Part I: NES publications under preparation*

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1. Establishing and Managing a Radioactive Waste Management Organization with Responsibility for Repository Development
2. Decommissioning of Industrial and Research Gamma Irradiators and Management of Associated Radioactive Sources
3. INPRO Methodology for Sustainability Assessment of Nuclear Energy Systems: Nuclear Security
4. Contracting and Partnering in Decommissioning and Environmental Remediation
5. Lifecycle Management and Sustainability for Environmental Remediation
8. Instrumentation and control and advanced digital technologies for the support of plant performance optimization
9. Development considerations and life cycle management approaches for nuclear facility I&C systems
13. Enhancing National Safeguards Infrastructure to Support the Introduction of Nuclear Power
14. Vendor and User Responsibilities in Nuclear Cogeneration Projects
15. Global Status of Decommissioning of Nuclear Facilities
16. Decontamination Methodologies and Approaches
17. Quality and Reliability Aspects in Nuclear Power Reactor Fuel Engineering (Rev.1)
18. Preparation of a Feasibility Study for New Nuclear Power Projects (Rev.1)
19. Milestones in the Development of a National Infrastructure for Nuclear Power (Rev. 2)
22. Strengthening Organizational Resilience in the Nuclear Organization
23. Guidance for Preparing Generic User Requirements and Criteria Documents for Small Modular Reactors and their Applications
24. Nuclear Fuel Technologies for Liquid Metal Cooled Fast Reactors (LMFRs)

* Manuscripts in the process of being drafted (open to contributions)
** Manuscripts approved in their final form and awaiting production
Part II: NES publications in final form**

25. Management of ageing and obsolescence of nuclear I&C systems and equipment through modernization
27. Management of Disused Ionization Chamber Smoke Detectors and their Associated Disused Sealed Radioactive Sources
28. Summary Review on the Application of Computational Fluid Dynamics in NPP Design
29. Training and Human Resource Considerations for Nuclear Facility Decommissioning (NG-T-2.3, Rev. 1)
30. Management of Disused Devices Containing Depleted Uranium (DU) Used for Radiation Shielding
31. Experience in the Management of Radioactive Wastes After Nuclear Accidents: A Basis for Pre-Planning
32. Evaluation of Status of National Nuclear Infrastructure Development (Rev.2)
33. Integrated Approach to Decommissioning within a Multi-facility Site
34. Transition Management from Operation to Decommissioning in Nuclear Power Plants
35. Fatigue Assessment in Light Water Reactors for Long Term Operation: Good Practices and Lessons Learned
36. Practices for interim Storage of Research Reactor Spent Nuclear Fuel
37. Managing Nuclear Design Knowledge Over the Life Cycle – Stakeholder Perspectives, Challenges and Approaches
38. Technical Approaches for the Management of Separated Civilian Plutonium
39. Post Irradiation Examination (PIE) for Research Reactor Fuels
40. Managing Human Resources in the Field of Nuclear Energy
41. Human Resource Management for New Nuclear Power Programmes (NG-T-3.10, Rev.1)
42. Managing Siting Activities for Nuclear Power Plants (NG-T-3.7, Rev.1)
43. Guide to Knowledge Management Strategies and Approaches in Nuclear Organizations
44. Terms for Describing Advanced Nuclear Power Plants
45. Reactor Technology Assessment for Near Term Deployment (NP-T-1.10, Rev. 1)
46. Determination of Environmental Remediation End States
47. Communication and Stakeholder Involvement in Radioactive Waste Disposal
48. Resource Requirements for Nuclear Power Infrastructure Development
49. Organization and Technical Options for Radioactive Waste Minimization during Operation and Maintenance of Nuclear Facilities
50. Knowledge Organization System for VVER Water-Cooled Water-Moderated Power Reactors
51. Guidelines for Conducting Strategic Environmental Assessment for a Nuclear Power Programme

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Additional information for NES publications under preparation (as listed in Part I)
| 1. Establishing and Managing a Radioactive Waste Management Organization with Responsibility for Repository Development | The objective of the document is to advise on practical aspects of a repository development project, in particular on how to prepare, plan, launch, perform and manage it. Technical activities shall be performed taking into account the possible mutual interactions between cross-linked tasks and relevant interfaces among project components. It is intended to describe managerial processes rather than to specify detailed technical solutions. In this frame, the document should cover both near-surface and geological disposal programmes, with their varying duration, technical focus and intensity of site characterization and assessment, but highlighting similar decision-making processes, methodologies, public interaction, information/data management and sequencing of main activities.

