

## REGULATORY AUTHORITY

The NUCLEAR REGULATORY AUTHORITY (ARN) was created as an autonomous body under Act 24,804 known as Nuclear Activity National Act, which came into force on April 25, 1997, to succeed the National Nuclear Regulatory Board. The Nuclear Regulatory Authority reports to the President of Argentina and is empowered to regulate and control the nuclear activity with regard to radiological and nuclear safety, physical protection and nuclear non-proliferation issues.

The objective of the Nuclear Regulatory Authority is to establish, develop and enforce a regulatory system applicable to all nuclear activities carried out in Argentina as well as to advise the Executive on issues under its purview. The goals of this regulatory system are:

To provide the public with an appropriate level of protection against harmful effects of ionizing radiation.

To ensure a reasonable degree of radiological and nuclear safety for nuclear activities performed in Argentina.

To ensure that nuclear activities are not diverted from authorized and intended purposes and are performed in accordance with international agreements to which Argentina is a signatory.

To establish criteria and standards to prevent deliberate actions from being committed which may either have severe radiological consequences or lead to the unauthorized removal of nuclear materials or other nuclear-related materials or equipment.

Articles 1, 7, 14, 15, 16, 18, 25 and 26 of Act 24,804 provide a detailed description of the functions, powers and duties vested in the ARN. Decree 1390/98 regulating said Act defines its scope and procedures facilitating its enforcement.

The direction and management of the Nuclear Regulatory Authority (ARN) are performed by the Board of Directors. The Board of Directors is composed of six members appointed by the Executive, two of which shall be respectively nominated by the Senate and the House of Representatives. The term of office of each Director shall be six years, with one third of them being chosen every second year. Selection criteria for the Director's office are based upon the candidate's technical and professional qualifications in the specific field.

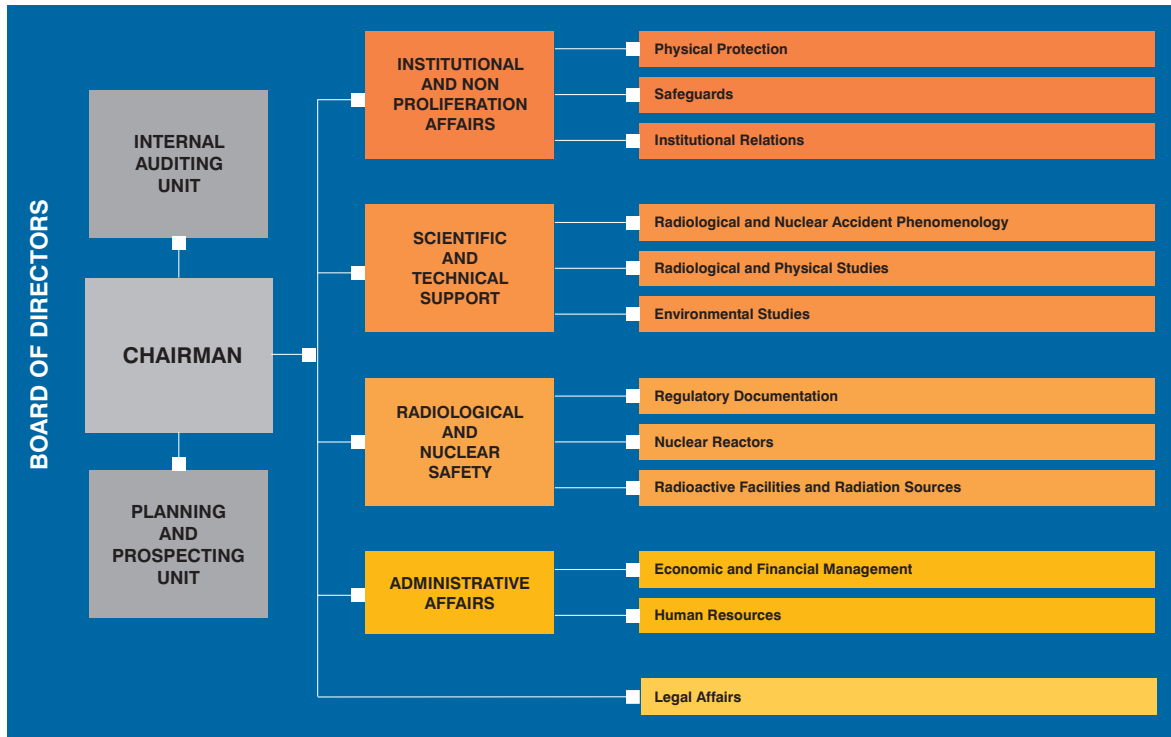
The President of Argentina, by virtue of the powers vested in him by article 18 of Act 24,804, appointed on March 8, 2000, by Decree 255, the Chairman and Vice-Chairman of the Board of Directors, as well as two of its Members. Members of the Board nominated by the Senate, and by the House of Representatives were appointed by Decree 147 of February 17, 2000 and Decree 458 of June 8, 2000.

### ARN Board of Directors

Chairman	Antonio A. OLIVEIRA
Vice-Chairman	Eduardo D'AMATO
Members of the Board	Norberto R. CIALLELLA Enrique E. MARIANO Sergio G. SOLMESKY Diana A. CLEIN



The organization chart below shows the ARN organizational structure approved on January 11, 1999:



## THE REGULATORY SYSTEM

In its capacity as the national authority on all issues relating to radiological and nuclear safety, non-proliferation assurances, physical protection and transport of radioactive materials, the ARN grants authorizations, licences and permits, as appropriate, in connection with practices associated with radiation sources. In addition, the ARN performs control activities to ensure that persons responsible for each practice comply with the provisions set forth in all regulations and other regulatory documents.

### Radiological and Nuclear Safety

The organization (owner or operator) in charge of the design, construction, commissioning, operation and decommissioning stages of a nuclear facility shall take full responsibility for the radiological and nuclear safety of the facility in question. No event affecting radiological and nuclear safety shall relieve said organization from its responsibility in each stage of the project.

As far as the licensing process is concerned, facilities are divided, according to the associated radiological risk involved, into two groups: major and minor facilities. For major facilities the ARN grants operating licences while for minor facilities it grants operating authorizations.

According to current regulations, three types of licences are required for the operation of major facilities: Construction Licence, Operating Licence and Decommissioning Licence. For nuclear power plants, a commissioning licence should also be envisaged.

Personnel of the major facilities whose activities could significantly affect safety shall hold Individual Licences and Specific Authorizations.

Two types of regulatory documents are issued for the purpose of certifying the ability of a person to hold a position in the facility operation chart. To be accepted for performing a key safety-related responsibility in a given facility, the applicant needs in addition to the individual licence a specific authorization which must be requested to the ARN. For this purpose, the applicant shall prove a specific knowledge of the facility in question, be suitably trained for the job and show an adequate psychophysical fitness.

