EUROPEAN COMMISSION

SUMMARY REPORT ON THE IMPLEMENTATION OF EURATOM SAFEGUARDS IN 2012

DIRECTORATE-GENERAL FOR ENERGY

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SUMMARY REPORT ON THE IMPLEMENTATION OF EURATOM SAFEGUARDS IN 2012

This report provides a summary of the activities carried out by the Commission in the field of Nuclear Safeguards in 2012.

This report is broken down into four sections covering the legal basis, operational activities, internal management and external relations.

1. LEGAL BASIS

Chapter 7 of the Euratom Treaty requires the Commission to *"satisfy itself that in the territories of Member States, [nuclear] materials are not diverted from their intended uses as declared by the users"*. In addition, the Commission must assure that the obligations and agreements concluded by the European Atomic Energy Community or "Euratom" with third states and international organisations are complied with.

Euratom is a party to Safeguards Agreements and their related Additional Protocols with the International Atomic Energy Agency (IAEA), concluded in the context of the Non-Proliferation Treaty.

The Community is also party to cooperation agreements with a number of third States.

The Euratom Safeguards system, established for this purpose, comprises a set of controls and verification activities covering all civil nuclear installations throughout the EU.

It is implemented by the Directorate-General for Energy, Directorate E - "Nuclear Safeguards".

2. OPERATIONAL ACTIVITIES

In order for the Commission to fulfil its primary law obligations, the Commission develops and implements a system of nuclear safeguards. This system is based on two parts.

The first part is a nuclear material accountancy system implemented by the nuclear operators of the EU, and their related accountancy declarations made to the Commission as mandated by Commission Regulation (Euratom) 302/2005.

The second part is based on the activities of the Commission to verify the completeness, correctness and coherence of these nuclear operator accountancy declarations. Part of those activities comprises inspections in the field, where Commission inspectors are sent to perform accountancy, physical, and other verifications on the nuclear material present at the installations to verify the correctness and coherence of these declarations with the physical reality.

2.1. Nuclear Safeguards Conclusions for 2012

No case of nuclear material diversion has been found in 2012 and no irregularities were reported for the EU by the IAEA. However, for two storage facilities, technical problems prevented a positive safeguards conclusion from being drawn. Also, for one enrichment plant, the measurement uncertainties were deemed too high. Actions have been agreed with the operators to correct the situation. The previously identified issues relating to the B30 spent fuel pond in Sellafield (UK), and its associated action plan, are on-going.

2.2. Staff

Staff of Directorate E consists of nuclear safeguards inspectors, technical staff, administrative staff and management. Directorate E and Unit D.3 (in charge of nuclear material accountancy, methods & evaluation and international agreements management) together comprise 213 persons.

Unit D.3 was integrated into Directorate E on 1 January, 2013 as Unit E.5.

151 staff (plus 11 in former Unit D.3) are qualified nuclear safeguards inspectors (carrying an inspector's card).

Due to the Commission's known staff reduction targets, the number of posts allocated to safeguards continues to drop. Retirements constitute a prime reason for departure from the service given the average age of the inspector corps.

2.3. Inspection Statistics

The following tables present the inspection effort of the Directorate in 2012. The effort is shown in the first table by nuclear facility type and in the second table by Member State (MS), both in number of inspections and as person-days spent on inspection (PDI).

Installation type	Person days	Nr of inspections	Joint inspections
Reprocessing	**1051**	**179**	**32**
Enrichment	**920**	**175**	**56**
Fabrication	**970**	**225**	**115**
Reactors + storages	**711**	**490**	**359**
Others	**377**	**206**	**102**
Total	**4029**	**1275**	**664**

Of the 1275 inspection carried out, 664 were joint inspections together with the IAEA. The difference is explained by the fact that the IAEA does not perform nuclear safeguards in all installations in the nuclear weapon States,

notably the reprocessing plants in Sellafield (UK) and La Hague (FR). For other facility types and Member States the difference is due to the fact that the IAEA uses Commission inspection results to reach their safeguards conclusions.