The document will be introduced by the consideration of prerequisites before starting a repository development project, followed by the overview of component’s specifications, their relationships, and indicative sequence of key activities/stages. Based on experience from countries with advanced programmes, it will further include stepwise description of appropriate planning, managing, organizing, staffing and implementing repository development process that will be illustrated by country cases. |

| 2. Decommissioning of Industrial and Research Gamma Irradiators and Management of Associated Radioactive Sources | This report is intended to collect information on experience and lessons learned from implementation of decommissioning projects for disused gamma irradiators and the management of their associated high activity sealed sources. Based on this information, the report will provide practical guidance for organizations that have a role in this process and will highlight typical issues and concerns in decommissioning irradiators. |

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This document will cover all technical and organizational aspects related with the decommissioning of industrial and research gamma irradiators and the management of the associated radioactive sources including decontamination operations associated with leaking sources. Radiotherapy equipment (Teletherapy, brachytherapy), industrial radiography equipment, nuclear logging equipment and industrial gauges are out of the scope of this document, because their dismantling requirements are comparatively simpler. Information will be provided on the various types of gamma irradiators in use at industrial facilities, or research centers, and how their design and construction features affect decommissioning. Practical guidance will be given on decommissioning strategies and technologies for the removal/recovery and management of the high activity sources. Reports on various gamma irradiators decommissioning projects that have been completed will be summarized. Lessons learned from both good and bad practices will be discussed.

This report will address, among others, the following major issues:

- Research and industrial gamma irradiators, types, number, construction and operational features
- Estimated life and reasons for shutdown of gamma irradiators
- Types and features of gamma irradiators and their influence on decommissioning
- Radiological characterization of irradiators
- Decontamination/dismantling strategies and their occupational / environmental impact
- Removal and Management (handling, conditioning, packaging, transport, storage and disposal) of the high activity sources during and after decommissioning. Experiences
- Organizational and managerial aspects of decommissioning (including costs)
- Project description, experience and issues (Annex)
- Case histories (Annex)

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<th>3. INPRO Methodology for Sustainability Assessment of Nuclear Energy Systems: Nuclear Security</th>
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<td>In this manual guidance is provided in assessing a nuclear energy system (NES) in the area of physical protection. The manual does not, however, provide guidance on implementing a physical protection regime in a country. Rather, the intention is to check whether such activities are (or will be) implemented to meet the INPRO methodology criteria, and hence the user requirements and the basic principle for physical protection. Physical protection focuses on the prevention and detection of and response to theft (unauthorized removal), sabotage, unauthorized access, illegal transfer or other malicious acts involving or directed at nuclear material, other radioactive materials, associated facilities, or associated activities. The INPRO methodology in the area of physical protection consists of one basic principle and eight user requirements. These requirements, if met, will result in an effective and efficient physical protection regime for the full lifecycle of a NES, i.e. will lead to long term sustainability of the system. They address four general areas of a physical protection regime:</td>
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<tr>
<td>• Legislative and regulatory framework</td>
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<td>• Siting, layout, and design of the NES facilities for physical protection</td>
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<td>• Design of the physical protection system; and</td>
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<td>• Contingency planning and consequence mitigation.</td>
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<td>The INPRO methodology user requirements were developed with due consideration of the Fundamental Principles of Physical Protection defined in the amendment to the Convention on the Physical Protection of Nuclear Material and Nuclear Facilities and the Essential Elements of a nuclear security regime (Nuclear Security Fundamentals, IAEA Nuclear Security Series No.20).</td>
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| 4. Contracting and Partnering in Decommissioning and Environmental Remediation | This publication is aimed at making available practical guidance regarding safe, timely and cost-effective participation of contractors and partners in a decommissioning or environmental remediation project.

The proposed task includes a study of experiences and lessons learned related to the role of and potential issues with contractors and partners in different cultures and working environments. This report will address, among others, the following major issues:
- O&M during active phases of decommissioning or environmental remediation
- O&M for the post-decommissioning or post-remediation phase of site reuse/redevelopment
- Organization of the decommissioning or environmental remediation workforce, including roles, responsibilities, reporting lines, qualifications and training
- In-house vs. contractors’ approach
- Management of contracted services (forms of contracts, administration, milestones, closure, payments etc.)
- Interactions contractor - plant staff
- Management of information
- Partners and their involvement
- National project description (Annex)
- Case histories (Annex) |

| 5. Lifecycle Management and Sustainability for Environmental Remediation | The objective of the document to be produced is to show how life-cycle assessment approach can be used to direct the development of technical activities according to environmental considerations with emphasis on the environmental remediation stage of the project. With this document Member States will have more elements to design their operations in order to maximize the environmental performance as to choose options that make sense if the whole Life-Cycle perspective of the operations is taken into account.

