ecuador**.
(Official Bulletin of the Argentine Republic November 3, 1978)

LAW Nº 22.314 — **October 31, 1980**.
Complementary Agreement on technical scientific cooperation between the Government of the Republic of Argentina and the Government of the **Republic of Venezuela** in the nuclear energy for peaceful purposes.
(Official Bulletin of the Argentine Republic. November 7, 1980)

LAW Nº 22.494 — **September 10, 1981.**
Cooperation Agreement between the Republic of Argentina and the **Federative Republic of Brazil** for the development and application of the pacific uses of nuclear energy.
(Official Bulletin of the Argentine Republic. September 16, 1981)

LAW Nº 22.886 — **August 31, 1983.**
Agreement between the Government of the **Republic of Chile** and the Government of the Republic of Argentina on cooperation in the pacific uses of the nuclear energy.
(Official Bulletin of the Argentine Republic. Sep. 14, 1983)

LAW Nº 23.387 — **September 25, 1986 – October 10, 1986.**
Approval of agreement for cooperation in the use of nuclear energy for peaceful uses executed on September 23, 1982 by and between the Argentine Republic and the **Socialist Federal Republic of Yugoslavia**.
(Official Bulletin of the Argentine Republic. March 4, 1987)

LAW Nº 23.712

September 13, 1989 – Ocutbre 6, 1989
Agreement between the Government of the Republic of Argentina and the Government of the People's Republic of China for the cooperation in pacific uses of nuclear energy.
(Official Bulletin of the Argentine Republic. October 12, 1989)

LAW Nº 23.914

March 21, 1991 – April 16, 1991.
Approval of agreement for cooperation in the peaceful uses of nuclear energy between the Argentine Republic and the **Republic of Turkey**.
(Official Bulletin of the Argentine Republic. October 12, 1989)

LAW Nº 24.046

December 5, 1991 – December 11, 1991.
Approval of Agreement between the Governments of the Republic of Argentina and the Federative Republic of Brazil for the exclusive pacific use of nuclear energy.
(Official Bulletin of the Argentine Republic. December 24, 1991)

LAW Nº 24.048

December 5, 1991 – January 2, 1992.
Approval of the Additional Protocol to the Agreements executed by and between the Argentine Republic and the **Federative Republic of Brazil** for the Exclusively Pacific Use of the Nuclear Energy
(Official Bulletin of the Argentine Republic. January 9, 1992)

LAW Nº 24.113

August 5, 1992.
Approval of the agreement by and between the **Argentine Republic**, the **Federative Republic of Brazil**, the **Argentine Brazilian Accountancy and Nuclear Material Control Agency, ABACC**, and the **International Atomic Energy Agency** (Four Party Agreement).
(Official Bulletin of the Argentine Republic. September 7, 1992)

LAW Nº 24.161

September 30, 1992 – October 26, 1992.
Approval of an Agreement between the Government of the Republic of Argentina and the Government of the **Republic of Indonesia** for the cooperation in the pacific uses of the nuclear energy.
(Official Bulletin of the Argentine Republic. November 2, 1992)

LAW Nº 24.217

June 2, 1993 – June 6, 1993.
Approval of an Agreement between the Government of the Republic of Argentina and the Government of the Republic of Romania for the cooperation in the peaceful uses of the nuclear energy.
(Official Bulletin of the Argentine Republic. July 1, 1993)

LAW Nº 24.253

October 13, 1993 – November 12, 1993.
Approval of an Agreement between the Government of the Republic of Argentina and the Government of the Union **of Soviet Socialist Republics** for the cooperation in the peaceful uses of the nuclear energy.
(Official Bulletin of the Argentine Republic. November 18, 1993)

LAW Nº 24.645

May 29, 1996 – June 26, 1996.
Approval of an Agreement between the **Government of the Republic of Guatemala** and the Government of the Republic of Argentina for the development of peaceful uses of nuclear energy.
(Official Bulletin of the Argentine Republic. June 28, 1996)

LAW Nº 24.646

May 29, 1996 – June 26, 1996.
Agreement between the Government of the Republic of Argentina and the **Government of the Republic of Canada** for the cooperation on the pacific uses of nuclear energy.
(Official Bulletin of the Argentine Republic. June 28, 1996)

LAW Nº 24.647

May 29, 1996 – June 26, 1996.
Approval of Cooperation Agreement between the Government of the Republic of Argentina and the **Government of the Republic of France** for the use of nuclear energy for exclusively peaceful and non explosive purposes.
(Official Bulletin of the Argentine Republic. July 1, 1996)

LAW Nº 24.860

August 13, 1997 – Setiembre 10, 1997.
Agreement between the Government of the Republic of Argentina and the **Government of the Republic of Korea** on cooperation in peaceful uses of nuclear energy. (It came into force as of September 19, 1997)
(Official Bulletin of the Argentine Republic. September 16, 1997)

LAW Nº 24.861

August 13, 1997 – September 10, 1997.
Approval of the Agreement between the Government of the Republic of Argentina and the **Government of the Kingdom of Thailand** on cooperation in peaceful uses of the nuclear energy.
(Official Bulletin of the Argentine Republic. September 16, 1997)

LAW Nº 24.862

August 13, 1997 – September 10, 1997.
Approval of the Agreement between the Government of the Republic of Argentina and the Government of the United States of America on the peaceful uses of the nuclear energy. It entered into force on October 16, 1997.
(Official Bulletin of the Argentine Republic. Noviembre 17, 1997)

LAW Nº 24.869

August 13, 1997 – September 11, 1997.
Approval of the Agreement between the Government of the Republic of Argentina and the **European Community of the Atomic Energy (EURATOM)** related to the pacific uses of the nuclear energy.
(It entered into force as of October 29, 1997)
(Official Bulletin of the Argentine Republic. September 18, 1997)

LAW Nº 24.980

June 3, 1998 – July 10, 1998.
Cooperation Agreement between the **Government of the Kingdom of Morocco** and the Government of the Republic of Argentina on peaceful uses of atomic energy.
(Official Bulletin of the Argentine Republic. July15, 1998)

LAW Nº 24.981

June 3, 1998 – July 10, 1998.
Cooperation Agreement between the Government of the Republic of Argentina and the **Government of the Republic of Costa Rica** and the development and application of peaceful uses of the nuclear energy.
(Official Bulletin of the Argentine Republic. July 15, 1998)

LAW Nº 25.285

July 13, 2000 – December 6, 2000.
Approval of a Cooperation Agreement on Pacific Uses of Nuclear Energy between the Government of the Republic of Argentina and the **Government of the Republic of Armenia.**
(Official Bulletin of the Argentine Republic. December 13, 2000)

LAW Nº 25.286

July 13, 2000 – December 6, 2000.
Approval of the Agreement between the Government of the Republic of Argentina and the **Government of the Hellenic Republic** on the cooperation in the peaceful uses of nuclear energy.
(Official Bulletin of the Argentine Republic. December 13, 2000)

LAW Nº 25.776

August 13, 2003 – September 12, 2003.
Approval of the Agreement between the Government of the Republic of Argentina and the Government of the Republic of the Socialist Republic of Vietnam on cooperation in peaceful uses of the nuclear energy.
(Official Bulletin of the Argentine Republic. November 13, 2003)

LAW Nº 25.809

November 5, 2003 – November 28, 2003.
Approval of the Cooperation Agreement of the Government of the Republic of Argentina and the Government of the Republic of Bulgaria concerning pacific uses of the nuclear energy.
(Official Bulletin of the Argentine Republic. December 2, 2003)

LAW Nº 25.842

November 26, 2003 – January 9, 2004.
Cooperation Agreement for the Promotion of Nuclear Science and Technology in **Latin America and the Caribbean (**ARCAL**)** adopted by the IAEA's Board of Governors in Vienna. (Official gazette of the Republic of Argentina 15/I/04)

LAW Nº 26.014

December 16, 2004 – January 10, 2005.
Cooperation Agreement between the Republic of Argentina and **Australia** on Pacific Uses of the Nuclear Energy. Signed in Canberra on August 8, 2001
(Official Bulletin of the Argentine Republic. January 14, 2005**).** It entered into force on January 22, 2005.

