IAEA Nuclear Energy Series

No. NG-T-3.2 (Rev. 2)

Evaluation of the Status of National Nuclear Infrastructure Development

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EVALUATION OF THE STATUS OF NATIONAL NUCLEAR INFRASTRUCTURE DEVELOPMENT

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EVALUATION OF THE STATUS OF NATIONAL NUCLEAR INFRASTRUCTURE DEVELOPMENT

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FOREWORD

The IAEA's statutory role is to "seek to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world". Among other functions, the IAEA is authorized to "foster the exchange of scientific and technical information on peaceful uses of atomic energy". One way this is achieved is through a range of technical publications including the IAEA Nuclear Energy Series.

The IAEA Nuclear Energy Series comprises publications designed to further the use of nuclear technologies in support of sustainable development, to advance nuclear science and technology, catalyse innovation and build capacity to support the existing and expanded use of nuclear power and nuclear science applications. The publications include information covering all policy, technological and management aspects of the definition and implementation of activities involving the peaceful use of nuclear technology.

The IAEA safety standards establish fundamental principles, requirements and recommendations to ensure nuclear safety and serve as a global reference for protecting people and the environment from harmful effects of ionizing radiation. When IAEA Nuclear Energy Series publications address safety, it is ensured that the IAEA safety standards are referred to as the current boundary conditions for the application of nuclear technology.

Appropriate nuclear infrastructure is essential for the safe, secure, peaceful and sustainable application of nuclear power. Countries considering nuclear power face the challenge of building the necessary nuclear power infrastructure for their first nuclear power plant. The IAEA supports its Member States by providing guidance through increased technical assistance, missions and workshops, and with new and updated technical publications. IAEA Nuclear Energy Series NG-G-3.1, Milestones in the Development of a National Infrastructure for Nuclear Power, first published in 2007 and subsequently revised in 2015, presents an approach to developing nuclear power infrastructure and identifies three milestones in the development of nuclear power infrastructure. Known as the 'Milestones approach' it provides an internationally accepted methodology that supports a sound development process for a new nuclear power programme, enabling a country to understand and prepare for the commitments and obligations associated with developing a safe, secure and sustainable nuclear power programme and its governance.

IAEA Member States have since requested additional information on determining how to assess the progress of their infrastructure development for nuclear power programmes. The present publication was prepared in response to their request. It provides a methodology for evaluating the status of national nuclear infrastructure development based on the guidance presented in the Milestones approach.

The evaluation methodology provides a comprehensive means to determine the status of the infrastructure conditions covering all 19 issues identified in Milestones approach. This methodology can be used by any interested Member State for self-evaluation to identify the additional work needed to develop appropriate national nuclear power infrastructure. In addition, the methodology is used as the basis of Integrated Nuclear Infrastructure Review peer review missions. These reviews help to determine progress in developing the national nuclear infrastructure areas for which IAEA assistance is requested. The evaluation methodology also helps to enhance national and international confidence in a Member State's ability to embark on a nuclear power programme including among potential nuclear power plant suppliers.

This publication is the second revision of IAEA Nuclear Energy Series NG-T-3.2, Evaluation of the Status of National Nuclear Infrastructure Development, which addressed the first two phases in the development of a nuclear power programme as described in the Milestones approach. The first revision of the publication (NG-T-3.2 (Rev. 1)) took into account the feedback from its use in a number of Integrated Nuclear Infrastructure Review missions and self-evaluations, the publication of a number of guides for each infrastructure issue and the lessons learned from the accident at the Fukushima Daiichi nuclear power plant. The second revision of this publication includes the evaluation methodology for the third phase that was finalized using the feedback from two pilot Integrated Nuclear Infrastructure Review Phase 3 missions.

The IAEA officers responsible for this publication were M. Ceyhan and J. Bastos of the Division of Nuclear Power.

CONTENTS

1. INTRODUCTION

1.1. BACKGROUND

A nuclear power programme is a major undertaking requiring careful planning, preparation and investment in time, institutions and human resources. While nuclear power is not alone in this respect, it differs from other energy sources because of the safety, security and non-proliferation requirements associated with using nuclear material.

The development of a nuclear power programme involves attention to many complex and interrelated issues over a long period. The introduction of a nuclear power programme involves a commitment of at least 100 years to maintain a sustainable national infrastructure throughout siting, construction, operation, decommissioning and waste disposal.

The IAEA publication NG-G-3.1 (Rev. 1), Milestones in the Development of a National Infrastructure for Nuclear Power [1] (henceforth referred to as the Milestones publication), describes the detailed infrastructure needed to support such a programme. It identified 19 infrastructure issues to be addressed by a Member State that is considering the introduction of nuclear power as part of its national energy strategy. It noted that early attention to all the identified issues would facilitate a successful nuclear power programme, whereas insufficient attention to any of them might compromise safety or lead to costly delays or even project failure.

As with any major programme, the commitment of resources to a nuclear power programme needs to be phased, and decisions to move to subsequent phases, where the commitment of resources will increase significantly, need to be made with a full understanding of the requirements, risks and benefits. The Milestones publication [1] identified three distinct phases in the introduction of a nuclear power programme:

— Phase 1: Considerations before a decision to launch a nuclear power programme is taken;
— Phase 2: Preparatory work for the construction of a nuclear power plant after a policy decision has been taken;
— Phase 3: Activities to implement a first nuclear power plant.

This publication is intended to complement the information presented in the Milestones publication [1] by providing an approach for evaluating the status of each of the 19 infrastructure issues in a Member State. It is therefore essential that people involved in developing infrastructure read and fully assimilate the guidance of the Milestones publication [1] before considering this evaluation approach.

This publication addresses all three phases in the development of a nuclear power programme, as described in the Milestones publication [1].

It is necessary to review progress across all 19 infrastructure issues, as each one is essential, and because they are interconnected. The management of each infrastructure issue and the human and financial resources required to support them need to be fully integrated. It is for this reason that the evaluation approach described in this publication addresses all 19 infrastructure issues.

This publication supports Member States in ensuring that all 19 infrastructure issues are reviewed and to ensure that results are compiled to provide an integrated view of progress. An assessment can be carried out at any time; however, the basis of evaluation provided in this publication is specifically appropriate to the end of each phase. Such an assessment will allow the Member State to identify those areas that need more focus or additional resources, or to confirm its readiness to move to the next phase.

The basis for the evaluation approach provided here comes from the Milestones publication [1], the requirements, recommendations and guidance of the IAEA safety standards, and the experience and good practices of Member States with developed nuclear power programmes. It is possible that there will be additional items, particular to Member State specific requirements, that will need to be addressed.