As indicated above, for the operation of minor facilities, the organization liable for any practice involving material or ionizing radiation shall apply to the ARN for an operating authorization. In addition, all responsible persons involved are required to hold a specific individual permit applicable to a given practice.

## **Safeguards**

Safeguards and nuclear non-proliferation assurances are an essential aspect in the Argentine regulatory system. They constitute a set of requirements and procedures applicable to nuclear materials and other nuclear-related materials, equipment and information, aimed at ensuring, with a reasonable degree of certainty, that such elements are not intended for an unauthorized use, and that the international agreements signed in this field are appropriately respected.

Safeguards may be national or international in nature, with the international safeguards being divided into regional and global. National safeguards are defined by the provisions set forth in the regulatory framework adopted by each State. For Argentina, the ARN has established the guidelines of the Argentine Accountancy and Control System for nuclear materials and other nuclear-related materials, equipment and facilities. As far as the international safeguards and non-proliferation assurances are concerned, their application proceeds in accordance with the provisions of the agreements on non-proliferation of nuclear weapons ratified by Argentina. In this case, the safeguards may be applied by regional or global international organizations and are aimed at detecting within reasonable time and a reasonable degree of certainty the diversion of “significant amounts” of nuclear materials for purposes banned by the agreements by virtue of which those safeguards are applied.

In this regard, it is worth mentioning the “Bilateral Agreement between the Argentine Republic and the Federative Republic of Brazil for the exclusively peaceful use of nuclear energy” signed in Guadalajara in 1991. By virtue of this agreement an agency was created, designated as “Brazilian-Argentine Agency for Nuclear Material Accountancy and Control” (ABACC) whose essential objective is the implementation of the “Common System for Nuclear Material Accountancy and Control” aimed at ensuring that nuclear materials are not diverted for the manufacturing of nuclear weapons or other nuclear explosive devices.

Immediately after the bilateral agreement came into force, a multilateral agreement was concluded by Argentina, Brazil, the ABACC and the International Atomic Energy Agency (IAEA) for the application of safeguards (referred to as the Quadripartite Agreement). This agreement commits the IAEA to applying safeguards in both countries for all nuclear materials in connection with all nuclear activities in Argentina and Brazil, based on the “Common System for Nuclear Materials Accountancy and Control”.

## **Physical Protection**

The Argentine regulatory system also envisages, with special attention focussed on the national regulatory function, the physical protection against robbery, removal or unauthorized use of nuclear materials, and sabotage against nuclear facilities. In this respect, the ARN takes full responsibility for requiring the Responsible Entity to implement a complete physical protection system applicable to nuclear facilities and materials in accordance with the regulatory requirements set forth by the ARN. Physical protection has become a matter of international interest and cooperation. In particular, the “Convention on Physical Protection of Nuclear Material”, regarding international transport of these materials, was opened to signature on March 3, 1980, in the IAEA’s headquarters in Vienna and the United Nations headquarters in New York; Argentina adopted this Convention under Act 23,620 and then ratified it.



## Transport of Radioactive Material

The transport of nuclear material within Argentina shall be carried out in accordance with the provisions of the IAEA's "Regulations for the Safe Transport of Radioactive Material" which 1985 edition (amended in 1990) came into force on December 11, 1993.



Type B (U) packages for cobalt 60 transport. GURI 01 (centre and right) and F129 (left) models.

All international, regional and national organizations responsible for regulation of land, air, river and sea transport of hazardous materials have endorsed the safety criteria contained in regulation AR 10.16.1. relating to "Radioactive Material Transport", literally in accordance with the aforesaid IAEA Regulations. Regulation AR 10.16.1. provides persons, goods and environment with a suitable safety level during normal transport of radioactive material, as well as in the event of any accident. In order to protect workers and public

under normal transport conditions, this regulation sets forth requirements which essentially limit the dose rate in the environment of the packages to be transported and the non-fixed contamination in their external surface.

## AR Regulatory Standards

In accordance with the provisions of article 16, section a) of Act 24,804, the ARN shall have power to "establish regulations relating to radiological and nuclear safety, physical protection and nuclear material use control, nuclear facilities licensing and control, international safeguards and transport of nuclear materials with regard to radiological and nuclear safety and physical protection".

The regulatory philosophy in Argentina is mainly structured on a performance basis.

The Regulatory Standards in force on December 31, 2000 are listed below:

- AR 0.0.1. Licensing of major installations
- AR 0.11.1. Licensing of major installations personnel
- AR 0.11.2. Psychophysical aptitude requirements for specific authorizations
- AR 0.11.3. Major facilities personnel retraining
- AR 3.1.1. Occupational exposure in nuclear power plants
- AR 3.1.2. Limitation of radioactive effluents
- AR 3.1.3. Radiological criteria relating to accidents in nuclear power plants
- AR 3.2.1. General safety criteria for the design of nuclear power plants
- AR 3.2.3. Fire protection
- AR 3.3.1. Nuclear power plant reactor core design
- AR 3.3.2. Nuclear power plant heat removal systems
- AR 3.3.3. Primary pressure circuit
- AR 3.3.4. Fuel performance in the reactor

AR 3.4.1.	Safety-related protection and instrumentation system
AR 3.4.2.	Shutdown systems
AR 3.4.3.	Confinement systems
AR 3.5.1.	Emergency electric power supply
AR 3.6.1.	Quality assurance
AR 3.7.1.	Documentation to be submitted to the regulatory authority prior to the commissioning of a nuclear power plant
AR 3.8.1.	Prenuclear commissioning
AR 3.8.2.	Nuclear commissioning
AR 3.9.1.	General criteria for operational safety
AR 3.9.2.	Communication of significant events
AR 3.10.1.	Earthquake protection
AR 3.17.1.	Nuclear power plant decommissioning
AR 4.1.2.	Limitation of radioactive effluents from research and irradiation reactors
AR 4.1.3.	Accident related radiological criteria
AR 4.2.1.	Critical assembly design
AR 4.2.2.	Research reactor design
AR 4.2.3.	Fire protection in research reactors
AR 4.5.1.	Electric power supply system design for research reactors
AR 4.7.1.	Documentation to be submitted to the regulatory authority prior to the commissioning of a Class II or Class IV research reactor
AR 4.8.1.	Commissioning of critical assemblies
AR 4.8.2.	Commissioning of research reactors
AR 4.9.1.	Critical assembly operation
AR 4.9.2.	Research reactor operation
AR 5.1.1.	Occupational radiological safety by the design of major accelerators
AR 5.7.1.	Documentation to be submitted to the regulatory authority prior to the commissioning of a major accelerator
AR 6.1.1.	Occupational radiological safety in major radioactive installations
AR 6.1.2.	Limitation of radioactive effluents in major radioactive installations
AR 6.2.1.	Radiological safety for design of industrial irradiation plants with a mobile underwater radioisotope source
AR 6.7.1.	Documentation to be submitted to the regulatory authority prior to the commissioning of an industrial irradiation plant
AR 6.9.1.	Industrial irradiation plant operation
AR 7.9.1.	Radiological safety for industrial gammagraphy equipment operation
AR 7.11.1.	Individual licences for industrial gammagraphy equipment operators
AR 8.2.1.	Use of sealed sources in brachytherapy
AR 8.2.2.	Operation of linear electron accelerators for medical use
AR 8.2.3.	Cobalt-therapy equipment operation
AR 8.2.4.	Use of unsealed radioactive sources in nuclear medicine
AR 8.11.1.	Individual licences for use of radioactive material or ionizing radiation in human beings
AR 10.1.1.	Basic Radiological Safety Standart
AR 10.12.1.	Radioactive waste management
AR 10.13.1.	Basic standart on physical protection of nuclear materials and installations
AR 10.14.1.	Guarantees of non-diversion of nuclear materials, and material, installations and equipment of nuclear interest
AR 10.16.1.	Transport of radioactive materials

