



# **Report on the Implementation of Euratom Safeguards in 2013**

*April 2014*

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This report provides a summary of the activities carried out by the European Commission in the field of Nuclear Safeguards in 2013.

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

### 1. LEGAL BASIS

Chapter 7 of the Euratom Treaty requires the European 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<sup>1</sup>.

The Community is also party to cooperation agreements with a number of Third States<sup>2</sup>.

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".

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<sup>1</sup> Euratom/non-nuclear weapons States (NNWS)/IAEA, published in the Official Journal of the European Communities as 78/164/Euratom in OJ L51/1 of 22 February 1978 and by the IAEA as "Information Circular" INFCIRC/193 of 14 September 1973. The Additional Protocol was published as 1999/188/Euratom in OJ L67/1 of 13 March 1999 and by the IAEA as INFCIRC/193/Add.8 of 12 January 2005 and Euratom/United Kingdom/IAEA, published only as INFCIRC/263 of 1976 and Euratom/France/IAEA, published only as INFCIRC/290 of 1981.

MS which acceded to the EU after the conclusion of the Safeguards Agreement in the subsequent enlargements of 1981, 1986, 1995, 2004, and 2007 also acceded to the European Atomic Energy Community's Safeguards Agreement by suspending their individual Safeguards Agreement with the IAEA. The Commission thus represents the Community of 25 non-nuclear weapons States (NNWS), and is also party to the agreement with the two nuclear weapon States UK and France. The accession process for Croatia is not yet finalised.

<sup>2</sup> USA, Canada, Japan, Australia, Kazakhstan, Uzbekistan, and Ukraine.

## 2. OPERATIONAL ACTIVITIES

In order 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<sup>3</sup>. This regulation is supplemented by two Commission Recommendations which serve as guidelines<sup>4</sup>.

The second part is based on the activities of the Commission to verify the completeness, correctness and coherence of these nuclear operator accountancy declarations (also referred to as the operator's Nuclear Material Accountancy & Control, NMAC). 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 2013

No case of nuclear material diversion has been found in 2013 and no irregularities have been reported for the EU by the IAEA.

Positive safeguards conclusions could be drawn for the vast majority of installations. However, for a limited number of installations, positive conclusions are dependent on satisfactory explanations to outstanding questions or corrective actions. The outstanding questions relate to one area of 1 reprocessing plant, and 1 storage facility. Corrective actions relate to 1 "small holder" installation. None of these outstanding questions or corrective actions is deemed serious and all are under resolution. At one "small holder" installation, the Physical Inventory Verification (PIV) inspection failed in 2013. The Commission found no indication of the diversion of nuclear material, however the operator's NMAC shortcomings and lack of immediate corrective action may entail sanctions in 2014 unless remedied.

The previously identified issues related to the B30 spent fuel pond in Sellafield, UK, persist and the associated actions are on-going. In 2004, the Commission issued a directive under Article 82 of the Euratom Treaty upon the UK due to the impossibility to perform mandatory safeguards verifications on the nuclear material stored in pond B30 at the Sellafield site. Since then, progress to remedy the situation has been good and the

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<sup>3</sup> Commission Regulation (Euratom) No 302/2005 of 8 February 2005 on the application of Euratom safeguards.

<sup>4</sup> Commission Recommendation of 15 December 2005 on guidelines for the application of Regulation No 302/2005 & Commission Recommendation of 11 February 2009 on the implementation of a nuclear material accountancy and control system by operators of nuclear installations.

execution of the infringement procedure before the Court of Justice was suspended in 2008. Improvements continue, and the 19<sup>th</sup> UK progress report, received by the Commission in December 2013, has confirmed that assessment. If sustained commitment and progress towards nuclear material removal continues in 2014 & 2015, the Commission anticipates beginning the procedure for the withdrawal of the directive as the first nuclear material becomes available for verification.

## 2.2. Inspection Activities

The following tables present the inspection effort of the directorate in 2013. 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	PDI	Nr of Inspections	Joint Inspections
Reprocessing	1013	185	32
Enrichment	928	170	53
Fabrication	770	205	102
Reactors & Storages	665	476	297
Others	455	264	142
<b>Total</b>	<b>3831</b>	<b>1300</b>	<b>626</b>

Table 1: Inspection effort by facility type in 2013

Of the 1300 inspections carried out, 626 were joint inspections together with the IAEA. The difference is in part due to the fact that the IAEA does not perform nuclear safeguards in all installations in the nuclear weapon states, only at a small number of designated installations under voluntary offer from the UK and France. It is also due to the fact that the IAEA has, since 2010, implemented a scheme of short notice random inspections and unannounced inspections in certain types of nuclear installations, reducing thereby its presence during inspections.

Despite their being relatively few reprocessing and enrichment plants in the EU, the high number of inspections and person days in these plants stems in part from the complexity of their industrial processes, and in part from the strategic value of the nuclear material they hold (separated plutonium and enriched uranium, respectively). Nuclear material at these installations is often in a chemical or physical form that requires verification using specialised inspection equipment and techniques.