1.2. OBJECTIVES

This publication provides a holistic approach to evaluating progress in the development of nuclear power infrastructure based on the guidance contained in the Milestones publication [1]. It can be used either by a Member State wishing to evaluate its progress (self-evaluation), or as a basis for an external evaluation where the Member State wishes to invite the IAEA to conduct an Integrated Nuclear Infrastructure Review peer review mission. The aim of the evaluation approach is to:

— Evaluate all relevant infrastructure issues in a consistent manner;
— Compile results in order to identify a comprehensive action plan for moving into a subsequent phase of the establishment of infrastructure for nuclear power;
— Provide a consistent international approach;
— Enhance national coordination and competence through participation in a detailed and comprehensive evaluation.

1.3. SCOPE

The scope of this publication includes the evaluation of the 19 infrastructure issues that are discussed in the Milestones publication [1]. It provides a means of evaluating the status of the issues for all three phases in the development of a nuclear power programme.

The results of the evaluation described in this publication include evidence that:

— All the work required in the phase leading up to the milestone has been completed adequately;
— The plans for the following phase are comprehensive and realistic.

1.4. STRUCTURE

This publication consists of two main sections in addition to this introduction. Section 2 summarizes the programme phases and milestones associated with a nuclear power programme. It also describes the steps of the evaluation approach. Section 3 provides detailed guidance on the evaluation of each issue for all three phases. The Appendix provides examples of evaluation forms for recording the results of the review.

1.5. USERS

This publication is principally for decision makers, advisers and senior managers in government, industry and regulatory bodies in a Member State interested in developing nuclear power. This publication can also be used by Integrated Nuclear Infrastructure Review team members to help them assess a Member State's progress in developing the infrastructure necessary for nuclear power and provide timely and meaningful assistance. Other organizations, such as suppliers, financing institutions, nuclear energy agencies and operating organizations, may also use this publication to increase confidence that a Member State has the infrastructure necessary for nuclear power or to identify areas for potential assistance. Member States interested in expanding their existing nuclear power programmes may also find the publication helpful, particularly if it has been a long time since they last built a new nuclear power plant.

This publication provides guidance to Member States on how to evaluate the progress of their nuclear power infrastructure development and their readiness to move to the next phase. Neither this publication nor the Milestones publication [1] is intended to provide a comprehensive description of how to create the entire infrastructure needed for a nuclear power programme. More detailed information and

guidance on each of the 19 issues is available in the IAEA publications listed in the regularly updated nuclear infrastructure bibliography on the IAEA web site[1].

2. INTEGRATED INFRASTRUCTURE EVALUATION

2.1. DEVELOPMENT OF THE NATIONAL INFRASTRUCTURE

The Milestones publication [1] provides an overview of the overall programme to develop the national infrastructure for nuclear power. It is a nuclear power programme governance guideline. Figure 1, taken from that publication, shows the various phases of such a programme.

The activities are split into three progressive phases of development. The completion of each phase is marked by a specific milestone at which the progress of the development effort can be evaluated and a decision made to move on to the next phase. The 19 issues that need to be considered for reaching each milestone are listed in Table 1.

In general, the evaluation of Phase 1 involves the examination of the proposed work programme for Phase 2 and beyond in order to establish whether the issues have been fully understood and researched. It is necessary to understand the purpose of the evaluation of each phase. For Phase 1, the evaluation concerns the quality of information available, the effective investment of resources for informed decisions, and the management of programme risk. While a Member State can do less work in Phase 1, there is a much greater risk of an ill informed decision or of Phase 2 taking much longer than planned because the necessary issues have not been properly investigated. This publication takes into account international

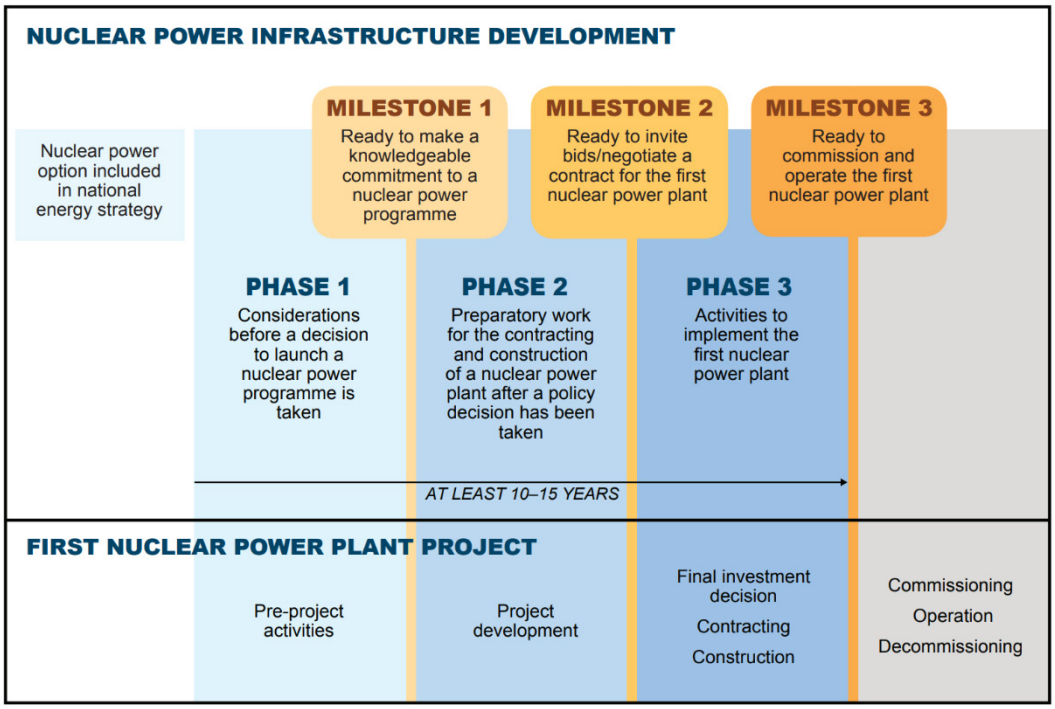

FIG. 1. Development of the infrastructure for a national nuclear power programme [1].

[1] See https://www.iaea.org/topics/infrastructure-development/bibliography

TABLE 1. THE 19 INFRASTRUCTURE ISSUES [1]

1.	National position	11.	Stakeholder involvement
2.	Nuclear safety	12.	Site and supporting facilities
3.	Management	13.	Environmental protection
4.	Funding and financing	14.	Emergency planning
5.	Legal framework	15.	Nuclear security
6.	Safeguards	16.	Nuclear fuel cycle
7.	Regulatory framework	17.	Radioactive waste management
8.	Radiation protection	18.	Industrial involvement
9.	Electrical grid	19.	Procurement
10.	Human resource development		

experience on how best to control these programme risks. However, there is no unique approach to developing the programme for the first nuclear power plant; therefore, the evaluation methodology provided here can only seek to ensure that a Member State has properly considered all the issues, is aware of key risks and has plans to manage them.

