

Document Preparation Profile (DPP)

Draft 6 dated 14 January 2014

1. IDENTIFICATION

Document Category **Specific Safety Requirements**

Working ID: **DS478**

Proposed Title: **Safety of Nuclear Fuel Cycle Facilities**

Proposed Action: **Revision of Safety Requirements NS-R-5: Safety of Nuclear Fuel Cycle Facilities (2008)**

Review Committee(s) or Group: **All (Leading Committee, NUSSC), NSGC**

Technical Officer(s): **A. M. Shokr, RRSS/NSNI**

2. BACKGROUND

The Safety Requirements document NS-R-5 on the safety of nuclear fuel cycle facilities was published in 2008. This document established requirements for all aspects of fuel cycle facility safety with particular emphasis on requirements for design and operation. NS-R-5 also included requirements on fuel cycle facilities regulatory supervision, management and verification of safety, site evaluation, construction, commissioning, and decommissioning.

The main objective of the NS-R-5 was to provide a basis for safety and for safety assessment during all stages in the lifetime of a fuel cycle facility, and to establish safety requirements on aspects relating to regulatory supervision, management of safety, site evaluation, design, construction, commissioning, operation and decommissioning of fuel cycle facilities.

The requirements established by the NS-R-5 apply to fuel cycle facilities of all types and sizes, including fuel cycle facilities for processing, refining, conversion, enrichment, fabrication of fuel (including MOX fuel), spent fuel storage, spent fuel reprocessing, and fuel cycle research and development facilities. Facility specific requirements for the predisposal management of radioactive waste during operation are included also. Facilities for mining and milling of ores are not covered by the scope of the NS-R-5.

3. JUSTIFICATION FOR THE PRODUCTION OF THE DOCUMENT

The revision of the NS-R-5 is initiated in the frame of the Roadmap described in the long term structure of safety standards “Strategies and Processes for the Establishment of IAEA Safety Standards – SPESS” which was approved by the IAEA Member States in 2008. SPESS imposes that the IAEA safety requirements shall be governed by the objective and principles of the Safety Fundamentals publication (SF-1).

A number of safety standards, including General Safety Requirements, have been published since the publication of the NS-R-5 in 2008. Other General Safety Requirements, which have interface with one or more areas important to the safety of fuel cycle facilities, are currently under development, and

include aspects that were not originally covered by the NS-R-5 such as the integrated management system. The revision of the NS-R-5 is required to ensure the coherency and consistence of its technical contents with the other relevant IAEA Safety Standards. The revision of the NS-R-5 will also take into account the experience acquired by the IAEA and Member States from its application, including incorporating, to the extent possible, the content of the Appendices in the main text. Furthermore, the revision process will be an opportunity to incorporate the relevant feedback and lessons learned from the accident at the Fukushima-Daiichi nuclear power plant.

Following feedback from users, discussion within the Division of Nuclear Installation Safety and advice from NUSSC it is a goal of the revised NS-R-5 to incorporate, to the maximum extent possible consistent with the statements in the preceding paragraph, and accessibility for users, the content of the current Appendices of NS-R-5 in the main text (body) of the revised NS-R-5

4. OBJECTIVE AND SCOPE

The objective of the revised version of the NS-R-5 is to provide a basis for safety and for safety assessment during all stages in the lifetime of a fuel cycle facility with particular emphasis on requirements for design, construction, commissioning, operation and decommissioning. For the benefits of the end-users (mainly from Member States operating fuel cycle facilities with small or no nuclear power programme), the revised version will also include reference to the generic safety requirement publications along with complementary specific safety requirements on aspects relating to regulatory supervision, management of safety, and site evaluation of fuel cycle facilities.

The original scope of the NS-R-5 will be kept for the revised version. The scope of the revised NS-R-5 will cover fuel cycle facilities of all types and sizes, including facilities for processing, refining, conversion, enrichment, fabrication of fuel (including MOX fuel), spent fuel storage, spent fuel reprocessing, and fuel cycle research and development facilities. Facility-specific requirements for the predisposal management of radioactive waste during operation are included also. Facilities for mining and milling of ores are not in the scope of the revised version of NS-R-5.