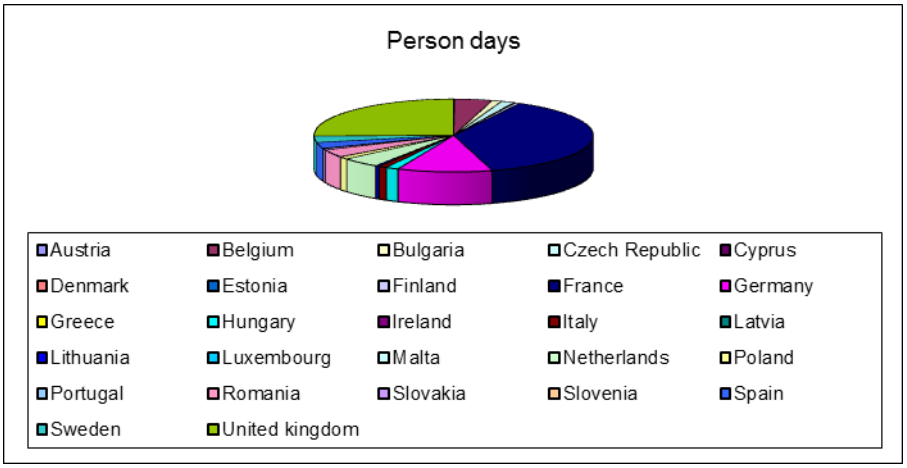
In comparison to 2011 & 2010, the number of inspections performed by Euratom inspectors continues to decrease slightly. The number of inspection person-days, after a slight drop in 2011, is effectively the same as in 2010, and in line with past trends since 2006. By contrast, the amount of nuclear material safeguarded in the EU continues to rise.

The high number of inspections and person days in reprocessing and enrichment plants results in part from the complexity of their industrial processes, and in part from the strategic value of the material (plutonium and enriched uranium, respectively).

Nuclear material at these installations is often in a chemical or radioactive form that requires using specialised inspection equipment and techniques.

Member State	**Person days**	**Nr of inspections**	**Joint inspections with IAEA**
Austria	4	3	2
Belgium	175	134	127
Bulgaria	47	26	21
Czech Republic	61	38	27
Cyprus	1	1	1
Denmark	6	6	5
Estonia	0	0	0
Finland	24	19	14
France	1517	307	25
Germany	439	212	181
Greece	3	3	0
Hungary	58	21	18
Ireland	1	1	0
Italy	37	30	16
Latvia	2	2	2
Lithuania	15	6	6
Luxembourg	2	1	1
Malta	0	0	0
Netherlands	178	38	30
Poland	46	13	7
Portugal	3	3	0
Romania	136	36	28
Slovakia	24	16	15
Slovenia	8	6	5
Spain	107	49	30

Sweden	114	62	45
United Kingdom	1020	241	57
WWWW[1]	1	1	1
Total	4029	1275	664



The higher number of person days on inspection in France, UK and Germany is due to the number and nature of installations in these countries, which currently or historically cover most or all installation types of the nuclear fuel cycle. France and UK operate the only two existing industrial reprocessing plants in Europe. These are large scale plants with throughput in the order of hundreds of tonnes of uranium and plutonium per year and which produce and hold large quantities of plutonium dioxide powder. Both countries also enrich, manufacture fuel and have a large fleet of power reactors.

Germany also has a large number of reactors combined with enrichment and fuel manufacturing installations. Belgium, although not as active, has a number of smaller closed down, or partly closed down installations, safeguarding of which is manpower-intensive. Larger numbers or complex installations are also found in Romania (on-load reactors and associated fuel fabrication), Sweden (power reactors and fuel fabrication) and in the Netherlands (uranium enrichment).

2.4. Amounts of Material & Number of Installations & Accountancy

As of 31 December 2012, the Commission's safeguards extended to 818 Material Balance Areas (MBAs) in the EU. These nuclear installations in the EU were holding the following quantities of nuclear material:

Quantity in kg	Type of nuclear material
350 485 918	Depleted Uranium (DU)
47 134 515	Natural Uranium
81 899 426	Low Enriched Uranium (LEU)

[1] WWWW is an artificial material balance area comprising the holders of small amounts of non-strategic nuclear material with limited reporting obligations.