L.3 National Laws

L.3.1 Law Nº 24804/97 National Law of Nuclear Activity

CHAPTER I
Nuclear Activity. Duties of the National Government
Criteria for Regulations. Jurisdiction.

ARTICLE 1.- The National Government, through the Argentine Commission of Atomic Energy and the Nuclear Regulatory Authority, shall define the policy and be responsible for research and development, regulation and surveillance functions in the nuclear field.

All productive oriented nuclear activities related to research and development, which may be commercially organized, shall be performed by the National Government or by the private sector.

The nuclear policy shall meet all the obligations assumed by the Argentine Republic as a party to the Treaty for the Prohibition of Nuclear Weapons in Latin America and the Caribbean (Tlatelolco Treaty), the Treaty on Non-Proliferation of Nuclear Weapons (TNP), the Agreement between the Argentine Republic and the Federative Republic of Brazil through the Brazilian-Argentine Agency for Accounting and Control of Nuclear Materials (ABACC) and the International Atomic Energy Agency (IAEA) for the Application of Safeguards, in addition to the commitments signed by Argentina as a member of the Nuclear Suppliers Group and the National Regime for the Control of Sensitive Exports (Decree Nº 603/92).

ARTICLE 2.- The Argentine Atomic Energy Commission created by Decree Nº 10936 dated 31 May 1950 and reorganised by Decree-Law Nº 22498/56, which was ratified by Law Nº 14467, shall continue operating as an autarchic organism within the jurisdiction of the President of the Nation, and shall be responsible for:

a) Advising the Executive Power on nuclear policy issues.

b) Promoting training of highly specialised human resources, and scientific and technological developments in the nuclear field, which include the promotion and development programs for technological innovations.

c) Fostering technology transfer programs for technologies acquired, developed and patented by the Institution in compliance with the non-proliferation commitments signed by the Argentine Republic.

d) Exercising the responsibility of radioactive waste management activities in compliance with the specific legislation.

e) Defining the procedures for decommissioning of nuclear power plants and any other relevant radioactive facility.

f) Providing the services requested by nuclear power plants and other nuclear facilities.

g) Exercising the rights of property of the National Government on special fissionable materials included in irradiated fuel elements.

h) Exercising the rights of property of the National Government on special fissionable materials, which might be admitted or developed in the country.

i) Developing, building and operating experimental nuclear reactors.

j) Developing applications for radioisotopes and radiation in biological, medical and industrial uses.

k) Performing mineral prospecting for nuclear use, without excluding the private sector from said activity.

l) Developing materials and manufacturing processes for fuel elements to be used in advanced cycles.

ll) Developing basic and applied research programs in basic sciences of nuclear technology.

m) Subscribing cooperation programs with third countries, through the Ministry of Foreign Affairs, International Trade and Worship, for the programs mentioned in the above item, and for fusion technology research and development programs.

n) Fostering and developing any other study and scientific application for nuclear transmutations and reactions.

ñ) Continuously updating of technical information on nuclear power plants during all their stages, and ensuring its optimum use.

o) Establishing direct relations with other foreign institutions that share similar goals.

p) Signing agreements with nuclear power plant operators in order to carry out research work.

ARTICLE 3.- The Argentine Commission of Atomic Energy shall manage its administrative, financial, proprietary and accounting matters in accordance with the contents of this Law and the regulations issued for such purpose by its Board of Directors. The Commission shall be subject to the public control regime.

The staff of the Commission shall be subject to the Labour Contracts Law and to the special conditions established in the regulations.

ARTICLE 4.- The duties of the Board of Directors of the Argentine Atomic Energy Commission shall be:

a) To perform the necessary actions in order to comply with the objectives and functions established in this Law.

b) To approve general work plans, strategic projects and annual budgets to be submitted to the National Executive Power.

c) To approve the annual activities report.

d) To advise the National Executive Power on matters related to atomic energy and its applications.

e) To establish relations with foreign institutions or with regional or international agencies that share similar goals, including the participation of the Ministry of Foreign Affairs, International Trade and Worship.

f) To accept assets and donations.

g) To sign agreements with public or private entities for the execution of the plans aimed at the achievement of the Commission’s goals.

h) To propose the Commission's organisational structure to the Executive Power.

ARTICLE 5.- The Chairman of the Board of Directors of the Argentine Commission of Atomic Energy shall be vested with every necessary executive power to comply with the laws and regulations ruling the Institution and the resolutions issued by the Board of Directors. The Chairman shall:

a) Undertake the legal representation of the Argentine Atomic Energy Commission for all administrative, judicial and extrajudicial matters.

b) Manage and administer the Institution.

c) Summon and chair the meetings of the Board of Directors.

d) Present general work plans, strategic projects and annual budget drafts to the Board of Directors to be submitted to the National Executive Power.

e) Grant general and special mandates.

f) Integrate, either by himself or through representatives, national, provincial or sectorial commissions dealing with the tasks of the Institution, including environmental matters.

g) Inform the Board of Directors about the general distribution of the annually granted budget.

h) Inform the Board of Directors about the compliance with plans, projects and other scheduled activities.

i) Propose to the Board the Commission's organisational structure at the levels not defined by the Executive Power.

j) Appoint, promote, sanction and dismiss staff according to the applicable laws and regulations.

k) Appoint and promote staff that will perform hierarchical and co-ordination activities.

l) Appoint and send representatives, and nominate on assignment qualified personnel, to participate in regional or international conferences, meetings or congresses.

m) Partially delegate, to the internal bodies he may designate, the faculties entrusted to him by this Law.

ARTICLE 6.- Resources of the Argentine Atomic Energy Commission shall be made up by the following revenues:

a) Contributions from the National Treasury as determined for each fiscal year and by special laws.

b) Proceeds resulting from its own activities in the field of production and from the services rendered.

c) Subsidies, legacies, inheritances, donations and transfers received for any concept.

d) A royalty fixed by the Executive Power aimed at financing research and development activities performed by the Argentine Commission of Atomic Energy, calculated as a percentage of the income obtained from the sale of electric power generated by

nuclear power plants in charge of Nucleoeléctrica Argentina S.A. (corporation) or by whoever legally substitutes it.

e) Interests and benefits accrued from the management of its own funds.

ARTICLE 7.- The Nuclear Regulatory Authority shall be responsible for regulating and controlling nuclear activities regarding radiological and nuclear safety, physical protection and controlled use of nuclear materials, licensing and surveillance of nuclear facilities, and compliance with international safeguards. The Nuclear Regulatory Authority shall also be an advisor to the Executive Power on issues within its field of expertise.

ARTICLE 8.- The Nuclear Regulatory Authority shall have regulatory and control responsibilities, as stated in this Law in order to:

a) Protect human beings from harmful effects of ionising radiation.

b) Ensure that nuclear activities carried out in the Argentine Republic comply with radiological and nuclear safety requirements.

c) Ensure that nuclear activities are not to be performed for purposes other than those authorised by this Law, and that regulations issued in the future comply with international commitments and Argentina's policy on non-proliferation of nuclear activities.

d) Prevent intentional actions that could lead to severe radiological consequences or to unauthorized decommissioning of nuclear materials or other materials, or equipments subject to regulation and control, as stated in this Law.

