

Document Preparation Profile (DPP)

1. IDENTIFICATION

Document Category	Safety Guide
Working ID:	DS427
Proposed Title:	Radiological Environmental Impact Analysis for Facilities and Activities
Proposed Action:	New document incorporating existing document and expanding scope.
Published Title/Date	Dispersion of Radioactive Material in Air and Water and Consideration of Population Distribution in Site Evaluation for Nuclear Power Plants Safety Guide (NS-G-3.2), 2002
Safety Series No.:	
SS Committee(s):	WASSC, RASSC, NUSSC
Technical Officer(s):	D. Telleria (NSWR) – A. Godoy (NSNI)

2. BACKGROUND

Methodologies to assess radiological impact on the environment have been widely used in Member States with *facilities and activities* that make use of radioactive substances. The terms “environment protection” and “impact to the environment” for facilities and activities has assumed different meanings and have defined methodologies used to calculate different endpoints, such as: doses to human, activity concentrations in environmental media, or ‘radiation risks’. This makes it difficult to compare the results of the assessments and to understand and accept by all stakeholders the soundness of the procedures used and the conclusions obtained. There is a general need for harmonization of definitions and methodologies adopted for different facilities and stages of life of a facility.

National regulations and international undertakings increasingly require that the development of nuclear and radiation applications is achieved in a sustainable manner. The sustainable use of the environment and its protection are also recognised as international issues. Although there are international standards and national legislation that require radiological environmental impact analyses to be performed, guidance on a comprehensive and harmonized approach to perform analyses of the radiological impact of facilities and activities is lacking. Such an approach will help strengthen the international regulatory framework for the protection of people and the environment.

3. OBJECTIVE AND JUSTIFICATION

This guide aims to help Member States to produce a Radiological Environmental Impact Analysis (REIA) to assess the radiological impact on the environment of facilities and activities using radioactive substances and radiation sources for which a safety assessment is required for purposes of compliance with given acceptance criteria.

The preparation of a REIA is a key component in the process to demonstrate the radiological protection of the environment. The process, which is part of a more general Environmental Impact Assessment (EIA) for these facilities, is based on a graded approach, to ensure that resources devoted to safety are commensurate to the magnitude of the radiation risks in accordance with Principle 5 of the Safety Fundamentals (Safety Standards Series No. SF-1). Within the proposed Safety Guide, EIA framework and its components will be referenced as an appropriate structure where REIA could be built-in. It is not the intention of the proposed Safety Guide to provide exhaustive information of EIA

procedures which should be adopted in the process of making decisions according to the existing national or international regulations under consideration.

The guide will facilitate the development of a standardised approach (at international level) for REIA to assess the radiological effect on the environment and promote a common understanding of the process, definitions and methodology used and its outcome by all relevant stakeholders. The guide is intended to cover all reporting stages in the life cycle of a facility – including site evaluation, safety analysis reports, periodic safety reviews, decommissioning reports – as well as different operational conditions: normal operation, anticipated operational occurrences and accident conditions (see Safety Assessment and Verification for Nuclear Power Plants Safety Guide, Safety Standards Series No. NS-G-1.2).

The guide is intended to provide a general structured approach which will reference and, when appropriate, incorporate recommendations and considerations from existing IAEA safety guides on methods, models, parameters, data and programmes to calculate the dispersion of effluents discharged into the atmosphere and into surface water and groundwater as well as considerations of site characteristics relevant to safety, including population distribution and particular geographical, economical, social and environmental factors (e.g., SRS No.19, RS-G-1.8 and NS-G-3.2). It is not intended to include in detail the models or parameters applicable to REIA and which are already included in other IAEA guidance. However, the Safety Guide will include discussions on the valid sources of information, the acceptable end-points and the levels of precision and accuracy expected.

Target users of this document will be: operators, regulators, other national and international organizations involved in a decision process, contracting parties to instruments such as international conventions and other interested parties, such as non-governmental organisations (NGOs) and the public in general.

The guide and the methodology described therein are intended to be used prospectively to assess the radiological risk for both normal operations and due to potential accidents. It should not be applied to the assessment of the consequences of actual accidents during the response phase or of past practices resulting in significant contamination for purposes of mitigation or remediation, where, in general, different approaches, models and data are needed and different acceptance criteria applied.

The methodology and criteria described in this guide should also be applicable for facilities dedicated to mining and milling of uranium ore, management of radioactive waste and materials containing NORMs, taking account of the limitations of the models applicable to these activities and the greater relevance of the results of environmental monitoring.