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Member State	PDI	Nr of Inspections	Joint Inspections
Austria	5	5	1
Belgium	196	131	126
Bulgaria	36	21	14
Czech	86	40	32
Croatia	6	1	0
Cyprus	0	0	0
Denmark	4	4	4
Estonia	2	2	2
Finland	25	17	14
France	1364	327	24
Germany	461	216	165
Greece	4	4	2
Hungary	42	24	17
Ireland	2	2	2
Italy	42	36	15
Latvia	1	1	0
Lithuania	20	6	6
Luxembourg	1	1	0
Malta	0	0	0
Netherlands	191	47	39
Poland	48	10	3
Portugal	4	4	3
Romania	87	28	24
Slovakia	22	18	16
Slovenia	12	12	5
Spain	108	48	39
Sweden	110	56	36
UK	951	238	40
WWWW <sup>5</sup>	1	1	1
<b>Total</b>	<b>3831</b>	<b>1300</b>	<b>626</b>

**Table 2: Inspection effort by MS in 2013**

The higher number of PDI in France, UK and Germany is due to the number and nature of installations in these countries, which currently or historically covers 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 uranium, manufacture fuel, and have a large fleet of power reactors.

Germany also has a large number of power reactors as well as enrichment and fuel manufacturing plants. Belgium, although not as active, has a sizeable number of smaller, closed down, or partly closed

<sup>5</sup> WWW is a material balance area comprising the holders of small amounts of non-strategic nuclear material with limited reporting obligations.

down installations the safeguarding of which is manpower-intensive. Sizeable numbers or complex installations are also found in Romania (on-load power reactors and fuel fabrication), in Sweden & Spain (power reactors and fuel fabrication), and in the Netherlands (uranium enrichment).

The directorate carried out 1300 inspections in 2013. The total number of PDI was 3831 days. In comparison to 2012, the number of PDI dropped slightly, but the number of inspections remained largely unchanged. Since 2009, both the number of PDI and the number of inspections have decreased. By contrast, the amount of nuclear material safeguarded in the EU continues to rise. Please see section 3.4 for a comparison of PDI against nuclear material, budget and number of inspectors.

Year	PDI	Nr of Inspections
2013	3831	1300
2012	4029	1275
2011	3775	1300
2010	4024	1415
2009	4155	1544

**Table 3: Person Days on Inspection over the last 5 years**

### 2.3. Amounts of Material & Number of Installations & Accountancy

As of 31 December 2013, the Commission's safeguards extended to 993 active Material Balance Areas (MBAs) in the EU. Of these, 145 have a frequency of reporting derogation, usually due to their small holdings.

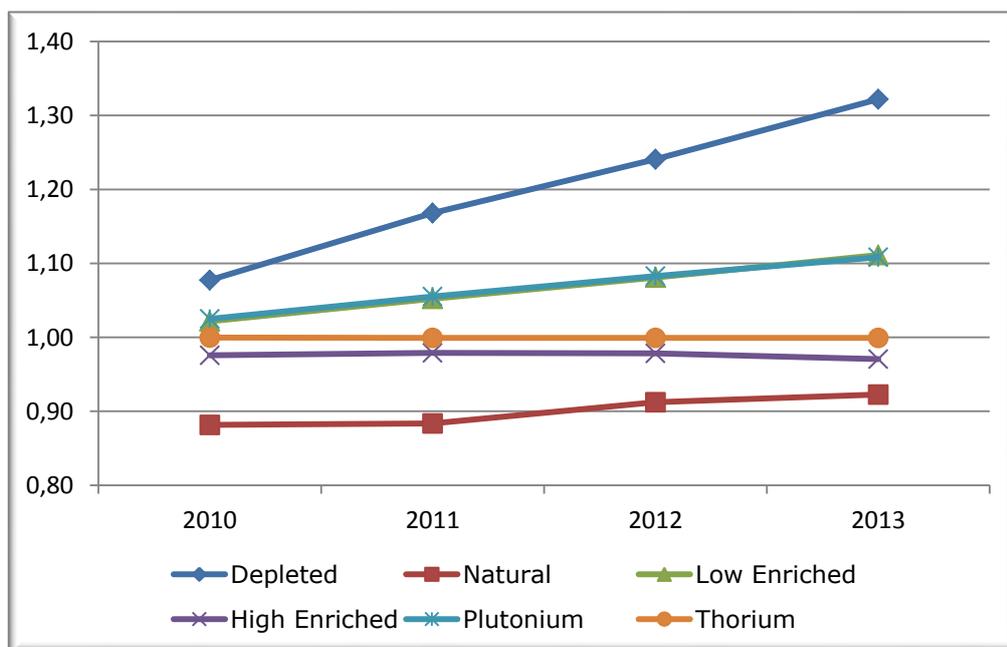
In total, all nuclear installations were holding the following quantities of nuclear material:

Quantity in kg	Type of Nuclear Material
373 384 519	Depleted Uranium (DU)
47 668 445	Natural Uranium (NU)
84 201 617	Low Enriched Uranium (LEU)
9 585	High Enriched Uranium (HEU)
854 911	Plutonium
6 315 391	Thorium

**Table 4: Quantity of nuclear material in the EU in 2013**

Since 2009 the quantities of HEU and Thorium held in the EU are stable while NU, DU, LEU and Plutonium are increasing steadily.

Over the same period Plutonium and LEU stocks have shown an annual increase of around 2.5% whereas the DU has risen between 6.2% and 8.4 % annually as seen in the comparative graph below.

