BRAZILIAN-ARGENTINE AGENCY FOR ACCOUNTING

AND CONTROL OF NUCLEAR MATERIALS - ABACC

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ABACC

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Ministry of External Relations

José Mauro Esteves dos Santos
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National Nuclear Energy Commission

For the Republic of Argentina

Enrique De La Torre
Director-General of International Safety,
Nuclear and Space Issues
Ministry of External Relations,
International Commerce & Religious Affairs

Dan Jacobo Beninson
President of the Directory,
National Nuclear Regulatory Agency

INTRODUCTION

This Annual Report describes the activities carried out by the Brazilian-Argentine Agency for Accounting and Control of Nuclear Materials - ABACC during 1995.

Set up under the Agreement between Brazil and Argentina for the Exclusively Peaceful Use of Nuclear Energy (Bilateral Agreement), the purpose of ABACC is to administer and apply the Common System for Accounting and Control of Nuclear Materials - SCCC. The purpose of this system, according to the guidelines laid down in the Bilateral Agreement, is to verify that nuclear materials used in all nuclear activities are not diverted to nuclear weapons or other nuclear explosive devices.

As a signatory of the Quadripartite Agreement for the application of international safeguards, also signed by Argentina, Brazil and the International Atomic Energy Agency - IAEA, ABACC has responsibilities regarding the implementation and application of this Agreement, as from its entry into effect in March 1994.

The Quadripartite Agreement was considered by the IAEA and the Agency for the Prohibition of Nuclear Weapons in Latin America and the Caribbean - OPANAL, as valid for complying with the requirements of the Treaty of Tlatelolco, of which Brazil and Argentina are signatories. ABACC forwards a half-yearly declaration to both countries on the application of safeguards, which acts as a basis for the declaration submitted by both countries to the OPANAL Council. The Quadripartite Agreement was also considered valid by the IAEA for complying with requirements for the application of safeguards established in the Nuclear Non-Proliferation Treaty - NPT, which Argentina signed in 1995.

The activities of ABACC progressed satisfactorily during 1995, the fourth year of its operations. Viewed schematically, 1992 was the year in which ABACC was set up and its staff recruited; 1993 saw the implementation of the

Common System for Accounting and Control of Nuclear Materials (SCCC) which came on stream that same year, with ABACC taking over control of all nuclear materials in all nuclear facilities not covered by the safeguards of the International Atomic Energy Agency (IAEA). The following year - 1994 - saw the consolidation of the SCCC and the entry into effect of the Quadripartite Agreement, when ABACC and the IAEA began to apply full scope safeguards jointly, covering all nuclear materials and nuclear facilities in both countries. Last year - 1995 - was particularly outstanding due to the efforts devoted to implementing coordination mechanisms between ABACC and the IAEA.

Based on nuclear materials verification activities carried out in compliance with the basic commitments of the Bilateral Agreement, and following the procedures established by the SCCC, ABACC did not detect any fact that could indicate any diversion of significant quantities of nuclear materials for the fabrication of weapons or other nuclear explosive devices.

INSTITUTIONAL ACTIVITIES

ABACC Commission

Meetings of the Comission

ABACC Secretariat

Relationship with the IAEA

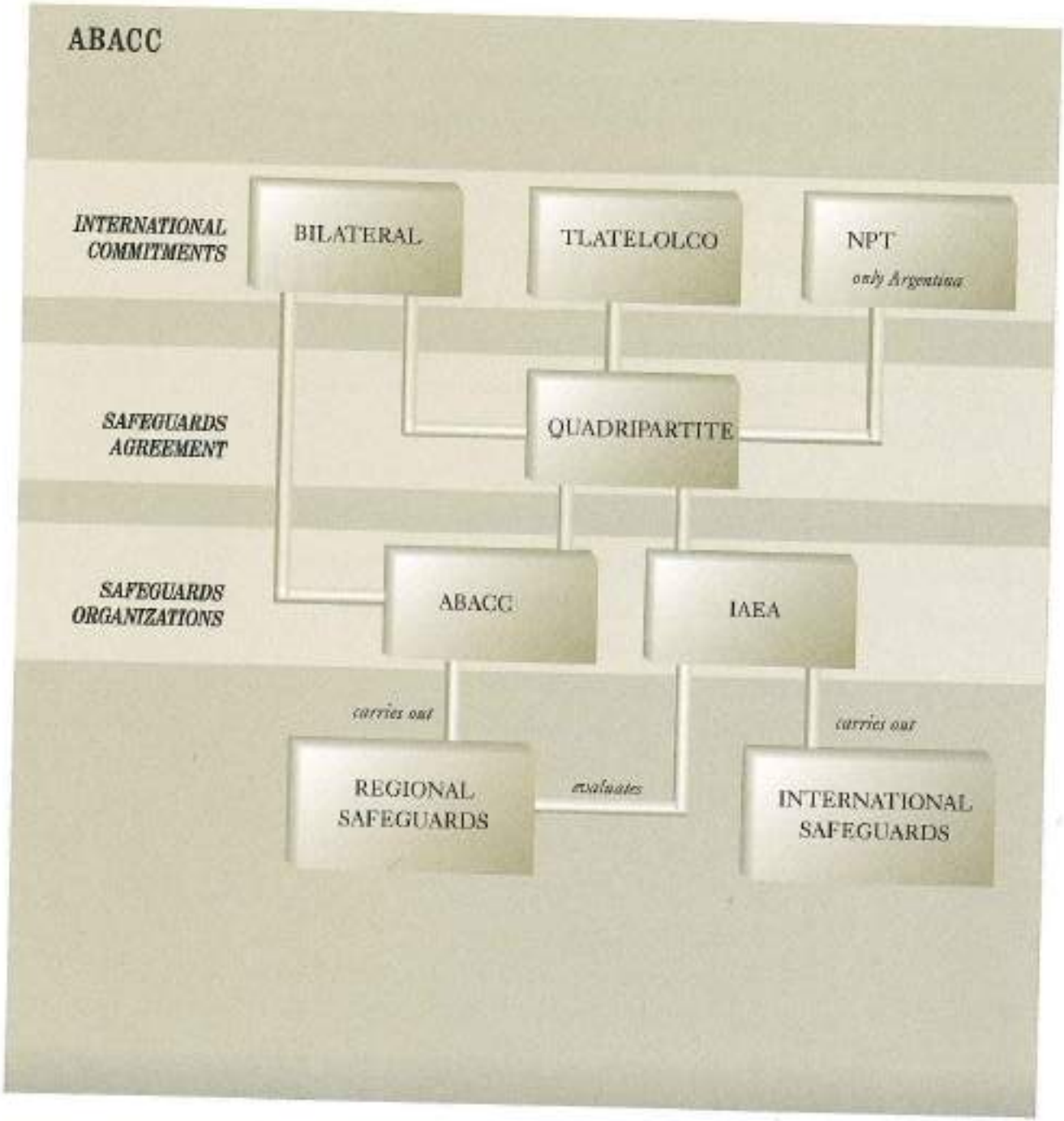
Technical Cooperation

Participation in Lectures, Symposia and Seminars

Visits

Publications

ABACC


ABACC
INTERNATIONAL COMMITMENTS
BILATERAL
TLATELOLCO
NPT
only Argentina
SAFEGUARDS AGREEMENT
QUADRIPARTITE
SAFEGUARDS ORGANIZATIONS
ABACC
IAEA
carries out
carries out
REGIONAL SAFEGUARDS
evaluates
INTERNATIONAL SAFEGUARDS

ABACC COMMISSION

ABACC consists of a directive body, the Commission, and an executive body, the Secretariat. The Commission consists of two members of each country, and its principal function is to ensure the smooth functioning of the Common System for Accounting and Control of Nuclear Materials - SCCC. The Commission approves the general procedures of the Common System for Accounting and Control of Nuclear Materials - SCCC, as well as the application manuals for each facility, while also supervising the functioning of the Secretariat through instructions and guidelines. It is also responsible for seeking the means necessary for its functioning, appointing its professional staff and approving the appointment of administrative personnel. It also prepares the list of inspectors, on the basis of suggestions put forward by the Governments of Brazil and Argentina, and reports back annually to both countries on progress in the application of the SCCC.