ARTICLE 9.- To develop any type of nuclear activity, all individuals and legal persons shall:

a) Comply with regulations issued by the Nuclear Regulatory Authority within its jurisdiction and, in order to operate, to apply for a license, permit or authorisation.

b) Comply with all the safeguards and non-proliferation agreements subscribed or to be subscribed in the future by the Argentine Republic.

c) Accept civil liabilities of nuclear power plant operators, as defined in the Vienna Convention on Civil Liability for Nuclear Damage, ratified by Law Nº 17048, for a total amount of eighty million US Dollars (U$S 80,000,000) per nuclear accident in each nuclear facility. This amount shall be guaranteed by an insurance policy or a financial warranty, to the satisfaction of the Executive Power or whoever shall be appointed by the Executive Power; the National Government shall be responsible for the remaining liability.

The Executive Power is hereby authorised to adjust the amount of the liability above mentioned if the conditions stated in the Vienna Convention on Civil Liability for Nuclear Damage are amended, provided said amendment is ratified by law.

Nuclear damages, as defined in the Vienna Convention on Civil Liability for Nuclear Damage, ratified by Law Nº 17048, shall mean loss of human lives, bodily injuries and material damages directly or indirectly caused by radioactive properties, or by radioactive properties in combination with toxic, explosive or other hazardous properties of nuclear fuels, or by radioactive products or radioactive waste in a nuclear facility or nuclear products arising from or originated by said facility or sent to it, or other ionising radiation released from any other source of radiation within a nuclear facility.

It is considered that the operator of a nuclear facility shall be liable for nuclear damages in case of:

i) Damages caused to the operator's employees and to the contractor and subcontractor's employees as a result of the nuclear accident at a nuclear facility that is operated by said company;

ii) Damages caused by the nuclear accident to International Atomic Energy Agency's officials while developing tasks to comply with the safeguards stated in the international agreements signed by the Argentine Republic;

iii) Damages caused by nuclear products when such accidents do not occur within a facility or during transportation, if at the time of the nuclear accident, said products were stolen, lost, jettisoned, or abandoned.

All operators of nuclear power plants shall contribute to a Fund for Decommissioning of Nuclear Power Plants. The funding, management and control of this Fund shall be determined by the National Executive Power.

ARTICLE 10.-As established in SECTION 11 of this Law, regulation and surveillance of nuclear activities concerning matters defined in SECTION 7 are submitted to the national jurisdiction.

ARTICLE 11.- Every new site for a relevant nuclear facility shall require a construction license authorizing its location issued by the Nuclear Regulatory Authority and approved by the Provincial Government in whose jurisdiction the new facility is scheduled to be built.

ARTICLE 12.-The Argentine Atomic Energy Commission shall suggest the location of the repositories for high, medium and low-activity waste. The site shall be approved by the Nuclear Regulatory Authority regarding radiological and nuclear safety, and the Provincial Government in whose jurisdiction the suggested site is located shall pass a law approving the site. Said requirements shall be prior and essential for any approval requests.

ARTICLE 13.-The location of radioactive waste treatment plants and of their corresponding temporary and final repositories managed by the Argentine Atomic Energy Commission or by the Corporation Nucleoeléctrica Argentina S.A. have in operation at the time this Law is enacted, including their expansion and routes of access by land, sea, air and river, shall require no additional authorization to continue operating, and all deliveries to, or shipments from said repositories, shall not require any special approval from the National Congress or from Municipal or Provincial authorities in whose jurisdiction the repository or routes of access are located.

CHAPTER II
Nuclear Regulatory Authority

ARTICLE 14.-The Nuclear Regulatory Authority shall operate as an autarchic entity within the jurisdiction of the President of the Nation. Said Authority shall succeed the National Board of Nuclear Regulation.

ARTICLE 15.-The Nuclear Regulatory Authority shall hold autarchy and shall have full juridical capacity to act both in Public and Private Law.

Its property shall be constituted by assets to be transferred to the National Board of Nuclear Regulation and by those acquired in the future for any concept. It shall have its headquarters in the City of Buenos Aires. The Authority shall approve its own organisational structure with prior intervention of the Public Functions Secretariat of the Presidency of the Nation.

ARTICLE 16.-The Nuclear Regulatory Authority shall have the following duties, attributions and obligations:

a) Issuing regulatory standards related to radiological and nuclear safety, physical protection and control of the use of nuclear materials, licensing and surveillance of nuclear facilities, international safeguards and transport of nuclear materials as far as radiological and nuclear safety and physical protection are concerned.

b) Granting, suspending and revoking construction licenses, commissioning, operation and decommissioning of nuclear power plants.

c) Granting, suspending and revoking licenses, permits or authorisations concerning Uranium mining and concentration, safety of research reactors, relevant accelerators, relevant radioactive facilities, including the facilities for waste or radioactive waste management, and nuclear applications in medical and industrial activities.

d) Performing regulatory inspections and evaluations of facilities subject to regulation of the Nuclear Regulatory Authority, with the periodicity it deems necessary.

e) Proposing to the Executive Power the transfer, extension or replacement of a concession for the use of a State-owned nuclear facility whenever there exist elements that advise to do so, or its expiration when based on non-compliance with the rules issued regarding radiological and nuclear safety matters.

f) Bringing civil or criminal lawsuits before the competent courts when licensees or authorisation or permit owners do not comply with what is ruled by this Law, as well as requesting for search warrants and for the aid of the police whenever such actions are deemed necessary to duly exercise the faculties granted by this Law.

g) Applying sanctions, which shall be graded according to the severity of the infringement; such as warnings, fines to be applied according to the severity of the fault and regarding the potential damage involved, suspension of a license, permit or authorisation or their revocation. Said sanctions shall be appealable for the sole purpose of remand before the National Administrative Contentious Court of Appeals.

h) Establishing procedures for the application of sanctions corresponding to the violation of rules issued while exercising its competence, thus ensuring the principle of due process of Law.

i) Disposing the seizure of nuclear or radioactive materials, as well as the preventive closure of facilities subject to regulations of the Nuclear Regulatory Authority, whenever they lack the due license, permit or authorisation, or whenever gross negligences are detected regarding the compliance with radiological and nuclear safety standards or with the protection of facilities.

   In this context, gross negligence means acts involving a serious threat to the safety of the population or to the environmental protection, or whenever the application of physical protection or safeguards measures cannot be guaranteed.

j) Protecting restricted information in order to ensure a trustworthy preservation of technological, commercial or industrial secrets, and an appropriate application of safeguards and of physical protection measures.

k) Establishing, in accordance with international parameters, radiological and nuclear safety standards for overland, river, sea or air transport of nuclear and radioactive materials, and for physical protection of transported materials.

l) Establishing, in accordance with international parameters, radiological and nuclear safety standards related to staff working in nuclear facilities and granting specific licenses, permits and authorisations that qualify for performance of functions subject to licenses, permits or authorisations.

ll) Defining a procedure for consultation with owners of licenses for relevant nuclear facilities whenever new regulatory standards are proposed or the existing ones are modified.

Such procedure shall foresee that modifications to the existing standards and the issuing of new ones are supported by an evaluation criterion based on the cost/benefit ratio arising from the application of the new standard.

m) Evaluating environmental impact produced by any licensed activity, which involves monitoring, analysis and follow-up activities concerning the incidence, evolution or possibility of environmental damage that may arise from the licensed nuclear activity.

n) Submitting an annual report to the National Executive Power and the Honorable National Congress on activities performed, including suggestions about measures to be adopted for the benefit of public interest.