Clearly, the introduction of a nuclear power programme in a country will involve the use of available international experience. Partnership agreements with vendors and Member States with experience of operating nuclear power plants and the use of recognized experts as consultants are encouraged. However, any evaluation of readiness to proceed to a further phase will need to ensure that a Member State wishing to implement a nuclear power programme has full ownership and a complete understanding of the key issues involved. Developing a nuclear power programme remains a national responsibility.

2.2. THE MILESTONES FRAMEWORK

2.2.1. Milestone 1

By Milestone 1, the Member State will be in a position to make a knowledgeable decision on whether it is appropriate to introduce a nuclear power programme. To achieve this milestone, the Member State will not only have determined that it needs additional energy and have included nuclear power as a possible option to meet some of these needs, but it will also have carried out the first phase of the programme, which involves the considerations and planning that occur before a firm decision is made to develop a nuclear power programme. During this phase, the responsible organization is the nuclear energy programme implementing organization (NEPIO) established by the government. A successful NEPIO is appropriately staffed and resourced and includes adequate expertise and experience.

In the context of national socioeconomic development, the NEPIO develops a clear understanding of the potential role, appropriateness and viability of nuclear power in a Member State's long term energy plan. The end of Phase 1 report will clearly demonstrate whether there is an adequate understanding of the infrastructure that needs to be developed, and will include viable plans for the introduction of nuclear power and identify resource requirements and timescales. The report will include plans for the development of organizations to undertake the role of regulatory body, owner and operator. It is also essential that the report addresses the development of an appropriate management system and that the organizations involved recognize their responsibilities for safety, security and safeguards.

2.2.2. Milestone 2

At Milestone 2, the Member State will have the necessary infrastructure for the contracting, financing and construction of a nuclear power plant. Following the policy decision to proceed with the development of a nuclear power programme, substantive work for achieving the necessary level of technical and institutional competence will have been undertaken, and the necessary legal and regulatory framework will be in place. An effectively independent regulatory body[2] will have been developed to a level at which it can fulfil all of its authorization and inspection duties.

The owner/operator has a key role at this stage to ensure that by the end of Phase 2 it has developed the competence to manage a nuclear project, meet regulatory requirements and be a knowledgeable customer in Phase 3. The owner/operator will also need to have clear plans to develop or acquire the capability to operate the plant safely by the end of Phase 3.

2.2.3. Milestone 3

At this point, the Member State will be in a position to commission and operate its first nuclear power plant. The owner/operator needs to be fully capable and licensed. This will have required significant recruitment, development and training for all levels of staff. The regulatory body will have been in operation for some time and will have developed regulations, licensed construction of the plant and carried out inspections during construction. The regulatory body will now be clearly seen as a competent, effectively independent regulatory body, capable of providing continuous oversight over the nuclear power programme and enforcing compliance with all regulatory requirements.

While achieving Milestone 3 is a major accomplishment, it is important to remember that it is only the beginning of a lasting commitment to the safe, secure, peaceful and sustainable application of nuclear power.

2.3. EVALUATION APPROACH

2.3.1. Overview

Self-evaluation is an important tool for any organization. The evaluation methodology described in this publication is to be carried out firstly by those who are directly involved in the development of the nuclear infrastructure issues. This may be followed by an independent review by others not involved directly in the initial evaluation. The methodology also forms the basis of the IAEA Integrated Nuclear Infrastructure Review (INIR) missions, which can be used to provide a peer review of the status of the nuclear infrastructure in a country after the self-evaluation process has been concluded. INIR missions are conducted in line with the process described in the Guidelines for Preparing and Conducting an Integrated Nuclear Infrastructure Review (INIR) published in 2017 [2].

2.3.2. Evaluation steps

The Member State needs to determine the scope of the evaluation. However, it is important that all 19 infrastructure issues be covered in order to obtain a complete picture of the progress made. A complete evaluation comprises four main steps:

(1) Identifying the terms of reference for the evaluation, the organizations to be involved and the individuals who will conduct the evaluation;

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[2] There may be more than one regulatory body. This publication follows the same approach as that of the Milestones publication [1]. Thus, the phrase ‘the regulatory body’ may generally be read as ‘the regulatory body or bodies’.

(2) Evaluating the status of development of the infrastructure against the basis listed in Section 3 of this publication for the appropriate milestone being evaluated;
(3) Identifying areas needing further attention;
(4) Preparing an action plan to address these areas.

All of the above steps need to be undertaken to obtain a comprehensive and accurate picture of whether the Member State has completed its work across all the issues for a particular milestone and any outstanding work.

2.3.3. Documenting results and formulating an action plan

It is important to prepare an evaluation report that contains, at a minimum, the following elements:

— A description of the process used to conduct the evaluation;
— Summaries of the evidence reviewed and further actions required;
— Summary conclusions giving the state of achievement of each condition;
— Identification of the 'team of evaluators' by position and role;
— Identification of the 'team of respondents';
— References to any relevant material used for conducting the evaluation;
— Confidentiality requirements, if any.

A tabular format is proposed to collate and summarize the results of the evaluations carried out for each condition. A sample form is suggested in the Appendix (A.1. Evaluation form for each infrastructure area). The form contains:

— The summary of the condition and examples of how the condition may be demonstrated (taken from Section 3 of this publication).
— The observations of the reviewer as to whether the summary of the condition has been met (e.g. work completed, work still outstanding).
— The evidence that supports the statements made in the observations section.
— An evaluation rating that indicates one of three status conditions:
  - Significant actions needed: Work still needs to be initiated or completed to meet the condition[3];
  - Minor actions needed: Work needs to be finalized or revised[3;]
  - No actions needed: All the work expected to meet the condition has been completed.

It is helpful to summarize these individual evaluations to give an overall picture. A sample form is provided in the Appendix (A.2. Example summary form).[4]

Upon completion of the report, an action plan is developed. The observations from the evaluation report are to be used by the Member State to determine the action plan. Each Member State decides on the most appropriate manner of preparing the action plan, but it needs to include:

— The issue being addressed;
— A clear statement of the action or actions showing how the identified shortfall will be addressed;
— An agreed completion time;
— The organization, function or person responsible for the completion of the actions.

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[3] The judgement on whether the actions are significant or minor is based on the importance of the work to the overall programme and the resources needed to complete it.

