

# Document Preparation Profile (DPP)

## 1. IDENTIFICATION

<b>Document Category</b>	<b>Safety Guides</b>
<b>Working ID:</b>	<b>DS442</b>
<b>Proposed Title:</b>	<b>Regulatory Control of Radioactive Releases to the Environment from Facilities and Activities</b> ( <i>provisional title</i> )
<b>Proposed Action:</b>	<b>Revision of a document “Regulatory Control of Radioactive Discharges to the Environment”, 2000, Safety Guide No. WS-G-2.3</b>
<b>Review Committee(s) or Group:</b>	<b>WASSC (leading committee), RASSC</b>
<b>Technical Officer:</b>	<b>V. Berkovskyy</b>

## 2. BACKGROUND

An IAEA Safety Guide (WS-G-2.3) on Regulatory Control of Radioactive Discharges to the Environment was issued in 2000. WS-G-2.3 outlines the underlying principles of discharge limitation, roles and responsibilities of regulatory bodies, licensees and registrants and provides guidance on the authorization procedure and responsibilities in operation. However, there have been significant developments in radiation protection policies since the publication of this Safety Guide. The most important documents, which were developed after publication of the WS-G-2.3 are as follows:

- In 2006, the IAEA, jointly with 8 other sponsoring international organizations, published the Fundamental Safety Principles (SF-1). The 10 new principles constitute the basis of safety requirements for protection of people and the environment against exposure to ionizing radiation.
- The ICRP Publication No. 101 “Assessing Dose of the Representative Person for the Purpose of Radiation Protection of the Public and the Optimisation of Radiological Protection” (2006) lays down the principles of the assessments of public exposure.
- The ICRP Publication No. 103 “The 2007 Recommendations of the ICRP” provides an updated scientific basis of radiation protection.
- During 2005–2010, the IAEA, jointly with 7 other international organizations, performed a review and revision of the International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources (BSS); and in January 2010 the revised BSS was circulated for consultations with Members States.

Regarding protection of the public and the environment, the SF-1 states that “The fundamental safety objective is to protect people and the environment from harmful effects of ionizing radiation” and elaborates this statement in 10 fundamental safety principles. In particular, the Principle 5 “Optimization of protection”, postulates that “the optimization of protection requires judgements to be made about the relative significance of various factors, including: (i) the number of people (workers and the public) who may be exposed to radiation; (ii) the likelihood of their incurring exposures; (iii) the magnitude and distribution of radiation doses received; (iv) radiation risks arising from foreseeable

events; and (v) economic, social and environmental factors. The optimization of protection also means using good practices and common sense to avoid radiation risks as far as is practical in day to day activities.” Furthermore, the Principle 7 “Protection of present and future generations” states that “Radiation risks may transcend national borders and may persist for long periods of time. The possible consequences, now and in the future, of current actions have to be taken into account in judging the adequacy of measures to control radiation risks... The general intent of the measures taken for the purposes of environmental protection has been to protect ecosystems against radiation exposure that would have adverse consequences for populations of a species...”. The revised BSS includes requirements which are based on the fundamental safety objective and principles and incorporates an updated scientific basis.

### **3. OBJECTIVE**

The purpose of the revised Safety Guide is to describe how to apply the SF-1 and the revised BSS in the regulatory control of radioactive releases and direct radiation from facilities, which may cause a public exposure and environmental impact in planned exposure situations. This Safety Guide will consider the experience of Member States and will update the WS-G-2.3 in order to ensure consistency of the IAEA guidance on the regulatory control of radioactive releases with the SF-1 and with requirements of the revised BSS.

### **4. JUSTIFICATION**

The need for additional guidance on practical aspects of setting authorized limits for radioactive releases was identified during the course of a Technical Meeting on Regulatory Control of Radioactive Discharges, held in 2001. Subsequently, a group of consultants prepared draft materials for discussion at a second Technical Meeting, which took place in July 2003. During the course of the development of the additional materials, it was recognized that the WS-G-2.3 would require a revision in the light of recent developments in the radiological protection policy and existing national approaches to the regulatory control of radioactive releases. The focus of the materials was therefore modified and after a third Technical Meeting in 2008, the IAEA finalized IAEA-TECDOC-1638 “Setting Authorized Limits for Radioactive Discharges: Practical Issues to Consider. Report for Discussion” in 2009. This TECDOC (attached) provides an overview of the key practical aspects of setting discharge limits and authorization conditions and is intended to stimulate discussions on the practical implementation of the control of radioactive releases. It includes a description of the main processes involved in setting discharge authorizations and presents examples of current practices drawn from both nuclear and non-nuclear industries. The range of approaches adopted in Member States is considered and the advantages and shortcomings of different approaches are discussed. The recommendations on key issues for the revision of WS-G-2.3, identified by Member States during the TM and during the preparation of the TECDOC, are summarized in the Annex II. The revised Safety Guide will take all these suggestions into account and it will address in full detail all aspects of the authorization process for releases of radionuclides to the environment.