Should any abnormality occur in the application of the SCCC, the Commission is charged with advising the respective country of this, and requesting the necessary corrective measures; in case of failure to comply with commitments, it advises the member countries of this fact.

The Commission is responsible for establishing its own regulations, as well as those of the Secretariat. According to its regulations, each Party may appoint alternate members to replace permanent members at the meetings of the Commission. In 1995, the following acted as alternate members: Minister Antonio GUERREIRO (replacing Ambassador José Maurício BUSTANI), Dr. Ivano MARCHESI (replacing Dr. José Mauro Esteves dos SANTOS), Engineer Pedro SAJAROFF (replacing Dr. Dan BENINSON) and Councilor Raúl PELAEZ (replacing Minister Enrique DE LA TORRE).

In accordance with these regulations, the Commission shall hold at least three ordinary meetings per year, and may also call extraordinary meetings at the request of its members or the Secretariat. At these meetings, the four members or their alternates should be present, and decisions should be taken by consensus.

In order to ensure assistance and advice in topics of interest, the Commission may request the countries to set up *ad-hoc* groups. At the moment,

a group is currently in operation focused on the application of safeguards in facilities considered as sensitive which - by decision of the Commission - will also take under consideration topics related to the strengthening of safeguards.

MEETINGS of the COMMISSION

The ABACC Commission held three ordinary meetings during 1995, during which the following major decisions were taken:

- Approval of the 1994 Annual Report of the Secretariat, and request to forward this to the Signatories of the Bilateral Agreement;
- Inclusion of three more Argentine inspectors on the ABACC list of inspectors;
- Approval of an additional budget for 1995, which is now based on an amount of US$ 2,850,000;
- Modification in membership of the *Ad-Hoc* Advisory Group for sensitive facilities, to three permanent members and one alternate from each country;
- Authorization for the Secretariat to receive financial contributions from the U.S. State Department Non-Proliferation and Disarmament Fund, under the Cooperation Agreement with the U.S. Department of Energy, for the acquisition of equipment and investment in training ABACC inspectors;
- Approval of the 1996 Work Plan and the corresponding Budget, whose basis shall be US$ 3,050,000.

The Commission examined the reports of the *Ad-Hoc* Group, devoting particular attention to the progress achieved by the Secretariat in the implementation of safeguards in enrichment facilities. The Commission also analyzed partial reports and four-monthly activity balance sheets submitted by the Secretariat, assessed and issued guidelines covering technical cooperation activities and the development of the safeguards application process, taking

into account the proposals and resolutions covering the strengthening of safeguards approved by the International Atomic Energy Agency (IAEA).

As established in the Bilateral Agreement, the Commission also officially recognized the transfer of the position of Secretary of ABACC.

ABACC SECRETARIAT

The ABACC Secretariat consists of ten technical officers, two administrative officers and five administrative assistants. Its head offices are in the City of Rio de Janeiro, with a support office in Buenos Aires that is staffed by two ABACC technical representatives. The senior technical officers of each country alternate annually in holding the positions of Secretary and Deputy Secretary. During 1995, the Secretary was Dr. Carlos FEU ALVIM, up to 12 December. On that date, Dr. Jorge Antonio COLL - Deputy Secretary for the period - took over the position of Secretary for the third period under this alternating system. The Secretary is responsible for the acts of the Secretariat, assisted by the Deputy Secretary, who replaces him in his absence or through express delegation.

The ABACC Secretariat is responsible for implementing the guidelines and instructions of the Commission, carrying out the activities necessary for the application of the Common System for Accounting and Control of Nuclear Materials - SCCC, and acting as the representative of ABACC, on the orders of the Commission. On the basis of a list approved by the Commission, the Secretariat appoints the inspectors for each inspection mission, receiving and assessing the corresponding reports. The Secretariat is also responsible for the preparation and implementation of the annual work plan, as well as the respective budget, which are submitted to the Commission. The Secretariat regularly advises the Commission on its activities and must also inform it immediately of any discrepancy in the records or irregularity indicated through the inspections. The Secretariat has a technical unit and an administrative unit.

The assistance rendered to the Secretariat with regard to

institutional relationships is handled by the administrative unit, under Ana Claudia RAFFO, Master of Arts in International Relations, who also handles the documentation covering all relationships with local and international organizations. She is responsible for public relations activities and the preparation of press releases or other types of publicity that enhance the image of ABACC. Her tasks also include coordination of ABACC publications.

RELATIONSHIP with the IAEA

Working closely with the IAEA, ABACC has done its utmost to build up appropriate coordination to fulfill the Quadripartite Agreement (INFCIRC/435) complying with the principles established therein, whereby both agencies should, when applying their safeguards, be able to reach independent conclusions, thus avoiding unnecessary duplication of activities.

Coordination in the execution of the Quadripartite Agreement is outlined in the wording of this Agreement, particularly in the Protocol that is an integral part thereof, and in the Subsidiary Arrangements negotiated by all four signatories. This coordination is established at the quadripartite level with regard to the coordination of the implementation of the Agreement, and at the bilateral level, between the two agencies, with regard to the coordination of the joint application of safeguards. Bilateral coordination takes place at the planning, operational and implementation levels of the inspections.

In order to facilitate application of the Agreement and the Protocol, it was decided to set-up a Liaison Committee to review the performance of coordination activities in the implementation of the agreement - including inspections, examining the development of safeguards methods and techniques. The Liaison Committee consists of representatives of the four signatories to the Agreement, and its purpose is to monitor the implementation thereof. The Committee may also appoint a Sub-Committee to discuss the implementation of safeguards covered in the Agreement.

In 1995, ABACC discussed various aspects of the application of safeguards under the Quadripartite Agreement in a number of meetings held

with the IAEA which, in some cases, were also attended by the national authorities of Brazil and/or Argentina.

At the second meeting of the Liaison Committee held in Vienna in June, specific issues were covered, some of them put forward by the Liaison Sub-Committee that had met two months earlier, such as the suspension of the tri-lateral safeguards agreements in existent prior to the entry into effect of the Quadripartite Agreement, coordination of negotiation of the Facility Attachments, and *ad-hoc* procedures, in addition to analyzing the implementation of the Agreement as a whole.

In order to comply with the coordination requirements between the ABACC and the IAEA as stipulated in the Agreement, coordination meetings were also scheduled at the planning level between the IAEA and the ABACC whenever necessary, and at least once every two years. As the inspection activities carried out jointly by the IAEA and the ABACC under the Quadripartite Agreement began in June 1994, the first coordination meeting took place in February 1995. The outcome of this meeting was an initial proposal to coordinate these activities entitled *Guidelines for the Coordination of Inspection Activities* which, although covering only some aspects of the coordination of activities between the IAEA and the ABACC, is important in regulating the joint activities of the inspectors of both agencies in the field. The provisions of these guidelines will be introduced into each Facility Attachment, where the inspection activities of the two agencies are described for each specific facility (see *Technical Activities*).