[4] Electronic forms are available at https://www.iaea.org/topics/infrastructure-development

A suggested form for the action plan is included in the Appendix (A.3. Action plan pro forma). At the request of a Member State, the IAEA can provide a self-evaluation workshop covering the approach described in this publication, as well as practical examples of its application.

3. BASIS FOR EVALUATION

3.1. OVERVIEW

Sections 3.2, 3.3 and 3.4 provide a series of tables covering each infrastructure issue in Phases 1, 2 and 3. Each table contains the conditions that apply to that issue in that phase and an explanation of what is expected for each condition through a row entitled 'Summary of the condition to be demonstrated'. It then lists examples of the detailed information that may provide evidence that the summary of the condition has been fulfilled, although it may not be necessary to have all the information listed. For several of the items listed, it is not so much whether the document exists but whether the scope and quality of the document are adequate. The point of the evaluation is not to tick the items off following an audit style inspection, but to ascertain whether adequate analysis and research have been conducted to judge that the condition has been fulfilled. For a self-assessment, this may involve reviewing a number of detailed documents, but for an Integrated Nuclear Infrastructure Review mission it is more likely to involve the review of some document contents lists and consideration of relevant questions about the content and methodology.

The tables in Sections 3.2, 3.3 and 3.4 include a list of IAEA publications that are relevant to the summary of the condition to be demonstrated or are dedicated publications for Member States embarking on nuclear power programmes. These publications, together with other publications related to the infrastructure issue, can be found in the regularly updated nuclear infrastructure bibliography on the IAEA web site[5]. Two of these publications, IAEA Safety Standards Series No. SSG-16 (Rev. 1), Establishing the Safety Infrastructure for a Nuclear Power Programme [3], and IAEA Nuclear Security Series No. 19, Establishing the Nuclear Security Infrastructure for a Nuclear Power Programme [4], are structured in a manner that addresses specific infrastructure issues. For this reason, the tables in Sections 3.2, 3.3 and 3.4 refer to specific sections or actions identified in these publications. For other publications, the reference is to the publication as a whole.

The tables often refer to evidence and plans. Evidence can include reports, meeting notes, correspondence, presentations, conferences attended with meeting reports, organization descriptions, job descriptions and summaries of experience. Plans can include various levels of detail, but they generally have clear actions with associated timescales and resources required. The documents will have been approved by a person/organization with the appropriate authority.

There are, of course, various approaches that can be used to implement a nuclear power plant project, for example strategic partnerships, intergovernmental agreements or build–own–operate arrangements. This publication does not assume any particular approach, since the actual nuclear infrastructure requirements do not change. What may change are the means by which the conditions are fulfilled, so not all the examples listed will apply in every case.

Some conditions make explicit reference to understanding and using the experience from other States operating nuclear power plants. This is not repeated for every issue, but it is clearly important for all infrastructure issues that the Member State makes use of the available international experience.

As stated earlier, the purpose of this methodology is to evaluate whether a Member State is ready to move to the next phase of infrastructure development. For this reason, the conditions look not only to

[5] See https://www.iaea.org/topics/infrastructure-development/bibliography

see whether activities have been completed, but also whether there is a clear work programme for the next phase of the project.

Following the detailed evaluation of each condition, the Member State needs to follow a holistic approach to information gathering, development of resources and decision making. It is, for example, necessary to ensure that the development of regulations and guides progresses in a manner that is consistent with the readiness of the owner/operator to issue a bid specification.

3.2. EVALUATION OF INFRASTRUCTURE STATUS IN PHASE 1

1. National position	**Phase 1**
Conditions	**Basis for evaluation**
1.1. Long term commitment made and importance of safety, security and non-proliferation recognized	**Summary of the condition to be demonstrated** A clear statement adopted by the government of its intention to develop a nuclear power programme and of its commitment to safety, security and non-proliferation, with evidence that their importance is embedded in the ongoing work programme.
	Examples of how the condition may be demonstrated (1) A clearly stated government commitment; (2) Evidence of clear responsibilities for each issue, with government coordination of activities.
	Relevant IAEA publication — NG-T-3.14 [5].
1.2. The NEPIO established	**Summary of the condition to be demonstrated** The NEPIO: (a) Has clear terms of reference that call for a comprehensive review of all the issues relevant to making a decision to proceed with a nuclear power programme; (b) Is recognized by all relevant ministries as having that role; (c) Reports to a senior minister or directly to the head of government; (d) Has appropriate human and financial resources; (e) Involves all relevant stakeholders, including the country's major utilities, the regulatory body for security and radiation safety, other relevant government agencies, legislative representatives and other decision makers.
	Examples of how the condition may be demonstrated (1) The charter establishing the NEPIO and to whom it reports; (2) Evidence that the roles and responsibilities of the NEPIO are known by all its members and by other government ministries; (3) A document defining objectives and timescales and an adequate scope of investigations; (4) A clear description of how the NEPIO operates in terms of funding, planning, reporting, scope of studies and use of consultants; (5) Evidence that the NEPIO has adequate skills to address all issues either directly or through commissioning specialist studies; (6) Evidence of relevant interactions between the head of NEPIO and appropriate ministries, such as those responsible for energy and the environment.
	Relevant IAEA publications — SSG16 (Rev. 1) (Actions 2, 25 and 146) [3]; — NGT3.6 (Rev. 1) [6].

1. National position	Phase 1
Conditions	**Basis for evaluation**
1.3. National strategy defined	**Summary of the condition to be demonstrated** A comprehensive report, defining and justifying the national strategy for nuclear power, including: (a) An analysis of energy demand and energy alternatives; (b) An evaluation of the impacts of nuclear power on the national economy, for example gross domestic product and employment; (c) A preliminary technology assessment to identify technologies that are consistent with national expectations; (d) Consideration of siting possibilities and grid capacity; (e) Consideration of financing options, ownership options and operator responsibilities; (f) Consideration of long term costs and obligations relating to spent fuel, radioactive waste and decommissioning; (g) Consideration of the human resource needs and external support needs of the regulatory body and the owner/operator; (h) Recognition that there remains a nonzero possibility of a severe accident and the need to deal with the consequences of such an accident will need to be addressed; (i) Consideration of the demands of each of the infrastructure issues and a plan for how they will be met in the next phase of development. **Note:** Any prefeasibility study conducted during Phase 1 can provide significant input to the comprehensive report, although it is important that the report fully addresses all 19 infrastructure issues.
	Examples of how the condition may be demonstrated (1) List of the studies that are feeding into the report(s); (2) Current status and conclusions; (3) Contents list for the report(s); (4) Executive summary of the report(s); (5) Evidence of ministerial review of the report(s).
	Relevant IAEA publications — SSG16 (Rev. 1) (Actions 3, 4, 62 and 148) [3]; — NSS19 (Section 2) [4]; — NWG1.1 [7]; — NWT1.24 (Rev. 1) [8].