The revision of NS-R-5 will also be an opportunity to increase consistency with SSR-2/1, SSR-2/2, and other safety requirements documents when no specificities of fuel cycle facilities warrant a specific requirement.

The revised NS-R-5 is intended for use by organizations engaged in the site evaluation, design, construction, commissioning, operation, and preparation for decommissioning of fuel cycle facilities as well as by regulatory bodies.

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

The document will be a Specific Safety Requirements publication for Fuel Cycle Facilities. This document will interface with the following publications (the list is not intended to be final or exhaustive):

1. Fundamental Safety Principles, IAEA Safety Standards Series No. SF-1, (2006);
2. Governmental, Legal and Regulatory Framework for Safety, IAEA Safety Standards Series No. GSR Part 1, (2010);
3. Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards - IAEA Safety Standards Series No. GSR Part 3, (Interim Edition 2011);

4. Safety Assessment for Facilities and Activities, IAEA Safety Standards Series No. GSR Part 4, (2009);
5. Predisposal Management of Radioactive Waste IAEA Safety Standards Series No. GSR Part 5, (2009);
6. Predisposal Management of Low and Intermediate Level Radioactive Waste Safety Guide IAEA Safety Standards Series No. WS-G-2.5, (2003);
7. Predisposal Management of High Level Radioactive Waste Safety Guide IAEA Safety Standards Series No. WS-G-2.6, (2003);
8. Storage of Radioactive Waste Safety Guide IAEA Safety Standards Series No. WS-G-6.1, (2006);
9. Site evaluation for Nuclear Installations, IAEA Safety Standards Series, No NS-R-3, 2003;
10. Strengthening the Global Nuclear Safety Regime, INSAG-21, 2006;
11. The Interface between Safety and Security at Nuclear Power Plants, INSAG-24 (2010);
12. Regulations for the Safe Transport of Radioactive Material, IAEA Safety Standards Series No. SSR-6, 2012.
13. Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Revision 5). IAEA Nuclear Security Series No. 13 (2011).

This document will also interface with the following IAEA publications under development:

14. DS457: Preparedness and Response for a Nuclear or Radiological Emergency Safety (Revision of GS-R-2);
15. DS456: Leadership and Management for Safety (Revision of GS-R-3);
16. DS450: Decommissioning and Termination of Facilities (Revision of WS-R-5);
17. DS462: Revision through addenda of GSR Part 1, NS-R-3, SSR-2/1, SSR-2/2 and GRS Part 4.

6. OVERVIEW

The table of contents is as follows:

1. INTRODUCTION

BACKGROUND

OBJECTIVE

SCOPE

Clarification of interfaces with complementary Standards

STRUCTURE

2. APPLYING SAFETY OBJECTIVE, PRINCIPLES AND CONCEPTS

SAFETY OBJECTIVE

SAFETY PRINCIPLES

CONCEPT OF DEFENCE IN DEPTH

3. LEGAL FRAMEWORK AND REGULATORY SUPERVISION

LEGISLATIVE AND REGULATORY INFRASTRUCTURE

REGULATORY BODY

LICENSING PROCESS

Safety Analysis Report and other licensing documentation

Review and assessment by the regulatory body

Acceptance criteria

REGULATORY INSPECTION AND ENFORCEMENT

4. MANAGEMENT AND VERIFICATION OF SAFETY
INTEGRATED MANAGEMENT SYSTEM
VERIFICATION OF SAFETY

5. SITE EVALUATION
INITIAL EVALUATION AND SELECTION OF THE SITE
MONITORING OF HAZARDS
REASSESSMENT OF THE SITE

6. DESIGN

PRINCIPAL TECHNICAL REQUIREMENTS

- Fundamental safety functions
- Radiation protection
- Application of the defence in depth concept
- Proven engineering practices
- Safety assessment
- Provisions for construction
- Features for facilitating radioactive waste management and decommissioning