A second coordination meeting at the planning level was held in November at the ABACC head offices, when ABACC stated its concern over the fact that the IAEA had not yet approved the Guidelines proposed at the February meeting. ABACC acknowledged the *de facto* advances achieved at the operating level, but stated that still more progress could be made in complying with the provisions of the Quadripartite Agreement, such as the IAEA taking into consideration the activities and results of ABACC inspections in the application of its safeguards.

The issue of cooperation between these two agencies has also been under discussion at the operating level during the meetings held prior to inspection missions, and at the coordination level at meetings between the IAEA and ABACC. Although some progress has been noted in these talks during 1995, there are still various points awaiting solution, such as procedures for sharing surveillance systems and other equipment.

Article 15 of the Additional Protocol to the Quadripartite Agreement establishes that the IAEA and ABACC should consult between themselves and identify the containment and surveillance measures, as well as verification measures to be applied to each facility, until the respective Facility Attachments enter into effect. To this end, two meetings were held with the IAEA to present and discuss the safeguards approach of ABACC to enrichment plants in Brazil and Argentina. We describe these talks in the chapter entitled *Technical Activities*.

At the inspections level, coordination was handled through meetings held prior to inspection campaigns, at the ABACC head offices, as well as through prior contacts with the national authority when necessary, and among the inspectors themselves in the field. This type of coordination depends heavily on the inspectors of the two agencies. The establishment of clear-cut procedures at the coordination levels described and the training of inspectors plays an outstanding role in ensuring that this coordination is successful in achieving the common objective of carrying out the inspections effectively and efficiently.

TECHNICAL COOPERATION

Technical cooperation with nuclear organizations in the Member-States and outside organizations is particularly relevant for fulfilling the purposes of ABACC, as it has decided to use the technical capacity and facilities of the Member-States or even outsiders wherever possible. Cooperation with other nations or international organizations also helped enhance the technical abilities available to ABACC. Technical cooperation has taken place through formal cooperation agreements (CNEA, CNEN and DOE/USA) or through complying with specific demands of ABACC.

Formal Working Groups such as that focused on non-destructive analysis (NDA) and laboratory inter-comparisons have streamlined this task. Additionally the ABACC Secretariat has called upon groups of experts from both countries to assist it on specific issues.

- *With the Brazilian National Nuclear Energy Commission (CNEN)*

Cooperation with the CNEN has taken place mainly in the areas of non-destructive analysis of nuclear material, as well as support for ABACC inspection activities and the organization of an ABACC inspectors training course.

As a recommendation of the ABACC Secretariat Advisory Group for non-destructive analysis, the Nuclear and Energy Research Institute (IPEN/CNEN), developed software that calculates calibration factors for appraising methods of measuring material in hold-up, proposed for the Pilcaniyeu enrichment plant in Argentina.

With the cooperation of the Nuclear Technology Development Center (CDTN/CNEN) preliminary gamma transmission measurements were taken to ensure that no cylinders containing UF6 are being introduced into the cascade hall of the Isotopic Enrichment Laboratory (LEI).

At the request of ABACC, the Fuel Elements Plant (FEC/INB) prepared Power Water Reactor (PWR) pin standards for the calibration of non-destructive analysis equipment. This was controlled and supervised by Brazilian and Argentine ABACC inspectors through the ABACC Technical Support Area, with the cooperation and participation of the CNEN.

- *With the National Atomic Energy Commission of Argentina (CNEA) and the National Nuclear Regulatory Agency (ENREN)*

Due to the new organization of the Argentine nuclear sector introduced in late 1994, much ABACC interaction in this country has taken place with ENREN. ABACC enjoyed the support and cooperation of the

CNEA and ENREN in the audit process to measure material in hold-up at Pilcaniyeu Gas Diffusion plant and for the organization of the first ABACC/DOE workshop, held during the second half of March in Buenos Aires (see *Cooperation with the DOE/USA*).

At the invitation of ENREN, ABACC is taking part in discussions on a system for checking the transfer of spent fuel elements between the reactor and the storage pool at the Atucha I Nuclear Power Plant. This activity is described in the chapter entitled *Technical Activities*.

Additionally, the Bariloche - CNEA Atomic Center is preparing a computer program to process remote motoring data from the Embalse Nuclear Power Plant dry storage, where most of ABACC safeguards effort is concentrated.

- *With the U.S. Department of Energy (DOE)*

Cooperation with the DOE/USA was reasonably intense during 1995. Under the Cooperation Agreement between the DOE and ABACC signed in April 1994, cooperation activities were carried out in the form of specific actions. In order to appraise the progress of each of these activities, the DOE/ABACC Agreement makes provision for an Annual Meeting of the Permanent Coordination Group (PCG) consisting of representatives of both parties. In October 1995, the PCG met for this purpose, on which occasion both parties negotiated a Memorandum of Understanding regularizing the transfer of financial contributions to ABACC from the U.S. Department of State Non-Proliferation and Disarmament Fund, to underwrite the cooperation activities covered, as well as the acquisition of equipment.

The cooperation activities carried out, and the corresponding state of implementation are as follows:

- Annual Safeguards Training Course: In addition to the courses carried out in 1993 (organized and sponsored solely by ABACC and the national authorities of Brazil and Argentina) as well as 1994 (already in cooperation with the DOE), another course is being scheduled to train

inspectors in the use of non-destructive analysis measurement techniques, basically for measuring enrichment. This course, initially scheduled for December 1995, was postponed for operational reasons to March 1996, and should enjoy the participation of technical staff from ABACC and the DOE.

- Laboratory Inter-Comparison Program: Phase II of this program was launched, including permanent quality monitoring of the ABACC analysis laboratory network, with the active participation of the New Brunswick Laboratory.

- Workshops for Training ABACC Inspectors: The first practical seminar for training inspectors was held in March in Buenos Aires, at the CONUAR Fuel Elements Plant (see *Training and Technical Courses*).

- Workshops on Advanced Measurement Techniques: This activity was formalized as an Addendum to the Inspector Training activities. It is designed to provide training for ABACC inspectors using measurement instruments, tools and systems that have not yet been acquired by this agency and which are either in use or under development by the DOE for application at the international level, or which may also be developed specifically for ABACC requirements. The first activity under this Addendum took place in October, when two Technical Support officers and two Inspectors from ABACC visited Los Alamos National Laboratory for training in the use of the Neutron Coincidence Collar, Active Well Coincidence Counter, Modular Miniature Multichannel Analyzer and Fork Detector equipment. In the case of the Fork Detector, partial calibration of this equipment was carried out, with the participation of IAEA inspectors, in addition to special adjustments of the parameters for use in the Angra I Nuclear Power Plant, as this equipment will be used

for spent fuels recently removed from the core of the reactor, and thus subject to a very high flow of gamma radiation.

ABACC and IAEA inspectors use the Neutron Coincidence Collar *to verify low enriched fuel*

- Cooperation and Participation in the International Remote Monitoring Project, DOE/Argentina: A remote station was configured at the ABACC head offices, with the DOE supplying the software necessary for connection and data transfer, as well as instructions for installation. ENREN/Argentina authorized ABACC to access this system and supplied a password for data transfer, on the understanding that this information is experimental, as the system has not yet been validated and approved for use in safeguards. Data have already been transmitted by the Embalse Nuclear Power Plant to ABACC head offices. During the visit of an ABACC Technical Support officer to the Sandia National Laboratory in October, discussions took place over other activities to be carried out, including: enhancement of data transmission capacity, analysis of data generated by the system installed at Embalse, organization of seminars on remote monitoring in Brazil and Argentina, and the possibility of installing a prototype of this system in Brazil.

