

Safeguards in the European Union: The New Partnership Approach

The IAEA and Euratom are co-operatively applying NPT-type safeguards in more cost-effective and efficient ways

Nuclear safeguards within Europe have long been applied jointly by the IAEA and the European Atomic Energy Community (Euratom). Over the years, arrangements have been progressively devised for common safeguards activities involving the staffs from the inspectorates of both organizations. These have included arrangements known as the "observation regime" and "joint team" inspections under which Euratom inspectors performed inspection activities under the observation of IAEA inspectors or jointly with them, depending upon the types of facilities being inspected.

Today, a new approach is in place, following critical reviews of both the effectiveness and efficiency of the two former arrangements. A "New Partnership Approach" (NPA) between the IAEA and Euratom was agreed in 1992 to improve the working arrangements for the application of safeguards within the European Union. The NPA enables both the IAEA and Euratom to meet responsibilities under comprehensive safeguards agreements [those that States conclude pursuant to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT)] in a more effective and efficient manner.

This article highlights the circumstances surrounding the birth of the NPA and the status of its implementation. It particularly looks at elements of the NPA and practical arrangements that are being followed for specific types of nuclear and related facilities. Since elements of the NPA have been put into practice, significant savings have been realized in the allocation of safeguards inspection resources for Euratom countries, while ensuring effective verification.

Birth of the New Partnership Approach

In the early 1970s, shortly following the NPT's entry into force, the IAEA and Euratom negotiated an agreement for the application of safeguards in the Community's non-nuclear weapon States party to the NPT. Some years ago, they devised the observation and joint-team working arrangements. However, these arrangements have required a higher level of inspection effort than desired and have resulted in unnecessary duplication.

For example, a review of the inspections at fuel fabrication plants within Euratom — which accounted for 60% of Euratom/IAEA inspection efforts under INFCIRC/193 (the Euratom/IAEA verification agreement) — illustrates the problems. At two mixed oxide (MOX) fuel fabrication plants, under the joint team approach, the IAEA required 650 and 400 person-days of inspection (PDIs), and at a uranium fuel fabrication plant, under the "observation" regime, the IAEA required 450 PDIs. (*See graph, page 27.*) Although these fuel fabrication plants are extreme cases, this level of IAEA inspection effort was much higher than necessary for safeguarding such types of facilities.

Another example is the number of samples taken, transported, and analyzed in the separate laboratories of the two organizations. In 1990, the IAEA took more than 300 samples for analysis during inspections within Euratom, and it may be assumed that the number taken by Euratom was at least equal to that taken by the IAEA. Therefore, it is reasonable to assume that more than 600 samples were taken for analysis by the IAEA and Euratom, whereas only about half this total number was necessary.

The duplication of resources is not limited to these examples. It also applies to areas such as research and development (R&D) and training. In most cases, the IAEA and Euratom are working separately in the R&D field. For example,

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Facility type	Number of facilities
Light-water reactors without mixed-oxide fuel	40
Low-enriched uranium fuel fabrication plants	4
Mixed-oxide fuel fabrication plants	3
Storage facilities with unirradiated plutonium	4
Light-water reactors with mixed-oxide fuel	6
Wet storage facilities of irradiated fuel	8
Enrichment plants	2
Dry storage facilities of irradiated fuel	4
Other storage facilities (e.g. UF ₆ open air facilities)	12
Research reactors and critical assemblies	46
Locations outside facilities	128

Types of facilities covered by the New Partnership Approach

both were developing different video surveillance systems.

It was important to reverse this trend, so as to give effect to two of the basic tenets of the INFCIRC/193 agreement, namely, that the IAEA and Euratom should co-operate in implementing safeguards and should avoid unnecessary duplication of effort.

Developing the New Partnership Approach. Under Article 25 of INFCIRC/193, the IAEA and Euratom established a Liaison Committee which meets as a High Level and a Lower Level Committee. A Working Group was established by the High Level Liaison Committee in September 1991. Its task was to examine ways and means by which co-operation and co-ordination between Euratom and the IAEA in the implementation of INFCIRC/193 could be enhanced. The Working Group prepared two reports which were submitted to the High Level Liaison Committee in April 1992. It recommended discontinuation of the existing observation and joint team arrangements and the initiation of a partnership approach, which should allow both the IAEA and Euratom to meet their responsibilities under the NPT safeguards agreement in the most effective and efficient manner. Furthermore, the Working Group recommended immediate discussions between the two organizations on implementation of the recommended approach.

On 28 April 1992, IAEA Director General Hans Blix and Euratom's Commissioner Cardoso e Cunha met in Brussels and endorsed the Working Group's recommendations. To this effect, they signed an agreement that provided the necessary components of a New Partnership Approach (NPA) which would lead to improvements in the working arrangements for the application of safeguards. A Technical Group (Euratom and IAEA) was established to work out

practical arrangements and this work has proceeded since July 1992.