2. Nuclear safety	Phase 1
Conditions	**Basis for evaluation**
2.1. Key requirements of nuclear safety understood	**Summary of the condition to be demonstrated** The key requirements for nuclear safety, specified in the IAEA safety standards, are understood by the NEPIO and other relevant stakeholders, and their implications are recognized.
	Examples of how the condition may be demonstrated (1) Evidence that the NEPIO has an understanding of, and commitment to, nuclear safety and the principles described in IAEA Safety Standards Series No. SF1, Fundamental Safety Principles [8], and is aware of how nuclear safety requirements are taken into account in various designs of nuclear power plants (NPPs); (2) Evidence that the responsibility for nuclear safety is recognized, for example in consideration of leadership, funding and expertise; (3) Evidence that the need to develop adequate capability and skills in nuclear safety is recognized; (4) Evidence of familiarity with IAEA safety standards and other States' practices, and recognition of the need for, and commitment to, the development of national safety standards.
	Relevant IAEA publication — SSG16 (Rev. 1) (Actions 1, 117, 170 and 193) [3].
2.2. Support through international cooperation initiated	**Summary of the condition to be demonstrated** The need for international cooperation and open exchange of information related to nuclear safety as an essential element is recognized and demonstrated.
	Examples of how the condition may be demonstrated (1) Evidence of review of options for bilateral or regional cooperation and specific actions for selected cooperation started, especially with countries with an established nuclear power programme; (2) Implementation of a national technical cooperation programme with the IAEA and evidence of government financial support, including nuclear safety aspects.
	Relevant IAEA publications — SSG16 (Rev. 1) (Actions 11–13) [3]; — SF1 [9].

3. Management	Phase 1
Condition	**Basis for evaluation**
3.1. Need for appropriate leadership and management systems recognized	**Summary of the condition to be demonstrated** There is a commitment to leadership and management systems that will ensure success and promote a safety and security culture as well as the peaceful use of nuclear technologies. There are plans to ensure that the knowledge gained by the NEPIO is transferred to the future regulatory body and the owner/operator of the programme.
	Examples of how the condition may be demonstrated (1) Plans to ensure appointment of leaders with the appropriate training and experience to plan, procure, construct and operate an NPP as well as to ensure the leadership and management of nuclear safety, security and safeguards; (2) Evidence that the importance of nuclear safety and security culture in each of the organizations to be established is recognized; (3) Evidence that the importance of ensuring the peaceful use of nuclear technology is recognized; (4) Evidence of a clear understanding of management system requirements; (5) A plan to implement management systems in future key organizations that is consistent with the appropriate standards and guidance.
	Relevant IAEA publications — SSG16 (Rev. 1) (Actions 72–74) [3]; — NSS19 (Actions 4.10–4.13) [4].

4. Funding and financing	Phase 1
Conditions	**Basis for evaluation**
4.1. Strategies for funding established	**Summary of the condition to be demonstrated** Mechanisms have been defined for funding a range of key activities that are specific to a nuclear power programme but may not be the fiscal responsibility of the owner/operator. The activities include: (a) Establishing the legal framework; (b) Activities of the regulatory body for safety, security and safeguards; (c) The government's stakeholder involvement programme; (d) Siting and environmental protection activities that are the responsibility of the government; (e) Emergency preparedness and response (EPR); (f) Education, training and research; (g) Any required improvements to the electrical grid, if such improvements are the government's responsibility; (h) Any proposed incentives and direct government support to promote localization; (i) Storage and disposal of radioactive waste, including spent fuel; (j) Decommissioning of the NPP.
	Examples of how the condition may be demonstrated (1) Clear statements of how the above areas will be funded, based on a consideration of options; (2) Evidence that the scale of the costs of each of these activities has been recognized.
	Relevant IAEA publication — SSG16 (Rev. 1) (Actions 48, 50 and 51) [3].
4.2. Potential strategies for financing identified	**Summary of the condition to be demonstrated** Potential options have been identified with financial and risk management strategies, which together: (a) Create sufficient confidence for lenders and investors to support an NPP project; (b) Ensure the long term viability of the owner/operator to fulfil all its responsibilities. **Note:** A large part of the government's role in nuclear power financing, if the government is not directly a sponsor of the project, relates to financial risk reduction.
	Examples of how the condition may be demonstrated A review of financing options and risk management strategies, considering the long term economics and risks associated with the NPP and including the extent of government funding, equity partners and borrowing, among other things.
	Relevant IAEA publications — SSG16 (Rev. 1) (Actions 49 and 147) [3]; — NGT4.1 [10]; — NGT4.2 [11].

5. Legal framework	Phase 1
Conditions	**Basis for evaluation**
5.1. Adherence to all relevant international legal instruments planned	**Summary of the condition to be demonstrated** There is an understanding of the requirements of the relevant international legal instruments, their implications and a commitment to adhere to them. The following instruments are covered: (a) Convention on Early Notification of a Nuclear Accident (INFCIRC/335) [12]; (b) Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency (INFCIRC/336) [13]; (c) Convention on Nuclear Safety (INFCIRC/449) [14]; (d) Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (the 'Joint Convention') (INFCIRC/546) [15]; (e) Convention on the Physical Protection of Nuclear Material (INFCIRC/274/Rev.1) [16] and Amendment thereto (INFCIRC/274/Rev.1/Mod.1) [17]; (f) Vienna Convention on Civil Liability for Nuclear Damage (INFCIRC/500) [18][a]; (g) Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage (INFCIRC/566) [19]; (h) Convention on Supplementary Compensation for Nuclear Damage (INFCIRC/567) [20]; (i) Joint Protocol Relating to the Application of the Vienna Convention and the Paris Convention (INFCIRC/402) [21]; (j) Comprehensive safeguards agreement — based on The Structure and Content of Agreements Between the Agency and States Required in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons (INFCIRC/153 (Corrected)) [22]; (k) Additional protocol — following the provisions of Model Protocol Additional to the Agreement(s) Between States(s) and the International Atomic Energy Agency for the Application of Safeguards (INFCIRC/540 (Corrected)) [23]; (l) Revised Supplementary Agreement Concerning the Provision of Technical Assistance by the IAEA.
	Examples of how the condition may be demonstrated (1) Plans for when each of the instruments will be adhered to; (2) Identification of the actions that will need to be undertaken and the required timescales; (3) Evidence that the resources required are understood and have been defined.
	Relevant IAEA publications — Handbook on Nuclear Law [24]; — Handbook on Nuclear Law: Implementing Legislation [25]; — IAEA Services Series 21 [26]; — SSG16 (Rev. 1) (Action 11) [3]; — NSS19 (Action 3.1) [4].