- Development and Evaluation of Advanced Containment and Surveillance Technologies: These activities were formalized in 1995, and a first meeting was held between ABACC and the Sandia National Laboratory to discuss specific needs and criteria for acceptance of containment and surveillance equipment, discussing surveillance and containment technologies used in enrichment plants and spent fuel storage areas. On this occasion, the supplier (*Aquila Technologies*) held a demonstration of C&S equipment. During the visit of an ABACC Technical Support officer, the GEMINI digital surveillance system was discussed, together with its image review station, which are being acquired by ABACC with funding provided by the DOE.

- ***With EURATOM***

Cooperation with EURATOM was limited to a technical visit made by a Planning and Evaluation officer to the Transuranium Institute at Karlsruhe, Germany. On this occasion, he studied programs being developed in the safeguards area, with a view to closer cooperation between ABACC and EURATOM.

- ***With France***

In February, the Secretary of ABACC visited the *Commissariat à L'Energie Atomique* (CEA) to discuss the progress of cooperation activities, which currently involve laboratory inter-comparison and the certification of isotope standards.

- ***With the U.K.***

ABACC received information on remote monitoring systems developed by the U.K., with a possible future visit to the Capenhurst enrichment plant still pending.

- ***With OPANAL***

At the invitation of the Secretary General of OPANAL, Ambassador Enrique Román-Morey, the Secretary of ABACC took part in the OPANAL General Conference as an observer, held in March in Chile.

PARTICIPATION IN LECTURES, SYMPOSIA AND SEMINARS

JANUARY

Jorge Coll, Deputy Secretary, took part in a seminar on nuclear non-proliferation organized by OPANAL, at Cancun, Mexico.

Work presented: "*ABACC: Its Contribution to the Peaceful Uses of Nuclear Energy*"

Carlos Feu Alvim, Secretary, took part in a conference on nuclear non-proliferation organized by the Carnegie Endowment for International Peace, as well as another conference on nuclear non-proliferation at the regional level, focused on Latin America, in Washington, D.C., USA.

Work presented at the second conference: "*ABACC and the Exclusively Peaceful Use of Nuclear Energy*".

APRIL

Jorge Coll took part as a guest lecturer in the training course on state systems of accounting for and control (SSAC) sponsored by the U.S. Department of Energy, with the cooperation of the IAEA and the Department of State, held in Santa Fé, New Mexico, USA.

MAY

Marco Marzo, Planning and Evaluation Officer, took part in the ESARDA congress in Aachen, Germany.

Work presented: "*Building a Safeguards System - ABACC's Experience*".
On this occasion, he also represented ABACC at the meeting of the Institute of Nuclear Materials Management (INMM).

Carlos Feu Alvim took part as a lecturer in the seminar on Public Information and Nuclear Energy organized by the Brazilian National Nuclear Energy Commission - CNEN, with the cooperation of the IAEA.

Work presented: "*Argentina e Brasil: Seus Acordos Internacionais para a Não-Proliferação Nuclear*"

JUNE

Carlos Feu Alvim gave a lecture on ABACC and the regional approach to the application of safeguards during the meeting of the Institute of Nuclear Materials Management (INMM) - Vienna Chapter, in Vienna, Austria.

JULY

ABACC staff members, including Carlos Feu Alvim, Marcio Costa, Marco Marzo and Ana Claudia Raffo took part in the symposium of the Latin American Section of the American Nuclear Society - LAS/ANS on regional integration and nuclear energy. On this occasion, the LAS/ANS awarded the prize for the best publication of 1994 to the work entitled "*As Salvaguardas e o Sistema Utilizado pela ABACC para Controlar os Materiais Nucleares em Centrais Nucleares do Brasil e Argentina*", by Ana Claudia Raffo and Marco Marzo.

Carlos Feu Alvim represented ABACC at the 36th. Annual Conference of the INMM, held in Palm Desert, California, USA, at which the work entitled "*DOE/ABACC Safeguards Cooperation*" was presented, of which he is the co-author.

SEPTEMBER

Carlos Feu Alvim represented ABACC as an observer at the 39th. General Conference of the IAEA, in Vienna, Austria, during which he made a statement on ABACC activities and the progress in implementing the Quadripartite Agreement.

Rubén Nicolás, Accounting Officer took part in the V International Conference on Facility Operations-Safeguards Interface, organized by the American Nuclear Society, in Wyoming, USA. Work presented: "*ABBAC's Nuclear Materials Accountancy*"

NOVEMBER

Marco Marzo took part as a guest lecturer in the training course on state systems of accounting and control held in Japan. At the end of his participation in the course, Marco Marzo gave two lectures at the invitation of the Korean authorities on ABACC activities: one at the Korean Atomic Energy Research Institute and the other at the National Reunification Institute.

VISITS

- Counselor Roy Simpkins and Consul Curtis Stewart, USA Embassy, Brazil.
- Mr. Sam Thompson and Mr. Gianni Frescura, Nuclear Energy Agency, OECD.
- Mr. Yutaka Ishiguro, *Yomiuri Shimbun* Japanese newspaper.
- Rear Admiral Ivan de Aquino, Director, Brazilian Navy Technology Center, São Paulo.
- Mr. Rodolpho Castello Branco, Krebs Engenharia, and Dr. François Billon, SCN, France.
- Ambassador Afonso Ouro Preto, Resident Representative of Brazil in Vienna, Austria.
- Mr. Hector Espejo, International Relations Department, National Atomic Energy Commission, Argentina
- Mr. John Graham, Chairman, American Nuclear Society
- General Álvaro Augusto Alves Pinto, Head, Brazilian Army Technological Center and General Dilson Correa de Sá e Benevides, Director, Special Projects Institute - IPE
- Dr. Frangini Norris, Legal and International Affairs Department, Nuclear Energy Commission, Chile.
- Ambassador Alieto Guadagni, Argentine Ambassador in Brazil.
- Dr. Kenneth Rogers, Commissioner, Nuclear Regulatory Commission, USA, Mr. Morton Fleishmen, Technical Assistant to the Commissioner, Ms. Karen Henderson, Policy Analyst, Ms. Xenia Wilkinson, Special Assistant, USA Embassy in Brazil, and Dr. John Rubio, US Consulate.
- Dr. Byung-Koo Kim, Senior Vice-President of the Korean Atomic Energy Research Institute.
- Dr. Lawrence Scheinman, Assistant Director for Non-Proliferation and Regional Arms Control, Dr. Frank Houck, Senior Scientist for International Safeguards - ACDA, Mr. William Murphey of the NuclearRegulatory Commission, USA, and Mr. Kenneth Sanders, Department of Energy, USA.

PUBLICACIONES

- Annual Report 1994
- ABACC News - January/April 1995
- ABACC News - May/August 1995

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TECHNICAL ACTIVITIES

Nuclear Materials Accounting

Operations

Planning and Evaluation

Technical Support

Training and Qualification

ABACC

The principal objective of ABACC in 1995 was to improve the application of safeguards under the aegis of the Bilateral and Quadripartite Agreements. To carry out technical activities, ABACC used its technical unit, which includes the Accounting, Operations, Planning and Evaluation and Technical Support sectors. Two experts are assigned to each of these sectors, one of each nationality. Technical activities are backed by the vital support of the national authorities, from both the human as well as technical facilities viewpoints. This support is particularly clear through the requisition of inspectors and assistants, as well as the use of laboratories in both countries.

NUCLEAR MATERIALS ACCOUNTING

The Accounting sector is responsible for keeping the inventory of nuclear materials up to date, as well as the records for facilitating inspections and appraisals; registration, processing and assessment of data and its consistency; and preparation of accounting documentation guaranteeing the reliability of this information. Additionally, the sector is responsible for the audit procedures covering records made during inspections and the assessment of this data. In compliance with the Quadripartite Agreement, this sector examines the consistency of the data to be forwarded to the IAEA and assists the Secretariat in data transfers, as well as helping correct any possible flaws.