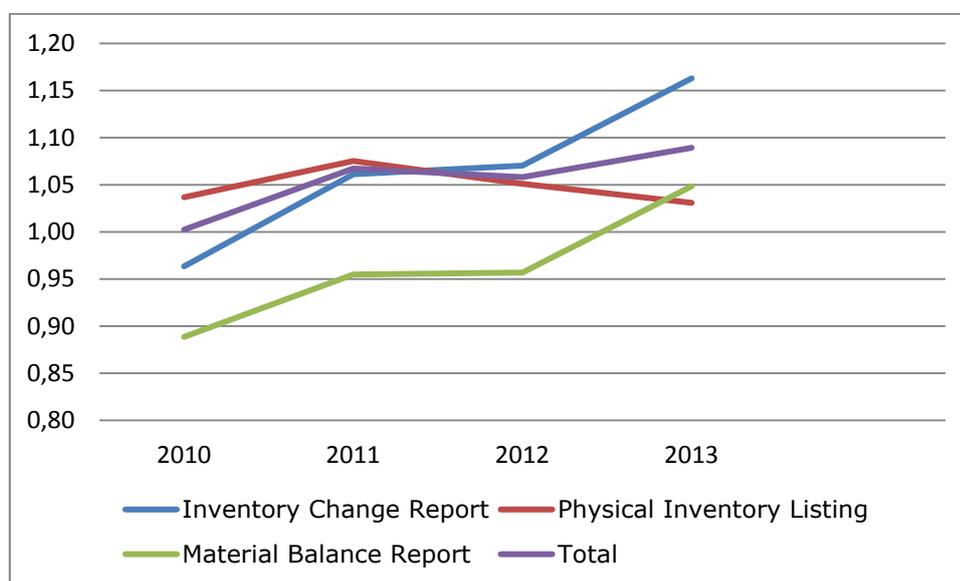


**Figure 1: Comparative graph of nuclear material trends over past 4 years (normalised)**

The Commission's safeguards service maintains the EU database on civil nuclear materials. During 2013, approximately 8,600 accountancy reports (Inventory Change Reports, Material Balance Reports, and Physical Inventory Listings) corresponding to approximately 1.9 million accountancy records were received and evaluated from all EU operators.

Almost 48 % of the reports provided were prepared by operators by using the Commission's ENMAS software. Approximately 86% of ENMAS users use the "Light" version of the software.

In 2013, a 3% increase of accountancy entries (lines) was received compared to the previous year. The trend over the last 4 years indicates an approximate 8% increase since 2010, as can be seen in the comparative graph below.



**Figure 2: Accountancy report trends over the past 4 years (normalised)**

In conformity with the obligations stemming from the Safeguards Agreements with the IAEA, approximately 5,400 accountancy reports, corresponding to approximately 1.6 million accountancy records, were transmitted to the IAEA after being processed in headquarters.

During 2013, approximately 190,000 transactions of nuclear material transfers within the EU were verified against the corresponding declarations (i.e. transit-matching). Unmatched lines that could not be immediately closed led to 103 letters requesting explanations to the operators. As in previous years, Thorium transfers and DU (non-fuel) are followed as far as possible by automatic matching. Manual closing and follow-up for Thorium and DU is only done for specific cases if required.

	Shipments	Receipts	Total
Transfer lines	182 929	196 588	379 517
Lines matched	182 704	196 252	378 956
Lines unmatched	225	336	561

**Table 5: Intra-EU transfer matching in 2013**

#### 2.4. Advance notifications of material transfer

In conformity with Articles 20 and 21 of Regulation 302/2005, 1,759 Advance Notification Communications for Exports and Imports were processed in 2013 resulting in 3052 incoming documents being treated. There were 1014 advance notification for exports and 745 for imports. No significant variation has been observed with respect to the previous year.

## 2.5. Euratom agreements

In 2013, the Commission's safeguards service continued the implementation of the seven Nuclear Cooperation Agreements (NCAs) for the peaceful use of nuclear energy between the European Atomic Energy Community and Third States. Euratom maintains NCAs with the United States, Canada, Australia, Japan, Kazakhstan, Ukraine and Uzbekistan.

During 2013, around 440 files were treated relating to the implementation and administrative arrangements of the seven NCAs. More than 90% of the files concerned the agreements with USA, Canada, and Australia.

The Commission's safeguards service pursued the negotiations for the renewal of the NCA with Canada during 2013, with a view to completion towards the end of 2014.

A new NCA was concluded with South Africa during 2013. The agreement was signed during the Sixth South Africa-Europe Summit held in July. The entry into force requires an exchange of a "note verbale" confirming the mutual acceptance of Administrative Arrangements of the NCA and is expected in 2014.

Discussions on a new NCA with the Republic of South Korea were held with the South Korean government during 2013. The discussions focused on the areas to be covered by the agreement, as well as mutual requirements and obligations. Completion of the agreement is expected towards the end of 2014.

## 2.6. Implementation of the Additional Protocol (AP)

Euratom is a party to the Additional Protocol of the IAEA Safeguards Agreement for the non-nuclear weapon states of the EU (INFCIRC 193/Add.8), as well as to the Additional Protocols of the two nuclear weapon states under their voluntary Safeguards Agreements (INFCIRC/263/Add.1 for the UK and INFCIRC 290/Add.1 for France). For the Non-Nuclear Weapons States (NNWS), the Additional Protocol helps to allow the IAEA to detect undeclared nuclear material and activities in a state. To this end, the IAEA receives annual and quarterly declarations from Euratom regarding nuclear installations and other locations related to the nuclear fuel cycle, as well as information on exports of certain equipment and other information.

