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COMMISSION STAFF WORKING DOCUMENT

on the application of Article 35 of the Euratom Treaty

Verification of the operation and efficiency of facilities for continuous monitoring of the levels of radioactivity in the air, water and soil

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1. INTRODUCTION

Chapter 3, Health and Safety, of Title II of the Euratom Treaty is concerned on the one hand with the establishment of Basic Safety Standards for the protection of the health of workers and members of the public (Articles 30 – 33) and on the other hand with levels of radioactivity in air, water and soil (Articles 35 and 36). The main purpose of controlling these levels is the protection of the health of members of the public.

Article 35 of the Euratom Treaty stipulates:

"Each Member State shall establish the facilities necessary to carry out continuous monitoring of the level of radioactivity in the air, water and soil and to ensure compliance with the basic standards.

The Commission shall have the right of access to such facilities; it may verify their operation and efficiency."

Article 35, second paragraph, confers a right of access to the Commission for the purpose of verification of the facilities for monitoring the levels of radioactivity.

Article 36 of the Euratom Treaty stipulates:

"The appropriate authorities shall periodically communicate information on the checks referred to in Article 35 to the Commission so that it is kept informed of the level of radioactivity to which the public is exposed. "

With regard to levels of radioactivity in the environment, the main tasks of the Commission over five decades have concerned the application of Article 36 (collection of data on levels of radioactivity to which the public is exposed, as transmitted by Member States on the basis of measurement facilities established by them according to Article 35, first paragraph) and publication of these data. This work was focused on the publication of those data on levels of radioactivity which are relevant to the assessment of the radiation exposure of the population as a whole, so as to allow comparison of levels of radioactivity in different Member States. The demand for data quality and the method for reporting are laid down in a Commission Recommendation[1]. A recommendation on the monitoring and reporting of discharges from nuclear power reactors and reprocessing plants was adopted on 18 December 2003[2].

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[1] Commission Recommendation 2000/473/Euratom of 8 June 2000 on the application of Article 36 of the Euratom Treaty concerning the monitoring of the levels of radioactivity in the environment for the purpose of assessing the exposure of the population as a whole – OJ L191 of 27/07/2000, p. 37

[2] Commission Recommendation 2004/2/Euratom of 18 December 2003 on standardised information on radioactive airborne and liquid discharges from nuclear power reactors and reprocessing plants in normal operation – OJ L2 of 06/01/2004, p. 36

At present, Member States can import and manage their own dataset in the Commission's database (REMdb[3]), which is accessible by the public. This database, as well as the resulting annual monitoring reports and an electronic platform allowing the exchange of data from automatic radiation monitoring systems set up in the Member States, is managed in a successful co-operation between DG ENER and JRC-ITU.

Following a review of its activities in the whole area of radiation protection, the Commission announced to the Council in 1986 – after the Chernobyl accident – its intention to exercise more systematically its right of verification under Article 35. The European Parliament adopted several resolutions with the same aim. Until 1989, verifications were performed sporadically. In December 1989 the Commission decided that the number of verifications should be increased.

Following the ruling of the Court of Justice of December 2002, stating that it is not appropriate to draw an artificial distinction between the protection of the health of the general public and the safety of sources of ionizing radiation, and the decision of the Commission to consider nuclear safety as a major priority, it became obvious that Article 35 verifications would become a priority area. Since 2004 these verifications have become systematic and priority has been given to the verification of the most sensitive installations.

Verifications were carried out along the lines of the Commission Communication published on 4 July 2006[4]. Before 2006, verifications were carried out along the lines ofprotocols that had been agreed upon individually with all 15 Member States between 1990 and 1993. The protocols and the Communication foresee the verification of both environmental monitoring facilities in sensu stricto and the monitoring of discharges necessary for the assessment of their impact on the public exposed.