Nuclear accounting at ABACC is assigned to Rubén NICOLÁS, Licensed in Physics, and Lília PALHARES, a Chemical Engineer. Accounting officer R. Nicolás has also worked in assisting the Secretary in the data technology area, and L. Palhares in assessing design information.

Updating the data-base records involved processing 1,994 lines of inventory changes and 3,009 lines covering the nuclear materials inventory, from a total of 518 reports received during 1995. Of these lines, 70% of the total correspond to domestic transfers and 26% were generated by Locations Outside Facilities (LOF).

The average delay in forwarding Inventory Change Reports (ICR), based on the deadlines laid down in the Common System for

Accounting and Control of Nuclear Materials - SCCC, was 24 days, and only 25% of the total lines corresponding to the ICRs were forwarded without delay. When also taking into consideration modifications in earlier ICRs (corrections of earlier lines or inclusion of lines not related during the period of the ICR), the average delay increased to 155.4 days. With regard to the Materials Balance Reports (MBR) and Physical Inventory Lists (PIL), out of a total of 83 MBRs and 86 PILs received during the year, the average delay was 75.2 days for MBRs and 60.1 days for PILs, and only 13 PILs and 12 MBRs were forwarded with no delays whatsoever.

The error rate detected in the reports was between 5% and 10% (it is not possible to be more accurate because the error base was implemented only recently) with over half in ICRs, some 45% in MBRs and only 2% in PILs. The analysis of the reports carried out by ABACC prevented some 95% of incorrect lines being forwarded to the IAEA.

At the request of the countries, the list of facilities and LOFs subject to the SCCC / INFCIRC/435 was altered through the inclusion of an Argentine facility, whose DIQ has already been forwarded with receipt of nuclear materials scheduled over the short term, as well as the withdrawal of three Argentine LOFs and one Brazilian LOF, whose nuclear material inventories have been reduced to zero, with no nuclear materials scheduled for receipt in the future. With these modifications, the list has changed to 39 facilities (16 Brazilian and 23 Argentine) and 28 LOFs (14 Argentine and 14 Brazilian).

A start was made on implementing two new data-bases for registration and control respectively of the punctuality and errors detected in reports received by ABACC. The inspection data-base was kept up to date with some changes in the inspection charts to be brought into effect during 1996. With regard to the accounting data-base, some improvements were introduced through the addition of various functions that the program could not handle previously, such as automatic generation of MBRs.

FACILITIES AND LOFS IN ARGENTINA AND BRAZIL

Type	Argentina	Brazil	Total
Conversion Plants	5	1	6
Enrichment Plants	1	2	3
Fuel Element Plants	4	1	5
Power Reactors	2	1	3
Research Reactors	6	3	9
Research and Development Facilities	2	3	5
Critical and Sub-critical Units	-	3	3
Deposits	3	2	5
LOFs * (fuel research)	4	5	9
LOFs (research and reprocessing)	-	1	1
LOFs (analysis laboratories)	3	2	5
Other LOFs	7	6	13
Total	**37**	**30**	**67**

* *Locations Outside Facilities* - any place where nuclear materials are used or stored in amounts equal to or less than 1 Kg effective.

OPERATIONS

The Operations sector is responsible for handling inspections checking nuclear materials and accounting records. It draws up the inspection schedule, appoint inspectors and outlines inspection plans with activities to be carried out in the field. Additionally, it coordinates assistance for the inspectors, prepares inspection report formats and reviews, and approves inspection reports. Under the aegis of the Quadripartite

Agreement, this sector is also responsible for handling coordination at the operating level with the IAEA for joint inspections, and also takes part in discussions on coordinating operating procedures between the two agencies.

The persons responsible for the Operations sector are Olga Y. MAFRA, Ph.D. in Physics, and Horácio LEE GONZALEZ, Engineer.

The 1995 Annual Inspections plan forwarded by ABACC to the IAEA in November 1994, served as a basis for the operating activities of both agencies. Prior notice of activities to be carried out during inspections and pre-mission inspections meetings have helped ensure a good level of coordination.

ABACC

ABACC and AIEA inspectors in a joint inspection.

With regard to the verification of Design Information Questionnaires - DIQs, by year-end 1994 ABACC had forwarded to the IAEA the DIQs for all facilities subject to safeguards. These documents are analyzed by both agencies and comments are forwarded to the corresponding national authorities. The first cycle of DIQ verifications was completed in October 1995, covering all facilities. Practically all the DIQs were verified, making it possible to speed up negotiation of the Facility Attachments. The task of verifying will continue throughout 1996, supplementing this information and when necessary re-verifying it due to the new criteria

adopted by the IAEA for strengthening safeguards (Program 93+2).

The IAEA started to hold meetings at the main facilities in Argentina and Brazil to verify the consistency of the initial inventory. The first mission of the IAEA for this purpose took place in March in Brazil, and in June in Argentina. ABACC accompanied these missions. The second mission, scheduled for November 1995, was postponed to early 1996.

ABACC inspection efforts in 1995 were approximately 40% greater than planned. This increased effort was largely due to the activities carried out at the Embalse Nuclear Power Plant in Argentina.

In terms of the number of inspections, the distribution between the two countries retains approximately the same ratio between the number of installations in the two countries. With regard to the inspection effort, 82% took place in Argentina, due largely to the larger inventory and greater complexity of Argentina reactors. Rationalization of the safeguards approach, particularly regarding the transfer of fuels at the Embalse Nuclear Power Plant, will reduce inspection efforts considerably.

ABACC

Using a Multichannel to verify experimental reactor fuel

The inspection efforts of ABACC in 1995, as well as the availability of the inspectors are shown in the following table and graphs.

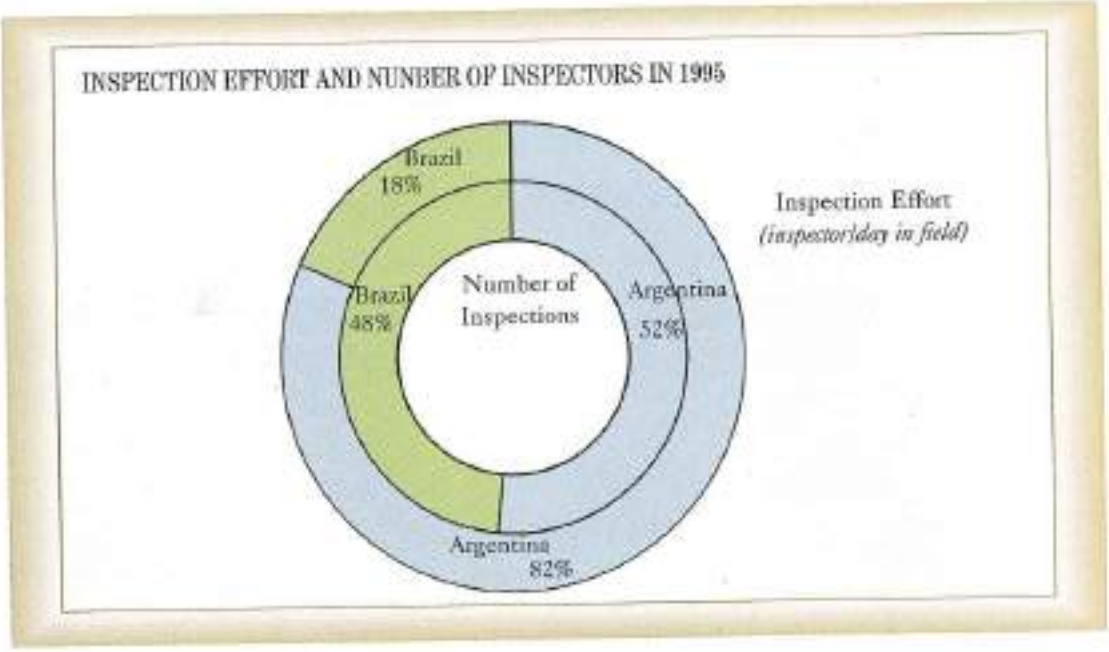
A data-base that organizes the principal inspection data in order to streamline the preparatory work for the inspections as well as