These objectives are beyond the scopes of the currently developed Safety Guides DS416, DS432 and DS427: DS416 provides a general overview on the processes to be included during licensing of nuclear installations, it covers issues as site evaluation, design and construction, operation, decommission and release from regulatory control. DS432 gives general guidance on the application of radiation protection principles for planned, existing and emergency situations in order to manage the protection of the public and the environment, whereas DS427 develops guidance on

implementation of a radiological environmental impact assessment. None of these documents will provide in-depth guidance on the processes to be involved to derive and authorize radioactive discharges.

The publication of the SF-1, the recent updates in the scientific basis of the radiation protection, the development of the revised BSS, and the outcome of the review of the Member States' experience in the setting of authorized limits for discharges, necessitate the revision of the WS-G-2.3 which was developed more than 10 years ago.

## **5. PLACE IN THE OVERALL STRUCTURE OF THE RELEVANT SERIES AND INTERFACES WITH EXISTING AND/OR PLANNED PUBLICATIONS**

This is a generic Safety Guide, which would fall within the thematic areas of waste and environmental safety and provide guidance on the requirements given in the revised BSS. Its intention is to update the WS-G-2.3 and to provide specific guidance on the application of the SF-1 and the revised BSS. It would also be based on relevant recommendations from the ICRP.

Thus, this Safety Guide will interface with the following Safety Standards (this is not, and cannot be, regarded as an exclusive list):

1. EUROPEAN ATOMIC ENERGY COMMUNITY, FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, INTERNATIONAL ATOMIC ENERGY AGENCY, INTERNATIONAL LABOUR ORGANIZATION, INTERNATIONAL MARITIME ORGANIZATION, NUCLEAR ENERGY AGENCY OF THE OECD, PAN AMERICAN HEALTH ORGANIZATION, UNITED NATIONS ENVIRONMENT PROGRAMME, WORLD HEALTH ORGANIZATION, Fundamental Safety Principles, IAEA Safety Standards Series No. SF-1, IAEA, Vienna (2006).
2. FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, INTERNATIONAL ATOMIC ENERGY AGENCY, INTERNATIONAL LABOUR ORGANIZATION, NUCLEAR ENERGY AGENCY OF THE ORGANIZATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT, PAN AMERICAN HEALTH ORGANIZATION, WORLD HEALTH ORGANIZATION, International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources (1996).
3. INTERNATIONAL ATOMIC ENERGY AGENCY, Legal and Governmental Infrastructure for Nuclear, Radiation, Radioactive Waste and Transport Safety, GS-R-1, (2000).
4. INTERNATIONAL ATOMIC ENERGY AGENCY, Justification of Practices, DS401.
5. INTERNATIONAL ATOMIC ENERGY AGENCY, Application of the Concepts of Exclusion, Exemption and Clearance, RS-G-1.7 (2004).
6. INTERNATIONAL ATOMIC ENERGY AGENCY, Decommissioning of Facilities Using Radioactive Material, WS-R-5 (2006).
7. INTERNATIONAL ATOMIC ENERGY AGENCY, Predisposal Management of Radioactive Waste. GSR Part 5 (2009).
8. INTERNATIONAL ATOMIC ENERGY AGENCY, Environmental and Source Monitoring for Purposes of Radiation Protection, RS-G-1.8 (2005).
9. INTERNATIONAL ATOMIC ENERGY AGENCY, Management of Radioactive Waste from the Mining and Milling of Ores, WS-G-1.2 (2002).
10. INTERNATIONAL ATOMIC ENERGY AGENCY, Radiation Protection and Radioactive Waste Management in the Operation of Nuclear Power Plants, NS-G-2.7 (2002).
11. INTERNATIONAL ATOMIC ENERGY AGENCY, Management of Waste from the Use of Radioactive Material in Medicine, Industry, Agriculture, Research and Education, WS-G-2.7 (2005).