9 662	High Enriched Uranium (HEU)
835 321	Plutonium
6 315 918	Thorium

The Directorate, having integrated unit E.5 (ex-D.3) on 1 January 2013, maintains the EU database on civil nuclear materials. During 2012, approximately 1.8 million accountancy records from all EU operators were received and evaluated. Of these, approximately 1.6 million accountancy records were then transmitted to the IAEA. More than 2000 advance notifications of material transfer have been treated and approximately 250,000 transactions of nuclear material shipments within the EU were verified against the corresponding receipts declarations.

2.5. Implementation of the Additional Protocol (AP)

2.5.1. Additional Protocol declarations

The Commission collects all required data on nuclear sites and other locations holding nuclear material either directly from the individual operators, or from the Member State. The 11 so called "side-letter countries" (Belgium, Denmark, Germany, Greece, Ireland, Italy, Luxembourg, Malta, Netherlands, Portugal and Spain) have in addition asked the Commission to collect and transmit the corresponding data to the IAEA on their behalf. These concern dual-use goods, research & development activities and development plans for the nuclear fuel cycle.

During 2012, the Commission received:

- 328 (330 in 2011) submissions of Additional Protocol data, each consisting of between 1 and 12 declarations.
- 399 (403 in 2011) declarations were provided to the IAEA for the 27 MS and the JRC under the regular reporting requirements.

Moreover, replies were prepared to 24 (3 in 2011) specific requests for clarification.

2.5.2. Complementary Access (CA) visits

The IAEA has the right of access to locations it considers necessary for verifying the absence of undeclared nuclear material and activities. The minimum notification time before such CA is generally 24 hours. A total of seven CAs took place during 2012, five of which at installations declared as "sites", two at research centres not so declared. The Commission was present at all CAs.

2.5.3. Trends

The number of declarations received from the MS, prepared by the Commission and then sent to the IAEA, remained almost unchanged. However, the number of CAs went down significantly from 28 in 2011 to 7 in 2012. Conversely, the number of requests for clarification/amplification rose from 3 in 2011 to 24 in 2012.

2.6. Budget

The operational budget for the execution of the Commission's safeguards obligations in 2012 was € 20.410.000, down from € 20.758.000 in 2011. The budget foreseen for 2013 is 20.550.000 €.

This budget is split between:

- equipment purchases and systems developments (approx. 22%),
- equipment maintenance (approx. 18%),
- development of data acquisition, transmission and processing tools (approx. 23%),
- inspection missions (approx. 14%),
- analytical laboratory services and management (approx. 21%) and
- radioprotection services (approx. 2%).

Specialised equipment is needed for verification activities; particularly monitoring equipment for containment and surveillance, gamma, neutron and other measurement devices, electronic and fibre-optic seals and seal reader systems.

The Commission's safeguards service also uses a number of specific tools for in-field verification and remote data transmission which require renewal and development. During 2012 there was a noticeable progress of the development of a *Safeguards Integrated Information System* (SIIS). Construction, integration and rationalisation moved to a tangible stage in reporting, access rights and document management. The *Euratom Seals Analysis and Management* (ESAM) project was completed in January 2013 after deploying the module for handling of electronic and ultrasonic seals.

Savings were made in projects at an advanced stage of completion (e.g. *Verification of Accountancy Records of Operators* - VARO) that have contributed to reduce the inspectors' workload from non-core activities. This was achieved (1) by rationalising the services of training, support and maintenance (now handled centrally) and (2) by reducing double data entry and increasing data quality by releasing a "mobile" version.