## FACILITY CONTROL

In Argentina there are two nuclear power plants in operation, one under construction, three critical assemblies, three research and isotope production reactors, 25 major radioactive facilities and more than 1,600 facilities for medical, industrial, research and teaching purposes which use radioactive materials or sources and radiation-generating systems. Those facilities are intended for various purposes such as electric power generation, radioisotope production, basic and applied research, or the use of ionizing radiation in the field of medicine and industry. Such various facilities are located all around the country and their complexity varies significantly.



The ARN's regulatory activities aimed at controlling those facilities include analyzing design and operation-related documents, permanently assessing safety during operation, and verifying by means of regulatory inspections and audits the compliance with the provisions of the licence concerned. The analysis and assessment duties are performed by staff members skilled in the field of radiological and nuclear safety who use modern information technology for data management and are acquainted with the use of calculation codes, in order to validate documents supplied by the licensee based on their own independent criteria.

The ARN's control action also includes a program of routine and non-scheduled inspections for monitoring all activities related to safety and verification of compliance with the provisions of the relevant licence.

Routine inspections are associated with the supervision of the facility's regular activities, process monitoring and verification of compliance with the provisions of binding documents. As far as nuclear power plants are concerned, inspections are basically conducted by ARN's resident inspectors relying on the technical support provided either by the ARN analysis and assessment teams or by teams working for the ARN under agreements or contracts.

Non-scheduled inspections are carried out both in the event of specific circumstances and when the need arises to increase the inspection effort. In both cases inspections are conducted by experts in a variety of disciplines, either from the ARN or other ARN-related institutions.

Facilities subject to regulatory control are listed in the following table:

Facilities under regulatory control	Number
Nuclear power plants in operation	2
Nuclear power plant under construction	1
Research reactors	3
Critical assemblies	3
Particle accelerators	4
Radioisotope or radioactive source production plants	5
High-dose irradiation plants	2
Facilities pertaining to nuclear fuel cycle	13
CNEA's waste management area	1
CNEA's minor facilities	26
Teletherapy centres	112
Brachytherapy centres	82
Nuclear medicine and radioimmunoassay centres	907
Gammagraphy facilities	57
Industrial applications	270
Research and education centres and other applications	224
<b>Total facilities</b>	<b>1712</b>

CNEA: National Atomic Energy Commission

The distribution of the inspections carried out by the ARN in 2000 by area under regulatory control, as measured in man-days, is shown below.

### Total Inspections

Area under regulatory control	Man-days
Radiological and nuclear safety	2296
Safeguards	637
Physical protection	107



## Radiological and nuclear safety inspections

Type of facility	Man-days
Nuclear reactors	1488
Major radioactive facilities	158
Medical applications	360
Industrial applications	265
Research and teaching and others	25

## Safeguard Inspections

Type of facility	Man-days
Nuclear reactors	464
Major radioactive facilities	160
Research facilities	13

## Physical protection inspections

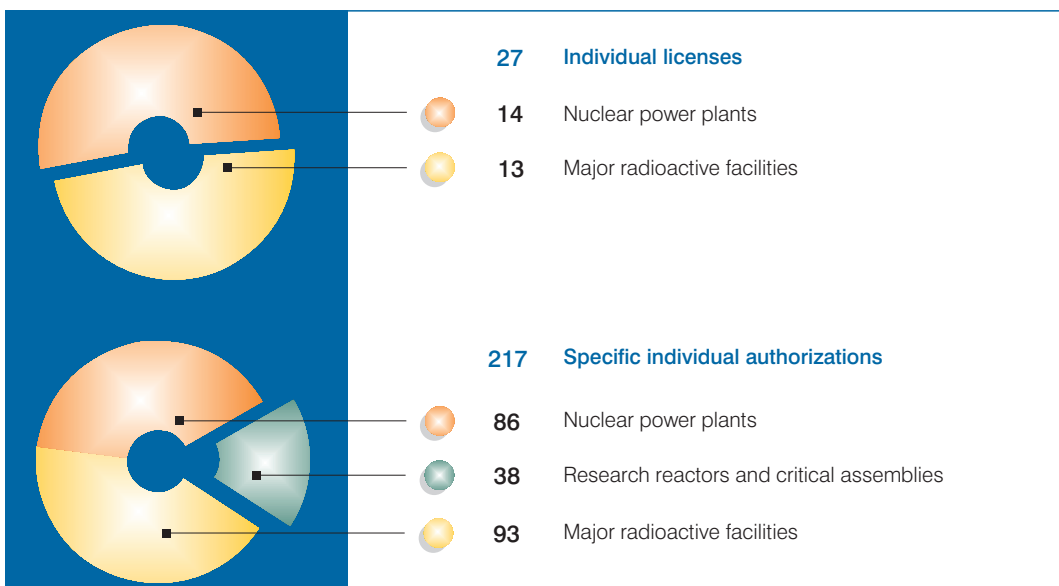
Type of facility	Man-days
Nuclear reactors	41
Major radioactive facilities	66

The ARN performed in 2000 its obligation to cooperate with the ABACC for implementation of the “Common System for Nuclear Material Accountancy and Control”, by contributing 13 inspectors who carried out a 156 man-day inspection work in Brazilian facilities.