The Communication foresees the verification of both, monitoring facilities in *sensu stricto* and the monitoring of discharges necessary for the assessment of their impact on the public exposed. Verifications may concern the "on-site" and "off site" radiological environmental monitoring of a specific site and/or the monitoring of the national territory of the Member State as a whole or in part. In order to be able to verify the monitoring of discharges of an installation at the point where they leave control by the operator verifications include on-site discharge monitoring facilities of an installation.

Verifications 1990 – 2007:

Between 1990 and 2003, 23 verifications were carried out. With few exceptions, the verification programme was established so as to provide an overview of the situation for a representative set of nuclear fuel cycle installations and for the facilities monitoring the levels of radioactivity in all Member States.

From 2004 to 2007, 25 verifications have been conducted. Priority was given to the most sensitive installations and to the new Member States. By the end of 2007, verifications had been conducted in all Member States. The Member States and

[3] http://rem.jrc.ec.europa.eu/RemWeb/activities/Remdb.aspx

[4] Communication from the Commission: Verifications of the levels of radioactivity monitoring facilities under the terms of Article 35 of the Euratom Treaty – Practical arrangements for the conduct of verification visits in Member States; OJ C155 of 04/07/2006, p. 2

respective nuclear sites visited in the framework of Article 35 are described in a first Commission Communication[5].

2. VERIFICATIONS 2008-2012

This Communication is the second report on the application of Article 35 and covers the period 2008 to 2012.

2.1. Verification programmes and objectives

The overall objective of all past and present Article 35 verifications is to verify if facilities for continuous monitoring are in place and operable and if monitoring is performed efficiently.

While under the terms of Article 35 the Commission is granted access to the facilities, for a factual verification of their operation and efficiency, the verifications actually start with an audit of the monitoring and inspection activities by the relevant national authorities and of the underlying national legal framework. All verifications in MS comprised an audit of the monitoring and inspection activities by the site operators and the relevant national authorities. Verifications were representative of the overall arrangements and not necessarily exhaustive.

The overall goal of the yearly verification programmes was to:

- cover all major installations of the nuclear fuel cycle with an acceptable frequency and yield a representative overview of the situation with regard to other types of installations;
- allow the situation to be monitored with regard to industries discharging natural radioactivity (NORM) and with regard to nuclear departments of hospitals and nuclear research centres;
- allow a representative view to be obtained of the arrangements for radioactivity monitoring in regions remote from installations discharging radioactivity;
- audit the monitoring and inspection activities of the Member States on a regular basis.

A scheme of some five to eight verifications per year was put in place to guarantee that around one verification or audit was conducted in each Member State every five years. This allowed a credible and representative verification programme to be established including the most representative installations.

From 2008 onwards additional priority was set to the verification of the environmental radiological monitoring of sites of current and former uranium mining and milling activities as well as to the environmental radiological monitoring at nuclear departments of large hospitals in several Member States.

In all cases the verification missions were concluded by the official transmission of the main findings / conclusions and the technical report.

For all verifications carried out since 1999 both, the technical report and the main findings/conclusions, as well as official comments supplied by the Member State visited are/ will be put on the EUROPA web-site:

[5] Communication from the Commission: Application of Article 35 of the Euratom Treaty - Verification of the operation and efficiency of facilities for continuous monitoring of the level of radioactivity in the air, water and soil; Report, 1990-2007; COM(2007)847
http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2007:0847:FIN:EN:PDF

http://ec.europa.eu/energy/nuclear/radiation_protection/article35/article_35_en.htm

2.2. Number of visits and sites visited

The Member States and respective nuclear sites visited from January 2008 to 31 December 2012 in the framework of Article 35 are listed in the Annex, table 1.