12. INTERNATIONAL ATOMIC ENERGY AGENCY, Release of Sites from Regulatory Control upon Termination of Practices, WS-G-5.1 (2006).
13. INTERNATIONAL ATOMIC ENERGY AGENCY, Protection of the Public against Exposure to Natural Sources of Radiation, DS421.
14. INTERNATIONAL ATOMIC ENERGY AGENCY, Radiation Protection of the Public and Environment, DS432.
15. INTERNATIONAL ATOMIC ENERGY AGENCY, Radiological Environmental Impact Analysis for Facilities and Activities, DS427.

## 6. OVERVIEW

This Safety Guide will provide Governments and regulatory bodies with a structured approach to the regulatory control of radioactive releases to the environment and direct radiation from facilities, which may cause a public exposure or environmental impact in planned exposure situations. It should help to ensure, in the above indicated thematic areas, that (i) the responsibilities of relevant parties are established; (ii) protection of the public is optimized; (iii) public exposure is limited; (iv) environmental monitoring programmes are in place; and (v) results of the environmental assessments are taken into account in accordance with the SF-1 and the revised BSS. The Safety Guide will aim to provide guidance on the application of requirements of the revised BSS and will incorporate the outcomes of the recent review of Member States' experience in the setting of authorized limits for discharges. The following are some of main topics for the further elaboration:

- The consistency with the SF-1 and the revised BSS should be ensured (including new requirements and terminology);
- The explanation of the optimization process should be expanded (e.g., consideration of good practices and availability of technology);
- The details of the discharge authorization process should be additionally elaborated; it would be important to reflect the different purposes and regulatory status of dose constraints, dose limits and operational limits and conditions<sup>1</sup> (including authorized discharge limits);
- The guidance on the consideration of results of the radiological environmental assessments in the authorization process should be provided;
- The direct radiation from facilities which may cause a public exposure should be included within the scope of the document in accordance with para 3.122 and 3.132 of the revised BSS (Draft 3.0);
- The transboundary public exposure due to discharges should be addressed in accordance with the relevant requirements of the revised BSS;
- The demonstration of compliance with operational limits and conditions and with dose limits should be additionally explained;
- Discharges from NORM and low-risk facilities should be addressed;
- More guidance is required on post-operational discharges and non-uniform discharges, including planned bulk discharges;

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<sup>1</sup> "Operational limits and conditions" is a defined term (see the IAEA Safety Glossary) and it is used in the revised BSS.

- The guidance on the use of screening and realistic dose assessments for different types of facilities should be given;
- The consideration of the cumulative impacts of annual discharges from the facility and the cumulative impacts from adjacent facilities should be included;
- The review of operational limits and conditions for existing facilities should be addressed;
- The guidance on prevention of unauthorised releases (particularly, the guidance on prevention of the contamination of groundwater) and on appropriate monitoring programmes should be included.

## 7. PRODUCTION SCHEDULE

Provisional schedule for preparation of the document, outlining realistic expected dates for:

Approval of DPP by the Coordination Committee	April 2010
Approval of DPP by the Safety Standards Committees	June 2010
Approval of DPP by the CSS	September 2010
Approval of draft by the Coordination Committee	Q3/2011
Approval by the Safety Standards Committees for submission to Member States for comments	Q4/2011
Approval of the revised draft by the Coordination Committee	Q2/2012
Review in NS-SSCS	Q2/2012
Approval by the Safety Standards Committees for submission to the CSS	Q2/2012
Endorsement by the CSS	Q2/2012
Approval by the Publications Committee	Q3/2012
Target publication date	Q4/2012

In order to take into account all requirements of the revised BSS the actual schedule could be adjusted in accordance with the schedule of the revised BSS.