## Individual licences and specific individual authorizations

During 2000 the ARN issued 27 individual licences and 217 specific individual authorizations for major facilities, the distribution of which is shown in the following figure:

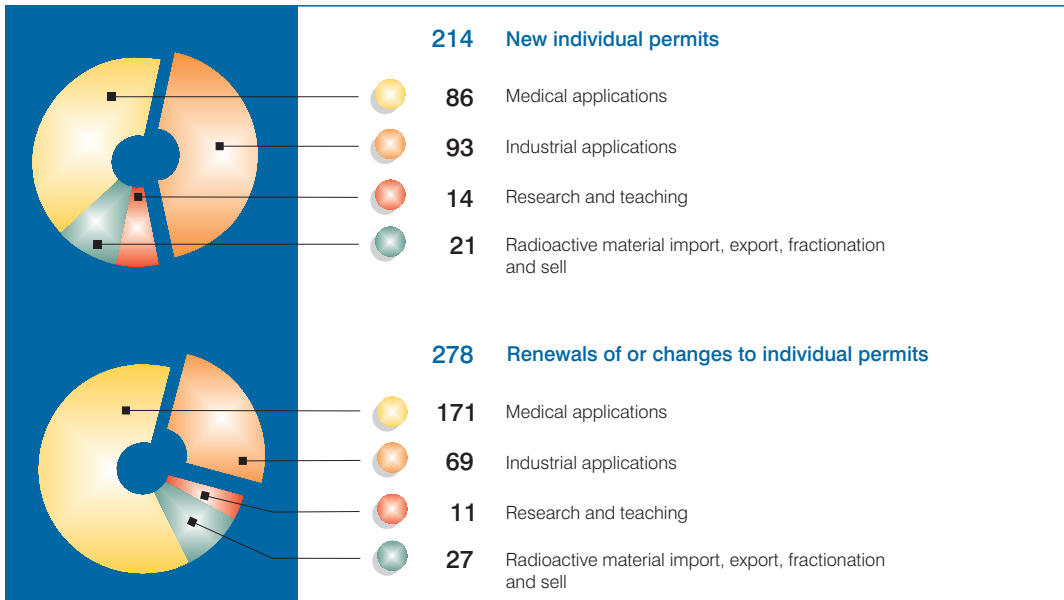
### Licences and specific authorizations



## Individual permits

In 2000 the ARN granted 214 new individual permits and 278 renewals of or changes to previously existing permits, as detailed in the Figure below.

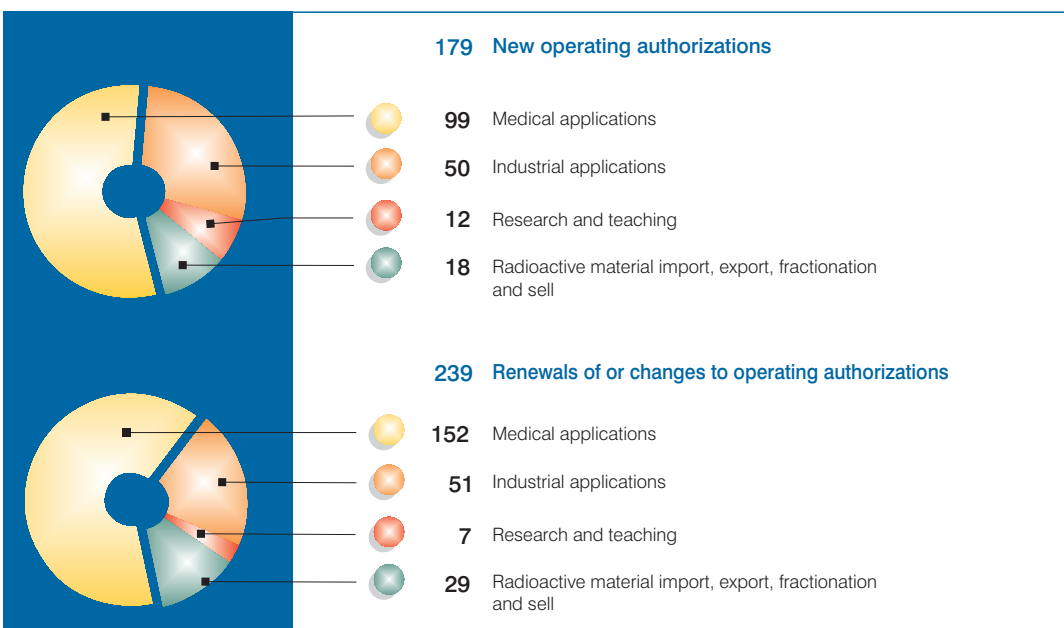
### Individual permits



## Facility operating authorizations

In 2000 the ARN granted 179 new operating authorizations and 239 renewals of or changes to previously existing authorizations, as follows:

### Operating authorizations





## EMERGENCY SYSTEM

All ARN-regulated activities involving the use of ionizing radiation should rely on emergency procedures or plans. Licensees shall be responsible for implementing such procedures or plans which are subjected to control by the ARN.

The ARN establishes the emergency criteria and evaluates the radiological and nuclear emergency plans and procedures developed by facilities under control.

Which actions are to be taken, who will take them and how they will be taken are the highlights of the emergency plan on which intervention is based. This plan contains all procedures to be followed in the event of an accident condition. For major facilities, the licensee shall be responsible for implementing an emergency plan prior to commissioning. For minor facilities, emergency procedures are required to contain accidents and minimize their consequences.

In the event of radiological emergencies in facilities other than nuclear power plants, the ARN will take the necessary steps through its own Radiological Emergency Intervention System (SIER). The SIER is intended to:

Advise personnel in charge of major installations in the event of an emergency.

Advise public authorities involved in radiological emergency control.

Act in the event of emergencies which may arise in minor facilities and practices where accidents can not be provided with adequate containment or may affect the public, as well as in the event of radiological emergencies in public areas.

The SIER has a primary intervention group which is on duty in weekly shifts all year round. The SIER has the specific equipment and necessary logistic infrastructure to ensure a prompt and efficient intervention in the event of a nuclear accident or a radiological emergency.

In addition, the ARN has signed cooperation agreements with other organizations such as the Federal Police, the Border Guard and the Coast Guard, so as to take common actions in the event of an emergency.

In compliance with the provisions of Act 24,804 and its regulating decree, the ARN has created through Resolution 25/99 issued by the Board of Directors the Nuclear Emergency Intervention System (SIEN) which serves as a complement to the previously created SIER. The implementation of the SIEN coincides with the creation (by Decree 1,250/99) of the Federal Emergency System (SIFEM). The SIEN's structure allows for the ARN to join the SIFEM as a participant organization.

The main features of ARN's SIEN and SIER emergency intervention systems are summarized in the following chart:

System	Objectives
SIEN Nuclear Emergency Intervention System	To act in the event of emergencies resulting from accidents in nuclear power plants, the consequences of which extend to the outside of the facility. To participate in planning and training stages aimed at intervention in emergencies. To take actions in conjunction with the Federal Emergency System (SIFEM).
SIER Radiological Emergency Intervention System	To act in the event of radiological emergencies arising in minor facilities and practices or affecting people. To act in the event of radiological emergencies in public areas. To advise public authorities and users.



