Euratom safeguards implementation in France and cooperation with the IAEA

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Introduction

The Euratom Treaty creates a number of obligations that France and its operators must comply with, amongst them, the implementation of safeguards through Chapter 7 of the Euratom Treaty and the 302/2005 Euratom Regulation. France is a Party to the NPT and has concluded a Safeguards Agreement with the International Atomic Energy Agency (IAEA) and the European Atomic Energy Community which entered into force in 1981. This agreement is a Voluntary Offer. The Additional Protocol to this agreement entered into force in 2004.

Therefore international safeguards in France are applied both by:
- the European Commission (EC), through the Chapter 7 of the Euratom Treaty;
- the International Atomic Energy Agency (IAEA), through the French Safeguards Agreement (INFCIRC/290), its additional Protocol (INFCIRC/290/Add.1) and other voluntary offers for safeguards strengthening such as INFCIRC/207, INFCIRC/415 and INFCIRC/549.

The Comité Technique Euratom (CTE) is the French authority responsible for monitoring the implementation in France of international safeguards on nuclear materials. It was created in 1958 and its missions were recalled in a new decree of 2011. The CTE shall ensure compliance with all the international commitments of France about the peaceful use of nuclear energy and the submission of nuclear materials to the Euratom and/or IAEA safeguards. Maintaining a good climate of cooperation between the European Commission and the IAEA has always been a major concern for the French authorities that supported all initiatives in this area.

I. Euratom Safeguards in France

Legal framework

According to the Treaty, the EC shall ensure that ores, source materials and special fissile materials are not diverted from the intended uses declared by users.

The article 81 of the Treaty provides a broad access to all nuclear facilities and nuclear materials, as it says “On presentation of a document establishing their authority, inspectors shall at all times have access to all places and data and to all persons who, by reason of their occupation, deal with materials, equipment or installations subject to the safeguards provided for in this Chapter”.

Finally, the article 84 provides that “In the application of the safeguards, no discrimination shall be made on grounds of the use for which ores, source materials and special fissile materials are intended.” and “The safeguards may not extend to materials intended to meet defence requirements [...]”.

The EC shall also verify the compliance with requirements of the agreements between Euratom and third States, i.e. the peaceful use and the submission to IAEA safeguards.
**Nuclear Fuel Cycle**

With the exception of mining, France has a complete nuclear fuel cycle from ore concentrates to waste. Based on the legal framework of the Euratom Treaty, all civil nuclear facilities and all civil nuclear materials are safeguarded by Euratom wherever they are in France. Therefore the two conversion plants, the two enrichment plants, the three fuel fabrication plants, the 59 nuclear power plants including the EPR of Flamanville under construction, the 2 reprocessing plants in La Hague, the five facilities for waste treatment and numerous research centers and reactors of CEA are declared and controlled by the European Commission.

The same level of verification applies to all French civil nuclear facilities as to any facility of European Non Nuclear Weapon States (NNWS). As the principle of non discrimination is fully respected, and due to its numerous nuclear facilities, France is therefore the most controlled country in Europe.

**Declarations**

All French nuclear facilities operating with nuclear materials send a preliminary declaration at least 200 days before construction begins and their Basic Technical Characteristics (BTC) at least 200 days before the first reception of nuclear materials. Material Balance Areas (MBA) are defined through early consultation with the EC. For nuclear material accountancy, monthly Inventory Change Reports (ICR) are sent to the Commission. These declarations allow a precise nuclear material follow-up through reporting of any change of location from one MBA to another, any change in nuclear material form, any operation that modifies the nuclear material composition, any change in particular safeguards obligation code.

The safeguards obligation codes can track the peaceful use commitment which was taken on a nuclear material. They can be country specific to allow reporting or particular notification to the Third State.