In a very brief way, the scope of the document will cover in an integrated manner the production, processing, waste treatment and disposal, rehabilitation and aftercare stages are integrated. As it can be seen the scope of the document goes far beyond than simple waste management planning and remediation from the very start of a project. |

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<td><strong>6. Handbook on Conditioning of Low- and Intermediate-Level Liquid, Solidified and Solid Waste</strong></td>
<td>The handbook is expected to provide end-users in Member States with necessary knowledge and information to understand and effectively implement technologies for conditioning of low and intermediate level liquid, solidified and solid waste. This document will integrate safety and technical information on conditioning of low and intermediate level liquid, solidified and solid waste. The new publication will supersede the outdated IAEA technical documents, published in period from 1970 to 2007 into one consistent handbook on the subject matter for designers, operators and regulators.</td>
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| **7. Guidance for the Sampling and Characterization of NORM Residues and Wastes** | The primary objectives of the publication are to:  
· Compile and share good practices and technologies to support Member States in (1) acquiring knowledge, (2) obtaining practical experience, and (3) implementing best practices related to the implementation of representative sampling of NORM residues.  
· Share sampling protocols developed for different NORM residues, supported by statistical concepts to ensure recognition of representativeness of collected samples.  
· Provide guidance on in-situ measures and laboratory procedures in the characterization of NORM residues and wastes |   |
| **8. Instrumentation and control and advanced digital technologies for the support of plant performance optimization** | The objective of the publication is to produce a new NE Series (NES) report to assist Member States in the judicious use of advanced I&C and digital technologies, so that existing and new NPPs are operated at their best possible performance level, and that costs of operation are minimized while ensuring high levels of safety and security and also to provide an overview on the current knowledge, up to date best practices, experiences, benefits and challenges related to the subject approaches (listed under “Scope”) on the role of I&C and advanced digital systems in supporting the improvement and optimization of plant performance. |   |

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9. Development considerations and life cycle management approaches for nuclear facility I&C systems

| The objective of the DPP is to produce a new NE Series (NES) report to assist Member States in raising awareness and a greater understanding of the approaches that can be adopted for life cycle management as applied to I&C system design and development. The life cycle management needs to be applicable to all I&C systems at a nuclear facility, including the overall engineering life cycle of I&C systems important to safety as described in IAEA SSG-39. The aim of the publication is to provide an overview on the current knowledge, up to date best practices, experiences, benefits and challenges related to the subject approaches (listed under “Scope”) on I&C systems life cycle management. This includes the coordination of life cycle management methods applied to I&C systems and those applicable to any safety systems that they might interconnect or otherwise interface with. The report is intended to be used by Member States to ensure that appropriate considerations are made to support the introduction of life cycle management approaches for all relevant stakeholders involved in the development of I&C for nuclear facilities and to discuss how these activities can support their safe, reliable and long-term operation. |

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| The storage of radioactive waste is an integral part of waste management from raw waste to fully conditioned waste packages ready for final disposition. The purpose of a storage facility or structure is to safely and securely contain the packaged radioactive waste in an organized and retrievable fashion for a defined period of time, while ensuring that the radiation protection of workers, the public and the environment are properly addressed according to applicable regulations.

IAEA publications regarding technical, managerial and safety-related aspects of radioactive waste storage were published between 1972 and 2006 and cover this topic to varying degrees. Whilst useful information is available in different publications, this information can be organized into a single publication to facilitate easier use for specific needs of the Member States. Thus, a Handbook is developed to update, consolidate and integrate in a coherent information provided in current IAEA publications with current operational, safety and technical information on approaches and technologies for storage of radioactive waste and conditioned waste packages.

The primary objective of this document is to provide state-of-the-art guidance to Member States on the storage of radioactive waste and conditioned waste packages in storage facilities. It aims to align technical information with safety assessment and operational needs, to provide operating experience and lessons learned and to have an adequate basis for development of training material required for technology transfer to less-developed Member States.

The information contained in the existing published Agency documents in this area will be consolidated, updated and organized in line with the proposed new Handbook structure. Consideration is given to waste storage in both initial unconditioned form (including liquid/sludge form) as well as disposal-ready conditioned waste packages awaiting final disposal.

