

**EURATOM**

Development, Role, Experience

By S. Tsalas

Euratom Safeguards Directorate, Luxembourg

Historical Development of Euratom

The European Atomic Energy Community (EURATOM) was established on the 25th of March 1957, when the relevant Treaty was signed in Rome. Its tasks were on one hand the promotion of the peaceful use of Nuclear Power, on the other the laying down of rules that would permit safe and controlled handling of the Nuclear Materials involved. Issues like Research, Investments, Common Undertakings, External Relations and Supply were addressed as well as Safety, Radiation Protection and SAFEGUARDS.

The task of safeguards as defined in the Treaty is to “make certain, by appropriate supervision that nuclear materials are not diverted to purpose other than those for which they are intended”. The main provisions for achieving this goal are:

- The obligation to the operator to provide Basic Technical Characteristics of his installation. In the special case of reprocessing facilities Euratom has to approve the chemical separation techniques that will be used.
- The obligation to the operators to establish a Nuclear Material Accountancy System.
- Inspections by own inspectors who ” have access to all places and data and to all persons who ... deal with materials, equipment or installations subject to safeguards”.
- The sanctions which may be imposed in cases of infringement of obligations by the operators.
- The issue by Euratom of a specific regulation laying down the nature and the extent of the requirements to the operator’s accounting and reporting system.

It is worth emphasising some particular features of Euratom Safeguards:

- The Treaty as well as the ensuing relevant Legislation constitutes European law applicable directly to all nuclear plant operators in the Community’s member states.
- All special fissile materials are property of the Community although the member states and the Operators have the unlimited right of use.

- The European court of Justice may intervene imposing inspection in a case of denied access but also providing the guarantee of fair treatment to any operator who disagrees with an imposed sanction.

To permit the implementation of safeguards measures and to fulfil the requirements of the Treaty, two Regulations were brought into force in 1959 and inspections were started. These two Regulations provided the early framework for the application of Euratom safeguards which included all main fuel cycle activities from uranium mining up to the reprocessing of spent fuel and waste storage.

In 1976 these Regulations were replaced by the new Commission Regulation 3227/76. This Regulation ensures that Euratom can comply with the requirements of the Verification Agreement negotiated between Euratom, its Non-Nuclear Weapon Member States and the IAEA, which finally came into force in 1977.

Regulation 3227/76 provides for the detailed requirements for Basic Technical Characteristics, Accountancy and Reporting System, Programme of Activities, Notification of Physical Inventory Taking date and programme and Advance Notifications of Imports and Exports. Finally there are provisions of Derogation / Exemptions and specific provisions for ore producers, carriers and Intermediaries as well as specific provisions applicable in Nuclear Weapon States.

Similar, yet even more detailed and facility specific, are the requirements set out in the Particular Safeguards Provisions (PSP), documents comparable to the Agency's Facility Attachments.

Role of Euratom Safeguards

The basic task for Euratom is to apply safeguards within the European Union in a way that it can "satisfy itself that ores, source and special fissionable materials are not diverted from the intended uses as declared by the operator" and make sure that "provisions related to supply and any particular safeguarding obligations are complied with".

A particularly important role for Euratom is the co-operation with the IAEA in the implementation of the NPT which requires Agreements between the IAEA and individual countries or groups of countries. Three such Agreements are in force in the countries of the European Union:

- One Comprehensive Agreement between the IAEA, Euratom and the Non-Nuclear Weapon States.

- Two Agreements based on voluntary offers of the UK and France, between the Agency, Euratom and the respective State.

In the framework of the above Agreements Facility Attachments have been elaborated which constitute the basis for the NPT safeguards implementation.

The political events of the last decade added some new elements also to the role of Euratom. Despite limitations imposed mainly by economic factors, Euratom has to give a careful consideration to:

- the collaboration with countries outside the European Union, notably the Eastern European Countries, for the establishment and development of adequate nuclear material accountancy and control systems, and
- the combat against the illicit trafficking of Nuclear Material.
- tasks emerging from the need of safeguarding Nuclear Material formerly used for defence purposes.