Euratom/IAEA Liaison Committee. The April 1992 NPA agreement also required the re-evaluation of the role of the Liaison Committee and its relationship to its subsidiary bodies. The procedures and working arrangements of the Liaison Committee established under Article 25 of the Protocol to INFCIRC/193 have now been revised to ensure efficient and effective implementation of safeguards in the non-nuclear-weapon States of Euratom. The arrangements were agreed upon on 26 November 1993.

Elements of New Partnership Approach. Under the NPA, the IAEA can be cost-effective without delegating the inspection activities and the responsibilities essential to the fulfillment of the objectives of safeguards implementation. (The IAEA performs all the required activities to meet its safeguards criteria and draws independent conclusions). This is consistent with the IAEA Director General's statement to the June 1992 meeting of the IAEA Board of Governors: "We assume that arrangements which would be expressive of a genuine partnership would be acceptable to our membership, while arrangements which would be tantamount to a delegation of our safeguards tasks to our partners would not be acceptable. For the Agency, the principal requirement is that an equal partnership must guarantee the Agency's access to all necessary information and enable it to draw independent conclusions and obtain the necessary degree of assurance and thus meet its own safeguards goals."

The new approach is based *inter alia* on optimization of the necessary practical arrangements and the use of commonly agreed safeguards approaches and inspection planning, procedures, activities, instruments, methods, and techniques.

Other elements of the NPA are:

- increasing common use of technologies to replace, to the extent possible, the physical presence of inspectors by appropriate equipment;
- performance of inspection activities on the basis of the principle "one job, one person", supplemented by quality control measures to enable both organizations to satisfy their respective obligations to reach their own independent conclusions and required assurances;
- use of commonly shared analytical capabilities in order to reduce the number of samples to be taken, transported, and analyzed;
- co-operation in research and development and in the training of inspectors with the aim of achieving a reduction of resources spent on both sides and leading to commonly agreed products and procedures.

Examples of practical arrangements

Light-water reactors (LWRs) without mixed oxide fuel (MOX). A scheme for a partnership approach for LWRs without MOX has been agreed which allows both the IAEA and Euratom to meet their responsibilities under INFCIRC/193. The arrangements involve one physical inventory verification (PIV), three intermittent inspections (IRIs) at quarterly intervals for timeliness purposes, and necessary inspections for verification of shipments of spent fuel. The quarterly IRIs can be arranged so that they can be performed in a technical and competent manner by one inspector from either organization or can be equally shared by the organizations.

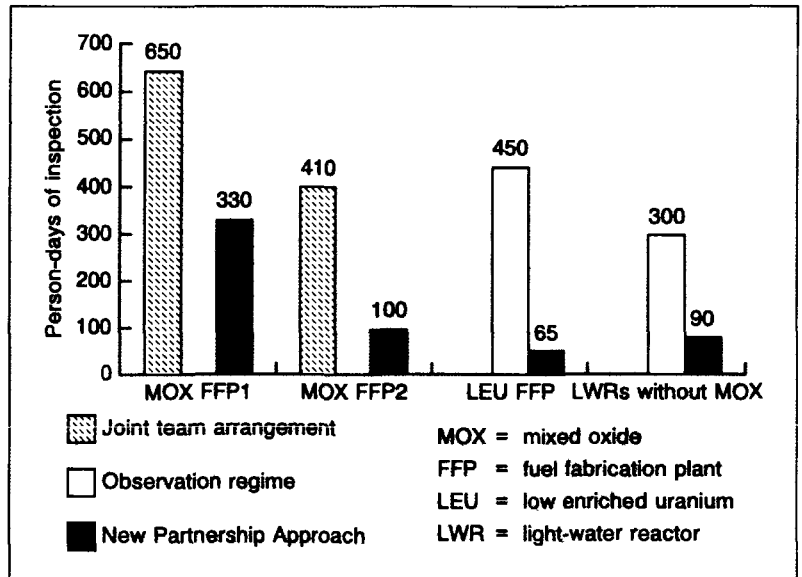
Surveillance and containment measures with tamper indicating capabilities are used to assist the IAEA to reach its independent conclusions. Euratom can install and remove the sealed surveillance units at interim inspections. Devices that indicate locations are fitted to the surveillance units to provide authentication of where the units are installed and removed. Work is under way to develop a tamper indicating device for one system.

Reviews of the results of surveillance will continue to be performed by the IAEA and Euratom together in Luxembourg. Both Euratom and the IAEA are making arrangements to acquire the necessary implementation experience on selected LWRs without MOX. In parallel, preparations for full implementation of the proposed arrangements are also under way.

Low enriched uranium (LEU) fuel fabrication plants. In LEU fuel fabrication plants, it was agreed to perform one physical inventory per year and a certain number of plant-specific interim inspections. Provided that the inspections and inspection activities are planned and structured in such a way that the requirements of the IAEA are fulfilled, this number would not exceed five routine interim inspections per year.

The development of unattended mode of measurements for LEU fuel assemblies is under discussion between Euratom and the IAEA. This would enable 100% coverage of flow verification of fuel assemblies.