As such, this publication will:

1. Summarize the lessons learned from the storage of radioactive waste in the past;
2. Succinctly state the technical requirements and conditions for selecting, designing and safely operating storage facilities for different types of waste;
3. Succinctly state the technical requirements and conditions for selecting, designing, specifying and using waste packages and waste forms for different types of waste;
4. Provide examples of various types of waste packages and storage facilities and their related technical and operating parameters;
5. Identify any other related technical considerations.

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| Low and intermediate level solid wastes are generated from nuclear power reactors, front and back-end fuel cycle facilities and nuclear applications. Over the years, a wealth of information has been accumulated on the principles and practices of the safe and efficient treatment of such wastes. Much of this information is now available in the public domain in the form of Agency publications. There are around 16 such publications dealing with various facets of solid waste treatment. Some of these are 20 and 40 years old, and others address specific aspects such as hospital wastes, graphite wastes or small waste producers. Whilst all this information is useful to the end-users in Member States, it is also recognized that there is room for improvement in the way the information is organized and presented so that it becomes easier to use for specific needs, plus updating is required to cover recent developments in this field. Such improvement is envisaged to be brought about by consolidating, updating and organizing the information in a structured way. This handbook will provide state of the art technical guidance to designers, operators and regulators in Member States in the area of treatment of low and intermediate level solid waste.

This work is part of a comprehensive effort to consolidate, update and reorganize technical information for publication as NE Series Technical Reports in the various areas of predisposal radioactive waste management. The present Handbook is one of a series of such publications.

The main objective of the document is to provide a comprehensive state-of-the-art source of relevant and practical information for assessing potential options for the treatment of low and intermediate level solid waste, and to facilitate the identification and safe, cost-effective implementation of an optimum treatment strategy for such wastes.

The information contained in the existing published Agency documents in this area will be consolidated, updated and organized in line with the proposed new Handbook structure.

The document will cover the treatment (volume reduction, stabilization, and change of form) of all types of low and intermediate level solid waste from power reactors, fuel cycle facilities and nuclear applications, including research institutions, medical usage, industrial use etc., including wet sludges and spent ion exchange resins. Some ‘specialist’ waste treatments such as alkali metal treatment, graphite wastes treatment will not be directly covered as suitable focused technical reports are already available.

The report will be structured in two parts: Part I will provide a technical overview of applicable treatment technologies and approaches, and considerations for their application. Part II will comprise of Annexes which describe each of the technologies/approaches in detail, including mode of operation, design and operational aspects.

This structure is based on the generic structure of the Handbook series.

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Low and intermediate level liquid wastes are generated from nuclear power reactors, front and back end fuel cycle facilities and nuclear applications. Over the years, a wealth of information has been accumulated on the principles and practices for the safe and efficient treatment of such wastes. Much of this information is now available in the public domain in the form of Agency publications. There are many publications dealing with various facets of liquid waste treatment. Whilst all this information is useful to the end-users in Member States, it is also recognized that there is room for improvement in the way the information is organized and presented so that it becomes easier to use for specific needs, plus updating is required to cover recent developments in this field. Such improvement is envisaged to be brought about by consolidating, updating and organizing the information in a structured way. This Handbook will provide state of the art technical guidance to designers, operators and regulators in Member States in the area of treatment of low and intermediate level liquid waste. This work is part of a comprehensive effort to consolidate, update and reorganize technical information for publication as NE Series Technical Reports in the various areas of predisposal radioactive waste management. The present Handbook is one of a series of such publications.

The main objective of the document is to provide a comprehensive state-of-the-art source of relevant and practical information for assessing options for the treatment of low and intermediate level liquid waste, and to facilitate the identification and safe, cost-effective implementation of an optimum treatment strategy for such wastes.

The information contained in the existing published Agency documents in this area will be consolidated, updated and organized in line with the proposed new Handbook structure.

The document will cover the treatment of all types of low and intermediate level liquid waste from power reactors, fuel cycle facilities and nuclear applications, including research institutions, medical usage, industrial use etc., including wet sludges and spent ion exchange resins.

The report will be structured in two parts: Part I will provide a technical overview of applicable treatment technologies and approaches, and considerations for their application. Part II will comprise of Annexes which describe each of the technologies/approaches in detail, including mode of operation, design and operational aspects. This structure is based on the generic structure of the Handbook series.