## 8. RESOURCES

1 CS during 2010  
 3 CS during 2011  
 2 CS during 2012

## ANNEX I.

### PROPOSED STRUCTURE

#### 1. INTRODUCTION

- 1.1. Background
- 1.2. Objective
- 1.3. Scope
- 1.4. Structure

#### 2. GENERAL RESPONSIBILITIES

- 2.1. The government and regulatory body
- 2.2. Responsible parties

#### 3. AUTHORIZATION FOR A NEW OR MODIFIED PRACTICE

##### 3.1. Responsibilities of government and regulatory body

*Following issues should be included:*

- Scope of the regulatory control of radioactive releases and direct radiation from a facility
- Dose and risk constraints
- Assessments of doses to the representative person
- Cumulative impacts of radioactive releases of adjacent facilities and activities
- Transboundary exposure
- Exposure of future generations
- Prevention of the contamination of groundwater
- Regulatory review of design documents
- Operational limits and conditions related to the public exposure
- Regulatory review of source and environmental monitoring programmes
- Reporting criteria and procedures
- Setting a discharge authorization

##### 3.2. Responsibilities of relevant parties

*Following issues should be included:*

- Design criteria and design features related to the public exposure and to the radiological impact on the environment
- Pre-operation studies and safety assessments
- Constrained optimization
- Monitoring programmes and systems
- Demonstrating of compliance at the design or planning stages
- Application for the authorization of discharges and authorization of the operation of a facility

#### 4. RESPONSIBILITIES AFTER THE START OF OPERATION

##### 4.1. Regulatory body

*Following issues should be included:*

- Periodic inspections regarding discharges, direct radiation, unauthorised releases and leakages
- Review of results of monitoring programmes and periodic safety assessments
- Independent environmental monitoring programmes
- Enforcements in a case of non-compliance with operational limits and conditions related to the public exposure

4.2. Registrant and licensees

*Following issues should be included:*

- Operational control of discharges and direct radiation
- Monitoring programmes and reporting
- Periodic safety assessments and demonstrating of compliance
- Quality management systems

- 5. SPECIFICITY OF NORM FACILITIES, SMALL AND LOW-RISK FACILITIES**
- 6. EXISTING PRACTICES**
- 7. APPENDIX: GENERIC UPPER VALUE FOR A DOSE CONSTRAINT FOR MEMBERS OF THE PUBLIC**
- 8. REFERENCES**

## ANNEX II:

This is a summary of issues to be included in the revision of Safety Guide (WS-G-2.3) Regulatory Control of Discharges as identified during the **Technical Meeting on National and International Trends in Radioactive Discharge Control, 1 to 5 September and the preparation of the TECDOC on *Practical Aspects of Setting Authorised Discharge limits for radioactive discharges:***

- The Safety Guide needs to be updated to be consistent with the revised IAEA Basic Safety Standards and to take account of the terminology and concepts introduced in ICRP -103.
- The Technical Document on *Practical Aspects of Setting Authorised Discharge limits for Radioactive Discharges* should be an input into the revision of the Safety Guide. In particular the figure for the authorization process should be considered in reviewing the figures in the Safety Guide.
- As discussed in the Technical Document it is important to include the importance of taking into account the availability of technology and best practice in the optimization process.
- There should be a discussion about including realism in dose assessment for the representative person/critical group.
- The use of critical group should be changed to representative person but it should be clear that this is only a change in terminology and will not require member states to change their procedures.
- The Safety Guide needs to be expanded to cover discharges from NORM industries and from small users of radioactive materials (e.g. hospitals). Particular points that need to be addressed are given below.
- When updating the Safety Guide the inclusion of protection on non-human biota (protection of the environment) should be considered. If possible guidance should be provided on how to take this into account but the importance of this should not be over-emphasized compared with protection of people.
- The extent to which collective dose should be considered in setting discharge authorizations needs to be addressed both for screening and as part of the optimization process. In considering collective dose the advice given in ICRP 101 should be considered.
- Advice on environmental surveillance needs to be reviewed. Reference should be made to other relevant IAEA documents on environmental surveillance.
- More guidance is required on non-uniform discharges including planned bulk discharges.
- It is important to reflect the different regulatory status of dose limits and dose constraints in the Safety Guide.
- It is suggested to review the authorizations for existing sources.
- The treatment of unauthorized discharges should be addressed.
- The revised Safety Guide should also address potential exposures.

### ATTACHMENT:

INTERNATIONAL ATOMIC ENERGY AGENCY, Setting Authorized Limits for Radioactive Discharges: Practical Issues to Consider. Report for Discussion. IAEA-TECDOC-1638, 2010  
[http://www-pub.iaea.org/MTCD/publications/PDF/te\\_1638\\_web.pdf](http://www-pub.iaea.org/MTCD/publications/PDF/te_1638_web.pdf)