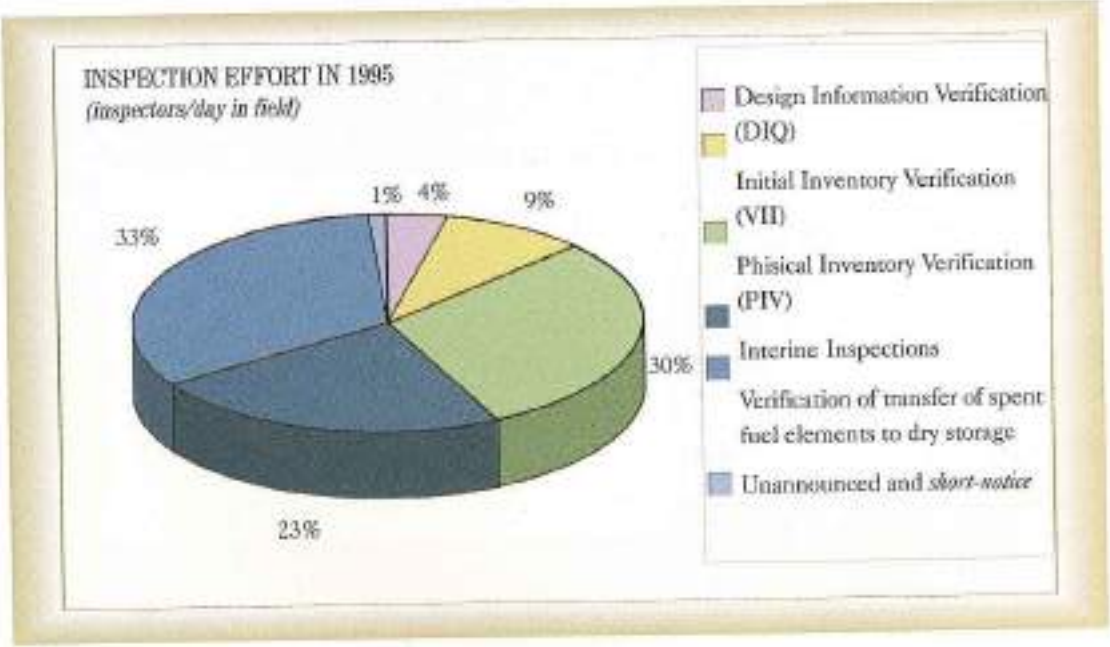
inspection reports was set up, ensuring rapid access to data from earlier inspections. This data-base is in the test phase, and is being used by some inspectors at the experimental level.

Type of Inspection	Country	Number of Inspections	Availability* (inspector/day)	Inspection efforts** (inspector/day)
Design Information Questionnaires	Argentina	2	47	15
	Brazil	8	32	13
	Total	10	79	28
Initial Inventory Verification	Argentina	2	131	64
	Brazil	-	-	-
	Total	2	131	64
Physical Inventory Verification	Argentina	37	366	170
	Brazil	27	170	43
	Total	64	536	213
Interim Verifications	Argentina	24	169	93
	Brazil	35	164	71
	Total	59	333	164
Verification of transfer of spent fuel elements to dry storage	Argentina	10	399	234
	Brazil	-	-	-
	Total	10	399	234
Unannounced Inspections	Argentina	0	0	0
	Brazil	2	8	4
	Total	2	8	4
Short Notice Inspections	Argentina	2	3	3
	Brazil	0	0	0
	Total	2	3	3
Total Inspections	Argentina	77	1.115	579
	Brazil	72	374	131
	Total	149	1.489	710

* *Inspector available to ABACC*

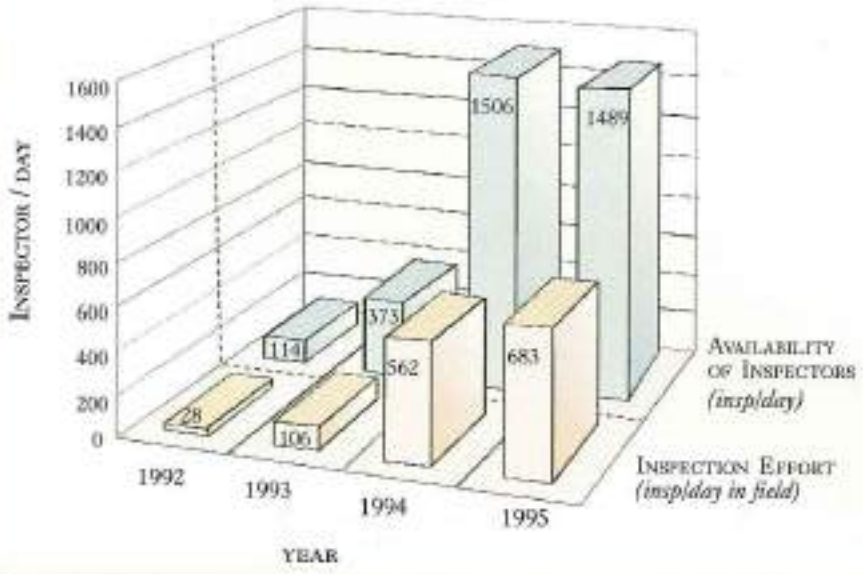
** *Days in the field*



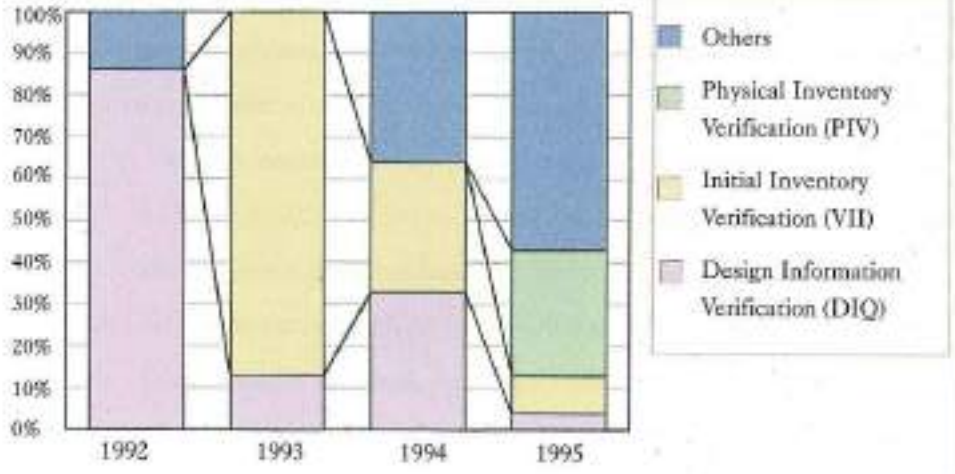


The development of inspection efforts over the four years of the existence of ABACC is shown in the following graphs. It is expected that inspection efforts will stabilize over the next few years at levels close to those of 1995, as no major increase is foreseen in the number of facilities under safeguard. It is believed that the rationalization drive introducing more advanced safeguards methods and concepts may well enhance the effectiveness of safeguards without increasing or even reducing current inspection efforts.