[a] The Convention on Third Party Liability in the Field of Nuclear Energy (Paris Convention) [27] is another relevant legal instrument under the auspices of the Organisation for Economic Co-operation and Development.

5. Legal framework	Phase 1
Conditions	**Basis for evaluation**
5.2. Plan in place for development of a comprehensive national nuclear law	**Summary of the condition to be demonstrated** There is an understanding of the requirements of the comprehensive national nuclear law that needs to be enacted, and there is a plan with the actions and timescales for development and enactment, together with a commitment from the government to achieve the stated plan. The plan includes the need for the law to: (a) Establish an independent nuclear regulatory body with adequate human and financial resources, and a clear and comprehensive set of functions; (b) Identify responsibilities for safety, security and safeguards; (c) Formulate safety principles and rules (radiation protection, nuclear installations, radioactive waste and spent fuel management, decommissioning, mining and milling, EPR and the transport of radioactive material); (d) Formulate nuclear security principles; (e) Give appropriate legal authority to, and define the responsibilities of, the regulatory body and all competent authorities establishing a regulatory control system (authorization, inspection and enforcement, review and assessment, and development of regulations and guides); (f) Implement IAEA safeguards, including a State system of accounting for and control of nuclear material (SSAC); (g) Implement import and export control measures for nuclear and radioactive material and items; (h) Establish compensation mechanisms for nuclear damage.
	Examples of how the condition may be demonstrated (1) A plan on how the law will be developed and approved; (2) A summary of how each of the areas listed above will be addressed within the law; (3) Interactions with the IAEA and the other relevant organizations.
	Relevant IAEA publications — Handbook on Nuclear Law [24]; — Handbook on Nuclear Law: Implementing Legislation [25]; — IAEA Services Series 21 [26]; — SSG16 (Rev. 1) (Actions 20, 21, 24 and 189) [3]; — NSS19 (Actions 3.2 and 3.3) [4].

5. Legal framework	Phase 1
Conditions	**Basis for evaluation**
5.3. Plans in place to enact and/or amend other legislation affecting the nuclear power programme	**Summary of the condition to be demonstrated** There is an understanding of which legislation that affects the nuclear power programme needs to be enacted and/or amended, the timescales for its development and approval, together with a commitment from the government to achieve the stated plan. The legislation to be considered includes that on: (a) Environmental protection; (b) EPR; (c) Occupational health and safety of workers; (d) Protection of intellectual property; (e) Local land use controls; (f) Foreign investment; (g) Taxation, fees, electricity tariffs and incentives; (h) Roles of national and local governments; (i) Stakeholders and public involvement; (j) International trade and customs; (k) Financial guarantees and any other required financial legislation; (l) R&D.
	Examples of how the condition may be demonstrated (1) A plan on how the legislation will be developed and approved; (2) A summary of how each of the areas listed above will be addressed within the proposed legislation; (3) Interactions with the IAEA and the other relevant organizations.

6. Safeguards	Phase 1
Conditions	**Basis for evaluation**
6.1. Terms of international safeguards agreement in place	**Summary of the condition to be demonstrated** (a) The Member State has a comprehensive safeguards agreement with associated subsidiary arrangements in force with the IAEA; (b) If the Member State currently has concluded a small quantities protocol to its comprehensive safeguards agreement, a plan needs to be developed setting out the necessary steps to rescind the small quantities protocol in a timely manner; (c) The Member State is aware of the requirements of the additional protocol [23]; if the Member State has made the decision to ratify the additional protocol [23] but has not already done so, a plan is in place for timely ratification.
	Examples of how the condition may be demonstrated (1) Plans for rescinding the small quantities protocol and/or for ratification of the additional protocol [23], including the actions that need to be taken, clear assignment of responsibilities and understanding of the resources and the required timescales; (2) Evidence that the need for outreach activities is recognized to ensure that all existing and future entities having to report to the State authority for safeguards are aware of their roles and obligations.
	Relevant IAEA publications — IAEA Services Series 21 [26]; — IAEA Services Series 22 [28].
6.2. Strengthening of the SSAC planned	**Summary of the condition to be demonstrated** The Member State has a plan describing how the existing SSAC will be strengthened or adjusted to deal with the increase of activities and resources, as well as the need for enhancement of capabilities.
	Examples of how the condition may be demonstrated (1) Evidence that the NEPIO includes a representative knowledgeable in the requirements of the comprehensive safeguards agreement; (2) A plan produced by the NEPIO covering the enforcement of national legislation, policies and procedures relevant to safeguards; the development of the legislation itself is covered under infrastructure issue no. 5, legal framework; (3) Evidence that approaches undertaken by one or more States with existing nuclear power programmes have been reviewed and the information gained has been adapted for the national context.
	Relevant IAEA publications — IAEA Services Series 21 [26]; — IAEA Services Series 15 [29]; — IAEA Services Series 30 [30]; — IAEA Services Series 13 [31].

6. Safeguards	Phase 1
Conditions	**Basis for evaluation**
6.3. Recommendations from any previous reviews or audits being addressed	**Summary of the condition to be demonstrated** If any reviews or audits have been conducted on the existing safeguards provisions, there is evidence that the actions resulting from it are progressing.
	Examples of how the condition may be demonstrated Action plans resulting from a review or audit, with progress identified, indicating the required timescales, responsibilities and resources required.
	Relevant IAEA publications — IAEA Services Series 21 [26]; — IAEA Services Series 22 [28]; — IAEA Services Series 15 [29]; — IAEA Services Series 30 [30].

7. Regulatory framework	Phase 1
Conditions	**Basis for evaluation**
7.1. Development of an adequate regulatory framework planned	**Summary of the condition to be demonstrated** The prospective senior managers of the regulatory body have been identified. There are plans to develop a regulatory framework for nuclear safety, nuclear security and safeguards that matches the overall plan for the NPP, and includes: (a) Designation of an effectively independent, competent regulatory body with clear authority, adequate human and financial resources, and strong government support; (b) Assignment of core safety, security and safeguards regulatory functions for developing regulations, review and assessment, authorization, inspection, enforcement and public information; (c) Authority and resources to obtain technical support, as needed; (d) A clear definition of the relationship of the regulatory body to other organizations (e.g. technical support organizations and environmental agencies); (e) Clearly defined responsibilities of licensees; (f) Authority to implement international obligations, including IAEA safeguards; (g) Authority to engage in international cooperation; (h) Provisions to protect proprietary, confidential and sensitive information; (i) Provisions for stakeholder involvement and communication with the public. There are agreed terms of reference for each regulator and a clear definition of roles of, and interfaces with, other regulators. There is recognition of the need for integrating existing security and radiation safety regulations with new regulations for NPPs. **Note:** Plans to develop competence are addressed under infrastructure issue no. 10, human resource development.
	Examples of how the condition may be demonstrated (1) Evidence of what has been done, or is planned, to develop the experience of the senior regulators; (2) Proposals on the overall approach to assessment, licensing, inspection and enforcement, among other things; (3) Plans to develop the regulatory body for safety, security and safeguards; (4) Plans to develop the required regulations; (5) Evidence of interaction and cooperation with established regulatory organizations; (6) Plans to enhance or develop appropriate technical support organizations (see also infrastructure issue no. 10, human resource development) to support the regulatory body; (7) Plans to secure support from international regulatory organizations.
	Relevant IAEA publications — IAEA Services Series 21 [26]; — SSG16 (Rev. 1) (Actions 24–26, 62, 107 and 189) [3]; — NSS19 (Action 3.2) [4].