ñ) Requesting information to all license, permit or authorisation owners on topics subject to regulation.

o) In general, performing any other action aimed at achieving a better performance of duties and at accomplishing the purposes of this Law and its regulations.

ARTICLE 17.-The Nuclear Regulatory Authority shall be managed and administered by a Board of Directors of six (6) members as follows: a Chairman, a Vice-Chairman and four (4) voting members.

ARTICLE 18.-Members of the Board of Directors of the Nuclear Regulatory Authority shall be appointed by the Executive Power, two of them as proposed by the House of Deputies and the Senate, respectively. Said members must have a technical and professional background in this field. They shall be entitled to a six (6) year period, and one third of them shall be renewed every two (2) years. They shall only be removed on ground basis by the Executive Power and they may be successively and indefinitely appointed.

In the case of the first appointment, the Executive Power shall fix the term of duration by drawing lots.

ARTICLE 19.-Members of the Board of Directors of the Nuclear Regulatory Authority shall have full-time dedication and shall be subject to incompatibilities in force for public officials. License, permit or authorisation owners as per this Law and individuals with any direct interest connected with this matter cannot be appointed as members of the Board.

ARTICLE 20.-The Chairman of the Board shall be entitled to such position during a six (6) year period and may be appointed successively and indefinitely for legal periods. He shall be the legal representative of the Nuclear Regulatory Authority. In case of impediment or temporary absence, the Vice-Chairman shall replace him.

ARTICLE 21.-The Board of Directors shall be legally competent with a quorum of four (4) of its members, while one of them must be its Chairman or Vice-Chairman. Its resolutions shall be adopted by simple majority. In case of a draw, the Chairman or the person replacing him shall have a double vote.

ARTICLE 22.-The duties of the Board of Directors of the Nuclear Regulatory Authority shall be:

a) To exercise and to control the fulfilment of statutory rules and regulations governing the Authority's activities.

b) To issue the Board's regulations for its performance.

c) To administer all matters related to the Authority's staff.

d) To prepare annual budgets and to estimate resources to be submitted to the Honorable National Congress through the Executive Power for its approval along with the general budget of the Nation.

e) In general, to perform any other action aimed at a better fulfilment of its duties and at accomplishing the purposes of this Law and its regulations.

ARTICLE 23.-The Nuclear Regulatory Authority shall manage its administrative, financial, proprietary and accounting matters in accordance with the contents of this Law and the regulations issued for such purpose by its Board of Directors. The Authority shall be subject to the public control regime.

ARTICLE 24.-The Nuclear Regulatory Authority shall draft an annual budget proposal that shall be published and submitted to individuals bound to pay the regulatory rate foreseen in SECTION 26 of this Law, who shall be able to formulate grounded objections within thirty (30) calendar days after such publication.

ARTICLE 25.-Resources of the Nuclear Regulatory Authority shall be made up by the following revenues:

a) Regulatory rate created by SECTION 26 of this Law.

b) Subsidies, inheritances, legacies donations and transfers received for any concept.

c) Interests and benefits accrued from the Management of its own funds.

d) National Treasury contributions as determined for each fiscal year.

e) Any other funds, assets or resources assigned to it by virtue of applicable laws and regulations.

ARTICLE 26.-Licensees owners of an authorisation or permit, or legal persons whose activities are subject to the control of the Authority shall pay in advance an annual regulatory rate to be approved through the general budget of the Nation.

In the case of nuclear power plants, such annual regulatory rate shall not be higher than a sum equivalent to the annual average price of one hundred megawatt-hour (100 Mw/h) at the Wholesale Electric Power Market, fixed on the basis of prices in force during the previous year. Said sum shall be paid for every megawatt of nuclear nominal power installed capacity until withdrawal of irradiated fuel from the reactor is finished during its decommissioning by the operator in charge of the facility.

Furthermore, new nuclear power plants shall also pay, annually and in advance, regulatory rates corresponding to construction and licensing process, which shall be approved by the Executive Power.

For the rest of licensees that are owners of an authorisation or permit subject to regulation, the Nuclear Regulatory Authority shall establish the corresponding regulatory rates for licensing and

inspection, which shall not exceed zero point five percent (0.5%) of their income, or an equivalent indicator of the activity subject to regulation of the previous fiscal year.

Arrears of payment of the rate or fines foreseen in SECTION 16, item g) shall be automatic and shall accrue punitive interests as established by the enforcement authority. A debt certificate indicating lack of payment issued by the Nuclear Regulatory Authority shall be sufficient to bring an executive lawsuit before the Civil and Commercial Federal Courts.

ARTICLE 27.-Staff of the Nuclear Regulatory Authority shall be submitted to the Labour Contracts Law and to special conditions established in the regulations, while the Basic Juridical Regime for Public Function shall not be applicable.

ARTICLE 28.-The Nuclear Regulatory Authority shall rule according to procedures established in the Administrative Procedure Law and its regulatory provisions as regards its relations with individuals and with Public Administration.

ARTICLE 29.-Whenever, as a result of instituting legal procedures on own initiative or as a result of denunciation by third parties, the Nuclear Regulatory Authority considers that any act by a nuclear facility licensee, by an authorisation or permit owner, or by a legal person somehow subject to regulation and control as well as by those using or producing nuclear technology or managing nuclear wastes violate this Law, its regulations or resolutions issued by the Nuclear Regulatory Authority, it shall notify all interested parties, being said Authority empowered to take preventive actions as deemed necessary prior to solving the existence of such violation.

CHAPTER III
Definitions

ARTICLE 30.-As used in this Law, the following terms shall have the definitions assigned to them hereunder:

a) ***Nuclear activities:*** Use of nuclear transmutations at a macroscopic scale.

b) ***Nuclear material:*** Plutonium 239, Uranium 233, Uranium 235, Uranium enriched in Isotopes 235 or 233, Uranium containing an isotopic mix equal to the one found in nature, Uranium depleted in Isotope 235, Thorium with nuclear purity or any material containing one or more of the above.

c) ***Nuclear facility:*** Concept understood in the terms defined by SECTION 1, item j, of the Vienna Convention on Civil Liability for Nuclear Damage approved by Law Nº 17048.

d) ***Relevant nuclear facility:*** It includes nuclear reactor, critical facility, relevant radioactive facility and relevant accelerator, as defined or to be defined by the Nuclear Regulatory Authority.

e) ***Restricted information:*** Any information delivered by an applicant or by a license, permit or authorisation owner to the Nuclear Regulatory Authority that is to be treated confidentially in virtue of legal or contractual obligations assumed by them or related to:

   I. Processes and technologies for the production of special fissionable material;

   II. Specific application of safeguards;

   III. Specific protection systems applied in nuclear facilities.

f) ***Special fissionable material:*** Plutonium, Uranium 233, Uranium enriched in Isotopes 235 or 233 and any other material containing one or more of the above mentioned elements.

g) ***Production of special fissionable material:*** Chemical separation of special fissionable material from other substances or production of special fissionable materials by means of isotopic separation methods.

CHAPTER IV
General Provisions

ARTICLE 31.-The responsibility for nuclear and radiological safety, safeguards and physical protection remains unfailingly with the license, permit or authorisation owner. Fulfilment of this Law and of rules and requirements arising from them do not exempt him from such liability or from doing everything that may be reasonable and consistent with his possibilities in favour of radiological and nuclear safety, safeguards and physical protection.
The license, permit or authorization owner may totally or partially delegate the execution of the tasks, but he still keeps the entire responsibility established in this SECTION.

