



The new Basic Safety Standards Directive and its implications for environmental monitoring



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ABSTRACT

Monitoring of levels of radioactivity in the environment is enshrined in Chapter 3 of the Euratom Treaty, in particular its Articles 35 and 36. These requirements in primary law have had an important impact on the importance of monitoring in Europe but have not been worked out in much detail in secondary legislation. The consolidation and revision of the Basic Safety Standards Directive was an opportunity for doing so. The requirements in Directive 96/29/Euratom had remained rather general. Now, more specific text is introduced on the establishment of discharge authorisations for radioactive effluents, and on monitoring these discharges. Requirements on estimation of public exposures and on environmental monitoring programmes have largely been copied from the old basic safety standards (BSS), however. The main novelty of the new BSS is the introduction of exposure situations, as defined by the ICRP in Publication 103 (2007). Environmental monitoring as part of the management of an emergency exposure situation is now addressed more clearly. As for existing exposure situations, indoor exposure to radon requires extensive surveys of indoor air or soil concentrations, and precise requirements are made on the management of residues from industries processing naturally occurring radioactive materials (NORM) as well as on the monitoring of building materials. Although the BSS do not address specific monitoring issues, studies have been undertaken on effluents from hospitals and on long-term management of uranium mining areas.

The proposal for the new Basic Safety Standards Directive is examined in the light of experience of the accident at Fukushima Dai-ichi Nuclear Power Plant disabled by the terrible tsunami on 11 March 2011. The arrangements for information exchange in a normal situation and in an emergency exposure situation need to be looked at from this perspective as well as from the perspective of smaller incidents such as the release of ¹³¹I in Hungary in autumn 2011.

Finally, an important novelty in the Euratom BSS is the inclusion of monitoring for the protection of non-human species in the environment, in line with ICRP Publications 103 and 108. These requirements are still under legal scrutiny in terms of the scope of the Euratom Treaty. The issue is very important also for the role of the Euratom legal framework in different EC policies, such as laid down in the Marine Waters Framework Directive or concluded under the OSPAR Convention (North-East Atlantic).

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1. Introduction

Two Treaties signed in Rome by the Representatives of France, Germany, Italy and the BENELUX States (25.03.1957) have established the European Economic Community (EEC) and the European Atomic Energy Community (EAEC). The first Treaty has launched the European economic integration and the second one, the so-

called “Euratom Treaty” fostered, at a very early stage, the development of the generation of nuclear energy and its safe application.

The objective of this work is to present the revision of the Basic Safety Standards of the European Commission and its implications for environmental monitoring. The revision of the EU BSS is in line with the new ICRP recommendations (ICRP, 2007). The main novelty of the new BSS is the introduction of exposure situations. Environmental monitoring as part of the management of an emergency exposure situation is now addressed more clearly. As the major part of existing exposure situations, indoor exposure to radon requires extensive further surveys.

Article 2b of the Euratom Treaty lays down that the Community shall “establish uniform safety standards to protect the health of

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workers and of the general public and ensure that they are applied". Chapter III (Health and Safety, Articles 30–39) is concerned with radiation protection, in particular with the safety standards (Articles 30–33) and specifically with environmental radioactivity (Articles 35–39).

2. Environmental provisions of the Euratom Treaty

2.1. Article 35

The first paragraph of Article 35 of the Euratom Treaty states that "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."

This paragraph is the cornerstone of extensive programmes for monitoring levels of radioactivity in the environment established in the Member States. The formulation "air, water and soil" is understood to be all-embracing and to include all compartments of the biosphere. It is worth noting that actual soil monitoring is carried out only sporadically but instead deposition measurements and biota measurements (grass, milk) are carried out as indicators for the transfer from soils to individuals. The "environment" includes both the ambient environment in proximity of, for instance, a nuclear installation and the overall territory of a Member State. It is the Commission's view that the environment starts where radioactive discharges pass out of operational control. Therefore, Community verifications, include the equipment for monitoring liquid and gaseous discharges, to the extent that such monitoring is necessary for the assessment of their environmental impact.