DEVELOPMENT OF INSPECTION EFFORT AND AVAILABILITY



INSPECTION EFFORT
(inspectors/day in field)



PLANNING and EVALUATION

The Planning and Evaluation sector is responsible for examining, evaluating and verifying design information, procedures and the results of inspections. This sector proposes and reviews general procedures and application manuals, advising the Secretary of possible anomalies and proposing actions to resolve them. Under the implementation of the Quadripartite Agreement, it prepares - for facilities that were not under IAEA safeguards - and discusses Facility Attachments, as well as *ad-hoc* procedures, topics related to the coordination with the IAEA.

The persons responsible for the Planning and Evaluation sector are Marco Antonio Saraiva MARZO, Ph.D. in Nuclear Engineering, and Alfredo Lucio BIAGGIO, Engineer.

The Planning and Evaluation sector analyzed eleven Facility Attachment drafts received from the IAEA, organizing bilateral and trilateral meetings, as well as at the working group levels to discuss these documents. These activities also included an analysis of the DIQs and the results of their verifications, as well as visits or technical discussions in certain cases, and the use of inspection results. ABACC proposed the inclusion of a specific item in the Facility Attachments covering joint activities by the two agencies, as established in the General Part of the Subsidiary Arrangements of the Quadripartite Agreement. In parallel, discussions are under way with the IAEA of the general principle for coordination between the two agencies for safeguards activities (*Guidelines for the Coordination of Inspection Activities*), as mentioned in the chapter on *Institutional Activities - Relationship with the IAEA*.

During the coordination meeting held in Vienna in February, ABACC forwarded to the IAEA a document on the criteria adopted by ABACC, entitled "*Some Considerations about ABACC's Safeguards Criteria and Procedures*".

The process of assessing the results of inspections and notifying the respective national authorities was streamlined and updated in 1995.

ENREN

Embalse's dry storage

Sensitive facilities, such as the Isotopic Enrichment Laboratory (LEI), and facilities where the major ABACC and IAEA inspection efforts were concentrated, such as the Embalse Nuclear Power Plant (CNE), demanded painstaking study and discussion with the operators, national authorities and the IAEA. In the case of the LEI, considerable progress was achieved in establishing procedures for *ad-hoc* inspections. ABACC presented the IAEA with a draft outline of procedures for announced inspections at the LEI, which were adopted in general lines. Additionally, discussions are under way between the Brazilian national authority, the IAEA and ABACC over acceptance of the procedures currently adopted by this agency for unannounced inspections and for the containment and surveillance system. Notwithstanding, in 1995 ABACC launched an unannounced inspection regime at the LEI, in compliance with the procedures negotiated with the Brazilian national authority and the operator of the facility. In the case of the Embalse Nuclear Power Plant, studies are being carried out on reducing inspection efforts at this facility,

without adversely affecting reliability in the application of safeguards.

The Planning and Evaluation officers are also carrying out Zone Approach studies to enhance the effectiveness and efficiency of the safeguards applied to the natural uranium cycle in Argentina.

The safeguards approach applied in Japanese facilities was discussed during the participation of one of the Planning and Evaluation officers in the training course on State Systems of Accounting and Control held in Japan in November. At this same period, and at the invitation of the South Korean authorities, nuclear facilities in South Korea were visited, and discussions took place over the safeguards approach applied to Candu-type reactors.

TECHNICAL SUPPORT

The Technical Support sector implement and assess measurement, sampling, containment and surveillance procedures, while identifying and fostering the development of laboratories and specialists. It is also responsible for guaranteeing the availability, calibration and maintenance of instruments and surveillance equipment, ensuring and reviewing analysis of samples and radio-activity protection services, while also planning and coordinating specific staff training, particularly with regard to the pre-inspection courses for the inspectors. Under the aegis of the Quadripartite Agreement, this sector monitors and analyzes the equipment and methods used jointly with the IAEA. It is staffed by Gevaldo Lisboa de ALMEIDA, with a Master's Degree in Nuclear Engineering, and Luis Alfredo Tomás ROVERE, Engineer, who joined the ABACC Secretariat during the year. The Technical Support sector is assisted by Max Teixeira FACCHINETTI.

Equipment and materials were received during 1995 totaling US$ 67,000. In December 1995, the equipment available to ABACC consisted of:

GAMMA MEASUREMENT EQUIPMENT

4 HM-4
5 Davidson Multichannels
2 Ortec Multichannels
2 Ge Detectors
8 NaI Detectors
6 Collimators for NaI detectors
2 Sets of calibration sources
2 Sets of isotopic standards
3 Contamination monitors
5 CdZnTe Detectors (*)

OTHER EQUIPMENT

2 Kratos load cells (5 tons)
2 BHL load cells (1 tons)
2 BHL load cells (0.5 tons)
1 Portable load cell (1 tons)
1 Portable load cell (0.5 tons)
4 Platform load cells
2 Ultrasonic thickness meters
1 Analytical scale
1 Cherenkov viewer device
Ampoules for UF_6 samples
Various analytic standards
Various sets of standard weights
Isotopic standards for NDA (*)
Isotopic standards for DA (*)
Oscilloscope (*)
Tape reader (*)
2 Thickness Meters (*)
2 Platform load cells (0.25 tons)(*)

(*) Equipment received in 1995

The following equipment was ordered for review, revision and copy of MIVS systems tapes (for Atucha, Argentina and Angra, Brazil) and MUX system tapes (for Embalse, Argentina).

5 8 MM Video cassette recorders
1 SVHS Video cassette recorder
2 13" CTR displays
2 LCD 4" portable displays

This equipment will handle the following functions:

- review of tapes at the ABACC offices and in Buenos Aires;
- portable equipment for review and copy of tapes in the field (one in Argentina, the other in Brazil);
- fixed equipment for copying VHS tapes (exclusive to Embalse).

The equipment ordered for containment and surveillance is the following:

2 Gemini surveillance systems (dual cameras)
1 Gemini review station
8 VACOSS+ active seals
10 E-tags
2 Portable seal readers
1 Set of portable fiber-optics

One of the most outstanding events of the year was receipt of the isotopic standards for non-destructive analysis, as well as enriched

uranium hexafluoride isotopic standards for destructive analysis, both from the European Union, a target pursued by ABACC since July 1992.

The availability, maintenance and calibration of ABACC equipment was guaranteed during the year in two ways: through contracting the services of accredited agencies, such as weighing equipment, for instance, or through its own Technical Support sector or the Nuclear Engineering Institute (IEN/CNEN).

The inter-comparison group that assisted the ABACC Secretariat in the laboratory inter-comparison program run by ABACC to guarantee the quality of analysis of samples by various laboratories in its analysis network met in August to discuss and assess the results of analyses by Brazilian and Argentine laboratories taking part in this program. It was noted that most of the laboratories performed adequately for safeguards requirements, and that over 40% surpassed these requirements. On this occasion, a scheme was established for implementing a permanent laboratory quality assessment system, and the basis were laid for an isotopic inter-comparison program with the additional objective of certifying isotopic standards developed by Brazil and Argentina.

In 1995, 39 samples of nuclear materials were taken, with ABACC receiving analyses of 27 of them. By year-end 1995, twelve samples were under analysis or in transit, or being cleared by customs. Additionally, 498 containment seals were applied and 517 were verified with no irregularities found.

At the invitation of the Argentine national authority, one of the ABACC Technical Support officers took part in a discussion at the Atucha Nuclear Power Plant on the technical assessment of the validity of installing a system to verify the transfers of fuel elements between the reactor and the spent fuel storage pool at this power plant. It was concluded that a Bundle Counter could be installed in the transfer pool, with the basic project currently being handled by a Canadian company specialized in this area.