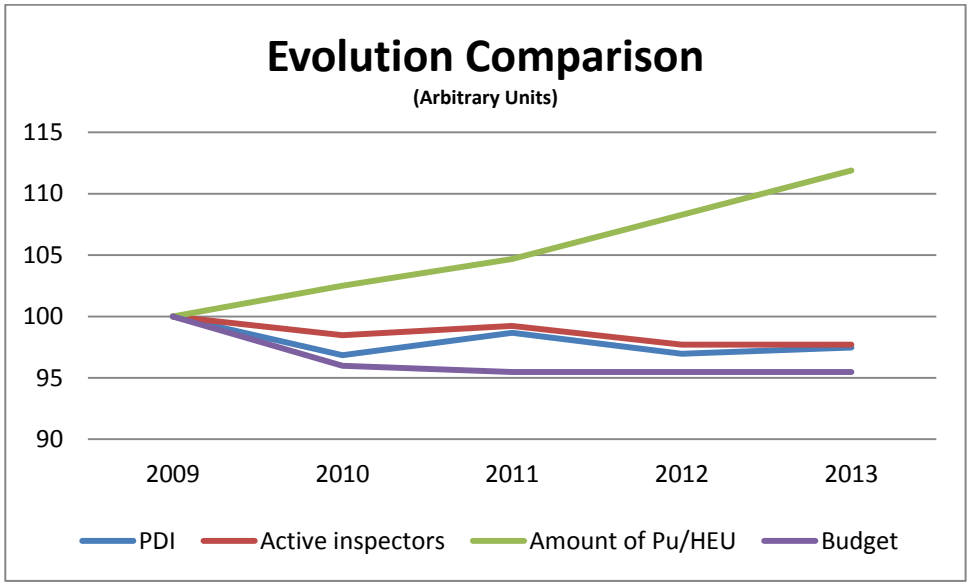
Several specific IT tools were used and others are to be built, for which support and maintenance were provided by inspectors. However, a high risk of disruption to job continuity has been identified due to job mobility and retirement of staff. Overall, IT development has reached its peak in 2012 and will significantly decline in the next two years due to the reduction of projects and completion of tasks.

There are also sizeable costs related to the running of on-site laboratories at the reprocessing plants in La Hague (France) and Sellafield (UK) for sample

preparation, analysis and transport. Included in the above costs list are also agreements and rent for in-field offices, secure cabinets and offices.

2.7. Evolution of Safeguarded Material & Costs

The following chart shows a comparison of the evolution of strategic value/direct use nuclear material quantities, number of inspectors, person days on inspection and budget over the last four years and the forecast for 2013 (a comparative graph using arbitrary units).



The purpose of the graph is to illustrate that despite ever increasing stocks in the EU of strategic value/direct use nuclear material (plutonium (Pu) and highly enriched uranium), improved efficiencies in the management of inspections – coupled with innovative safeguards approaches relying on use of the IT, unattended and remote data systems – have not required additional resources or budget.

3. INTERNAL MANAGEMENT

There are three issues of importance which were pursued in 2012: the establishment of a quality management system within the Directorate, the health & safety of inspectors in the field and internal audit and reporting. These subjects will continue to be the Directorate's major focus in 2013.

3.1. Integrated Management System – Quality Assurance & Control

Directorate E has decided to implement a quality management system named *Integrated Management System* (IMS) across the scope of its activities. The IMS supplements the procedures of the DG and the Internal Control Standards (ICS) of the Commission.

Based on the ISO 9001, ISO 17020, ISO 17021 and ISO 17025 standards, IMS will ensure continuous improvement and compliance of the Directorate's internal processes with the ICS and latest international standards. The quality policy statement was issued in spring, the project team assembled and IMS

introduced to staff later in 2012. In the first instance only implementation is sought, not certification.