GENERAL REQUIREMENTS FOR DESIGN

- Classification of Structures, Systems, and Components
- Codes and Standards
- Design Basis
- Design for extension conditions
- Design for reliability
- Design for criticality prevention
- Human factors and ergonomics
- Ageing management
- Design for commissioning
- Design for Radioactive Material Movements
- Provisions for maintenance, testing and inspection
- Design for emergency planning
- Provisions for modification
- Design for decommissioning
- Non-radiological hazards
- Design for Fire Prevention and Safety
- Safety analysis

SPECIFIC REQUIREMENTS FOR DESIGN

- Buildings and structures
- Means of confinement
- Process systems
- Fuel handling and storage systems including transport interfaces
- Waste pre-discharge and pre-disposal treatment, handling and storage systems
 - Aerial and Liquid Discharges
 - Low and Intermediate Waste
 - High level Waste
- Radiation protection

Radioactive waste
Instrumentation and Control systems
Electrical systems
Supporting and auxiliary systems

7. CONSTRUCTION

8. COMMISSIONING

COMMISSIONING PROGRAMME
COMMISSIONING STAGES AND TESTS
COMMISSIONING PROCEDURES AND REPORTS

9. OPERATION

ORGANIZATIONAL PROVISIONS
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OPERATIONAL LIMITS AND CONDITIONS
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CRITICALITY CONTROL
RADIOACTIVE MATERIALS MOVEMENTS
MAINTENANCE, PERIODIC TESTING, AND INSPECTION
NON-RADIOLOGICAL HAZARDS
FIRE SAFETY
EMERGENCY PLANNING AND PREPAREDNESS
MODIFICATION OF THE FACILITY
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RADIOACTIVE WASTE MANAGEMENT
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FEEDBACK OF OPERATING EXPERIENCE

10. PREPARATION FOR DECOMMISSIONING

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11. INTERFACE BETWEEN SAFETY AND SECURITY IN DESIGN AND OPERATION

APPENDIX: SELECTED POSTULATED INITIATING EVENTS FOR FUEL CYLCE FACILITIES

7. PRODUCTION SCHEDULE:

	A*	B*	C*
STEP 1: Preparing a DPP	DONE	DONE	DONE
STEP 2: Approval of DPP by the Coordination Committee	July 2013		
STEP 3: Approval of DPP by the relevant review Committees	4 th Q 2013		

STEP 4: Approval of DPP by the CSS	1 st Q 2014		
STEP 5: Preparing the draft	4 th Q 2014		
STEP 6: Approval of draft by the Coordination Committee	1 st Q 2015		
STEP 7: Approval by the relevant review Committees for submission to Member States for comments	2 nd Q 2015		
STEP 8: Soliciting comments by Member States	4 th Q 2015		
STEP 9: Addressing comments by Member States	4 th Q 2015		
STEP 10: Approval of the revised draft by the Coordination Committee Review in NS-SSCS	4 th Q 2015		
STEP 11: Approval by the relevant review Committees for submission to the CSS	2 nd Q 2016		
STEP 12: Endorsement by the CSS	3 rd Q 2016		
STEP 13: Establishment by the Publications Committee and/or Board of Governors (for SF and SR only))	1 st Q 2017		
STEP 14: Target publication date	3 rd Q 2017		

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- *Column A for Safety Fundamentals, Safety Requirements and Safety Guides.*
- *Column B for Nuclear Security Series publications noting that for Technical Guides a fast track may be proposed and justified for approval by the NSGC at step 3. If approved, the draft will not be subject to the steps 4 to 10 and, be provided at step 11 to the NSGC to take note of it before its publication*
- *Column C for TECDOCs, safety reports and other publications*

8. RESOURCES

Secretariat: P staff (12 Man weeks) + 3 CSM (15 Man-weeks of non-staff)