Part I will cover the following areas:

— Overview of requirements for treatment of L&IL liquid wastes;
— Waste inventory requirements for treatment of L&IL liquid waste;
— Overview of applicable treatment technologies;
— Technology selection considerations;
— Implementation of preferred strategy;
— Conclusions and recommendations

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Part II will include Annexes that will provide detailed information for each of the treatment technologies discussed in Part I. This information will include technology deployment configurations, system design and operational considerations. Note – only Part I of the document is planned to be published in print. Part II of this report will be available in electronic form only, i.e. on CD which will be included with the print version of Part I.
| 13. Enhancing National Safeguards Infrastructure to Support the Introduction of Nuclear Power | This publication provides guidance on safeguards-related activities that need to be carried out during each of the three phases of nuclear power infrastructure development. A country can use it to help ensure that:

1. It is aware of the safeguards obligations associated with the introduction of nuclear power;
2. The state authority responsible for safeguards implementation and the nuclear power plant (NPP) owner/operator plan and systematically develop the necessary technical and administrative competencies on timescales consistent with the development of the nuclear power programme, including, for example, for licensing requirements related to safeguards; for locating, collecting, managing and reporting relevant information; for conducting domestic inspections; and for cooperating with the IAEA and relevant stakeholders. This may require additional staffing, training and technical capabilities.

It has, in a timely manner, adequately strengthened the state system of accounting for and control of nuclear material (SSAC) to (a) regulate and control the nuclear material and related activities associated with the nuclear power programme, (b) provide correct and complete information, on time, to the IAEA, and (c) facilitate IAEA verification activities through institutional arrangements and by providing access to IAEA inspectors.

This publication covers the necessary safeguards infrastructure and associated activities required for the implementation of a nuclear power programme, within the context of a country’s international safeguards obligations. The infrastructure needs are discussed in detail from consideration and decision-making, through programme implementation, construction, fuel delivery and preparation for NPP commissioning. Subsequent steps including operation, spent fuel and radioactive waste management and decommissioning are addressed to the degree necessary for informed decision-making and future planning. |

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### 14. Vendor and User Responsibilities in Nuclear Cogeneration Projects

The objective of this document is to: 1) Analyse responsibilities and requirements of users and vendors involved in nuclear cogeneration plants compared to the ones for standalone NPPs; 2) develop a generic algorithm to define the roles of various stakeholders in nuclear cogeneration project in general, and users and vendors in particular; in consideration of the technology, business models, regulations, public sensitivity, media involvement, scientific groups, etc; and 3) develop guidelines for vendors and users of retrofit and new build projects covering production of electricity and process steam for nuclear cogeneration applications such as desalination, district heating, hydrogen production.

The scope of this document includes both new build as well as potentially retrofitted projects in terms of technical and managerial requirements within the context of the national, vendor’s, and user’s requirements that may be established for nuclear cogeneration projects. It will analyse responsibilities and requirements of stakeholders involved in nuclear cogeneration projects taking into consideration the different aspects of implementation, including: economic, technical, safety, environmental, communication, regulatory, and contractual issues. It will also provide an insight to issues and lessons learned from previous experiences on the planning and deployment of such projects. The document will highlight and discuss concerns and challenges for nuclear desalination projects, being considered as example of nuclear cogeneration. Common understandings from stakeholders, including cases of multiple vendors for nuclear and the non-electric application plant (i.e. desalination plant) will be addressed. As a result, the document will provide an implementation roadmap and recommended practices for the project planning, commissioning, operation, and decommissioning of nuclear cogeneration projects.

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15. Global Status of Decommissioning of Nuclear Facilities

A significant proportion of the nuclear power plants currently in operation around the world are more than 30 years old and are likely to be withdrawn progressively from service between now and 2050; a similar situation applies in the case of research reactors and for other facilities forming part of the nuclear fuel cycle. This will result in increasing needs over the coming decades for comprehensive decommissioning and associated waste management programmes throughout the nuclear sector.

In 2019 IAEA launched an international collaborative project to collect and analyze the current global status and future prospects for decommissioning of nuclear facilities (Technical Meeting, 26-30 August 2019, Vienna International Centre), following which the Terms of Reference for the project were finalized by a Steering Group comprising representatives from Member States with significant decommissioning programmes. The Terms of Reference were issued to Member States in February 2020, together with details of an online survey to collect data on decommissioning plans. The collected national-level information will not be published; rather it will inform a global and regional-level analysis of current practice in decommissioning and of future plans.