## OCCUPATIONAL SURVEILLANCE

Basic criteria supporting radiological safety establish that: all practices involving the use of ionizing radiation shall be adequately justified, radiological protection shall be optimized, dose limits and constraints shall be complied with, the likelihood of accidents (potential exposure) shall be kept at a minimum level.

The ARN assesses information related to occupational exposure in the most important major and minor facilities. This work allows the ARN to define behavioral indicators for radiological protection systems, to identify trends, to verify compliance with dose limits, and to compare different practices to each other. In 2000, the total number of workers subjected to control in the different facilities reached 1961, with 79,8 % of them pertaining to the nuclear power plants.

The resulting collective dose to major facility workers was 15 man Sv. For Embalse nuclear power plant (CNE) the dose to workers did not exceed 50 mSv in year 2000, while for Atucha I nuclear power plant (CNA I) 62% workers received individual doses of less than 20 mSv. No dose to workers in the latter power plant exceeded 50 mSv in 2000.

The total number of workers in research reactors and critical assemblies reached 137. The annual collective dose to workers involved in the operation of these facilities was 0.15 man Sv.

At the end of the second five-year period (1996-2000) of application of occupational dose limits, it may be concluded that individual doses to all workers were less than 100 mSv for that period, taking into account individual doses received in all facilities.

## ENVIRONMENTAL SURVEILLANCE

The ARN performs environmental monitoring of areas around the different nuclear facilities, fully independently from monitoring carried out by the facilities themselves. In 2000, such a monitoring was carried out in the surroundings of Atucha I and Embalse nuclear power plants, Ezeiza and Bariloche atomic centres, San Rafael uranium ore mining plant, Cordoba uranium ore milling plant and the following decommissioned plants for mining and milling of uranium ores: Malargüe, Los Gigantes and La Estela. The facilities under environmental control are shown in the map below.

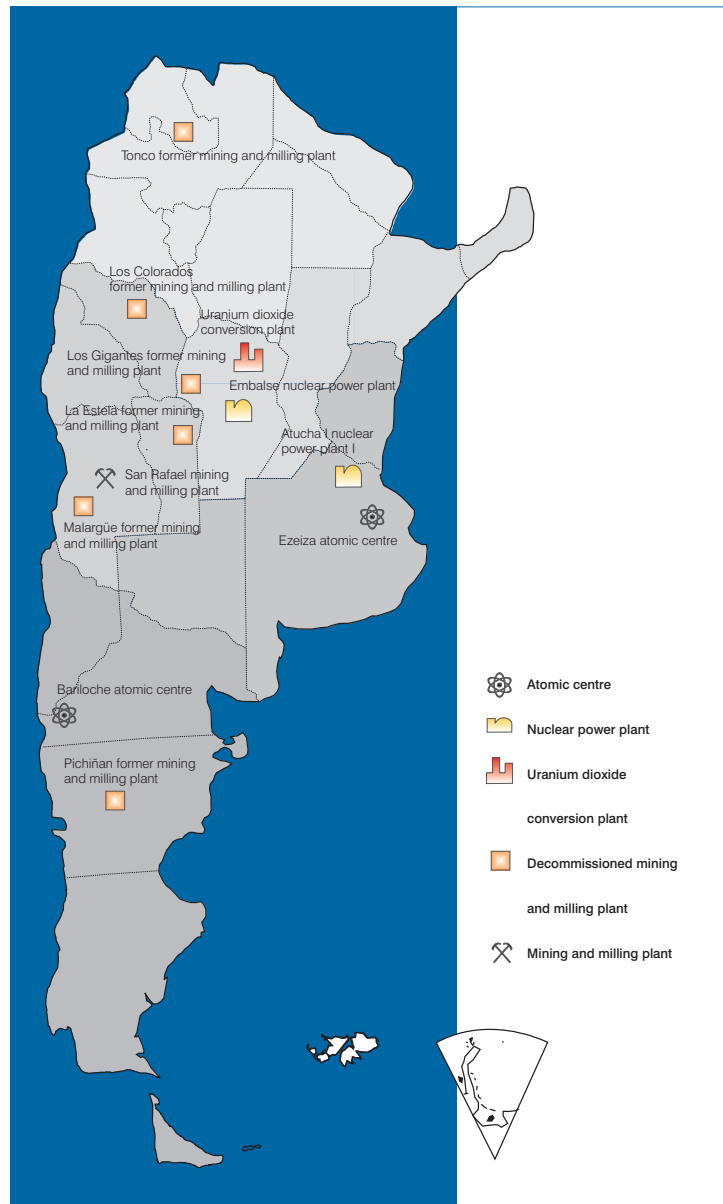
In the surroundings of Atucha I and Embalse nuclear power plants, representative samples were taken of the different compartments within the radionuclide transfer environmental matrix. In order to evaluate the environmental impact of the liquid discharges, samples of river and lake water, sediments and fish were collected and analyzed. To assess the environmental impact of gaseous emissions, samples of locally produced food, such as milk and vegetables, were taken and analyzed. Grass was analyzed as an indicator of radioactive material deposition. On account of their importance from the radiological point of view, radionuclides analyzed were mainly the radioactive fission products (cesium 137, strontium 90, iodine 131) and neutron activation products (tritium and cobalt 60).

No environmental pollution was detected in 2000 attributable to nuclear power plant operation, except for very low activity levels in some sediment samples.

Environmental monitoring was also carried out for CNEA's Ezeiza Atomic Centre. As done for the nuclear power plants, representative samples of the different compartments of the environmental matrix were collected in the surroundings of the Atomic Centre and then analyzed. No radionuclides were detected in the environment attributable to the operation of the atomic centre, except for some sediment samples.



The ARN has continued to periodically perform environmental monitoring in the areas surrounding the operating and decommissioned facilities for the mining and milling of uranium ores. Monitoring was conducted at currently operating Córdoba plant, San Rafael uranium ore mining plant, as well as the following decommissioned plants: Malargüe, Pichiñán, Los Gigantes, La Estela, Los Colorados and Tonco. To assess the radiological environmental impact of the operation of the various facilities, surface water, sediment and ground water were sampled. Natural uranium concentration and radium 226 activity were determined, as was radon gas emission rate for uranium mill tailings, on account that uranium, radium 226 and radon maintain the highest potential to produce radiological exposure. The results obtained show that no environmental pollution exists attributable to the monitored facilities.



In the course of year 2000, the ARN continued to carry out the radon concentration measurement program directed to monitor houses in different cities of Argentina, so that exposure incurred by members of the public could be estimated. For houses monitored from 1983 to 2000 all around the country, the radon concentration mean value was estimated at 34.2 Bq/m<sup>3</sup>. Studies performed show that radon levels in Argentine houses are well within the permissible values.