In this five years period, two visits were made to reprocessing plants (UK); seven to nuclear power plants (NL, ES, SE, DE, SK, IT and BE); one to an enrichment plant (FR); one to a fuel fabrication plant (RO); ten to uranium mining and milling sites (RO twice, FR, CZ, PT, SI, BG twice, PL, and ES); one to a research reactor (PL); one to a nuclear research centre (FR); two to nuclear waste disposal sites (UK and EE); one to a spent nuclear fuel storage site (SE); three to NORM industries (ES, BG and GR);nine to the nuclear medical departments of hospitals (DK, CY, MT, AT, HU, EE LT, DE and GR) and three to radioisotope production facilities (BE; HU; DE),

A few visits were made to sites about which Members of the European Parliament had questions.

In all verification missions parts of the national monitoring systems of the visited MS were included.

Re-verification visits were conducted specifically to satisfy the Commission that the recommendations that were made during a previous mission had been given due attention:

- A reprocessing site visited in 2004 was the subject of follow-up visits in 2010 and 2011.
- A visit with regard to former uranium mining and milling sites in 2006 in one Member State was followed up in 2010.
- A visit to a uranium production site in 2008 was followed-up in 2012.
- A first visit with regard to regional environmental monitoring arrangements in one Member State in 2006 was followed up in 2010 and 2011 in other regions of this Member State.

Uncontrolled releases of radioiodine led to verifications in 2009 and 2012 in two Member States.

2.3. Findings and results

All verifications showed that all Member States fullfil their Article 35 obligations even though a number of improvements have been requested by the Commission.

In a number of cases observations had to be issued related to a lack of overall quality assurance of the facilities and laboratories and to a need for strengthening the supervisory function of the competent authority. It was often found that improvements needed to be made in record-keeping so as to facilitate both internal quality audits and verification by national or Community officials. Sampling programmes were not always updated regularly or the practical implementation of those programmes did not fully abide by the regulatory requirements.

Specific technical recommendations have been made on many occasions. In general, subsequent feedback from the national authorities confirmed that shortcomings had been rectified. Non-technical recommendations, e.g. management recommendations

or recommendations to strengthen regulatory supervision, are less tangible and hence more difficult to follow up.

The verification of past and present uranium mining and milling issues demonstrated that depending on the mining technologies used and on the geological situation in the concerned Member States, the environmental radiological monitoring has to be adapted. Special attention has to be given to groundwater and radon in air monitoring. Site specific knowledge concerning the remediation of contaminated areas has to be passed on to future generations also because long term effects such as surface cracking may lead to enhanced levels of radioactivity and thus need appropriate measures including monitoring. Long term environmental monitoring is an essential task in long term stewardship. Knowledge and know-how gained in certain Member States using specific mining technologies in combination with a special geological condition should be shared between Member States facing similar issues.

Verifications in nuclear departments of hospitals demonstrated that approaches to manage and monitor liquid releases differ from Member State to Member State (ie.: decay facilities; use of model calculations for determination of releases; etc.). A study initiated by the EC ('Mediwaste') came to similar findings. The Commission recommends that MS using model calculations should validate these models through monitoring and measurements.

In the specific case of the verification of the Palomares site in Spain (plutonium contaminated area further to an accident in 1966 involving United States military aircraft, one carrying nuclear bombs, the Commission confirmed that the monitoring performed by the Member State is appropriate and efficient.

In some other specific cases, the findings of Art. 35 verifications strengthened the position of national competent authorities in these Member States, to demonstrate that the radiological environmental monitoring of the underlying radiological issues had been well managed (e.g. nuclear power plant incident, 2008; contaminated phosphogypsum waste pile, 2009; former uranium mines, 2010; and former in situ uranium leaching fields, 2010).

In some cases, the observations of the verification team permitted the authorities to strengthen their own verification procedures.

Pre-announced re-verifications foster positive changes of environmental radioactivity monitoring in the concerned Member States. Re-verifications in some Member States demonstrated that recommendations issued by the Commission during previous verifications have been efficiently implemented. Some Member States invited the Commission to conduct a re-verification in order to help them to address specific monitoring issues on their territory.