The goal of the ‘Global Status of Decommissioning’ project is the collection and analysis of authoritative information on the current status and likely future evolution of nuclear decommissioning activities around the world. Such information is currently not generally available and therefore the deliverables from this project will address a current knowledge gap.

The main output from the project will be a report on ‘The Global Status of Decommissioning’, expected to be finalized in 2021. Inter alia, the report will discuss envisaged decommissioning strategies, timeframes and milestones, current status of programmes (including important drivers or restraints on implementation) and foreseen strategic issues including resource needs, in terms of human resources and technological developments necessary for effective implementation of future programmes. The analysis will provide information at global/regional, rather than national, levels. It is anticipated that the project will provide benefits in a number of key areas:

- Support benchmarking, planning and decision making;
- Facilitate collaboration between Member States with similar challenges and opportunities;
- Make available data which can support further analysis.

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### 16. Decontamination Methodologies and Approaches

Decontamination is an option successfully employed to address the inevitable build-up of radioactive contamination on surfaces of systems, structures and components in a nuclear or radiological facility. The application of decontamination techniques may have different objectives such as reducing occupational exposures, limiting releases to the environment and uptake of radioactive substances, permitting the reuse of components and recycle of materials, and reducing the burden on further waste management particularly disposal. Decontamination processes are carried out during facility operations, outages and during decommissioning. However, although beneficial per se, the decision to decontaminate should be weighed against the associated impacts and costs.

For decades a number of decontamination methods have been developed for use in the non-nuclear industry, and later adapted for the nuclear industry. Decontamination methodologies have benefited from a large amount of R&D and innovative techniques are being developed. The IAEA has followed this evolution with a number of publications on the subject, mostly focusing on state-of-the-art and emerging technologies: however, international and IAEA publication on factors relevant to the selection of a decontamination method, the decision-making process, case histories and lessons learned does not exist thus this proposed report will address that need.

The objectives of the publication are:

- Provide information and guidance on relevant factors (technological, safety, environmental, organizational etc.) in the selection of decontamination strategies and methods;
- Set out general approaches to the holistic assessment of above-mentioned factors leading to the selection of preferred method(s); and
- Inform the reader about experience and lessons learned from the application of decontamination techniques on success (or failure), through case studies.

This report focusses on the decision-making factors to be considered when planning decontamination activities. It includes consideration of several relevant factors and how these factors are seen as a whole, in preparing an integrated programme. It is not the intent of this document to duplicate available information on proven decontamination technologies but rather prepare the user to make an informed decision regarding and selection and deployment of a particular decontamination approach and methodology.

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| 17. Quality and Reliability Aspects in Nuclear Power Reactor Fuel Engineering (Rev.1) | The main objective of the publication is to provide guidance and best practices to improve fuel reliability and performance in water-cooled reactors. This publication will cover:  
- Design (e.g. simulation tools, design methodologies, safety limits, design process...),  
- Fabrication (e.g. QA process, fuel vendor surveillance, ...),  
- Operation (e.g. monitoring of defected fuel, surveillance of the key parameters, water chemistry monitoring, fuel assembly distortion, sustainable power manoeuvring, pool side inspections, ...),  
- Handling (e.g. distorted fuel assemblies for reuse, debris, transport to the reactor, loading into the reactor, discharge from the reactor...),  
- Spent fuel storage (e.g. no failure in “at reactor” spent fuel pool, testing for gamma radiation activity, pool-side inspection, PIE strategies, ...). |

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| 18. Preparation of a Feasibility Study for New Nuclear Power Projects (Rev.1) | This publication is intended to update the previous IAEA publication “Preparation of a Feasibility Study for New Nuclear Power Projects (IAEA NG-T-3.3, 2014)” by aligning the activities with the current milestones approach, by reflecting the pre-feasibility study scope versus the feasibility study scope and by recent experiences from Member States. The review will also address the technical content of the described activities to reflect the actual experience and knowledge.

The objective of the revised publication is to facilitate an understanding of the necessary activities to be performed during a feasibility study in the context of the Milestones approach for the introduction of a nuclear programme.

The discussions are intended to be in context with the nuclear infrastructure development approach described in NG-G-3.1, ‘Milestones in the Development of a National Infrastructure for Nuclear Power.’ Rev 1. This revised publication will describe the responsibilities and activities related to the feasibility study by all stakeholders involved in the nuclear programme.