3.2. Health & Safety of Nuclear Inspectors

In 2012, the Nuclear Safeguards Directorate continued analysing and documenting the health & safety conditions for the nuclear inspectors during missions and inspection activities. This review also includes the health & safety conditions of staff working in the inspectorate's headquarters laboratories and workshops. Following these surveys, and for implementing Commission Decision C(2006)1623 on Health & Safety at Work, actions have been taken to further improve the existing safety culture in-house. Some of the actions are:

- Conclusion of "Joint Arrangements for Radiation Protection" as agreed between DG ENER.E and the IAEA Department of Safeguards. This was necessary as many inspections are carried out jointly by Euratom and IAEA inspectors.
- Improvement of communication between the Safeguards Directorate and operators aimed at establishing risk assessments and related prevention plans as well as dose reduction concepts for inspectors during safeguards interventions.
- Review of responsibilities and improvement of communication networks in cases of incidents or accidents.
- Organisation of specific training courses for the operational implementation of the radiation dose reduction concept "*As Low As Reasonably Achievable*" (ALARA);
- Organisation of training courses on practical health & safety aspects, best practices of working on-site and on handling of dangerous substances.

Some of these initiatives will continue in 2013 and will be supplemented by others whenever necessary. The aim is to raise awareness amongst management and inspectors for the risks involved.

3.3. Internal audit & Reporting

A Commission internal "Audit on the systems supporting the nuclear accountancy" in 2012 resulted in 5 recommendations. The two "important" recommendations are due for completion in 2013. Two of the three "Desirable" recommendations have already been completed and the last will be completed in 2013.

All recommendations from previous audits have been implemented and completed, except one. This recommendation, concerning the development of an IT tool to interface with the Commission's general financial system, made substantial progress during 2012. The Computerized Material Management System (CMMS) will be completed in 2013.

The directorate has maintained, and seeks to further improve, its internal and external reporting.

4. EXTERNAL RELATIONS

In the field of safeguards, the Commission interacts with a large number of MS authorities, the IAEA, and other safeguards organisations in the world. Safeguards policy and direction are determined by the Commission and the IAEA in consultation with the MS.

4.1. Member States

Close contacts were maintained with EU Member States (MS) throughout the year by means of a number of bilateral meetings. In March 2012, a MS meeting for representatives of the State authorities on the implementation of Euratom safeguards was held. Safeguards approaches, their implementation and related potential difficulties and the implications of the Integrated Management System (IMS) were discussed. The meetings confirm a broad support for the Commission's safeguards policies. The next seminar for all MS is scheduled for October 2013.

The Commission's safeguards service also holds regular bilateral meetings with Member States on issues relating to their facilities. In 2012, Directorate E held bilateral meetings with Belgium, Germany, the Netherlands, Finland, France, Sweden, Spain and the United Kingdom. Preparations were made for the forthcoming accession of Croatia to the European Union.

Support to nuclear operators and MS authorities was offered on a number of occasions during the year, by means of several training courses, and seminars covering an array of legal and implementation aspects. In February 2012, a MS training seminar was held in Luxembourg, with 38 participants from 13 MS. Another two MS training seminars are scheduled in March and September 2013, while a dedicated one-day seminar for France is planned for October 2013. A dedicated training for Romanian authorities and small users of nuclear material was organized in Romania during 2012.

4.2. International Atomic Energy Agency (IAEA)

The IAEA is a key partner of the Commission's safeguards service. The cooperation modalities between the two sides are set out in the Safeguards Agreements (INFIRCs 193, 263 & 290) and their respective Additional Protocols. Their implementation arrangements are overseen by a Liaison Committee which meets at a higher level (HLLC) and lower level (LLLC). At the lower level, there are also Working Groups on Safeguards Implementation, on Logistical & Technical Support, Inspection Planning and Accountancy & Reporting. In addition, a Reflection Group was created in 2011.

The HLLC met in January and October 2012, with the participation of a rotating group of three MS. The next meeting is scheduled for June 2013. Items of review included the performance of the working arrangements between the Commission and the IAEA, and an examination of the development of safeguards techniques (including equipment needs and cost sharing plan). The HLLC facilitates the application of INFCIRC 193 and its related protocol.

The LLLC also met twice in 2012 and made significant progress on a number of topics, especially with respect to the Partnership Approach papers which define the common safeguards approaches employed in-field by both inspectorates. The LLLC also created a dedicated liaison group on encapsulation plants and final geological repositories to follow safeguards aspects of the related projects in Finland and Sweden.

The Working Groups met several times during the year to advance issues relating to safeguards implementation, planning, training, equipment & logistics, accountancy & reporting as well as the Subsidiary Arrangements.