Concerning the situation in analytical laboratories, the Commission stresses that purchasing new equipment is only one element for operation. Without enough skilled personnel, the best equipment is useless. The Commission recommends that Member State authorities analyse this issue and consider allocation of money to both, personnel and equipment.

Further to the nuclear accident in Fukushima in 2011 the verification teams included questions concerning specific radioiodine monitoring issues. It was found that the systems applied in a number of Members States were sensitive enough to detect the

small effects of the accident on their territory; however, the methods applied often do not take into account all iodine forms (aerosol, elemental, organic).

Finally, the verifications are an important means to ensure adequate implementation of the Commission Recommendation on the application of Article 36 of the Euratom Treaty and to discuss on a bilateral basis whether the networks established to monitor the levels of radioactivity are adequate (covering the national territory and providing representative data on actual levels of radioactivity).

3. CONCLUSIONS

3.1. After almost 25 years of verifications, the Commission gained a good overview of the situation in the Member States.

The Commission fully discharged its responsibilities under Article 35 of the Euratom Treaty, and thus ensured, in conjunction with the legislative requirements and the implementation of Article 36 of the Euratom Treaty, that levels of radioactivity in the air, water and soil were adequately monitored and controlled.

The experience gained so far has proven that the verifications yield a significant added value, both for the Commission and for Member States.

For the Commission, they allowed in a number of cases sensitive issues to be assessed independently. The verifications also permitted a broad overview of the different national approaches and the way these are implemented and encouraged a common approach for improved monitoring.

For Member States, the Commission verifications allowed an independent validation of their approaches, so as to provide reassurance both to their own population and to neighbouring Member States. Overall, the Commission verifications certainly enhanced the status of radioactivity monitoring programmes.

3.2. The objective of Chapter III of the Euratom Treaty to contribute to the protection of workers and of members of the public is achieved in all MS's.

All Article 35 verifications conducted from 2008 to 2012 showed that the concerned Member States fulfil their Article 35 obligations and have established sound and effective monitoring systems, even though in a number of cases there is room for improvement.

3.3. The experience of almost 25 years of Article 35 verifications in Europe allows to reduce the number of verifications from 2013 onwards.

The expertise gained on the overall situation of radiological monitoring according to Art. 35 in the EU Member States permits reducing Article 35 verification activities from 2013 onwards to a minimum of three verifications per year in order to maintain its "savoir faire" in this area.

Arrangements will still be made to respond to ad-hoc requests or make use of the Commission's right of access in special circumstances.

ANNEX

VERIFICATIONS IN TERMS OF ARTICLE 35 EURATOM TREATY

Verifications 2008 – 2012

The list of verifications carried out from 2008 to date is given in table 1. Figure 1 provides a histogram of the number of verifications carried out each year since 1990.

The installations included in the verification activities were reprocessing plants, waste disposal sites, nuclear power plants, nuclear research institutes and reactors, NORM (Naturally Occurring Radioactive Material) related installations, and nuclear fuel production sites. In the last years, focus was put on past and present uranium mining and milling activities. The departments of nuclear medicine of several hospitals and their monitoring approach were verified in several Member States. In most Member States parts of the national monitoring systems of the levels of radioactivity on their territory were verified in the context of the visit.

The verifications carried out so far were planned essentially with the objective of obtaining a representative view of the monitoring approach adopted in Member States. A few verifications were carried out in response to requests from Member States or were triggered by concerns expressed about certain installations.

The distribution among Member States is shown in figure 2.

