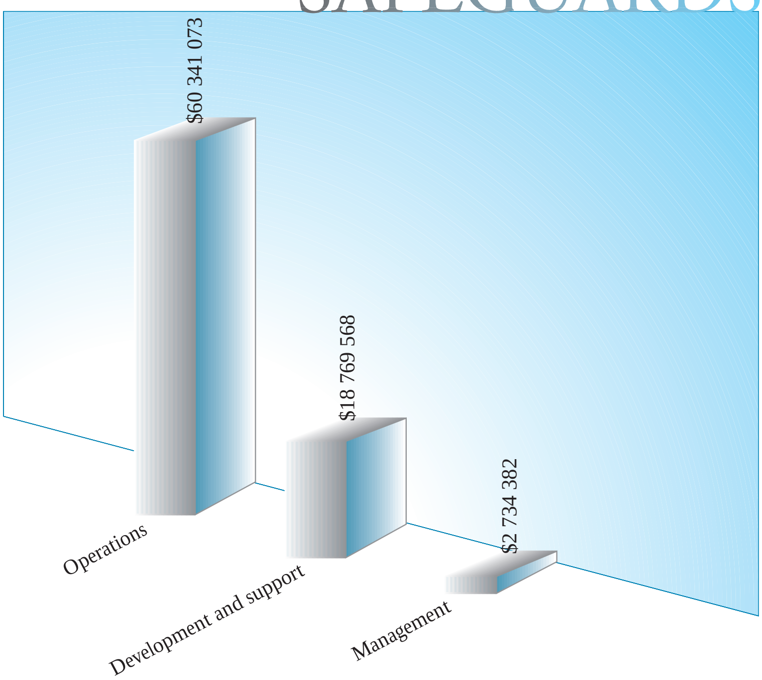
SAFEGUARDS

Regular budget expenditure: $81 845 023

Expenditure by subprogramme

Extrabudgetary programme expenditure (not included in chart) $12 217 000

Note: An amount of $2 427 292 for implementation of UN Security Council Resolution 687 on Iraq is included in the extrabudgetary figure



The Agency's safeguards system has evolved over the past 30 years and has been strengthened through the continuing introduction of new methods and techniques. The discoveries of undeclared nuclear material and facilities in Iraq and the problems associated with the Agency's efforts to verify the correctness and completeness of the initial declaration of nuclear material by the Democratic People's Republic of Korea (DPRK) highlighted the need to strengthen the safeguards system and give the Agency an improved capability to detect undeclared nuclear material and activities. As States had also been calling for more efficient use of resources, the Agency has taken steps towards a strengthened, more efficient safeguards system.

In fulfilling the safeguards obligations of the Agency in 1997, the Secretariat did not find any indication that nuclear material which had been declared and placed under safeguards had been diverted for any military purpose or for purposes unknown, or that safeguarded facilities, equipment or non-nuclear material were being misused. All the information available to the Agency supports the conclusion that the nuclear material and other items which had been declared and placed under Agency safeguards remained in peaceful nuclear activities or were otherwise adequately accounted for.

A major milestone in the efforts to strengthen the safeguards system was reached in May when the Board of Governors approved a 'Model Protocol Additional to Safeguards Agreements'. The Protocol provides the legal basis necessary to enhance the Agency's ability to detect undeclared nuclear material and activities. By concluding the additional protocol, each State undertakes to provide more information about its nuclear programme and the Agency is given greater access rights. By the end of 1997, seven States had concluded an additional protocol. Australia was the first State to bring its additional protocol into force in December; Armenia and Georgia agreed to apply theirs provisionally.