8. Radiation protection[b]	Phase 1
Conditions	**Basis for evaluation**
8.1. Enhancements to radiation protection programmes planned	**Summary of the condition to be demonstrated** The enhancements to the existing radiation protection programme required to address NPP operation have been identified, including consideration of transport of radioactive materials and radioactive waste management. Both the increase in scale and the need to cover new technical issues are considered. **Note:** This issue is closely linked to infrastructure issue no. 7, regulatory framework; in particular, the development of regulations and the question of whether the existing regulatory body will expand its role or the infrastructure issues will be addressed by a separate organization.
	Examples of how the condition may be demonstrated (1) Evidence of discussions with specialists from other countries; (2) Identification of the main areas requiring enhancement; (3) Recognition that additional competences will be required to review proposed designs against the requirement to control contamination and to reduce exposures to as low as reasonably achievable (ALARA); (4) Recognition that the programme for dose assessment will need to be significantly expanded; (5) Plans for who will be responsible for the main elements of a radiation protection programme.
	Relevant IAEA publication — SSG16 (Rev. 1) (Action 105) [3].

[b] This covers protection of workers and the public onsite during planned operation. Off-site releases from planned operation are addressed in infrastructure issue no. 13, environmental protection; and accidental releases and associated radiation protection are addressed in infrastructure issue no. 14, emergency planning.

9. Electrical grid	Phase 1
Conditions	**Basis for evaluation**
9.1. Electrical grid requirements considered	**Summary of the condition to be demonstrated** A preliminary study of the grid system has been conducted covering: (a) Capability and reliability to take the output from the NPP; (b) Ability to withstand loss of the output; (c) Reliability to minimize the risk of loss of power to the NPP from the grid.
	Examples of how the condition may be demonstrated (1) An analysis of the grid covering: (a) The expected grid capacity; (b) The historical stability and reliability of the electrical grid; (c) The historical and projected variation in energy demand. (2) Evidence of consideration of: (a) Available NPP designs to identify those with output consistent with required grid performance and reliability (‘grid code’), with due consideration taken for safety aspects; (b) Potential NPP sites and their impact on grid operation; (c) The anticipated growth of grid capacity; (d) The potential for local or regional interconnectors to improve grid characteristics. (3) Preliminary plans to enhance the grid to meet NPP requirements.
	Relevant IAEA publications — SSG16 (Rev. 1) (Action 171) [3]; — NGT3.8 [32].

10. Human resource development	Phase 1
Conditions	**Basis for evaluation**
10.1. Necessary knowledge and skills identified, and gaps in current capability assessed	**Summary of the condition to be demonstrated** A broad assessment of the typical staffing needs of each of the key organizations and their technical support has been completed, together with an assessment of improvements required in the current capability of the country to meet the projected need. The assessment covers the full range of scientific, technical, managerial and administrative disciplines and considers: (a) Current human resource competences and capabilities; (b) Estimated required competence and capability; (c) Availability of domestic and foreign capacity for education and training; (d) Additional education, recruitment, training and experience that will be required (gap analysis), including specialist training in nuclear safety, nuclear security, safeguards, radiation protection, spent fuel and radioactive waste management, management systems and EPR; (e) Which facilities and programmes need to be established for education, training and experience building; (f) Which research capability needs to be developed; (g) A senior leaders development programme.
	Examples of how the condition may be demonstrated (1) An analysis identifying the competences and number of staff needed, covering all the future organizations. The analysis needs to include: (a) Bulk workforce needs per phase; (b) A breakdown by knowledge, skills and discipline per phase; (c) The flow of workforce to other projects (e.g. future NPPs). (2) An analysis of existing human resource capabilities and the ability to attract experienced staff from other countries. (3) An assessment of the capability of existing education and training facilities.
	Relevant IAEA publications — SSG16 (Rev. 1) (Actions 85–89, 99 and 100) [3]; — NSS19 (Actions 4.37–4.44) [4]; — NGT3.10 [33].

10. Human resource development	Phase 1
Conditions	**Basis for evaluation**
10.2. Development of human resources planned	**Summary of the condition to be demonstrated** Outline plans have been agreed to: (a) Enhance national education and training; (b) Develop a detailed human resource development plan for each key organization; (c) Integrate the plans to develop a national strategy, including the development of an initial core leadership group.
	Examples of how the condition may be demonstrated (1) Plans to develop human resources required, including: (a) Identification of national organizations that could support human resource development; (b) Enhancement of education and training infrastructure; (c) Development of national competences (through schools, universities, institutes, industry); (d) Nonnational human resources that are needed to augment national resources and how they will be secured; (e) International cooperation and vendor support; (f) Leadership development. (2) Strategies for the recruitment and retention of staff. (3) Recognition of the need for qualification and certification programmes for personnel. (4) Evidence that key stakeholder organizations have participated in the development and review of the plans.
	Relevant IAEA publications — SSG16 (Rev. 1) (Actions 85–89, 99 and 100) [3]; — NSS19 (Actions 4.37–4.44) [4]; — NGT3.10 [33].

11. Stakeholder involvement	Phase 1
Conditions	**Basis for evaluation**
11.1. Open and transparent stakeholder involvement programme initiated	**Summary of the condition to be demonstrated** Stakeholder involvement strategy and plan, with the required resources and competence, implemented by the NEPIO based on transparency and openness. The public, and other relevant interested parties, receive information about the benefits and risks of nuclear power, including the nonzero potential for severe accidents.
	Examples of how the condition may be demonstrated (1) A clear mandate for the NEPIO to engage with stakeholders; (2) Actions to disseminate information in the context of the national energy outlook, policy and needs, and pros and cons of all sources of energy, using a range of effective tools; (3) Evidence of a professional communication team available to the NEPIO, with appropriate financial resources; (4) Results of surveys to determine the public's knowledge of and receptiveness to nuclear power; (5) Approaches to address public concerns, including waste management and severe accidents; (6) Evidence of activities at the local, regional and national level; (7) A plan for ongoing interaction with the public, in particular, opinion leaders, media, local and national governmental officials, and neighbouring countries; (8) Plans for regular opinion polls managed by specialist companies; (9) A training programme to enable identified spokespersons to interact with stakeholders.
	Relevant IAEA publications — SSG16 (Rev. 1) (Actions 12 and 39) [3]; — NGT1.4 [34].