For the NNWS, 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. Eleven MS, so called "Side-Letter States"<sup>6</sup> (SLS) have in addition asked the Commission to collect and transmit the corresponding data to the IAEA on their behalf.

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<sup>6</sup> Belgium, Denmark, Germany, Greece, Ireland, Italy, Luxembourg, Malta, Netherlands, Portugal and Spain.

These declarations concern dual-use goods, research & development activities and development plans for the nuclear fuel cycle.

During 2013, 5 new AP sites were registered in the EU and 2 were suppressed. At year end, the total number of AP sites registered was 177, of which 110 were located in SLS and 67 in non-SLS.

The Commission received:

- 381 (328 in 2012 & 330 in 2011) submissions of AP declarations.
- 448 (399 in 2012 & 403 in 2011) declarations were provided to the IAEA for the 27 MS<sup>7</sup> under the regular reporting requirements.<sup>8</sup>

The Commission's Additional Protocol Editor (CAPE) is the software application that has been developed by the Commission specifically for AP reporting. Its use by MS and operators is encouraged, because it simplifies the reporting procedure for all parties. Approximately 47% of AP declarations are made with CAPE while "Protocol Reporter" – a different application - represents 12 % and Excel spreadsheets represents 35%. With the aim of increasing the number of CAPE users during the coming years, the Commission is going to provide specific training and dedicated workshops to interested MS and operators.

At the beginning of 2013, 15 IAEA requests for clarifications were open. During the year 22 new requests were submitted by the IAEA while 26 were answered by correspondence or specific declarations. At year end, 11 requests remained open.

The IAEA has the right to access locations it considers necessary for verifying the absence of undeclared nuclear material and activities. The minimum notification time before such a Complementary Access (CA) is either 24 hours, or 2 hours if announced during an inspection. A total of 9 CAs took place during 2013, all of which were at installations declared as "sites". 5 of the CAs were performed with 24 hour notification and 4 with 2 hour notification. The Commission was present at all CAs. The number of CAs has dropped significantly, from 44 in 2010 to 9 in 2013, but an increased use of the CAs with 2 hour notification has been observed.

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<sup>7</sup> Croatia has not yet acceded to INFCIRC 193.

<sup>8</sup> The difference is due to the fact that the Commission is responsible for the preparation and submission of certain specific provisions of the AP such as Art 2a(v), 2a(vi), and 2a(vii) (e.g. production capacities of mines & concentration plants, source material, and exempted nuclear material).

Year	2 hr CAs	24h CAs	Cas in sites	CAs in other locations	Total nr of CAs	% with Commission presence
2013	4	5	9	0	9	100
2012	0	7	5	2	7	100
2011	0	28	28	0	28	93
2010	4	40	33	11	44	84
2009	2	34	32	4	36	89
2008	2	23	16	9	25	92
2007	1	27	24	4	28	100
2006	7	18	23	2	25	100
2005	19	25	41	3	44	100

**Table 6: Number of CAs over the last 9 years**

### 3. RESOURCES

#### 3.1. Organisation

Unit D.3 of Directorate D was integrated into Directorate E as of January 1, 2013, to complement the existing three operational inspection units (E.2, E.3 & E.4) and logistical support unit (E.1). Unit D.3 retained its title: "Nuclear Accountancy, Methods and Evaluation", but its new denomination became E.5. Its personnel, tasks and responsibilities remain the same. The regrouping of all safeguards activities in one directorate has led to better coordination and strengthened verification activities by the directorate as a whole. Internal management and external communication are also more streamlined and efficient.

#### 3.2. Staff

The staff of Directorate E consists of nuclear safeguards inspectors, technical staff, administrative staff and management. Directorate E comprises 202 persons down from 213 persons in 2012.

163 staff are accredited nuclear safeguards inspectors.

In parallel with 2012, and due to the Commission's known staff reduction targets, the number of posts allocated to safeguards continues to drop. Retirements continue to be a prime reason for departure from the service given the average age of above 50 years of the inspector corps.

An open competition for assistants (function group AST3) in the field of nuclear inspection is being organised in 2014 to constitute a reserve list from which to recruit officials. The publication of the competition took place in April 2014.

### 3.3. Budget

The operational budget for the execution of the Commission's safeguards obligations in 2013 was € 20.550.000, up from € 20.410.000 in 2011. The budget foreseen for 2014 is 20.600.000 €.

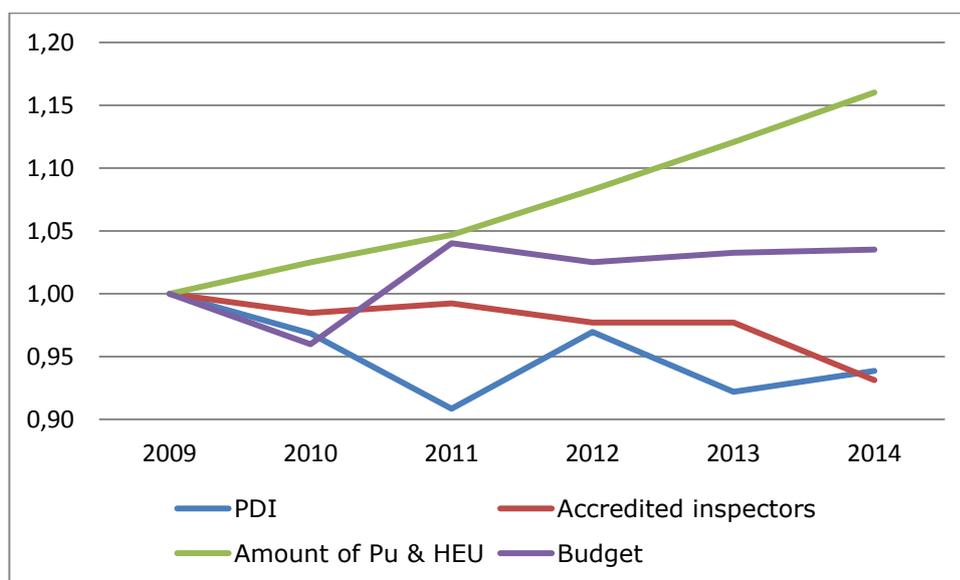
The budget breaks down approximately as follows:

- Services (including maintenance, laboratories & informatics) - 13.240.000 €
- Equipment - 4.680.000 €
- Inspectors' missions -2.600.000 €

A large part of "Services" is related to the running costs of on-site laboratories at the reprocessing plants in La Hague, France and Sellafield, UK for the preparation, analysis and transport of samples. Included in "Services" is also rent for in-field offices, secure cabinets and other services provided by operators as foreseen by Art 6 of Regulation 302/2005.

### 3.4. Evolution and Operational Challenges

The following comparative graph shows the evolution of strategic value nuclear material quantities in the EU (plutonium and highly enriched uranium) against the number of inspectors, person days on inspection and the budget over the last five years and the forecast for 2014.



**Figure 3: Comparative graph of nuclear material against resources (normalised)**

The graph illustrates that safeguards-sensitive nuclear material amounts continue to increase while the resources of the Commission safeguards service are largely static or are decreasing.

One of the major challenges for the Commission over the next few years will be to find the right balance between available resources, in particular personnel, on the one hand and safeguards activities on the other.

A number of industrial operations will generate extra workload, such as the defueling of nuclear power reactors in Germany, Spain, Lithuania and possibly other MS in the future. The production and export of a large number of nuclear fuel elements for the Chinese market over a number of years, the consolidation on the site of Sellafield of nuclear materials currently stored at Dounreay in the UK, in conjunction with the construction of encapsulation plants and final repositories in Finland, Sweden and Spain are all expected to add to the current safeguards activities.

This challenge is being met by performing a multi-step review of safeguards activities in order to continue to assure the EU citizen of a high-performing, credible safeguards scheme that reflects today's proliferation environment and risks. The review comprises a number of complementary components with the aim of introducing greater adaptability to safeguards approaches. MS and the IAEA have been and will continue to be consulted.

#### **4. INTERNAL MANAGEMENT**

##### **4.1. Technical support**

An extensive logistical support is needed to assure the requirements of the in-field inspection activities. This logistical support is largely provided by unit E.1 and includes activities such as the follow up of technical developments, the testing of promising technologies, the purchase of routine equipment, spare parts & consumables, the installation and maintenance of equipment installed on-site, the calibration, provision & maintenance of hand-held equipment, and finally the removal of obsolete equipment. These logistical support activities relate mainly to nuclear measurement techniques, to destructive analysis, to video surveillance, to sealing technology and to IT systems and infrastructure.

Many of these technical and administrative tasks are performed at the Commission's headquarters in Luxembourg. Other tasks, such as the installation or maintenance of unattended measurement and surveillance equipment, are performed on-site at the nuclear installations.

##### *4.1.1. Activities in nuclear facilities to support inspections*

For physical verification activities, inspectors utilise portable measurement equipment, cameras and sealing equipment. About 650 cameras are installed in many nuclear installations in the EU, generating about half a million images per day. In large installations, measurement devices and multiple camera surveillance systems oversee the operator's industrial processes related to movements of nuclear material. Various types of sealing arrangements, placed by the inspectors, ensure that the continuity of knowledge is maintained by the Commission on static inventories of nuclear material.

The directorate has its own IT infrastructure on the larger sites and transmits data to headquarters where possible. In the reprocessing and fuel fabrication plants such as La Hague, Sellafield and Melox, the directorate operates several networks with a multitude of data acquisition computers (DAPC) to acquire data from the installed nuclear measurement devices and cameras. The data is stored locally for subsequent evaluation by inspectors using dedicated data analysis software.

### *4.1.2. Remote Data Transmission*

The automated electronic transfer of safeguards data from nuclear installations to the Commission's headquarters is an important step towards more efficient working methods. The Commission recognized the significance of remote data transfer early, and has taken steps in that direction since 2007.

In 2013, solid progress was marked by agreements being concluded with authorities and operators from Sweden, Finland and Germany for the automatic and secure remote transfer of safeguards data to Luxembourg.

To this end, the directorate has performed risk assessments of and established security plans for the IT security of the computer systems and networks which transfer data, both on-site and in headquarters. In addition, the directorate has begun complementing the data transmission infrastructure with quality control checks that verify the availability of networks and IT systems as well as the completeness and the quality of the data received.