4. POSITION IN THE OVERALL STRUCTURE OF THE RELEVANT SERIES AND INTERFACES WITH EXISTING AND/OR PLANNED PUBLICATIONS

Protection of the environment, the conceptual framework, the radiological criteria and the necessary safety assessment methods have been covered in the Safety Standards Series and other IAEA documents, including:

- Safety Fundamentals (Safety Standards Series No. SF-1),
- Basic Safety Standards for Protection Against Ionizing Radiation and for the Safety of Radiation Sources (Safety Standards Series No. 115, and its undergoing revision),
- Safety Assessment and Verification of Nuclear Facilities and Activities (Safety Requirement DS348)
- Regulatory Control of Radioactive Discharges to the Environment Safety Guide (Safety Standards Series No. WS-G-2.3)

- Environmental and source Monitoring for Purposes of radiation Protection Safety Guide (Safety Standards Series No. RS-G-1.8)
- Generic Models for Use in Assessing the Impact of Discharges of Radioactive Substances to the Environment (Safety Reports Series No.19)
- Dispersion of Radioactive Material in Air and Water and Consideration of Population Distribution in Site Evaluation for Nuclear Power Plants Safety Guide (Safety Standards Series No. NS-G-3.2)
- Safety Assessment and Verification for Nuclear Power Plants (Safety Standards Series No NS-G-1.2)
- Predisposal Management of Low and Intermediate Level Radioactive Waste (Safety Guide WS-G-2.5)
- Environmental Impact assessment for uranium mine, mill and in situ leach projects (IAEA-TECDOC-979)
- Ethical Considerations in Protecting the Environment from the Effects of Ionizing Radiation – A Report for Discussion (IAEA-TECDOC-1270)
- Protection of the Environment from the Effects of Ionizing Radiation: A Report for Discussion (IAEA-TECDOC-1091)
- Development and Application of Level 2 PSA for Nuclear Power Plants (DS 393)

The proposed Safety Guide will be in line with SS 115 (revision), DS348 and NS-G-1.2. It will complement the existing IAEA publications WS-G-2.3, RS-G-1.8 and SRS No.19 and incorporate NS-G-3.2.

ICRP Recommendations (ICRP Publications 60 and 103) and the advice from ICRP given in other documents (ICRP Publications 82, 91, 101) should also be taken into account as should implications arising from relevant International Conventions (like the ESPOO Convention on Environmental Impact Assessment in a Transboundary Context) and other international instruments.

5. OVERVIEW

After introductory remarks providing background information and the objectives and the scope of the guide, as well as a definition of “environment” within this context and a general description of EIA, the document will provide a conceptual framework showing how the verification that radiological protection of the environment is ensured fits in the wider context of producing a general assessment of relevant effects (e.g., radiological, social, economical, etc) of development proposals prior to decisions being taken. The REIA framework proposed in the Safety Guide could be also applicable in situations where, due to the characteristics of the facilities and activities, an EIA is not foreseeing as necessary (e.g., facilities with predicted no significant impacts to the environment).

The document will delineate a simple comprehensive methodology, which the Agency recommends should be adopted to undertake REIAs to demonstrate compliance with regulatory acceptance criteria. The methodology will follow current knowledge and recommendations in the area of radiological protection of people and the environment. The methodology will be based on a tiered approach to reflect the varying complexity required for REIAs for different types of facilities. It will be applicable to a wide range of nuclear facilities and all stages in their life and operational conditions.

A possible list of contents of the document is given below:

1. Introduction
 - 1.1 Background
 - 1.2 Concepts of radiological environmental “impact” and “protection”
 - 1.3 General description of Environmental Impact Assessment (EIA)
 - 1.4 General description of Radiological Environmental Impact Analysis (REIA) (within EIA and stand alone REIA).
 - 1.5 Scope
 - 1.6 Structure of the Safety Guide
2. Conceptual framework for the radiological protection of people and the environment
 - 2.1 The need to perform a REIA
 - 2.2 Roles and responsibilities

- 2.3 Regulatory requirements for the radiation safety of people and the environment
- 2.4 Radiological Environmental Impact Analysis (REIA)
- 2.5 Acceptance/Compliance
- 2.6 Consideration of REIA results in the decision process.
- 3. Description of a REIA
 - 3.1 Endpoints
 - 3.2 Models and methods
 - 3.3 Input data
- 4. Acceptance criteria
- 5. Consideration of 'Optimization' results.
- 6. Application of a graded approach for the REIA for facilities and activities
 - 6.1 REIA for authorized *facilities and activities*
 - 6.1.1 The use of Generic and Specific REIA
 - 6.2. REIA for nuclear installations (other than nuclear power plants e.g. research reactors, fuel cycle)
 - 6.3 REIA for nuclear power plants
 - 6.3.1 Transport and diffusion of effluents discharged into the atmosphere
 - 6.3.2 Transport and diffusion of effluents discharged into the hydrosphere
 - 6.3.3 Use of land and water in the region of the site
 - 6.3.4 Environmental and Population data
 - 6.4 Synergies between REIA and Safety Assessment reports for nuclear facilities
- 7. Role of Environmental and Source Monitoring
 - 7.1 Environmental monitoring for facilities and activities.
 - 7.2 Environmental monitoring for nuclear installations

6. PRODUCTION

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

Approval of DPP by the Steering Committee – August 2008
Approval of DPP by the Safety Standards Committees – November 2008
Approval of DPP by the CSS - April 2009
Approval of draft by the Steering Committee – September 2009
Approval by the Safety Standards Committees for submission to Member States for comments – November 2009
Approval of the revised draft by the Steering Committee – December 2009
Approval by the Safety Standards Committees for submission to the CSS - April 2010
Endorsement by the CSS –June 2010
Submission to Publications Committee – July 2010
Approval by the Board of Governors, as appropriate
Target publication date: October 2010