MOX fuel fabrication plants. In one MOX fuel fabrication facility, the continuous presence of inspectors will be replaced by a presence of four to five days a month while meeting all the requirements for timely detection and flow verification. This will be made possible through the use of technologies to replace the physical presence of inspectors by appropriate equipment. A reduction of PDIs from about 410 (in 1990-91) to 150 per year is foreseen when all the components are installed.



Savings under the NPA

The contribution of the NPA has been mainly due to discontinuation, for practical purposes, of the observation and joint team regimes. Efforts have been directed to ensure that inspection activities are planned to cover only the requirements of the safeguards criteria. The comparison of PDIs between arrangements under the observation/joint team arrangements and the NPA for selected facilities shows significant reductions. (See graph.)

Examples of how savings have been achieved are as follows:

- the frequency of inspections of small facilities is limited to the requirements of the criteria;
- the number of inspections in LEU fuel fabrication plants is limited mainly to those required to cover the requirements of the IAEA safeguards criteria and one inspector is used for interim inspections. In one LEU fuel fabrication plant in Germany, PDIs have been reduced from 450 to 65 per year;
- the principle of "one job, one-person" is effectively utilized (supplemented with quality control measures) at PIV inspections;
- the follow-up and balancing of mixes (FBOM) scheme at one MOX fabrication plant has been abandoned (the plant at present is not fully operating). The FBOM scheme required high inspection effort and was manpower intensive. As a result, the inspection effort requirements in PDIs have been reduced from about 650 to 330 per year;
- normally one IAEA inspector is sent to interim inspections at one MOX fuel fabrication plant (optimization of resources). The principle of "one job, one person" can be effectively utilized, supplemented with quality

Comparative IAEA inspection effort under the NPA and previous regimes for selected facilities

control measures. The inspection effort in PDIs has been reduced from about 410 (in 1990-91) to 290 in 1993. Further reduction is expected.

Implementation of the NPA, coupled with the shutdown of two large facilities, has led to a substantial decrease in IAEA inspection effort in the States in question. Previously, in 1990-91, the effort was approximately 3000 PDIs per year. This has decreased to about 1200 PDIs per year. In 1995, the remaining facility types are to be brought under the new arrangements, and there should be further improvements in cost-effectiveness. The savings in inspection effort have allowed the IAEA to direct resources to other areas — for example, for safeguards activities involving the newly independent States of the former Soviet Union. (*See related article in this edition, beginning on page 29.*)

Selected cost-effective procedures that have been developed under the NPA now are being tested for use in other settings through the field trials of the IAEA's safeguards development programme (Programme 93+2). (*See related article in this edition, beginning on page 14.*)

Practical arrangements for NPA support activities. Through the NPA, the IAEA and Euratom also have agreed on arrangements for the following support activities: optimization of the necessary practical arrangements and the use of commonly agreed inspection instruments, methods, and techniques; and the use of commonly shared analysis capabilities to encourage co-operation in training, R&D, and the use of new technology.

Technical effectiveness and co-operation

The technical effectiveness of Euratom's system and organization has enabled the translation of the NPA elements into practical arrangements. The IAEA intends to continue to make use of Euratom's capabilities to develop and establish optimal practical arrangements, thereby reducing inspection effort while performing activities required by the safeguards criteria and drawing its independent conclusions.

The technical effectiveness of Euratom's system can be illustrated by identifying some of its key features.

- Euratom has a fully established system and organization based on more than 30 years experience.
- Euratom carries out its functions through the continuous or intermittent presence of its inspectors in facilities.
- The range of activities performed by Euratom includes: inspections to cover physical verifi-

cation activities, flow verifications, verifications at strategic points, and audit activities; destructive and non-destructive assay; establishing historical measurement data; stratification and sampling plan preparation; material balance evaluation; application of containment and surveillance systems; transmission to the IAEA of reports (physical inventory listing, material balance report, inventory change report); design information verification and re-examination; transmission of Euratom's findings to the IAEA under Article 21 of the Protocol to INFCIRC/193; and follow-up activities on anomalies and discrepancies discovered during inspections.

- Other capabilities available in Euratom include: surveillance review station; seal verification; calibration of instruments; destructive analysis laboratories; computer services; research and development; and training.

Impact of NPA on the operator of inspected facilities. The NPA bring a series of benefits to the operator of inspected facilities in non-nuclear-weapon States. They include:

- less intrusion for the operator;
- reduced time and effort spent by the operator on safeguards activities and inspection;
- common inspection procedures and arrangements, thus minimizing conflicting demands by the two inspectorates;
- improved planning, thanks to the advanced transmittal of precise information on programme activities (production, campaigns, shipments, receipts, etc.) by the operator; the inspectorates thus can better plan effective and efficient safeguards activities and inspection scheduling;
- increased co-operation with the operator, which could reduce the presence of inspectors at the facility.

Could elements in the IAEA's New Partnership Approach with Euratom be extended to other areas? It would be possible, as long as the necessary technical capabilities exist to enable the IAEA to make use of and maintain independent conclusions. The IAEA's present activities for improving the overall effectiveness and efficiency of its safeguards system provide an opportunity for such an assessment. □