### *4.1.3. Technical developments for specific facilities and facility types*

Encapsulation plants and long-term geological repositories for spent fuel will become operational around 2020 (at first in Finland and Sweden). This new type of facility presents significant safeguards challenges at various levels. In addition to the definition of inspection approaches, specialized equipment will have to be developed. The directorate is collaborating with the Commission's Joint Research Centre (JRC), authorities and operators in Finland & Sweden, as well as other specialised laboratories around the world. During 2013, successful tests have been carried out in Finland on a tomography tool for the verification of spent fuel. In Sweden, a number of new technologies are also being investigated for spent fuel verification.

Gas Centrifuge Enrichment Plants (GCEPs) present specific challenges for nuclear safeguards due to their commercial and proliferation sensitivity. In an effort to support the development of better inspection equipment for GCEPs, during the year the Commission and the US Department of Energy concluded a successful test campaign at the URENCO facility in Almelo, the Netherlands, on new UF<sub>6</sub> cylinder verification systems.

In 2013, a solution was developed to address a previously identified weakness in the Server Digital Image Surveillance (SDIS) systems. All

such systems installed in Germany, Belgium and Slovenia were upgraded. In the first half of 2014 the remaining SDIS systems will also be upgraded.

#### *4.1.4. Technical developments for generic equipment*

The Next Generation Surveillance System (NGSS) is intended to replace the aging Digital Camera Module 14 (DCM14) systems throughout the EU. A multi-annual framework contract was signed in 2012 and the first deliveries of the NGSS systems were received in 2013. Due to the sophisticated built-in encryption and improved tamper-proof housings, the NGSS can be used jointly with the IAEA and allow each organisation to draw its independent safeguards conclusions.

With the support of the JRC, the infrastructure of the directorate's Seal Verification Laboratory was improved during 2013. The first of two new robotized seal verification machines was installed and has increased efficiency.

### **4.2. IT Support**

The obligations placed on the Commission's safeguards service by the Euratom Treaty, Safeguards Agreements with the IAEA, and agreements with third States, require the Commission to receive, treat and transmit a very large amount of safeguards related information of a disparate nature on a continuous basis. For that reason the directorate relies on a number of specific IT tools in order to discharge its tasks effectively. These IT tools are maintained and developed by the Shared Resources Directorate (SRD) of the Directorates-General for Energy and Transport.

2013 was a pivotal year for IT support. A review was ordered by the Director-General on the IT processes and systems of the safeguards service which was subsequently carried out by the Shared Internal Audit Capability (SIAC). The report, delivered in the second quarter of 2013, made a number of suggestions that were binding on both the safeguards service and SRD with the objective of rationalising the scope of IT development.

Amongst the suggestions by SIAC was prioritising the release of the most essential new applications under development: MEDOR (Metadata and Document Repository), IMIS (Inspection Management Integrated System) and VARO (Verification of Accountancy Records of Operators). In addition, SRD was asked to focus future development only on core functionality of these systems and suspend development of lesser prioritized projects such as I-Files and SIT-ES.

Following the recommendations, MEDOR and IMIS were both brought into operation successfully during 2013. Further modules of VARO were also released. ANIA (Advanced Notification and International Agreements) was also re-released incorporating major developments. Both the safeguards service and SRD are proceeding with the development and deployment plan as per the SIAC report.

#### **4.3. Training**

Nuclear safeguards inspectors are required to be adequately trained and technically skilled in performing their duties.

The directorate's safeguards training team works closely with the inspection units and partner organisations (JRC and IAEA) to ensure that training needs are properly analysed, training processes developed and implemented in the most effective and efficient way possible.

During 2013, 93 training sessions were provided to a total of 735 participants. The number of participants includes the directorate's staff as well as a number of external attendees from MS authorities, operators and the IAEA. In comparison to the previous year, 69 courses were held in 2012, with a total of 530 participants. The increase stems partly from the number of newly recruited inspectors arriving during 2013 and the compulsory training courses they are expected to follow, and partly from the launch of a number of new IT applications.

Around 53 internal lecturers were involved in delivering the training sessions above. External trainers, at times instructors or facilitators from partner organisations (JRC, IAEA) were brought in as necessary.

The Commission and the IAEA exchanged a draft strategy for developing and conducting joint training activities to meet the needs of inspectors from both organisation during 2013. It is considered as a good basis for developing future joint training activities.

#### **4.4. Integrated Management System**

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 Directorate-General 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.

A solid basis for the system has been set up including: the conceptualization of the system, the mapping of the main processes which run in the directorate, and the necessary working modalities and structures involving all units. The documentation of selected processes as well as selected inspection schemes has started and is well advanced.

The involvement of all staff in the documentation and implementation of the system is crucial, and as a consequence significant effort is being put in communication and training.

Next steps will include the continuation of process & inspection scheme documentation, the launch of the measurements management system, and the introduction of systematic continuous improvements tools.

#### **4.5. Health & Safety of Nuclear Inspectors**

Staff working in the laboratories and workshops at headquarters are exposed to chemical and physical agents and there is danger related to the use of high voltage electrical equipment and cryogenic liquids. The directorate continued implementing Commission Decision C(2006)1623 in 2013, by reviewing the health & safety conditions of staff and by further improving the existing in-house safety culture.

Actions taken include:

- The improvement of the ergonomics and safety conditions on the work floor of the Non-Destructive Assay lab, the Seals Verification lab and the IT lab and its temporary storage.
- The procurement of personal protection equipment for safe electrical work.
- The reorganisation of the loading bay.
- A review of the risk assessment for all the laboratories in headquarters. Several actions were proposed to improve working conditions.
- The organisation of specific training courses for the operational implementation of the ALARA (As Low As Reasonably Achievable) radiation dose concept.
- The organisation of training and accreditation of staff installing and maintaining electrical and high voltage equipment.