In 2000 the radioactive effluent release during operation of CNA I and CNE nuclear power plants accounted respectively for 16% and 2% of the annual dose constraints.

The resulting doses to individuals of the critical group for Atucha I and Embalse nuclear power plants reached respectively 0.0049 and 0.0011 mSv. These doses accounted for 2% of the annual dose constraints for a particular facility.



The resulting doses to individuals of the critical group in the remaining major facilities were lower than a tenth of the annual dose constraints for each particular facility.



Environmental sampling at Aguirre watercourse near Ezeiza Atomic Centre

## ARN LABORATORIES

The ARN performs various scientific and technological tasks to support its regulatory activity. For this purpose, the ARN relies on appropriate laboratories, equipment and skilled personnel whose work consists in implementing and validating the corresponding methodologies within different working sectors.

The ARN has various laboratories working at the Ezeiza Atomic Centre, located in Ezeiza, province of Buenos Aires. Those laboratories cover an area of 2,000 m<sup>2</sup> and work on physical dosimetry, radiopathology and biological dosimetry, radiochemical analyses, uranium particle detection, iodine 129 detection, radon measurement, environmental sample processing, and internal contamination assessment. Those facilities also include measurement laboratories (whole body counter, gamma and alpha spectrometry laboratory, gross alpha and beta activity measurement laboratory, and low background activity counter), electronic support laboratories and filter efficiency determining laboratories.

Various activities supporting the regulatory and development control functions are performed within the following specific areas:

- Physical dosimetry.
- Internal contamination.
- Biological dosimetry.
- Radon measurement techniques.
- Program of medical assistance on radiological protection.
- Diagnostic and prognostic indicators applicable to accidental overexposure.
- Prenatal irradiation effects on developing central nervous system.
- Remote surveillance and monitoring system.
- Computer model development for assessment of nuclear power plant safety.
- Study on core material behavior in nuclear power plants during severe accidents.
- Filter tests.
- Development of techniques aimed at detecting undeclared nuclear activities.
- Nuclear test detection techniques.

Within the framework of the Comprehensive Nuclear Test Ban Treaty, a gamma spectrometry laboratory is in operation which serves as a primary laboratory within the international network set forth in that Treaty.

For the purpose of developing application radionuclide identification and analysis techniques within the context of the international safeguards, works are being carried out for the installation of an ion accelerator. Such electrostatic accelerator (FN model - High Voltage Electrostatic Corporation) was donated to the ARN by the University of McMaster, Ontario, Canada, and is currently being mounted at CNEA's Ezeiza Atomic Centre.

The radiochemical laboratories process samples obtained from environmental monitoring and inspections. The different types of samples analyzed include waters, soils, sediments, vegetables, filters and biological samples such as urine, feces and nasal wipes, in order to determine different alpha and beta emitter radionuclides.

#### Microscopy metaphase analysis

In the radiation measuring laboratories, routine and special measurements in thyroid, lungs and the whole body are performed. Measurements associated with environmental studies, inspections and audits are also conducted.

In the field of physical dosimetry, routine measurements of personnel dosimetry and special measurements in reactors, critical assemblies, accelerators for medical use and research accelerators are carried out.

These laboratories are regularly involved in international quality assessment programs aimed at keeping up the required operating standards.



## INSTITUTIONAL RELATIONS

In compliance with its regulatory function, the ARN maintains a close and varied interaction with domestic and foreign, governmental and non-governmental organizations, as well as with international agencies. Such an interaction has the following objectives:





To facilitate the exchange of experiences and information as well as the participation in developing international recommendations to address issues related to radiological and nuclear safety, nuclear non-proliferation assurances and physical protection.

To establish and develop technical cooperation agreements.

To promote cooperation in order to improve effectiveness and efficiency of the international safeguards system through the participation of experts and the development of specific techniques in the country.

Furthermore, the ARN is actively involved in negotiating international instruments in connection with nuclear regulatory activities as well as in their subsequent implementation. In addition, the ARN contributes to the articulation of Argentine regulatory policies upheld in different international forums.

The negotiation of local and international agreements has always been one of the most important tasks within the context of the ARN's institutional relations. The ARN is currently involved in the execution of numerous agreements signed with local and foreign universities, public hospitals, the Federal Police and the Coastguard, as well as with American, Canadian, Spanish and Swiss regulatory authorities, among other countries.

#### LOCAL AGREEMENTS

Universities	Security Forces
University of Buenos Aires, Faculty of Exact Sciences University of Cuyo University of San Juan University of Buenos Aires, Faculty of Engineering	Federal Police Firemen Department Border Guard Coastguard
Hospitals	Others
San Martin Hospital Burnt Person Hospital Navy Hospital	Province of Mendoza's Ministry of the Environment CIHOY (Retina Network) CNEA (Legal department) CNEA (Radiomedicine) IMPRESS (Seismic Survey)

#### INTERNATIONAL AGREEMENTS

Framework Agreements	Safeguards
Switzerland - HSK - Hauptabteilung für die Sicherheit der Kernanlage United Kingdom - NRPB - National Radiological Protection Board South Africa - CNS - Council for Nuclear Safety Canada - AECB - Atomic Energy Control Board U.S.A. - NRC - Nuclear Regulatory Commission France - CEA - Commissariat à l'Energie Atomique Spain - CSN - Consejo de Seguridad Nuclear Armenia - ARNA - Armenia's Nuclear Regulatory Authority Egipto - NCNSRC - National Centre for Nuclear Safety and Radiation Control Germany - GRS - Gesellschaft für Anlagen und Reaktorsicherheit Italy - ANPA - Agenzia Nazionale per la Protezione dell' Ambiente	ABACC (Brazilian-Argentine Agency for Nuclear Material Accountancy and Control) DOE (U.S. Department of Energy)
	Safety Software
	NRC (U.S. Nuclear Regulatory Commission) EPRI (U.S. Electric Power Research Institute) IPSN (France's Institut de Protection et de Sûreté Nucléaire)
	Others
	Canada's McMaster University - Cooperation in the field of particle accelerators

In 2000 a cooperation agreement was signed with Italia's Agenzia Nazionale per la Protezione dell' Ambiente. Cooperation continued with foreign institutions with which agreements had been previously signed. At home, an agreement was signed with the City of Neuquén.

The ARN attaches great importance to its link with the International Atomic Energy Agency (IAEA). This link can be defined by three essential aspects:

- Attendance to regular meetings of the IAEA's "policy-making" organs;
- Participation in meetings of high-level expert committees advising the IAEA Director-General on issues in connection with nuclear safety and safeguards, as well as in activities related to negotiation or implementation of international agreements significant for nuclear safety; and
- Contributing experts for technical assistance missions in various countries, preparing safety-related publications and providing training for foreign trainees.