The second paragraph of Article 35 states that "The Commission shall have the right of access to such facilities; it may verify their operation and efficiency". The right of verification relates to the efficiency of the facilities installed for the measurement of environmental radioactivity and of radioactive discharges and the adequacy of the environmental monitoring programme. The efficiency and adequacy are assessed in relation to the overall approach developed at national level for ensuring the protection of the population in compliance with the Basic Safety Standards.

The verifications are essentially technical, looking into the adequacy of methods for sampling and procedures for laboratory analysis, accuracy of registration of the measured data and quality assurance as well as into the comprehensiveness of the overall national environmental radiation monitoring programme.

2.2. Article 36

Article 36 of the Euratom Treaty requires that Member States 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".

The EU Member States regularly transmit to the Commission the national (annual) reports on environmental radio-activity. The Commission regularly publishes data extracted from such reports at Community level. Such compilations have an added value compared to national reports to the extent that data are comparable across borders. This should be the case for the levels of radioactivity resulting from global fall-out from atmospheric weapons' testing in the sixties and for the Chernobyl contamination. The Community publications are a means of ensuring that the data are consistent. Thus only such sampling locations are incorporated in the Community reports that are not directly affected by the discharges of nuclear installations (for river sampling locations this is not always possible). This choice is without prejudice to the scope of the monitoring requirement under Article 35.

The Commission has published a continuous series of reports beginning in the early 1960s. The REM (Radioactivity Environmental Monitoring) data bank was set up for this purpose in the Joint Research Centre, at Ispra, initially for holding data on the contamination resulting from the Chernobyl accident. It was decided to use this data bank to streamline the various formats adopted in the EU for reporting routine environmental measurements and to prepare the Community reports in a more systematic way. The data records are accessible to registered external users via Internet (REM).

The consensus on monitoring and reporting requirements has been laid down in a Commission Recommendation (EC, 2000a). It establishes the modalities for reporting on the following sample categories: airborne particulates, air (dose rate), and surface water, water intended for human consumption (with reference to the EC Drinking Water Directive (EU, 1998)), milk and mixed diet, for different measurement categories, in two networks, labelled "dense and sparse".

A common data exchange platform (EURDEP) has been developed with an agreed format for automatic data exchange, in particular for the dose rates continuously monitored by national early warning networks. It is a communication platform for the urgent exchange of data (dose rates and air radioactivity concentrations in particular) in an emergency exposure situation (complementary to the ECURIE arrangements under Council Decision 87/600/Euratom), but also permits the exchange of routine data for several sample types. EURDEP is accessible on the web, both for the public and restricted use (<http://eurdep.jrc.ec.europa.eu>).

A further Commission Recommendation under Article 36 Euratom (EC, 2004) was adopted to achieve transparency of information on radioactive discharges, and to ensure that minimum requirements for the methods of analysing radioactive discharges are met throughout the Community. The Recommendation addresses airborne and liquid radioactive discharges from nuclear power plants and nuclear fuel reprocessing plants during normal operation. The Recommendation not only defines the radionuclides to be monitored but also, for each radionuclide category, identifies key radionuclides that are significant in terms of radiological impact to which minimum requirements for detection limits should apply. In this latter context the Recommendation also proposes substitution rules for measurement results that are below the detection limit.

2.3. Article 38

Article 38 of the Euratom Treaty gives significant powers to the Commission to take measures in the event that levels of radioactivity in the environment would not comply with the Basic Safety Standards. This article also offers a legal basis for the establishment of recommendations on this subject matter. Such Commission Recommendations were issued with regard to levels of ¹³⁷Cs (from Chernobyl) in certain wild food products (EC, 2003a) and for radon and its decay products in water supplies (EC, 2001).

3. Specific cases

3.1. Uranium mining

Over 60 years of uranium mining and milling in Europe has left a legacy of thousands of environmental liabilities. In particular tailing sites in 12 Member States will need long-term stewardship, including monitoring of levels of naturally occurring radionuclides. Over the years 2004–2006 studies were conducted to look into uranium mine and mill tailings and a follow-up study in 2008 looked into their long-term safety. These tailings can be regarded as waste from extractive industries, covered by Directive 2006/21/EC under the Treaty on the Functioning of the European Union, but not

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