Each year every French MBA sends two specific reports following the annual physical inventory of the nuclear material. The Physical Inventory List and Material Balance Report are sent 30 days after the date of the Physical Inventory Taking (PIT). Prior notifications are sent before any transfer of nuclear material and outline programme of activities are sent at the beginning of the forthcoming year. If an unexpected event occurs in a facility, the operator must send a special report to the Commission without delay.

### DECLARATIONS IN 2010

<table>
<thead>
<tr>
<th>2010</th>
<th>168 MBAs for France</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of ICR, PIL and MBR</td>
<td>Approx. 2500</td>
</tr>
<tr>
<td>Total number of ICR lines</td>
<td>170 300</td>
</tr>
<tr>
<td>Additional information or modification to BTC</td>
<td>23</td>
</tr>
<tr>
<td>Initial outline programme of activities</td>
<td>223</td>
</tr>
<tr>
<td>Total of transfers notified</td>
<td>830</td>
</tr>
<tr>
<td>Total number of notifications</td>
<td>1739</td>
</tr>
</tbody>
</table>
**Verification and inspections**

At Luxembourg Headquarters, the accountancy verifications can raise discrepancies between two MBAs of the same State or of two different EU Countries. A letter is sent to the facilities in order to request explanation and to solve the discrepancy. The operator shall answer to the Commission request.

BTC are scrutinised and some precisions can be required. Each evolution of the plant in terms of design, production or organization for nuclear material management should be reported to the EC.

Prior notifications of transfers are verified and compared between senders and receivers inside the EU. If a Third Country obligated material is concerned by the transfer, the prior agreement of the Supplying Country should be obtained in some cases. These notifications also allow EC inspectors to verify the nuclear material before it leaves the facility.

The outline programme of activities is used to plan all the routine on-site activities of verification for the forthcoming year. Euratom can conduct various types of inspections with different frequencies depending on the type of facility.

At the first stage in the plant’s life the first type of inspection is the verification of the BTC of the facility. But this type of inspection can be conducted regularly and especially when some evolution occurred in the plant.

All MBAs have at least an annual inspection of Physical Inventory Verification (PIV). Each year after the PIT, the European inspectors come to verify the results of the inventory but also the way it was conducted.

Larger facilities with large amount of nuclear material also have routine inspections or Import/Export inspections.

In conjunction with an unexpected event declared by the operator through a special report, a special inspection can be triggered by the EC.

For the specific case of the Gas Centrifuge Enrichment Plant of Georges Besse II and within a precise and agreed framework, Low Frequency Unannounced Access (LFUA) can be conducted by the Commission and/or the IAEA.

With the exception of LFUA, a prior inspection notice is usually sent the week before.

The duration of an inspection varies: a half-day for the verification of a power reactor up to 2 weeks for the PIV of AREVA NC La Hague or Melox plant.

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**Euratom Inspection Effort in France**

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of inspections</th>
<th>Inspection Effort (person days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>1600</td>
<td>356</td>
</tr>
<tr>
<td>2006</td>
<td>1200</td>
<td>1389</td>
</tr>
<tr>
<td>2007</td>
<td>1000</td>
<td></td>
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<td>800</td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td>600</td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>400</td>
<td></td>
</tr>
</tbody>
</table>
The activities of the Euratom inspectors are of various kind depending of the facility and the type of inspection. The most common checks are: identification and counting of the nuclear material, verification of accountancy declaration vs. physical follow-up of the nuclear material, non-destructive analysis and destructive analysis after sampling in large bulk handling facilities.

Some years before the Commission started to test a new approach of verification through auditing the NMAC system of the operator. The audit is a complementary tool which contributes to build confidence between the inspectors and the operator. As it is also time consuming, it should be used with parsimony.

After each inspection, the European Commission sends an official letter to the operator copy to the French Authorities whether stating that the control was conclusive or asking for some explanations or corrections. The operator has a limited time for answering to the Commission request.