ARTICLE 32.-The National Government shall be the sole owner of special fissionable materials contained in irradiated fuel elements when activities encompassed by this Law are performed, as well as of any special fissionable materials admitted or developed in the country.

ARTICLE 33.-SECTIONs 2, 5, 9, 11, 16 and 17 of Decree-Law Nº 22498, dated 19 December 1956, are annuled.

CHAPTER V
Privatisations

ARTICLE 34.-It is declared as subject to privatisation nuclear power generation activity performed by the Corporation "Nucleoeléctrica Argentina Sociedad Anónima (Nucleoeléctrica Argentina S.A.)", as an indivisible productive unity, either directly or in association with other entities, including its various aspects (construction, commissioning, operation, maintenance, decommissioning of nuclear power plants), as well as management and execution of nuclear power plant construction being performed by the Corporation "Empresa Nuclear Argentina de Centrales Eléctricas Sociedad Anónima (ENACE S.A)".

This privatisation shall ensure the completion of the nuclear power plant, currently under construction, within a maximum term of six (6) years after the enactment of this Law.

ARTICLE 35.-"Nucleoeléctrica Argentina Sociedad Anónima (Nucleoeléctrica Argentina S.A.)", or corporation organized in furtherance of the execution of privatisation authorized in the previous SECTION, shall maintain up to twenty per cent (20%) of its capital and at least one (1) share as property of the National Government, and their possession as well as the exercise of corporate rights shall remain with the Ministry of Economy and Public Works and Services.

The company´s employees shall receive from said capital the percentage that shall be fixed in the framework of the programme of participated property foreseen in Law Nº 23696.

The National Government shall be the permanent owner of one (1) share of the society and its affirmative vote shall be required to take any decisions related to:

a) An expansion of capacity of an existing nuclear power plant and/or the construction of a new one.

b) Decommissioning for non-technical causes of a nuclear power plant, either temporarily or definitively.

ARTICLE 36.-Activities related to nuclear fuel cycle aimed at nuclear power generation, either at an industrial or research scale, and at the production and applications of radioisotopes and radiation presently performed by the Argentine Commission of Atomic Energy, either directly or in association with other entities, are declared as subject to privatisation, considering them both as a whole or as any of their constituent parts.

ARTICLE 37.- Corporations shall be constituted for the purpose of the privatisations mentioned in SECTION 36, and the National Government shall hold at least one (1) share and the right to veto any decisions involving discontinuation of such activities.

ARTICLE 38.-The licensee of the nuclear power plants or the corporation created for the purpose of privatisation authorised by SECTION 34 shall hire its supply of heavy water from the Industrial Plant for the Production of Heavy Water ("Planta Industrial de Agua Pesada - PIAP") installed in Argentina and shall be responsible for the restitution of heavy water hired for Embalse Nuclear Power Plant, according to technical quality features and prices of the international market.

ARTICLE 39.-Privatisation processes authorised in this Chapter shall be subject to conditions established by Law Nº 23696, by SECTION 96 of Law Nº 24065, by SECTION 14 of Law Nº 24629 and by this Law.

ARTICLE 40.-Nuclear Power Plants shall use nuclear fuel originated or elaborated from radioactive minerals of mines located in the country.

ARTICLE 41.-This Law shall be enforced as from the date of its publication in the Official Bulletin.

ARTICLE 42.-To be communicated to the Executive Power.

L.3.2 Law Nº 25018/98 National Law on Radioactive Waste Management Regime

General Provisions

ARTICLE 1.- This law sets forth the basic instruments for an adequate radioactive waste management that, in this aspect, assure the protection of the environment, public health and the rights of posterity.

ARTICLE 2.- For the purpose of the present law, Radioactive Waste Management means the ensemble of the necessary activities to isolate from the biosphere radioactive waste derived exclusively from the nuclear activity performed in the Argentine territory, the time required for the decay of its radioactivity to such a level that its possible re-entrance to the biosphere does not imply risks for man and his environment. Such activities will have to be performed in complete agreement with the limits established by the NUCLEAR REGULATORY AUTHORITY and with all the corresponding national, provincial and City of Buenos Aires regulations as well as with the international agreements.

ARTICLE 3.- For the purpose of this law, radioactive waste means all radioactive material, combined or not with non-radioactive material, which has been used in productive processes or applications, for which no immediate subsequent uses are foreseen in the same facility, and which, because of its radiological characteristics, cannot be dispersed in the environment in accordance with the limits established by the NUCLEAR REGULATORY AUTHORITY.

ARTICLE 4.- The ARGENTINE ATOMIC ENERGY COMISSION (CNEA) is the enforcement authority of this law and will co-ordinate everything related to its application with the provinces or the City of Buenos Aires, as may correspond.

ARTICLE 5.- In all the activities of radioactive waste management the ARGENTINE ATOMIC ENERGY COMISSION will have to comply with regulatory standards referred to radiological and nuclear safety, physical and environmental protection and international safeguards established by the NUCLEAR REGULATORY AUTHORITY and with all the corresponding national, provincial and City of Buenos Aires regulations.

Responsibility and Transference

ARTICLE 6.- The National State, through the enforcement authority of the present Law, shall assume the responsibility of the radioactive waste management. The generators of radioactive waste will have to provide the necessary resources to undertake it in due time and manner. The generator shall be responsible for the safe conditioning and storage of the waste generated by the facility operated by him, in compliance with the conditions determined by the enforcement authority, until its transference to the ARGENTINE OF ATOMIC ENERGY COMISSION, and shall notify the NUCLEAR REGULATORY AUTHORITY immediately about any situation that could lead to an incident, accident or operation failure.

ARTICLE 7.- The ARGENTINE ATOMIC ENERGY COMISSION shall establish the radioactive waste acceptance criteria and transference conditions that are necessary to assume its responsibility, and these will have to be approved by the NUCLEAR REGULATORY AUTHORITY.

ARTICLE 8.- The transference to the ARGENTINE ATOMIC ENERGY COMISSION of radioactive wastes, particularly irradiated fuel elements, will be done at the time and according to the procedures determined by the ARGENTINE ATOMIC ENERGY COMISSION with the prior approval by the NUCLEAR REGULATORY AUTHORITY. Under no circumstances the operator of the generating facility will be released from the responsibility in case of eventual civil and / or environmental damages until the transfer of radioactive waste has been accomplished.

ARTICLE 9.- The ARGENTINE OF ATOMIC ENERGY COMISSION, must prepare, within a term of SIX (6) months as from the enacting of the present Law, to be updated every THREE (3) years,

a Strategic Plan for Radioactive Waste Management which will include the National Programme of Radioactive Waste Management created by SECTION 10 of the present Law. This Plan and its updated versions will be forwarded to the EXECUTIVE who, after consulting with the NUCLEAR REGULATORY AUTHORITY, will send it to the NATIONAL CONGRESS for its enactment.

Likewise, it will annually present to the National Congress a report on the tasks performed, the progress of the strategic plan and the need of its update.