It is worthy of note that Argentina is one of the few member countries of the four technical committees working within IAEA's Secretariat-established process for the preparation and review of safety standards. Those committees are as follows:

- Radiological Safety Standards Advisory Committee (RASSC)
- Nuclear Safety Standards Advisory Committee (NUSSC)
- Waste Management Safety Standards Advisory Committee (WASSC)
- Transport Safety Standards Advisory Committee (TRANSSC)

Officers of the ARN are also members of other important committees, in particular the Standing Advisory Group on Safeguard Implementation "SAGSI" and the Advisory Commission on Safety Standards "CSS".

The ARN is a member of the Latin American Forum of Nuclear Regulatory Organizations and the Network of Regulators of Countries With Small Nuclear Programmes (NERS).

Adherence to the Comprehensive Nuclear Test Ban Treaty (CTBT) adopted by the United Nations General Assembly in September, 1996, requires continuous work to be performed by different sectors in the ARN. In fact, for the purpose of verifying compliance with the essential obligations set forth in the Treaty, an International Surveillance System envisaging the use of various detection techniques was established. For radionuclide and infrasound safeguards, the ARN is the responsible organization.

## TRAINING

The ARN undertakes as a permanent activity the training of specialists in radiological and nuclear safety, safeguards and physical protection, by means of training courses and the participation in local and international congresses and expert meetings. The training activity is carried out through the Training Department in charge of defining, organizing and coordinating courses, workshops and follow-up seminars.

### Postgraduate Course

Participants in the 21th Postgraduate Course in Radiation Protection and Nuclear Safety



The Postgraduate Course in Radiation Protection and Nuclear Safety organized in accordance with the provisions of an agreement with the University of Buenos Aires (UBA) and the Ministry of Health under the auspices of the IAEA, has uninterruptedly taken place on a yearly basis since its inauguration in 1980. Since then, a total number of 563 professionals have been granted a degree, half of them foreigners. The course consists of two





modules respectively relating to radiological protection and nuclear safety and running for 20 and 10 weeks. Both modules run on a daily seven-hour basis. 24 participants attended the course in 2000; 8 of them were from Argentina while 16 came from the rest of Latin America.

### Technician Training Course

A course in radiation protection is provided to train technicians from public and private institutions. This course runs for eight weeks on a daily seven-hour basis. In the 2000 edition, participants belonged to the Nuclear Regulatory Authority, the National Atomic Energy Commission of Argentina, the Border Guard and the Chilean Nuclear Energy Commission.

### Specialized Courses

In addition to general courses in Radiation Protection and Nuclear Safety mentioned above, different ARN groups provide specific courses, for example the following:

Transport of radioactive material

Safeguards, for IAEA and ABACC inspectors

Aerosol monitoring, for CTBT International Surveillance System operators

Medical response in radiation accidents

These courses run for a period of 1 to 4 weeks on a daily full-time basis. They take place every 2 years, average.



Practical work in the Regional Course in Medical Response in Radiological Emergencies. Buenos Aires, October 16 to 20, 2000

Furthermore, the ARN gives every year the radiological protection modules for the following courses: "Postgraduate Course in Nuclear Engineering" (CNEA/UBA), "Course in radioisotope methodology and Application" (CNEA) and courses in "Radiotherapy Physics" and "Dosimetry in Radiotherapy" (CNEA). Courses relating to ionizing radia-

tion industrial applications are provided at the request of radioactive material users.



Regional Course in Safe Transport of Radioactive Material Buenos Aires, October 3 to 13, 2000

ARN specialists are typically invited as lecturers for courses such as the Ministry of Health's Course in Sanitary Radiophysics and the University of the Littoral's Course in Radiological Protection.

Training courses provided by the ARN during 2000 are shown in the following table:

Name of the course	City	Duration	Date
Postgraduate Course in Radiation Protection and Nuclear Safety	Buenos Aires	21 weeks	April 6 to August 27
a) Module I "Radiation Protection"		9 weeks	August 30 to October 29
b) Module II "Nuclear Safety"			
Radiation Protection (Technical Level)	Buenos Aires	8 weeks	October 4 to November 26
Regional Course in Medical Response in the event of Radiological Accidents	Buenos Aires	40 hours	November 16 to 20
Regional Training Course on Safe Transport of Radioactive Material	Buenos Aires	2 weeks	October 3 to 13
Follow-up courses in Radiation Protection			
- University of Comahue	Bariloche	1 week	March 6 to 10
- University of Tucuman	San Miguel de Tucumán	1 week	July 3 to 7
Radiation Protection Module – Course in Radioisotope Methodology and Application (CNEA)	Buenos Aires	15 hours	April 6 to June 30
Radiological Safety Module - Master's Degree in Nuclear Reactors (CNEA/UTN)	Buenos Aires	45 hours	Annual
Course in Radiological Protection University of Entre Rios' Faculty of Engineering	Paraná	32 hours	September 1 to November 30
Inventory Verification of Small Gaseous Diffusion Plants (ARN/DOE)	Pilcaniyeu	40 hours	November 13 to 14
Annual Course in Radiology - Litoral's Oncology Centre	Santa Fe	32 hours	Annual
Course in Radiation Protection for oil industry applications	Neuquén	24 hours	September 11 to 14

The ARN has an Information Centre comprised of two functional units allowing the public to access specialized literature on radiological and nuclear safety, safeguards and physical protection through both the ARN's own databases and remote data banks, or by means of periodicals and specific textbooks.

### ARN Publications

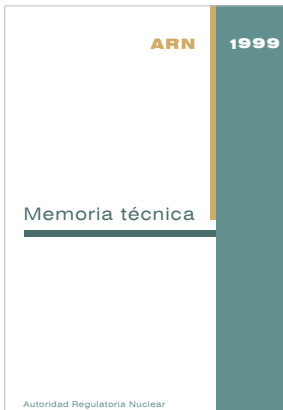
The following institutional publications are regularly edited by the ARN in printed and compact disk form:

#### AR Standards

This publication contains the text of the 55 regulations currently in force relating to radiological and nuclear safety, safeguards, physical protection and transport of radioactive material.

Separate printouts of each standard are also provided.

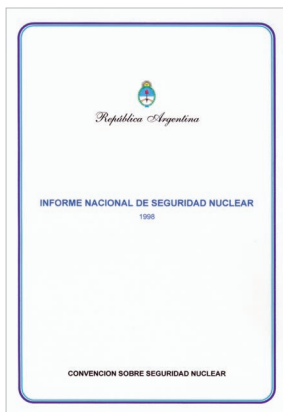




### Annual Technical Reports

The ARN Technical Reports contain all works published and/or submitted to congresses by the ARN's different working parties in the field of radiological and nuclear safety, safeguards and physical protection. They also include works performed under agreements between the ARN and universities or other local and foreign organizations.