II. Cooperation between IAEA and Euratom

International Atomic Energy Agency (IAEA) safeguards are applied in conjunction with the European Commission under the tripartite agreement concluded between France, the Community and the IAEA and its additional Protocol.

**Declarations and verification**

All declarations due to the French Safeguards Agreement and all Additional Protocol declarations concerning nuclear material are sent to the IAEA by the EC. As soon as France informed the EC that a French facility is on the eligible list of facilities that can be subject to IAEA verification, ALL declarations concerning this facility are sent to the IAEA by Euratom.

This mode of transmission ensures that the IAEA obtains reliable data within mandatory deadlines.

Majority of IAEA inspections in France are joint team inspections with the EC. This pooling of equipment and teams can save money and human resources. Equipment for containment and surveillance are paid whether by the EC or by the IAEA and can be used by both inspectorates. With the principle of “One Job One Person”, verification activities are done only once and it saves time for the inspectorates and the operators.

The experience acquired by the inspectors of the Commission through 50 years of verification in French facilities can provide many answers to the questions of the IAEA inspectors. IAEA also benefits from the very accurate Euratom inspectors' knowledge of French facilities due to a more frequent presence on site. This cooperation avoids wasting time on issues of understanding and focuses the verification on the essential objectives. Therefore, the inspections are going smoothly most of the time.

In France, it is also possible for the IAEA to trigger some inspections on its own decision or to perform some independent review if the IAEA's inspectors are willing to do so.

All joint on-site activities bring results that allow each inspectorate to draw its own conclusion independently based on their specific objectives, whether the ones of the Euratom Treaty or the ones of the French Safeguards Agreement.
A CASE STUDY: Georges Besse II Plant

The Safeguards Approach for the French enrichment plant of Georges Besse II was based on the same principles as for the three URENCO plants in Germany, the Netherlands and the United Kingdom.

Channel of communication
During the construction of the plant, all information (preliminary declaration, construction planning, design information…) was sent in due time to the IAEA through the EC. Therefore both inspectorates have the same level of information. All clarifications requested whether by the EC or by the IAEA were taken into account and solved jointly.

Equipment
All the equipment for measurement and surveillance was provided by the EC taking into account the concern of both inspectorates. For example, on the request of the IAEA, the need for authentication data that is one of the pillars for a non-proliferation credible verification was studied and some technical solutions were found to guarantee that the provided signals could not be corrupted.

Joint verification of DIQ / BTC
Before introduction of nuclear material, many visits for Design Information Verification (DIV) were triggered. The EC decided to perform verification every month. The IAEA joined many of these inspections. However when the verification was conducted solely by the Commission, IAEA inspectors were kept informed by Euratom inspectors from all points of major importance during the following joint verification. The consequence is a better understanding of the plant’s operation for the IAEA inspectors, i.e. a gain of efficiency.

Routine Inspections
Since nuclear material was introduced all routine inspections have been conducted jointly. The different verification activities are divided between the two inspectorates therefore this allows each team to save time.

LFUAs
Since July 2011, two joint LFUAs were triggered: one by the European Commission during a routine inspection and one jointly by the EC and the IAEA outside of routine inspections. Everything went smoothly between the two inspectorates and with the operator. Some LFUAs can be triggered by the IAEA alone and in this framework they are totally unannounced for the operator and the French Authorities but also for the EC.

Conclusion

As for any EU country, Euratom inspectors bring their experience and logistic support. But as France is a Nuclear Weapon State with less IAEA inspection effort than a NNWS, the experience of Euratom based on their knowledge of the nuclear fuel cycle in France is of course even more important.

This cooperation is made possible by a combination of several criteria that underlies the action of the European Commission: a strong legal basis, its independence from the Member States in terms of budget and operating, an experienced staff of inspectors and a historic of 50 years of verification in the EU.

Finally, this cooperation between the IAEA and Euratom saves resources and time for the IAEA but sometimes also for Euratom, for national Authorities and for the operators.