National Program of Radioactive Waste Management

ARTICLE 10.-The ARGENTINE ATOMIC ENERGY COMISSION through the National Programme of Radioactive Waste Management created by this Law must:

a. Design the strategy of radioactive waste management for the Argentine Republic and the places under its jurisdiction.
b. Propose the research and development lines related to technologies and methods of radioactive waste management of high, intermediate and low level.
c. Plan, co-ordinate, execute and assign the necessary funds, and control the execution of research and development projects related to radioactive waste management.
d. Study the need to establish repositories and facilities for the management of wastes of high, intermediate and low level generated by nuclear activity of the public or private sector.
e. Promote studies on safety and preservation of the environment.
f. Project and operate the systems, equipment, facilities and repositories for the management of wastes of high, intermediate and low level generated by nuclear activity of the public or private sector.
g. Construct, by itself or by third parties, the systems, equipment, facilities and repositories for the management of waste of high, intermediate and low level generated by nuclear activity of the public or private sector.
h. Propose the acceptance criteria and transference conditions of radioactive waste for the repositories of high, intermediate and low level.
i. Determine the procedures for the collection, segregation, characterisation, treatment, conditioning, transport, storage and final disposal of radioactive wastes.
j. Manage the waste originated by the nuclear activity of the public or private sector, including those generated at the closure of facilities, those derived from uranium mining and those originated in abandoned mining deposits and out of service industrial plants.
k. Implement, maintain and operate an information and recording system containing the documentation to allow the identification in a reliable and continuous form of the waste generators and transporters and other participants in all the stages of the management. It must also include the inventory of all radioactive waste existing in the country. Copies of the documentation, corresponding to their respective jurisdiction, must be forwarded to the competent authorities of the provinces and the City of Buenos Aires for their information.
l. Prepare contingency plans for incidents, accidents or operation failures and evacuation programmes for emergencies.
m. Permanently inform the community about the scientific and technological aspects of radioactive waste management.
n. Exercise the long term responsibility on the radioactive waste repositories.
o. In the case of a nuclear emergency act as a support to the services of civil protection in the manner and circumstances that may be required.
p. Perform the necessary technical and financial studies, taking into account the deferred costs derived from radioactive waste management, with the objective to establish the adequate economic policy.
q. Perform any other activity needed to comply with the objectives of the management.

ARTICLE 11.- The National Programme of Radioactive Waste Management will incorporate the recovery of the sites affected by the activities of extraction, grinding, concentration, treatment and elaboration of radioactive minerals originated in exploitation deposits and their respective

manufacturing plants, as well as from abandoned mining deposits or out of service industrial plants.

The application of the principle “as low as possible environmental impact” must be integrated with complementary programmes of sustainable development for directly affected communities and shall continue under the evaluation procedures of environmental impact determined by the provinces or the City of Buenos Aires, as may correspond.

ARTICLE 12.- In the case that the ARGENTINE ATOMIC ENERGY COMISSION proposes the need to locate facilities for the final disposal of radioactive waste of high, intermediate or low level, the selected sites will have to be previously approved as an essential requisite by the law of the province or the City of Buenos Aires, as may correspond, in agreement of the NUCLEAR REGULATORY AUTHORITY.

For this purpose, the corresponding studies of environmental feasibility will have to be undertaken containing a description of the proposal and of the direct and indirect potential effects that it could cause to the environment, indicating in this case the adequate measures to avoid or minimise the risks and / or negative consequences and informing about the scopes, risks and benefits of the project.

A public hearing shall be called with a notice of no less than TEN (10) calendar days, through a media of regional circulation giving the pertinent information related to the future site.

Financing of Radioactive Waste Management

ARTICLE 13.-This Law creates the Fund for the Management and Final Disposal of Radioactive Waste to be constituted when this Law is enacted and whose exclusive destiny will be the financing of the National Programme of Radioactive Waste Management under the responsibility of the ARGENTINE OF ATOMIC ENERGY COMISSION.

Said Fund will be integrated with the contributions of the radioactive waste generators in the form to be determined by the regulation, according to Section 10, item p) of this Law respecting the principles of equity and equilibrium according to the nature, volume and other characteristics of the generation. Such contributions will be integrated at the shortest term as from the generation of the corresponding wastes.

ARTICLE 14.- Taking into account the existence of deferred costs in the radioactive waste management, the National Congress will promulgate a law regulating the administration and control of the fund foreseen in Section 13 of this Law.

ARTICLE 15.- This Law revokes the Fund for Final Repositories of High Activity Nuclear Wastes created by Decree Nº 1540/94. The existing resources shall be transferred to the Fund established by this Law.

ARTICLE 16.- To be communicated to the Executive Power.

L.4. Standards for the Nuclear Regulatory Authority with reference to the National Report

STANDARD AR 0.0.1. Revision 2
Licensing of Type I facilities.

STANDARD AR 0.11.1. Revision 3
Licensing of the staff of Type I facilities

STANDARD AR 0.11.2. Revision 2
Psychophysical test requirements for specific authorizations

STANDARD AR 0.11.3. Revision 1
Re-training of the staff of Type I facilities

STANDARD AR 2.12.1. Revision 0
Radiological safety criteria for the management of radioactive waste generated by mining industrial facilities

STANDARD AR 3.1.1. Revision 2
Occupational exposure in nuclear power reactors

STANDARD AR 3.1.2. Revision 2
Radioactive effluent limitation in nuclear power reactors

STANDARD AR 3.1.3. Revision 2
Radiological criteria related to accidents in nuclear power reactors

STANDARD AR 3.2.1. Revision 2
General safety criteria for the design of nuclear power reactors

STANDARD AR 3.2.3. Revision 2
Nuclear power reactors fire protection

STANDARD AR 3.3.4. Revision 1
Nuclear power reactors fuel performance

STANDARD AR 3.6.1. Revision 2
Nuclear power reactors quality system

STANDARD AR 3.7.1. Revision 1
Schedule of documentation to submit before a nuclear power reactor commercial operation

STANDARD AR 3.8.1. Revision 1
Preliminary tests and nuclear power reactors commissioning

STANDARD AR 3.9.1. Revision 1
General safety criteria for the operation of nuclear power reactors

STANDARD AR 3.17.1. Revision 2
Nuclear power reactors decommissioning

STANDARD AR 4.1.1. Revision 0
Occupational exposure in nuclear research reactors

STANDARD AR 4.1.2. Revision 1
Limitation of radioactive effluents from nuclear research reactors

STANDARD AR 4.1.3. Revision 2
Radiological criteria related to accidents in nuclear research reactors

STANDARD AR 4.9.2. Revision 2
Research reactors operation

STANDARD AR 6.1.1. Revision 1
Occupational exposure in Type I radioactive facilities

STANDARD AR 6.1.2. Revision 1
Limitation of radioactive effluents in Type I radioactive facilities

STANDARD AR 7.9.1. Revision 3
Industrial gammagraphy equipment operation

STANDARD AR 7.11.1. Revision 3
Individual permits for industrial gammagraphy equipment operators

STANDARD AR 7.11.2. Revision 3
Individual permits for radiation source operators for industrial applications

STANDARD AR 10.1.1. Revision 3
Basic radiological safety standard

STANDARD AR 10.12.1. Revision 2
Radioactive Waste Management

STANDARD AR 10.13.1. Revision 1
Basic standards on physical protection of nuclear materials and facilities

STANDARD AR 10.13.2. Revision 0
Physical safety standard for sealed sources

STANDARD AR 10.14.1. Revision 0
Assurance of non deviation of nuclear materials and of materials, facilities and equipment of nuclear interest.

STANDARD AR 10.16.1. Revision 1
Transport of radioactive materials

L.5 Quality Assurance Manual

The list of the code, title and summary of the 64 operative procedures that are part of the 78 procedures of the quality assurance system of the PNGRR (see F.3.3. *Table 8 – General Quality Assurance Program Status)* is the following:

DD-SNA03C-001 Revision 6
Missions, tasks and requirements of the "Radioactive Waste Management" Area of the Ezeiza Atomic Center

Determines the missions and tasks of the operative positions and the requirements to be complied in order to perform the specific tasks corresponding to the "Radioactive Waste Management" Area.