ABACC

Placing seal during inspection activity

This system is a support project being developed by Canadian and Argentine technicians for the IAEA.

A conceptual design of a device for the Hungarian Underwater Telescope was prepared, which will allow more rapid, reliable identification of fuel elements in the process of transfer from the pool to the dry storage at Embalse. Another conceptual design covered the fine-tuning of dry storage verification equipment, which was prepared and is currently under study by an electronics group from IEN/CNEN. Preliminary activities are under way for the fabrication of a special depleted uranium collimator for use with the Spent Fuel Verifier of the IAEA to verify the fuel elements in the storage pool at Embalse. Within this context, the IAEA has already forwarded the plans for the collimator to ABACC, and isotopic analyses are currently under way of the depleted uranium available in Brazil. The effective implementation of these latter three activities now depends on the safeguards approach for the Embalse Nuclear Power Plant that will come under discussion by the

ABACC/IAEA/Argentine national authority working group. These projects also pave the way for activities under discussion within the framework of ABACC/DOE cooperation.

Forging ahead with the inspection support infrastructure, procedures were drawn up and published for UF_6 Sampling, Determination of Enrichment with Multichannel Analyzer, and the Use of Load Cells. Collimators and other tools were also designed and built for non-destructive analysis measurement.

Additionally, after the inspections, the Technical Support sector has been verifying the results of the non-destructive analysis measurements when requested to do so by the Operations or Planning and Evaluation sectors. Under these circumstances, a report is issued to correct or explain anomalous figures.

ABACC carried out an assessment of the method of measuring materials in hold-up at the Pilcaniyeu plant in Argentina. This was consolidated in the form of a technical report issued by ABACC dated November 1995, and entitled "*Evaluation of the NDA Method for the Inventory Verification of a Gaseous Diffusion Enrichment Cascade*".

The Secretariat requested the assistance of two specialists in radio-protection and dosimetry, in order to analyze the actions implemented by ABACC for the dosimetric control and internal contamination checks of its inspectors.

TRAINING and QUALIFICATION

Each technical sector of ABACC takes care of training and courses for the inspectors in a specific field. The general coordination of these activities is handled by the Secretary, assisted by the Deputy Secretary and the person Responsible for Institutional Relations. The coordination of the specific courses is assigned to an employee appointed by the Secretary for this task.

The training of the ABACC inspectors in measurement techniques and equipment operations prior to inspection campaigns represents an important tool for the performance of the inspectors in the field. Twenty inspectors took part in this type of training, tailored to the needs and experience of each of them, for a total of 60 inspector-hours during the year.

Yet another training course for Argentine and Brazilian inspectors was held with the support of the national authorities of both countries in 1995. The purpose of this course, which was given by the Accounting Officers with active participation from the Operations sector, was to guide inspectors in the procedures for verifying records and filling in the record auditing charts. These training sessions were held in Argentina and Brazil in August. The course held in Argentina was attended by ten Argentine inspectors, while another ten Brazilian inspectors took part in the course given in Brazil. The outcome was satisfactory, and allowed the inspectors - who played an active part in this training - to put forward suggestions for improving the accounting procedures used by ABACC.

Under the auspices of cooperation with the CNEA, ENREN and the DOE/USA, the Nuclear Fuel Elements Plant - CONUAR in Argentina hosted the first workshop for training inspectors in the fabrication of fuel elements. The exercises during this workshop consisted of simulating a physical inventory verification, and were held on the fuel fabrication line for the Atucha Nuclear Power Plant, using UO_2 batches of powder and pellets, fuel elements and pins, with a total inventory of 9200 Kg of natural uranium. The equipment used in these exercises was supplied by ABACC and the DOE (multichannel, load cell, HM4, standard weights). This workshop fostered interaction between Argentine and Brazilian inspectors who, due to the practice of each inspecting the facilities in the other country, never work together, thus allowing them to exchange experiences accumulated during their inspections.

ADMINISTRATIVE & FINANCIAL ACTIVITIES

Human / Financial Resources

Statement of Accounts

ABACC

HUMAN & FINANCIAL RESOURCES

The Administrative Unit of ABACC is staffed by an Adm. & Finance Manager, Márcio COSTA, Engineer, and a Responsible for Institutional Relations, whose responsibilities were outlined in this report, in the section covering *Institutional Activities*. The Administrative & Financial sector is responsible for controlling the administrative and financial activities of ABACC, assisting the Secretary in preparing and implementing the budget and work plan, as well as handling personnel matters. It is also responsible for controlling payments. The Adm. & Finance Manager is assisted in his work by Luiz da Costa GONÇALVES, Administrator.

Administrative support at ABACC is provided by two secretaries, Maria Isabel Reyes GONZALES and Teresinha CURVELO, as well as clerk Maria Dilma Marcolan COSETTI, and driver Mauro de Souza de JESUS. Accounting, legal aid and office maintenance are all outsourced.

The Buenos Aires office is staffed part-time by Camilo PAGANINI and Osvaldo CRISTALLINI, who handle not only the administrative tasks but also provide support with the technical activities related to the equipment and the organization of inspections.

Administrative activities supporting the functioning of ABACC and the organization of inspections for the control of nuclear materials took place in a fully satisfactory manner.

Outstanding among the main administrative activities carried out by the Secretariat of ABACC during 1995, are the following:

- The hiring of Dr. Luis Alfredo Tomás Rovere by the Secretariat as a Technical Support Officer.

- The rental by the Secretariat of new premises for technical support activities, as well as administrative support, meeting room and store-room.

- Closing the Annual Balance sheets for 1994 with corresponding certification thereof through external audit.

- Review of the ABACC Counts Plan in order to classify expenditures and revenues in accordance with a system tailored to current requirements, streamlining the updating of net worth. These alterations should come into effect early in 1996.

- Opening a current account with the Banco do Brasil in New York to allow separate control of funding coming in through the U.S. Department of State Non-Proliferation and Disarmament Fund contributions to technical cooperation between ABACC and the U.S. Department of Energy (DOE).

- Review of the 1995 budget due to two facts that took place in 1994 and altered its implementation, and also affected 1995 budget costs: the entry into effect of the *Real* Economic Stabilization Plan in Brazil, with corresponding alterations in the dollar costs of expenditures in the ABACC host country, and the entry into effect of the Quadripartite Agreement, with activities that are both more extensive and intensive, as determined by the IAEA, than those foreseen by ABACC when preparing the 1995 work plan. Taking these factors into account, the ABACC Secretariat requested - and was authorized by the Commission - to review its budget for that year. In parallel, the ABACC Secretariat increased its efforts to trim its operating and administrative costs.

STATEMENT OF ACCOUNTS
on 31 December 1995
(values in US$)

1. REVENUES

Brazilian Government Contribution	1,250,000.00
Argentine Government Contribution	1,250,000.00
Financial Revenues	87,157.70
Total	**2,587,157.70**

2. EXPENSES

Payroll	1,308,620.48
Temporary Assistance	3,835.74
Travels & Accommodation	746,778.98
Technical Support	97,783.50
Office & Vehicles	451,261.26
Financial Expenses	13,265.36
General	18,071.68
Depreciations	79,382.76
Total	**2,718,999.76**

3. INVESTMENTS DURING THE YEAR

Technical Support	155,801.12
Office & Vehicles	9,917.21
General	0.00
Total	**165,718.33**

4. LETTERS OF CREDIT & ADVANCES FOR PURCHASING EQUIPMENT 27,081.00

5. YEAR-END BALANCE (131,842.06)