Finally, in the context of the IAEA "SSS" Euratom will assume responsibilities for all measures that fall under Community competence (e.g. provision of information concerning material in mines, pre-IAEA-safeguards material and exempted material. It will also implement some further measures that fall under national competence on behalf of those member states that wish to delegate this to Euratom.

Implementation experience

Euratom Safeguards were applied in 1996 in:

- more than 700 installations/ LOFs
- which involved approximately:
- 430 Tonnes of Plutonium
 - 11 Tonnes of High Enriched Uranium
 - 285000 Tonnes of other grades of Uranium
 - 4600 Tonnes of Thorium

and reported:

- more than 1 000 000 computer entry lines in that year
- Euratom performed for safeguarding this nuclear material:
- ~ 9300 inspection mandays , in the course of
 - ~ 2300 inspections.

Depending on the scope of the inspection a set of measures is applied from the following list of verification methods:

Accountancy audit

Visual checks, Counting and Identification
Non destructive measurements
Sampling and Destructive Analysis
complemented by Containment and Surveillance Measures.

For many years techniques were developed that lead to achieving an appreciable level of performance. Euratom has always supported technical development. Beyond the successful routine implementation of standard equipment, the introduction of special or facility specific devices like the "Phonid", an active neutron interrogation instrument, the "Sigma", a delayed neutron interrogation instrument for THTR graphite pebbles, as well as the, in the meantime widely used, mobile mass spectrometer and the Hybrid K-edge densitometer. Such development will continue being of major importance also in the future. Modern Nuclear Facilities, notably the big reprocessing and MOX fabrication plants, challenge the safeguards authorities with their design features that are dictated by the high throughput and the strict safety and radiation protection requirements. The facilities are now designed for hands-off operation, and the increasing automation degree results in decreasing access to the subject nuclear material. Safeguards operations had to be adapted accordingly.

For the verification of the Basic Technical Characteristics, Euratom has followed closely the facilities in their construction and commissioning phase to convince itself that the plant design corresponds to the submitted documents.

Remote bar code identification, enables the inspector to follow the nuclear material without being present at all times or in areas with increased radiation dose uptake risk. For NDA the key word is unattended measurement stations which are designed mainly by combining classic neutron and gamma measurement devices with appropriate C/S measures.

In the area of destructive analysis Euratom decided at an early stage of that the big reprocessing facilities of La Hague and Sellafield would produce such a number of samples that it was worth establishing own analytical Laboratories on the sites. The investments are justified by the long term cost savings, by the avoidance of numerous nuclear transports and by the timely delivery of inspection relevant analytical results. The first On Site Lab is expected to be fully operational within a few months.

The aim of all inspection effort is the drawing of safeguards conclusions. For this reason particular importance must be given to the evaluation of inspection results. Beyond the formal analysis of the results of the measurements, the seals' verification, the surveillance reviews and the consistency analysis of the accountancy records and reports, we need to evaluate the justification for special inventory changes like Shipper/Receiver Differences, Nuclear Transformation or Accidental Losses as well as the MUF and its statistical significance.

15

As mentioned in the context of the Euratom legal basis, sanctions are foreseen in the case of infringement of the safeguards provisions. In such a case an anomaly follow-up procedure applies. In the first place the operator is requested to provide, normally in the form of a special report, explanations about the findings. Should this not be considered satisfactory, a change in strategy may be introduced, e.g. increasing inspection frequency or intensity. If the established anomaly is considered a serious infringement sanctions according to art. 83 of the Euratom treaty will be issued. These can be:

- a warning
- the withdrawal of special benefits such as financial or technical assistance
- to put the undertaking under other administration
- withdrawal of material

To perform the tasks that were roughly mentioned above Euratom needs a big number of inspectors plus appropriate administrative and logistical support at headquarters. At present the staff of the Safeguards directorate comprises approximately 300 persons, two third of which are active inspectors. Euratom has a solid legal basis for performing safeguards inspections and the necessary infrastructure for inspection support, information treatment and data evaluation. It is a full scope multinational regional safeguards system fulfilling its obligations under the Euratom Treaty and contributing to the successful implementation of the NPT by satisfying its obligations in the framework the Safeguards Agreements with the IAEA. ,