DD-SNA_PNGRRC-003 Revision 0
Description of "Radioactive Waste Management" Area of the Ezeiza Atomic Center

Describes the facilities of "Radioactive Waste Management" Area of the Ezeiza Atomic Center.

DD-SNA_PNGRRC-004 Revision 0
Characterization of the site

Characterises the sites of the facilities which are part of the "Radioactive Waste Management" Area of the Ezeiza Atomic Center.

MC-SNA_PNGRRJ-002 Revision 0
Quality Manual of the "Radioactive Waste Management" Area of the Ezeiza Atomic Center and communicates the requirements of different activities conducted in this facility.

PO-00P3C-001 Revision 0
Emergency procedures applicable to the activities in the radioactive waste management area of the Ezeiza Atomic Center (AGE)

Description of abnormal situations that may be foreseen in the different AGE facilities and of the respective counter-proceedings in order to mitigate their consequences.

PO-SNA_PNGRRC-002 Revision 0

Application for rendering services and general requirements of radioactive material acceptance

Establishes the procedure to apply for services render and defines general requirements which must be met with the radioactive material to be accepted for its later management in the "Radioactive Waste Management" Area of the Ezeiza Atomic Center.

PO-SNA_PNGRRC-004 Revision 2
Acceptance requirements of compactable low level solid radioactive wastes

Establishes acceptance requirements of compactable low level solid radioactive wastes in regulatory plastic bags.

PO-SNA_PNGRRC-006 Revision 2

Segregation of radioactive wastes when generated

Establishes the methodology to segregate radioactive wastes when generated.

PO-SNA_PNGRRC-006 Revision 2

Acceptance requirements of liquid radioactive wastes in special containers

Establishes and determines acceptance requirements of liquid radioactive wastes in special containers.

PO-SNA_PNGRRC-011 Revision 2

Acceptance requirements of non compactable solid radioactive wastes in 200-litre containers.

Establishes acceptance requirements of non compactable solid radioactive wastes in 200-litre containers.

PO-SNA_PNGRRC-015 Revision 1

Procedures to entry and exit from the radioactive waste management area (AGE) of permanent hired staff and temporary staff

Defines the procedures to be followed upon entry and exit from radioactive waste management area at the Ezeiza Atomic Center (AGE).

PO-SNA_PNGRRC-022 Revision 2

Plan of Monitoring the radioactive waste management area at the Ezeiza Atomic Center (AGE)

Determines the routines to take samples, measurements and assessments to enable the verification of radionuclide isolation and protection of the personnel, the public in general and the environment.

PO-SNA_PNGRRC-060 Revision 0

Acceptance requirements of low level radioactive wastes in 20-litre drums

Determines the acceptance requirements of low level radioactive wastes in 20-litre drums.

PO-SNA_PNGRRC-061 Revision 1

Decommissioning of a Low Level Solid Radioactive Waste Treatment Plant

Describes decommissioning tasks to be performed in the aforementioned plant of AGE prior to its delivery to be restructured.

PO-00P3D-001 Revision 1

General Requirements for the final disposal of low level conditioned radioactive waste

Determines the general requirements that must be complied by the low level conditioned radioactive wastes for their final disposal.

PO-00P3D-002 Revision 1
Acceptance conditions of drums containing radioactive liquid wastes cemented for final disposal

Determines the acceptance requirements and conditions for low level liquid wastes immobilized by cementation for their final disposal.

PO-00P3D-003 Revision 1
Cementation process conditions used for the immobilization of low level liquid radioactive wastes generated by the CNA I

Determines the cementation process conditions at the Atucha I Nuclear Power Plant, for the immobilization of sludge or liquid radioactive wastes, in order to comply with the requirements determined by PNGRR.

PO-00P3D-004 Revision 1
Acceptance conditions for the transport of low level solid radioactive waste

Determines the requirements and conditions to be complied for the transport of low level solid radioactive waste.

PO-00P3D-005 Revision 1
Adjustment procedure at the plant of lab developed formulations for the immobilization of liquid waste

Determines the adjustment procedure at the plant of lab developed formulation for the immobilization of low level concentrated or sludge liquid wastes, in order that the solidified product complies with the general requirements (PO-00P3D-001) and with the acceptance conditions (PO-00P3D-002) determined by the PNGRR for the final disposal in the repositories to be determined in due time.

PO-00P3D-006 Revision 1
Documentation with reference to the immobilization of low activity level radioactive waste generated at CNA I

Confirm all controls inherent to the cementation process of low level liquid wastes generated by the CNA I, by means of a series of forms used as documents, in order to guarantee that the characteristics of the conditioned product respond to the acceptance conditions for their final disposal.

PO-00P3D-007 Revision 1
Requirements and controls of the components of the cementing matrix in the immobilization of liquid radioactive wastes

Determines the requirements and controls to be complied by the different materials to be used in the formulation of the cementing matrix, prepared during the immobilization of low activity liquid wastes generated at CNAI.

PO-00P3D-008 Revision 1
Requirements for the reception and storage of materials used in the immobilization of liquid radioactive wastes

Determines the criteria for the reception and storage of materials to be used in the cementation process of low level liquid wastes generated at the CNA I, as well as of those used in the preparation of the interior linings of the drums.

PO-00P3D-009 Revision 1
Requirements and controls for the components of the concrete layering of the drums for the immobilization of liquid radioactive wastes

Determines the requirements and controls to which the materials to be used in the manufacturing of the layering of the drums must be submitted.

PO-00P3D-010 Revision 1
Manufacturing of the layering for the drums

Determines the manufacturing process for the layering of the drums to be used in the immobilization process of low activity wastes generated at the CNA I.

PO-OOP3D-011 Revision 1
Operation and inspection stages during the cementation process of low level liquid radioactive wastes

Determines the development of activities for the operations and inspection of the PNGRR during the different stages of the immobilization process of low level liquid wastes generated at the CNA I.

PO-OOP3D-012 Revision 1
Control of the layering of the drums

Determines the conditions under which it is considered that the fresh mix has reached the required characteristics.

PO-OOP3D-013 Revision 1
Mix conditions

Determines the conditions under which it is considered that the fresh mix has reached the required characteristics.

PO-OOP3D-014 Revision 1
Control of the fresh mix and sampling

Determines the procedure to determine the properties of the fresh mix in order to optimize the quality of the final product and the sampling methodology for the manufacturing of test tubes to be used in the product characterization

PO-OOP3D-015 Revision 1
Hardened product control

Determines the procedure to determine the properties of the hardened product that must be controlled in the storage area.

PO-O3E-001 Revision 0
Preparation of the Eu-152 patron

Obtain an extended source to calibrate the geometry of homogeneous packages of a gamma explorer, by segments.

PO-O3E-002 Revision 0
Determination of the total alpha activity concentration in CNAI resins. Uncertainty calculation and recommendations on the expression of the final result

Describes the method used to determine the concentration of the total alpha activity in organic ionic exchange resins, uncertainty calculation and recommendations on the expression of the final result.

PO-SNA03F-002 Revision 0

Procedure for inspection records drafting

Establishes requirements for ordering and containing Inspection Records.

PO-SNA03F-002 Revision 0
Acceptance procedure of dimensional control instruments
Details the characteristics to be verified of measurement elements with which controls are to be performed of manufactured element dimensions.

PO-SNA03F-004 Revision 0
Procedure to issue non conformity documentation

Establishes the way to prepare material detection reports which do not answer to what is specified and the steps to follow until it is repaired or replaced by another which complies with the requirement.

PO-SNA03F-005 Revision 0
Procedure to implement engineering changes
Establishes the way to implement engineering changes arising from the building work needs.