The work of a Reflection Group consisting of senior safeguards officials from each organisation has identified a number of areas, within the existing legal framework, where enhanced cooperation could be developed between the inspectorates. An area of prime focus is seeking to further minimise overlap and duplication of work. This will lead to savings and more efficient use of resources on both sides.

Several trilateral meetings between Euratom, the IAEA and MS were held during the 2012 IAEA General Conference in Vienna.

4.3. Working groups: ESARDA, INMM and ENEF

The Commission's safeguards service is involved in the working groups of the European Safeguards Research and Development Association (ESARDA), which promotes the development of equipment and strategy. In 2012 the Directorate hosted the 34th Annual ESARDA Symposium in Luxembourg, May 22 – 24.

Other development activities extend to the US Institute of Nuclear Material Management (INMM) and the International Safeguards Division (ISD) of the INMM. Directorate E is represented in the European Nuclear Energy Forum (ENEF) in the non-proliferation sub-Working Group "Risks".

4.4. Other Commission services and institutions

The Commission's safeguards service cooperates with other services and other EU institutions on a frequent basis: Directorate E maintains active cooperation with the Commission's Joint Research Centre (Ispra, Karlsruhe, & Geel), focussing on the development of technological solutions that facilitate the implementation of safeguards, and on training of inspectors. Equally, the Commission's safeguards service attends the Atomic Questions Group of the European Council when so needed.

4.5. Third countries and organisations

The Commission's safeguards service maintains relations with third states with whom agreements have been signed, and with safeguards organisations such as the Argentine-Brazilian Agency for Accounting and Control of Nuclear Material (ABACC).

4.5.1. Euratom agreements

In 2012, the Commission's safeguards service continued the implementation of Agreements on Cooperation in the peaceful uses of nuclear energy between the European Atomic Energy Community with the United States, Canada, Australia, Japan, Kazakhstan, Ukraine and Uzbekistan.

A comprehensively revised agreement on the peaceful use of nuclear energy with Australia entered in force on 1 January 2012. This new Agreement is reciprocal and each party is requested to provide annual balances for nuclear material, non-nuclear material, equipment as well as technology.

The Commission's safeguards service has pursued the negotiations for the renewal of the Nuclear Cooperation Agreement with Canada. The signature of this new agreement is expected in 2013.

In addition, the Directorate-General will conclude a new agreement with South Africa. The signature of this new agreement is expected in 2013. Finally, the Directorate-General has started discussions with South Korea, Russia and China.

4.5.2. Meetings

During 2012, the Commission's safeguards service received delegations from Canada and Australia to discuss the yearly balances, the updating of the Administrative Arrangements and operational issues. Meetings were held with UK operators and authorities and Japanese operators to discuss the arrangements for the transfer of Japanese owned depleted uranium from the UK to Russia for further processing and enrichment.

Representatives from the US Nuclear Regulatory Commission (NRC), and the Departments of Energy (DoE) and State came to Luxembourg in January 2012 to discuss with DG ENER and the Euratom Supply Agency (ESA) topics related to the physical protection of material and supply of highly enriched uranium. In June, the DoE and the Commission's joint steering committee met to discuss the research & development program between the U.S. and Euratom. The DoE discussed the U.S. Domestic Safeguards Inspector Qualification Program with DG ENER in November 2012.

The Euratom safeguards system is recognised the most developed regional system of safeguards worldwide, so there is a strong interest from emerging countries to seek information on the Commission's safeguards service, as well as on the implementation of IAEA safeguards in the EU. Delegations from China and the Gulf States visited Luxembourg for this reason in 2012.

The Commission's safeguards service also contributed to US-sponsored programmes on the application of the AP in Serbia and in a workshop in Hanoi on the Implementation of Comprehensive Safeguards Agreements and the AP for States starting with nuclear energy. Furthermore, the Commission's safeguards service participated in drafting guidance documentation and providing lectures in the IAEAs programme on the use of Nuclear Material Accountancy and Control for Nuclear Security at facilities.