Several measures to strengthen safeguards continued to be implemented:

— Under existing comprehensive safeguards agreements, States have already undertaken voluntarily to submit more information on their nuclear programmes. The need for the early submission of design information has been incorporated in the Subsidiary Arrangements to existing safeguards agreements; in 1997, 32 new or revised facility attachments entered into force with this modified design information requirement. A scheme for improved verification of this information was developed and its implementation begun. The Agency has also received substantial information from States about closed down or decommissioned nuclear facilities. States have continued to submit periodic reports on their exports and imports of nuclear material, specified equipment and non-nuclear material. As of December 1997, a total of 955 reports had been received by the Agency. Information from all these sources contributes to much greater knowledge and transparency about the nuclear programmes of States.

— Information available from open sources can complement the declarations made by States. The Agency's system for the collection of such information was improved during 1997. New open source databases and on-line services were accessed.

— Regular evaluations of information related to States' nuclear programmes commenced during 1997. These are based on information related to a State's nuclear programme, and provide an independent assessment of the completeness and consistency of information available to the Agency. These evaluations will have a key function in the implementation of additional protocols.

— A report on the Agency's regime for maintaining the confidentiality of safeguards information was provided to the Board in March and December. A comprehensive review of the confidentiality procedures in use is being performed and will serve as a tool for the periodic upgrading of the regime.

— Systems using unannounced inspections were implemented on a test basis in two States. Unannounced inspections, particularly in combination with additional operational data and advanced technology, are expected to increase the efficiency of safeguards.

— Increased co-operation with State's Systems of Accounting and Control (SSACs) is an important element in improving efficiency while maintaining or enhancing safeguards effectiveness. The Agency is expanding such co-operation through measures that will not impinge on its ability to draw independent conclusions. Further optimization of inspection activities in the Member States of the European Union took place during 1997 through increased co-operation under the 'New Partnership Arrangements with the European Commission'. There was greater co-operation with the Brazilian–Argentine Agency for Accounting and Control of Nuclear Materials (ABACC) to improve the efficiency of safeguards implementation between Argentina, Brazil, ABACC and the Agency.

— Among the new technical measures, priority has been given to environmental sampling at enrichment plants and at selected facilities with hot cells. By the end of 1997, baseline sampling had been carried out at most of these facilities. After completion of this activity, environmental sampling will become part of the regular inspection programme. Detailed internal guidelines have been developed to ensure tamper-proof management of the techniques.

— Advances in transmission technology have provided the basis for the implementation, on a test basis, of remote monitoring and transmission of safeguards data from nuclear facilities. This technology will contribute to the reallocation of verification efforts from in-field inspections to Agency Headquarters or regional offices.

As of 31 December 1997, 221 safeguards agreements were in force with 137 States (and with Taiwan, China). At the end of 1997, safeguards agreements which satisfy the requirements of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) were in force with 123 States. NPT safeguards agreements entered into force with Algeria and Belize in January, Slovenia in August, the Czech Republic in September and Estonia in November. The Board of Governors approved a draft NPT safeguards agreement with Georgia. This agreement had not entered into force at the end of 1997. The Treaty on the South East Asia Nuclear Weapon-Free Zone (Treaty of Bangkok) entered into force on 27 March 1997 and nine States are party to it. NPT safeguards agreements are in force with seven of these States. NPT safeguards agreements are in force with all 11 signatories of the South Pacific Nuclear Free Zone Treaty (Rarotonga Treaty). Thirty-one of the 32 States party to the Treaty of Tlatelolco have safeguards agreements in force which satisfy the requirements of this Treaty. Safeguards agreements pursuant to Additional Protocol I of the Treaty of Tlatelolco are in force with two of the four States outside Latin America which have jurisdiction over territories in the zone of application of the Treaty. A safeguards agreement pursuant to NPT and the Treaty of Tlatelolco entered into force with Guyana in May and with the Bahamas in September.