The directorate's existing risk register also advocates that risk assessments are performed in-field by type of nuclear installation (e.g. fabrication plants, enrichment plants & reactors) and should be directly linked to the inspectors' activities. IMS's definition of safeguards activities offers a good basis for such a review. The assessment of health & safety risks specific to nuclear installations is expected to be launched in 2014.

### **5. EXTERNAL RELATIONS**

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

#### **5.1. Member States**

Close contacts were maintained with EU Member States throughout the year by means of a number of bilateral meetings. In October 2013, a MS meeting for representatives of state authorities on the implementation of Euratom safeguards was held in Luxembourg. Safeguards approaches, their implementation and related potential difficulties were discussed. MS were informed of the on-going, multi-step review of safeguards activities to align the Commission's safeguards service with future operational challenges (see section 3.4). The meeting confirmed a broad support for the Commission's safeguards policies and direction. The next meeting for all MS is scheduled for 2015.

The Commission's safeguards service also holds regular bilateral meetings with MS on issues relating to their facilities. In 2013, the directorate held bilateral meetings with Belgium, Germany, Latvia, the Netherlands, Finland, France, Romania, Sweden, Spain and the United Kingdom.

Support to nuclear operators and MS authorities was offered on a number of occasions during the year, by means of several training courses, including a course on Euratom Safeguards for national authorities and operators held regularly in Luxembourg, and seminars covering an array of legal and implementation aspects.

Meetings and exchanges with the Croatian state authorities (SONS) were held during 2013 in preparation of their accession to the EU and later to INFCIRC 193. The consolidation of their small holders, 26 different locations, into a single national MBA was agreed. Extensive assistance has been provided to ensure reporting compliance with Commission Regulation 302/2005.

## **5.2. International Atomic Energy Agency (IAEA)**

The IAEA's verification activities in the EU rely on the Commission's safeguards service and apply to all nuclear material in the NNWS of the EU. They also apply to a small number of specifically selected installations under voluntary offer in the Nuclear Weapon States (NWS) France and the UK. The Commission's and the IAEA's activities strongly complement each other. This requires close day-to-day cooperation both for defining safeguards approaches and for their in-field implementation.

Inspections in the NNWS and in certain installations in France and the UK are carried out jointly by Commission and IAEA inspectors. For the efficient use of staff, such inspections are carried out applying the principles of One-Job-One-Person (OJOP) and joint-teams.

The Safeguards Agreement between the NNWS, Euratom and the IAEA provides for a Liaison Committee to review the performance of and to agree on arrangements for the implementation of common safeguards activities in the EU<sup>9</sup>. The Committee meets annually at a higher level (HLLC) and more frequently at a lower level (LLLC). Representatives of the EU MS and the European External Action Service (EEAS) are invited to participate in all HLLC meetings.

### *5.2.1. HLLC*

The High Level Liaison Committee met in Vienna on 2 July 2013.

The meeting in 2013 concentrated its efforts on identifying further possibilities for efficiency gains since both organizations continue to face

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<sup>9</sup> The two separate Safeguards Agreements between Euratom, the IAEA and France and the UK, respectively have similar provisions on Liaison Committees. They are implemented respectively through regular tri-lateral meetings.

increasing resource constraints. Enhanced cooperation should allow maintaining the effectiveness of safeguards in the EU despite decreasing resources. In 2012, the HLLC initiated a review of the implementation of all arrangements of the New Partnership Approach (NPA) signed in 1992. One tangible result of this review has been a more efficient use of the OJOP principle during PIVs at GCEPs, which has resulted in the reduction of the IAEA inspection effort. The representatives of the EEAS and MS fully support efforts for closer cooperation.

### 5.2.2. LLLC

The Lower Level Liaison Committee (LLLC) met for its 60<sup>th</sup> meeting on 15 May in Luxembourg and for its 61<sup>st</sup> meeting on 5 December 2013 in Vienna.

The Commission and IAEA finalized the draft Subsidiary Arrangements (General Part) under the multi-lateral (NNWS) Safeguards Agreement. The document will amend the Subsidiary Arrangements (General Part) to INFCIRC/193, which entered into force on 1 June 1978, and will specify how the measures in INFCIRC/193/Add.8 are to be applied. The formal entry into force was proposed for 1 March 2014.

Spent fuel cask loading activities for the long-term dry storage of spent fuel, (in Germany for example), will sharply increase in the coming years. The principles for a new approach for verifying the spent fuel assemblies in reactor ponds were agreed. The approach is expected to significantly decrease the Commission's and IAEA's inspection effort related to cask loading activities.

### 5.2.3. LLLC Working Groups

There are 3 LLLC Working Groups (WG) dealing with: Inspection Planning, Logistical & Technical Support and Safeguards Implementation which includes accounting & reporting issues.

As part of the continuous process of coordinating common inspection activities the WG on Inspection Planning met in March, June, September and December 2013.

The WG on Logistical & Technical Support prepared the joint in-field use of the NGSS which will gradually replace the current DCM-14 based surveillance systems. Further, a written agreement was concluded between the Commission and the IAEA on detailed arrangements for the joint development of the CRISP software package. This common software project provides a common basis for the evaluation of data from various types of instruments and will also be used by the IAEA outside the EU. Furthermore, following the HLLC requests, the WG continued to review the arrangements between both organizations related to shared analytical capabilities, sharing analysis results and environmental sampling.