Table 1: Overview of verification missions 2008 to 2012

	COUNTRY	INSTALLATION	DATE
1.	The Netherlands	NPP-Borssele; National (Nat'l) monitoring system of levels of radioactivity	March 2008
2.	Denmark	Nat'l monitoring system of levels of radioactivity; hospital (nuclear department[nd])	April 2008
3.	Spain	NPP – Ascó (further to a nuclear event)	April 2008
4.	France	Tricastin site – uranium enrichment plant EURODIF; Nat'l monitoring system of levels of radioactivity	May 2008
5.	Cyprus	Re-verification of the nat'l monitoring system of levels of radioactivity; hospital (nd)	June 2008
6.	Romania	Uranium mining and milling; Nat'l monitoring system of levels of radioactivity	August 2008
7.	Malta	Re-verification of the nat'l monitoring system of levels of radioactivity; hospital (nd)	September 2008
8.	Belgium	IRE production site; Nat'l monitoring system of levels of radioactivity	January 2009
9.	Sweden	NPP Forsmark; Nat'l monitoring system of levels of radioactivity	February 2009
10.	Germany	NPP Isar-2; ; Nat'l monitoring system of levels of radioactivity	April 2009
11.	Slovakia	NPP Jaslovske Bohunice; Nat'l monitoring system of levels of radioactivity	June 2009
12.	Poland	Research reactor; Nat'l monitoring system of levels of radioactivity in central Poland	July 2009
13.	Austria	Nat'l monitoring system of levels of radioactivity; hospital (nd)	July 2009
14.	Bulgaria	Uranium mining and milling; Nat'l monitoring system of levels of radioactivity in central Bulgaria	August 2009
15.	Spain	Monitoring of levels of radioactivity at the Huelva site;	September2009
16.	Spain	Monitoring of levels of radioactivity at the Palomares site;	April 2010
17.	Italy	Re-verification of the nat'l	May2010

		monitoring system of levels of radioactivity in southern Italy	
18.	Hungary	Verification of the nat'l monitoring system of levels of radioactivity; hospital (nd)	May 2010
19.	Estonia	Nat'l monitoring system of levels of radioactivity; hospital (nd)	June 2010
20.	United Kingdom	"On-site" environmental radioactivity monitoring of the Sellafield site	August 2010
21.	France	Uranium mining and milling; Nat'l monitoring system of levels of radioactivity in the Limousin region	September 2010
22.	Czech Republic	Uranium mining and milling; Nat'l monitoring system of levels of radioactivity in the north and central regions	October 2010
23.	Portugal	Re-verification of Uranium mining and milling; Nat'l monitoring system of levels of radioactivity	April 2011
24.	Slovenia	Uranium mining and milling; Nat'l monitoring system of levels of radioactivity	June 2011
25.	France	Monitoring system of levels of radioactivity at and around the CEA site of Cadarache; nat'l monitoring system of levels of radioactivity	June 2011
26.	Bulgaria	Uranium mining and milling; Nat'l monitoring system of levels of radioactivity in south-eastern Bulgaria	July 2011
27.	Italy	Re-verification of the nat'l monitoring system of levels of radioactivity in central Italy	September 2011
28.	Lithuania	Verification of the national monitoring system of levels of radioactivity; university hospital in Vilnius (nd)	September 2011
29.	United Kingdom	"Off-site" environmental radioactivity monitoring of the Sellafield site; monitoring system of levels of radioactivity at landfill sites	August 2011
30.	Hungary	Isotope production site at Budapest; Nat'l monitoring system of levels of radioactivity	March 2012
31.	Belgium	NPP-Doel; Nat'l monitoring system	June 2012

		of levels of radioactivity	
32.	Poland	Uranium mining and milling; Nat'l monitoring system of levels of radioactivity in southern Poland	July 2012
33.	Germany	Nat'l monitoring system of the levels of radioactivity in Baden-Württemberg; university hospital in Freiburg (nd)	July 2012
34.	Romania	Uranium mining and milling in south-western Romania; re-verification at Feldioara uranium production site; Piteşti fuel production site; parts of the nat'l monitoring system	August 2012
35.	Spain	Uranium mining and milling; Nat'l monitoring system of levels of radioactivity	September 2012
36.	Greece	Nat'l monitoring system of the levels of radioactivity in northern Greece; hospital in Thessaloniki (nd)	October 2012
37.	Sweden	Monitoring system of levels of radioactivity at and around the Oskarshamn CLAB site; parts of the nat'l monitoring system	November 2012