PO-SNA03F-006 Revision 0

Acceptance Procedure of plates, pipes and sections and stainless steel

Establishes the quality certification requirements to be complied with by materials to be used in component fabrication in accordance with applicable standards, specifications and/or requirements of IO from CNEA.

PO-SNA03F-007 Revision 0

Control criteria and material reception to be applied in building reinforced concrete structures

Establishes control criteria and reception of materials to be applied in building reinforced concrete structures.

PO-SNA03F-008 Revision 0
Acceptance criteria of fresh and hardened concrete.

PO-SNA03F-009 Revision 0
Control criteria and acceptance of soil assays
Establishes control and acceptance criteria of soil assays.

PO-SNA_PNGRRF-014 Revision 0

Determines quality certification requirements to be fulfilled by materials applied in component manufacture in accordance with applicable standards, specifications and/or requirements of IO from CNEA.

PO-60J-001 Revision 0

Procedure to codify technical documentation and Quality Management System in the Radioactive Waste Management National Program, PNGRR.

GR-DOC-003 Revision 1
Acceptance requirements of low and intermediate level radioactive wastes in 200-litre drums.

Determines acceptance requirements of low and intermediate level wastes in 200-litre drums.

GR-DOC-005 Revision 1
Acceptance requirements for biologic radioactive wastes.

Determines acceptance requirements for biological radioactive wastes.

GR-DOC-013 Revision 1
Acceptance requirements for sealed radioactive sources.

Determines acceptance requirements of sealed radioactive sources to keep in custody, transfer property or manage it as a radioactive waste.

GR-DOC-014 Revision 1
Acceptance requirements of solid structural radioactive wastes to radioactive waste management.

Determines acceptance requirements of structural solid radioactive wastes to its radioactive waste management.

GR-IC-PN-020 Revision 1
Instruction and training plan for the licensing of the staff in the radioactive waste management area at the Ezeiza Atomic Center (AGE)

Description in detail of the training plan of the staff that will cover positions that require a license in the operation of the facilities, equipment and devices at the AGE (Ezeiza Management Area).

GR-IC-PN-021 Revision 1
Code of Practice in the radioactive waste management area at the Ezeiza Atomic Center (AGE)

Determination of the responsibilities, attributions and obligations of the staff that works at the Ezeiza Management Area (AGE), as well as the general procedures to be respected for the operation of the area.

GR-IC-IF-060 Revision 0
Report on the protection against fire in the radioactive waste management area of the Ezeiza Atomic Center (AGE)

Analyzes the different AGE facilities in relation to the existence of combustible materials and their fire load, determining the characteristics of the mitigation systems.

GR-IS-PR-007 Revision 1
Procedure for the transport of spent fuels and irradiated control bars between the RA 3 reactor and the Central Deposit for Irradiated Special Fissionable Material

Describes the conditions, operations and documentation to be prepared in case of transferring the spent fuels and the control bars.

GR-IS-RQ-008 Revision 3
Acceptance conditions for the transport of solid radioactive waste

Determines the acceptance conditions for the transport of packages containing solid radioactive waste.

GR-IS-IN-015 Revision 1
Access conditions for individuals and vehicles to the radioactive waste management area at the Ezeiza Atomic Center (AGE)

Determines the acceptance conditions: identification of individuals and vehicles, radioactive material transport equipment, registry and filing, for the access to the AGE.

GR-IS-PO-052 Revision 0
Procedure for the operation of the semi-containment system for solid radioactive wastes

Determines the procedure for the final disposal of packages containing solid low activity radioactive waste.

GR-IS-PO-053 Revision 0
Procedure for the operation of the semi-containment system for liquid radioactive waste

Determines the evacuation procedure of liquid low activity radioactive waste in the semi-containment system of liquid radioactive waste at the AGE.

GR-IS-PO-054 Revision 0
Procedure for the operation of the final disposal system for structural radioactive waste and sealed sources

Determines the final disposal procedure of solid low activity structural radioactive waste in the final disposal system for structural radioactive wastes and sealed sources at the AGE.

GR-IS-PO-055 Revision 1
Procedure for the final disposal of biological radioactive wastes under conditioned deregulation

Determines the practice methodology for the final disposal of solid biological radioactive wastes considered as conditioned deregulated.

GR-IS-PO-057 Revision 1
Procedure for the conditioning of sealed sources in disuse

Determines the practice methodology to proceed to the conditioning of sealed sources, as from their reception until their temporary storage or final disposal, as may correspond.

GR-IS-PO-064 Revision 1
Procedure for the operation of the Handling Yard and stowage of packages

Determines the mechanism for the verification, admission, manipulation of packages in the Handling Yard and stowage of packages at the AGE.

IS-14-RZ-50 Revision 1
Final Report on the Safety of the temporary storage deposit for radioactive sources and wastes

Determines the safety criteria applied for the design, construction and operation of the temporary storage deposit for radioactive sources and wastes.

PO14RZ16 Revision 2
Compacting procedure for low activity solid radioactive wastes

Determines the conditions and requirements of the compacting activities of low activity solid radioactive waste.

PO14RZ19 Revision 2
Procedure for the conditioning, long term storage of Radon 226 sources in disuse

Determines the requirements and conditions that must be complied for the conditioning, long term storage of Radon 226 sources in disuse that are admitted at the AGE.

PO14RZ26 Revision 2
Procedure for the inspections and control tests associated with the radioactive waste management at the AGE

Determines the procedure for the inspection and control tests for the verification of the acceptance requirements determined for the not conditioned and conditioned packages of low and intermediate activity wastes in their different management stages.

PO14RZ28 Revision 0
Procedure for the radiological monitoring of trucks loaded with urban waste

Determines the activities to perform the radiological monitoring of trucks loaded with urban waste.

PO14RZ29 Revision 2
Proceedings for the documentation originated by the radioactive waste management and sealed sources in disuse that are admitted at the AGE

Determines the mechanism for the proceedings of the documentation originated during the collection services as well as during the treatment, conditioning and location operations of the radioactive wastes admitted at the AGE.

PO14RZ30 Revision 1
Procedure for the collection, transport and transference of liquid radioactive wastes denominated *tellurides*

Determines the procedure for the collection, internal transport and transference of liquid radioactive waste produced by the Radioisotope Production Plant denominated *tellurides.*

L.6 Emergency Plans

PN00O011 Revision 1
Emergency and evacuation plan of CNEA facilities

Determines the methodology and requirements to be complied by each nuclear facility of CNEA for the control of emergency situations, in order to protect lives and property, mitigate consequences and minimize the operation failure of the facilities.

PG 14 OZ 15 - Revision 0
Emergency and evacuation plan for the Ezeiza Atomic Center

Determines the guidelines for the organization and standardization of the behaviour of the sections and staff in such a manner that in case of emergency situations they are prepared to act correctly and with precision

PG 13 O 006 - Revision 0
General emergency and evacuation plan for the Constituyentes Atomic Center

Determines the guidelines to organize and standardize the behaviour of the sections and staff in such a manner that in case of emergency situations they are prepared to act correctly and with precision.

PG 12 S 100 - Revision 4
Emergency Plan for the Bariloche Atomic Center

Determines the guidelines to organize and standardize the behaviour of the sections and staff in such a manner that in case of emergency situations they are prepared to act correctly and with precision.

PN 00 51 Revision 0
Guidelines for the preparation of the Evacuation Plan of the Buildings of the CNEA

Determines the general guidelines for the implementation of the Evacuation Plan in buildings, adapting it to the characteristics of the persons therein and the tasks they perform.

End of the

Fourth National Report

of the Argentine Republic

In furtherance of the

Joint Convention

on the Spent Fuel Safety

and on the Radioactive Waste Management Safety