Operations

Initial inventory verifications were completed in Algeria and in Uzbekistan, and were nearing completion in

VERIFICATION ACTIVITIES IN 1997

	1994	1995	1996	1997
Inspections performed	2 349	2 285	2 476	2 499
Person-days of inspection	9 152	10 167	10 831	10 240
Seals applied to nuclear material or safeguards equipment detached and subsequently verified (including seals applied jointly with a group of States)	21 746	23 877	27 029	23 737
Optical surveillance films reviewed	2 408	2 638	2 173	1 500
Video tapes reviewed	2 937	3 807	4 045	4 010
Nuclear material samples analysed	1 590	1 246	937	888
Nuclear material analytical results reported	2 579	2 559	2 200	2 150
Environmental samples analysed	—	—	278	585
Environmental sample results reported	—	—	4 200	7 400
Nuclear material under safeguards (in tonnes):				
Unirradiated plutonium outside reactor cores	40.5	45.0	53.6	57.6
Plutonium contained in irradiated fuel	452	512	533	571
High enriched uranium	19.4	20.5	20.7	20.5
Low enriched uranium	41 069	47 260	48 620	49 282
Source material (in tonnes)	93 907	104 395	105 395	108 648

Belarus, Kazakhstan and Ukraine by the end of the year. Major facilities in Argentina and Brazil were visited as a part of the assessment of the completeness and correctness of their initial reports.

An inspection regime based on the use of unattended non-destructive analysis (NDA) equipment under the New Partnership Arrangements with the European Commission was introduced in October at a MOX fuel fabrication plant. This approach was tested satisfactorily during field trials and has resulted in a significant reduction in inspector presence at the facility.

Preliminary agreement between China, the Russian Federation and the Agency was reached on the safeguards approach to be implemented in an enrichment plant in China that uses Russian centrifuge technology. Initial inventory verifications were carried out and a physical inventory verification is planned for January 1998.

Other inspection activities of particular note were as follows:

— A large, automated plutonium oxide store in the United Kingdom was designated for safeguards under the voluntary offer safeguards agreement following successful completion of acceptance tests of the safeguards equipment;
— Safeguards equipment, including a CONSULHA gamma neutron system, was installed in a new modular vault dry store in Hungary, and verification of the transfer of 450 spent fuel assemblies into a new modular dry store was completed in December;
— Verification of the transfer of approximately 1200 spent fuel assemblies from Slovakia to dry storage in the Czech Republic was completed.

Considerable efforts were made to introduce advanced safeguards equipment and techniques:

— Thermohydraulic reactor power monitors used to confirm the absence of unrecorded production of plutonium were introduced at two large research reactors in the Republic of Korea and Indonesia;
— In preparation for implementing short notice random inspections (SNRIs) for flow verification, a computerized mailbox, which will be a key element in such SNRIs, was installed and successfully tested at a low enriched uranium (LEU) fuel fabrication plant in Japan;
— A spent fuel transfer monitoring system functioning in an unattended mode was developed and installed at two facilities in Canada; this will lead to considerable savings in inspection effort;
— Installation of a new generation of spent fuel bundle verifiers, as well as new core discharge monitors, continued at on-load reactors in Canada.

Under the voluntary offer safeguards agreement with the USA, the Agency continued to carry out inspections on material released from the military programme at one site containing high enriched uranium (HEU) and at two sites containing plutonium. In other work in the USA, safeguards activities on the downblending of a quantity of HEU were completed at one facility. The Agency also participated in studies related to the stabilization and repackaging process for plutonium subject to safeguards and initiated a verification experiment regarding the downblending of HEU released from military programmes.

On the basis of the decision of the Board of the Governors following the request of the United Nations Security Council, the Agency has maintained a continuous presence of inspectors in the Nyongbyon area in the DPRK for the purpose of monitoring the "freeze" on the DPRK's graphite moderated reactors and related facilities. A number of inspection related issues remain open or unresolved, including the monitoring of the liquid nuclear waste at the reprocessing plant (Radiochemical Laboratory) and access to technical support buildings at particular facility sites. The canning campaign of the spent fuel rods at the 5 MW(e) reactor, which was started in April 1996, is expected to be completed by early 1998. However, related work in the spent fuel pond area will continue for some time. Measurement of the plutonium contained in these rods was not permitted by the DPRK.