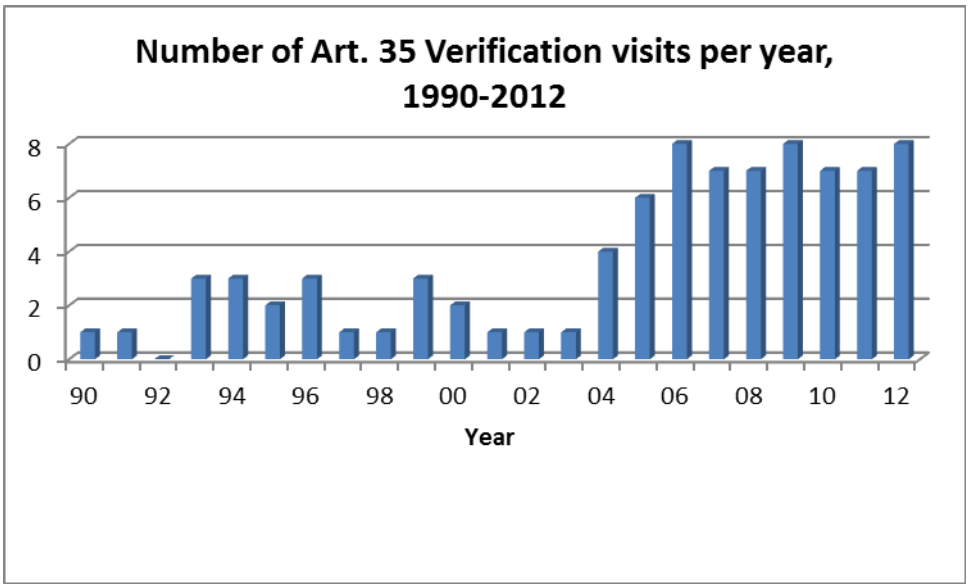

Figure 1: Overview of verification missions performed from 1990 to 2012

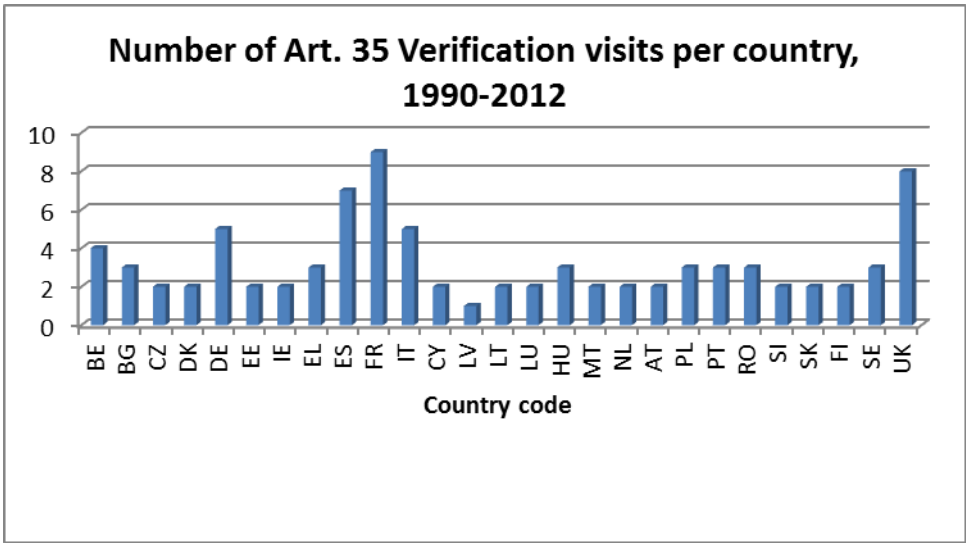

Figure 2: Verifications performed from 1990 to 2012 in each Member State