This publication will define the objectives and scope of the pre-feasibility study performed in phase 1 and of the feasibility study in phase 2 and explain the key managerial and strategic elements of the latter. It will describe the various steps generally undertaken to prepare a feasibility study in relation to the prerequisites of a nuclear project. It will provide an effective guideline in support of prospective organizations of countries that are embarking on their first nuclear power project. Roles of stakeholders in the preparation of a feasibility study for the introduction of a nuclear project will be discussed.

This publication will review the existing document for consistency with current experience from newcomers, and with technical developments in the areas covered by the feasibility study since the publication of the document in 2014.

The publication is intended to support the countries in considering and applying suitable options for accelerated clean energy deployment. |

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| 19. Milestones in the Development of a National Infrastructure for Nuclear Power (Rev. 2) | The main objectives of the revision are to:
- incorporate the recent experience of advanced embarking countries, in particular those with advanced projects (Phase 3 countries) or that have already started operation (recent experiences of UAE and Belarus which started operation of the first units in 2020)
- incorporate, when appropriate, considerations to programmes with SMRs instead of large nuclear power reactors. A Technical Meeting held in 2020 on this particular issue, concluded that the 19 issues of the Milestones approach apply as well to programmes based on SMRs; however some aspects of the infrastructure could be implemented or considered differently. Among others, this is the case of the issues related to financing, regulatory framework, emergency planning, siting, and industrial involvement.
- refer, in more detail, to the potential use of non-electric applications, such as district heating and desalination, and their potential implication. These topics are already listed in the Milestones approach, but more considerations could be included.

The scope of the document will be, to a large extent, maintained as it will not be impacted by the proposed considerations: This publication covers both the ‘hard’ infrastructure (i.e. electrical grid and sites, etc.) and ‘soft’ infrastructure (i.e. nuclear law, regulations, training, etc.) needed for a nuclear power programme. Infrastructure needs are discussed from the time a country first considers the nuclear power option, through decision making, planning, procurement, construction and preparations for commissioning. Subsequent steps — operation, decommissioning, spent fuel and radioactive waste management — are addressed only to the degree necessary for planning purposes prior to commissioning and operation. They are included because all stages, including operation and decommissioning, as well as spent fuel and radioactive waste management, should be considered when the decision is made to proceed with nuclear power and because planning for these stages should be in progress by the time specifications for the plant are set. By the time the country is ready to commission and operate a nuclear power plant, it should be ready to manage the longer-term commitments associated with operation, spent fuel and radioactive waste management, and decommissioning. |

* Manuscripts in the process of being drafted (open to contributions)
** Manuscripts approved in their final form and awaiting production

This publication will aim to provide a generic implementation level guidance, based on the experience and current knowledge, for design control, i.e. for developing, establishing, implementing, assessing, and continually improving a structured preparation, review, acceptance, approval and modification of NPP project and plant designs and associated responsibilities, including the cases of new NPP designs, changes to the existing NPP designs and redesign of NPPs.

It will address relevant aspects of performing effective design (and the modifications to it) development, review and approval in support of decision making on nuclear project/plant safety and performance by providing a common understanding of the design activities and their implementation throughout the NPP lifecycle. It may also serve as a roadmap towards capacity building in countries embarking on nuclear power programmes by describing forthcoming design development acceptance, control and maintenance activities and associated skills.

The publication intends to disseminate the observations gained, the lessons learned and the conclusions drawn from good practices for defining and maintaining fundamental elements, roles, responsibilities and interfacing requirements for NPP owner/operating organizations and nuclear power plant/project entities concerning the acceptance and utilisation of initial facility design (and the changes to it thereafter). As such, it provides a set of descriptive and practiced processes that integrate safety, performance and economical aspects to achieve safe, reliable, and efficient nuclear electricity and energy generation with an emphasis on strengthening the design decision making capabilities supported by adequate and timely maintenance and control of the NPP design.

This publication will describe the specific design process stages, elements and associated design control activities and roles that are applied throughout NPP lifecycle by the decision makers of a NPP or a NPP project.

In order to provide guidance for a structured and rigorous design control process, this publication will develop an understanding of fundamental and specific definitions, phases and techniques, interfaces and assessment methods of the design control process towards design decision making capabilities on the NPP design at various stages of its lifetime to maintain the design integrity.

The scope will not include the design control process during the development of a technology (e.g. design of a generic/standard reactor design) that is performed by the technology owners, i.e. nuclear steam supply system (NSSS) vendors/responsible designers. However, the publication will discuss necessary actions by the purchaser of the technology to ensure that the technology owner/designer has an established and appropriate design control and assurance processes.