During 1997, the DPRK agreed to the designation of more inspectors and agreed to improve communications with the Agency. Two technical meetings between the DPRK and the Agency were held during the year. No progress was made with respect to measures required to be implemented in order to enable the Agency to verify the completeness and correctness of the DPRK's initial declaration. As a result, the Agency is still unable to verify that declaration. The DPRK remains in non-compliance with its safeguards agreement.

Further progress was made in the negotiation of Subsidiary Arrangements: four new and one revised General Parts of Subsidiary Arrangements, as well as 32 new or revised Facility Attachments entered into force.

The Safeguards Analytical Laboratory (SAL) received and analysed over 800 samples of nuclear materials and heavy water, leading to the reporting of 2150 results for the verification of operators' material accountancy. In addition, SAL and the Network of Analytical Laboratories (NWALs) analysed 91 samples taken in Iraq by the IAEA Action Team pursuant to United Nations Security Council resolutions.

An audit conducted in October of the SAL quality assurance system for the handling and analysis of nuclear materials concluded that the practices conform to quality control requirements. Approximately 3000 analytical measurements were carried out by SAL and NWAL in support of quality control of the analyses, calibration and quality control of on-site verification measurements, maintenance, testing and improvements of destructive analysis procedures.

Progress made in the use of secondary ion mass spectrometry for particle analysis was reviewed at a meeting of NWAL consultants in December. Development of improved procedures for the handling, screening and analysis of hot cell swipes was initiated. A quality assurance manual for the handling and analysis of environmental samples at SAL was also issued.

The development of a safeguards approach for the large scale reprocessing plant under construction in Japan proceeded on schedule. The approach for the cask storage and spent fuel receipt and storage areas was finalized. Preparation of the safeguards approach and the required verification systems for the head-end, solution process, conversion and storage areas continued. The conceptual design of an on-site analytical laboratory was completed and a preliminary list of the required equipment prepared.

Development and support

The Remote Monitoring Project (RMP), established in 1996, made significant progress in several areas:

— Safeguards concepts, approaches and methods were drafted as a basis for establishing policy, guidelines and criteria for the implementation of remote monitoring technology;
— Remote monitoring equipment was selected on the basis of the most cost effective combination of authorized inspection and commercially available equipment, and procurement was initiated for the initial implementation phase;
— The infrastructure needed for data collection, transmission, distribution, evaluation and storage

was defined and the necessary hardware and software acquired;

- Field trials of inspection regimes incorporating remote monitoring were conducted in Japan, South Africa, Switzerland and the USA to determine the performance of remote monitoring systems and to provide experience with relevant inspection procedures and other arrangements;
- Demonstrations of remote monitoring systems were made to several Member States.

Field testing of three new digital image surveillance systems (EMOSS, Gemini and VDIS) was carried out. Approximately 30 units of each system were installed in various facilities. Field testing of the Gemini system was completed at the end of 1997 after the accumulation of 150 operating months. VDIS field testing started in May and will be completed by March 1998. On the basis of test results, an upgraded EMOSS system was developed and several units were placed under limited field testing.

The security of the computer infrastructure and the confidentiality of safeguards information were further improved through the installation of a 'firewall' between networks in order to select, control and monitor access. Further security measures were implemented to ensure the principle of access to information on a 'need to know' basis. Dedicated, secure computer communication links were established between the two regional offices and Headquarters.

An international symposium on safeguards, held in October in Vienna, provided a forum to review the expanding verification activities of the Agency. Topics related to technological and policy aspects from national, regional and global perspectives were covered and key elements of the strengthened safeguards system were reviewed.

Staff training in 1997 addressed the implementation of the strengthened safeguards system, particularly: the performance of environmental sampling; the background of nuclear fuel cycle and proliferation indicators; enhanced observational skills; the basic engineering design of nuclear facilities; and design information review at research reactors.