The WG on Safeguards Implementation revised a number of facility type partnership approach papers for approval by the LLLC. The WG continued

to put large effort on the resolution of issues related to the implementation of the Additional Protocol and in particular related to site declarations for small installations.

With regards to accounting & reporting issues, the participants met twice in 2013. Significant progress was made with regards to transit-matching; an agreement was reached on the format to be used for mutually provided information. Discussion also focussed on anticipating changes that can be expected as the IAEA's new accountancy system becomes operational in 2015.

### *5.2.4. SIR 2012*

The IAEA issues an annual Safeguards Implementation Report (SIR) which summarizes the findings and conclusions of the IAEA's safeguards. The report is issued to IAEA Member States authorities in May/June each year and covers safeguards implementation of the preceding year.

In the SIR for 2012 the IAEA did not report on any specific issues related to any of the EU MS; conclusions for the EU were satisfactory.

### *5.2.5. Joint approaches and developments*

The IAEA concept of Integrated Safeguards (IS) has been successfully introduced in all NNWS with significant nuclear activities in the EU since January 2010. IS is an optimised combination of safeguards measures which allows the IAEA to relax certain inspection criteria. The IAEA concept of IS has become an integral part of the common system of Euratom/IAEA inspections in all NNWS. Inspections are carried out based on Partnership Approaches (PA) agreed between the Commission and the IAEA. The IAEA inspection approach includes the use of Random Interim Inspections with short notification (RII) (now normally announced 48 hours in advance to both, Commission and facility operator) or Unannounced Inspections (UI).

UI are restricted to a small number of installations in the NNWS of the EU where there is no possibility to introduce alternative inspection regimes (e.g., RII) or to use technical measures in order to allow the IAEA to fulfil its goals. A practical consequence for the operator and the state is that Commission inspectors cannot participate in all the IAEA UI. In the spirit of coordinated inspection activities of both the IAEA and the Commission it is necessary to keep the number of UI requested by the IAEA as low as possible, and that the IAEA provides detailed information on their inspection activities similar to the information which the DG ENER provides to the IAEA for all inspections where the IAEA did not participate.

The IAEA has the intention to further develop their State-Level Concept (SLC) by taking into account all information available on a state and considering a number of state-specific factors, amongst them the effectiveness of state and regional systems of accountancy and control when determining their verification activities. This may lead to a differentiation of IAEA activities for the same type of installation between

EU MS in the future, and/or further increase of the element of unpredictability in IAEA approaches. The Commission strongly supports the principles of SLCs and its introduction worldwide. With respect to SLC's further introduction in the EU, it is expected that this will be a step-wise process. The Commission has provided specific comments to the IAEA related to the implementation of the SLC in the EU and developments at the IAEA will be carefully followed.

The Commission and the IAEA agreed to organise tri-lateral meetings with MS during the IAEA General Conference as an efficient means to have contacts with many member states. The Commission contacted all EU MS on their needs and organised tri-lateral meetings with 9 MS in September 2013. This included a meeting with Croatia with a view of Croatia's accession to the common Safeguards Agreement between the NNWS, Euratom and the IAEA.

The Commission participated in the IAEA's Additional Protocol Training Exercise in Vienna, as well as in the preparation of the IAEA's document "In-Field Activities' Safeguards Implementation Practices Guide".

### **5.3. ESARDA, INMM and ENEF**

The Commission's safeguards service plays an active role in the framework of the European Safeguards Research and Development Association (ESARDA). It has an observer status in the ESARDA Steering Committee and participates regularly in the meetings of the Steering Committee and Executive Board.

The Commission's safeguards service is also involved in the work of all the Working Groups (WGs) and committees of ESARDA.

In March 2013, a joint ESARDA workshop on "Reference material needs and evaluation of measurement uncertainties in Destructive (DA) and Non Destructive Analysis (NDA)" took place in Luxembourg. The workshop was jointly organised by three ESARDA Working Groups (DA/NDA/NA&NT) and ran for three days.

In May 2013, the Commission participated in ESARDA's annual symposium in Bruges.

Through the Editorial Committee, the Commission contributes regularly to the preparation and issuing of the ESARDA Bulletin.

Through the JRC, the Commission also provides secretarial and organizational support for ESARDA.

Other outreach activities of Directorate E 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".

#### **5.4. Other Commission services and institutions**

The Commission's safeguards service cooperates with other services and other EU institutions on a frequent basis: the directorate maintains active cooperation with the Commission's Joint Research Centre (JRC), focussing on the development of technological solutions that facilitate the implementation of safeguards, the operation of the on-site laboratories in La Hague and Sellafield, and on training of inspectors. Equally, the Commission's safeguards service attends the Atomic Questions Group of the European Council when so needed and maintains good contacts with the EEAS, in particular the EU Delegation to the International Organisations in Vienna.

#### **5.5. Third countries and organisations**

The Commission's safeguards service maintains relations with Third States with whom agreements have been signed, and with other international safeguards organisations.

During 2013, the Commission's safeguards service met with delegations from the United States, Canada, Japan, South Korea, South Africa, Montenegro, Taiwan, and the Argentine-Brazilian Agency for Accounting and Control of Nuclear Material (ABACC).