* Manuscripts in the process of being drafted (open to contributions)

** Manuscripts approved in their final form and awaiting production
| 21. **Guidance for the Sampling and Characterization of NORM Residues and Wastes** | The two primary objectives of the publication are to:

- Compile and share good practices and technologies to support Member States in (1) acquiring knowledge, (2) obtaining practical experience, and (3) implementing best practices related to the implementation of representative sampling of NORM residues.
- Share sampling protocols developed for different NORM residues, supported by statistical concepts to ensure recognition of representativeness of collected samples.
- Provide guidance on In-situ measures and laboratory procedures in the characterization of NORM residues and wastes.

The publication encompasses the sampling and analysis of residues that include, but may not be limited to:

- Active facilities or legacy sites with NORM radioactive contamination issues
- Oil and gas industry,
- Mining and processing of minerals leading to enhancement of natural radionuclides in industrial residues such as in the zirconium, titanium, rare earths processing operations among others
- Environmental compartments contaminated by NORM containing residues |

| 22. **Strengthening Organizational Resilience in the Nuclear Organization** | This publication is intended to offer guidance on how to elicit and strengthen resilient performance at the individual, group, and institutional levels to optimize nuclear safety, security, and performance and create institutional strength in depth.

This document will cover the following content:

- Cognitive and behavioural agility
- Adaptive capacity
- Decision-making, both risk-based and naturalistic (e.g., emergent)
- Navigating in complex and complicated environments
- Risk analysis and success path formation |

* Manuscripts in the process of being drafted (open to contributions)
** Manuscripts approved in their final form and awaiting production
23. Guidance for Preparing Generic User Requirements and Criteria Documents for Small Modular Reactors and their Applications

| **Guidance for Preparing Generic User Requirements and Criteria Documents for Small Modular Reactors and their Applications** | To serve as a guidance document that provides a framework to cover any near-term deployable SMR designs, basing on identify identified specific requirements and criteria associated with the need of SMR technologies for various energy market niches, by considering key technology attributes of SMRs and Member States’ specific needs and conditions, with feedbacks from Member States by conducting exchange of information, sharing experience and expertise, and discussions on the development of guidance on preparing generic user requirements and top-tier criteria for small modular reactor technology for near term deployment.

The scope of Guidance for Preparing Generic User Requirements and Criteria Documents for Small Modular Reactors and their Applications herein is for developing a comprehensive statement which reflects key policy of a Member State on the expectations of its user/owner/operator on SMR technology. This publication places emphasis on the standing points of users/owners/operators who drive the demand and requirements for the reactor designs. It also provides a basis for designers/developers to offer a licensed SMR product that addresses/incorporates specific needs of embarking countries, and for strong investor confidence that risks associated with the initial investment to complete and operate the first SMR can be minimized.

The publication is divided into three parts:

**Part I** is to establish the background, objective, scope and structure of the guidance for preparing GURC documents for SMR and their applications.

**Part II** is to introduce GURC and to provide a generic structure and main contents that need to be addressed for the GURC document. The generic structure includes national nuclear energy programme, national scenario of energy for electricity and other applications, overall safety performance objectives, technical considerations, general plant performance, economic requirements, deployment scenario, infrastructure development, considerations on deployment models, safeguards, proliferation resistance, security, and microreactors options.

**Part III** is to summarise and give a set of recommendations.

The Appendix A shows the status of SMRs for near-term deployment. The Appendix B lists the IAEA’s Safety Standards for readers’ reference.

The Annex provides an example of GURC Document respectively of an embarking country and of an expanding country, only on the aspect of top-tier requirements. |

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** Manuscripts approved in their final form and awaiting production
| 24. Nuclear Fuel Technologies for Liquid Metal Cooled Fast Reactors (LMFRs) | The new IAEA NES Document “Nuclear Fuel Technologies for Liquid Metal Cooled Fast Reactors (LMFRs)” should update and complement the IAEA Nuclear Energy Series No. NF-T-4.1 (published in 2011) and cover the development (i.e., design, manufacturing, thermo-physical properties, irradiation experiments, post irradiation examinations, and fuel performance) of fuels for LMFRs, including SMRs. It will not include any information on the SNF management (such as their storage, recycling and reprocessing and their transportation). |

* Manuscripts in the process of being drafted (open to contributions)

** Manuscripts approved in their final form and awaiting production