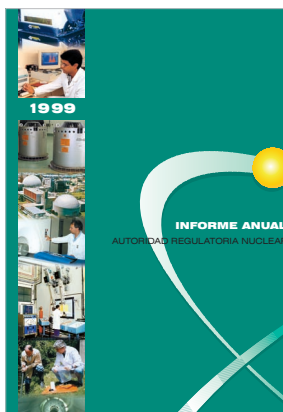
The Technical Report is edited on a yearly basis since the creation of the Regulatory Authority.



### National Nuclear Safety Report

This report, comprised of 14 chapters and 10 annexes, has been written according to the guidelines established by the Convention on Nuclear Safety, the objective of which is obtaining and maintaining all around the world a high-level nuclear safety by improving nation-wide measures and international cooperation. Argentina signed the Convention on Nuclear Safety adopted by a Diplomatic Conference held in Vienna on June 17, 1994, and adopted the Convention through Act 24,776 passed by Parliament on February 4, 1997.

This report describes the actions performed by Argentina since the start of its nuclear activities, such that compliance with provisions of the Convention above could be verified.



### Annual Reports

Annual reports summarize the main regulation and control activities regarding radiological and nuclear safety, safeguards and physical protection which are carried out each year at all facilities and for all practices involving ionizing radiation.

This report, regularly sent to Parliament since 1997, describes the Argentine regulatory system, the facilities under control and the main regulatory activities performed by the ARN during the period from January 1 to December 31 each year. Two annexes contain all licences, operating authorizations and transport certificates issued and inspections performed during the year at medical, industrial and research and teaching facilities.

### **Radioprotection in Ionizing Radiation Medical Applications**

This book, comprised of 11 chapters and one annex, is intended to provide professionals and technicians working on medical applications of the ionizing radiation with the main elements for radiological protection.

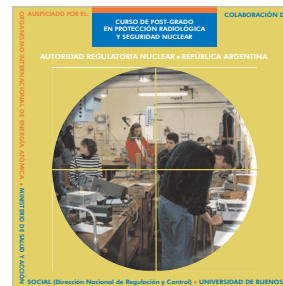
The first chapters relate to dosimetric magnitudes and techniques and describe the biological effects of the radiation and the fundamentals of radioprotection. The rest of the book relates to the main radioprotection aspects in radiodiagnostic, nuclear medicine and radiotherapy.



### **Postgraduate Course in Radiation Protection and Nuclear Safety**

This book contains the main radiological protection and nuclear safety-related subjects required for training professionals working for regulatory organizations or in assignments relating to radiation application in medicine, industry, research and teaching.

The book is intended for participants in the Postgraduate Course in Radiological Protection and Nuclear Safety given by the Nuclear Regulatory Authority, the Ministry of Health and the University of Buenos Aires Faculty of Engineering under the auspices of the IAEA.

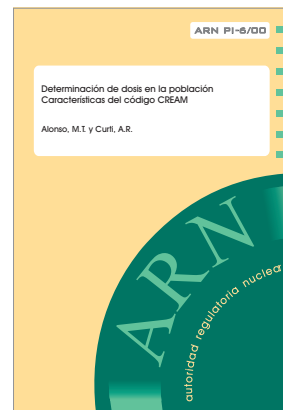


### **Internal Publications**

These publications contain preliminary information on different technical issues regarding radiological protection, safeguards and physical protection.

Papers concerned are eventually submitted to congresses or published in international journals.

At the end of the year they are added to the Annual Technical Report.



## **INFORMATION SYSTEMS**

Since 1995 the Nuclear Regulatory Authority relies on an information network allowing both internal and external communication.

This network supports 240 work stations and is divided in two local area networks, one located in the ARN Headquarters and the other one in Ezeiza Atomic Centre.





The main objectives of the information network are as follows:

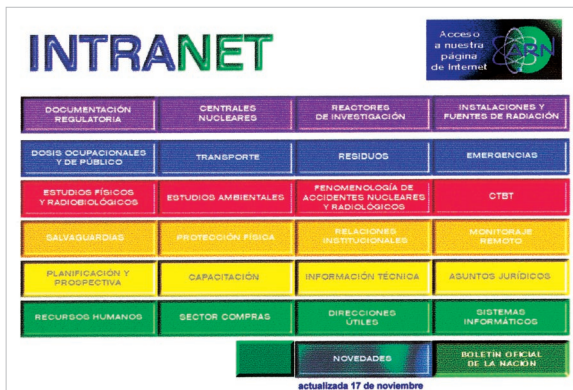
To allow users at any ARN department to work on group projects, share documents, access databases or any other type of available information within the network.

To automate the workflow contemplated in the ARN administrative processes.

To design and maintain a common system for network management.

Operating Systems used are: Netware 4.1, Windows NT 4 and SCO Unix 5.04, which are supported by Servers with Multiprocessor, redundant disk and source array. For connection to the Internet a 64 kbps and a 128 kbps radio links are used which connect the ARN Headquarters and the Ezeiza Atomic Centre to Retina (Red Teleinformática Académica), the Internet service provider.

### Intranet



The ARN has developed and maintains in operation an Intranet intended for becoming the central file for all technical information necessary to accomplish the objectives set forth by the law. The Intranet is accessed through the internal information network.

Thus, technical information on radiological and nuclear safety, safeguards and physical protection as well as general administrative information may be accessed from ARN's 240 work stations on a permanent basis.

The use of the Intranet in ARN's daily work has allowed information to be quickly and permanently accessed by the different working parties, thus resulting in a more efficient execution of the ARN's annual work schedule.

### ARN Web Site



ARN Web page address is:

**<http://www.arn.gov.ar>**

In addition to general information on the ARN, the following specific information may be obtained in the ARN Web page: AR Standart, Licensing and Inspection Fee System, Sanction System, Press Releases, Laws and Decrees relating to the regulatory sector, licences and operating authorizations issued, Training Courses, Technical Reports, Annual Reports and National Report on the Convention on Nuclear Safety.

## HUMAN AND ECONOMIC RESOURCES

The organizational structure of the ARN is made up of 215 established posts and 6 posts pertaining to the Board of Directors. In the course of the year 2000 seven qualified contract workers were engaged while 18 employees quitted by joining the compensated resignation plan. By the end of the year the number of trainees at the ARN was 18.

Out of the total regular staff, 64% are university-degree holders. 85% of the total regular staff is devoted to specialized scientific and technical tasks within the ARN's sphere of activities, while the remaining 15% is assigned support and administrative work.

The total budget allocation for the ARN approved by Administrative Decision 1/01 for the year 2000 was \$ 19,220,154, funded by the Treasury Department contributions, Specific Resources and Specific-Allocation Resources. This initial budget was modified by the Ministers General Accord (Decree 487/00). Therefore, the ultimate budget allocation for the year 2000 was \$ 19,020,154.