12. Site and supporting facilities	Phase 1
Conditions	**Basis for evaluation**
12.1. General survey of potential sites conducted and candidate sites identified	**Summary of the condition to be demonstrated** Exclusion and avoidance criteria (covering safety, security, cost, socioeconomic issues, engineering and the environment) have been identified and regional analysis to identify candidate sites has been conducted. The analysis includes the impact of external hazards on security and emergency response capability. Consultations with stakeholders have been part of the process.
	Examples of how the condition may be demonstrated (1) A report covering: (a) Safety and security criteria for initial NPP site selection; (b) National criteria (e.g. socioeconomic and environmental); (c) Engineering and cost criteria. (2) An assessment report issued and approved identifying: (a) Regional analysis and identification of potential sites; (b) Screening of potential sites and selection of candidate sites. (3) Evidence that NPP site selection studies have been conducted by persons and organizations that are competent in and experienced with NPP site selection. (4) Plans for the work that will be required in Phase 2 to select and justify the site. (5) Evidence that safety and security related activities conducted (e.g. site evaluation and environmental impact studies) are included within the framework of an effective management system.
	Relevant IAEA publications — SSR1 [35]; — SSG35 [36]; — SSG16 (Rev. 1) (Action 160) [3]; — NGT3.7 [37].

13. Environmental protection[c]	Phase 1
Conditions	**Basis for evaluation**
13.1. Environmental requirements considered	**Summary of the condition to be demonstrated** The NEPIO has considered the main environmental requirements related to the siting of an NPP, including land use, water use, water quality and the impacts of low level radioactive effluents.
	Examples of how the condition may be demonstrated (1) Identification of key requirements for siting and during construction; (2) Evidence of discussions by specialists with States operating nuclear power; (3) Evidence that the nonradiological environmental issues, such as water use, transport of materials, disposal of hazardous waste, additional environmental monitoring requirements and construction impact, have been considered and taken into account by the NEPIO.
	Relevant IAEA publications — SSG16 (Rev. 1) (Action 106) [3]; — NGT3.11 [38].
13.2. Framework for environmental protection reviewed	**Summary of the condition to be demonstrated** The NEPIO has reviewed the suitability of the State's existing framework for environmental protection and for meeting its international obligations.
	Examples of how the condition may be demonstrated (1) Procedures developed for the elaboration, reporting and assessment of environmental studies for nuclear and other related facilities; (2) Evidence of interactions by specialists with States operating nuclear power.
	Relevant IAEA publications — SSG16 (Rev. 1) (Action 106) [3]; — NGT3.11 [38].

[c] This covers offsite releases from planned operation and all other environmental issues. Protection of workers and the public onsite during planned operation are addressed in infrastructure issue no. 8, radiation protection. Accidental releases and radiation are addressed in infrastructure issue no. 14, emergency planning.

14. Emergency planning	Phase 1
Conditions	**Basis for evaluation**
14.1. Requirements and resources for developing an emergency response capability recognized	**Summary of the condition to be demonstrated** (a) The NEPIO is aware of the EPR arrangements and capabilities that will be required for the nuclear power programme. It has evaluated existing EPR arrangements and capabilities in the country and is aware of the major gaps that will need to be addressed; (b) The NEPIO has identified the main organizations and resources that will need to be involved in the establishment of adequate national EPR capabilities; (c) The lead for the execution of the action plan and the action plan coordination framework has been identified. **Notes:** (1) The process of developing adequate EPR will be initiated in Phase 2 and will be largely carried out in Phase 3; (2) The requirements of the conventions on early notification [12] and assistance [13] are covered under infrastructure issue no. 5, legal framework.
	Examples of how the condition may be demonstrated Report summarizing existing EPR arrangements and capabilities and identifying those to be enhanced and/or developed, in addition to identifying the main organizations and resources that will need to be involved in the establishment of adequate national EPR capabilities.
	Relevant IAEA publications — GSR Part 7 [39]; — GSG2 [40]; — GSG2.1 [41]; — SSG16 (Rev. 1) (Actions 133 and 134) [3]; — EPR 2012 [42].
14.2. Recommendations from any previous reviews or audits being addressed	**Summary of the condition to be demonstrated** If any reviews or audits have been undertaken of the existing framework, there is evidence that the actions resulting from it are progressing.
	Example of how the condition may be demonstrated Presentation of any action plans resulting from a review or audit with progress identified.

15. Nuclear security	Phase 1
Conditions	**Basis for evaluation**
15.1. Nuclear security requirements recognized and the actions of all relevant organizations coordinated	**Summary of the condition to be demonstrated** The NEPIO recognizes the importance of nuclear security, based on a national threat assessment and principles of prevention, detection and response. All competent authorities that are involved in nuclear security have been identified and a coordinating body or mechanism has been established that brings together all of the organizations that have responsibility for nuclear security. **Note:** The need to establish legislation and a regulatory framework is addressed under infrastructure issues nos 5 and 7, legal framework and regulatory framework, respectively.
	Examples of how the condition may be demonstrated (1) Evidence of familiarity with IAEA Nuclear Security Series publications and other States' practices; (2) Clear identification of all organizations that have roles in and responsibilities for nuclear security and of the work that will need to be carried out in the subsequent phases; (3) Evidence that nuclear security considerations for siting have been defined and have been considered as part of the siting assessment (see infrastructure issue no. 12, site and supporting facilities); (4) Evidence that international cooperation and assistance is being used; (5) Evidence that the need to address the interface with safety and safeguards is recognized.
	Relevant IAEA publication — NSS19 (Actions 2.1–2.10, 4.1, 4.2, 4.26 and 4.53) [4].
15.2. Recommendations from any previous reviews or audits being addressed	**Summary of the condition to be demonstrated** If any reviews or audits have been undertaken with respect to the existing framework, there is evidence that the actions resulting from it are progressing.
	Example of how the condition may be demonstrated Presentation of any action plans resulting from a review or audit, with progress identified.

16. Nuclear fuel cycle	Phase 1
Conditions	**Basis for evaluation**
16.1. Options for nuclear fuel cycle (front end and back end) considered	**Summary of the condition to be demonstrated** At a strategic level, options have been considered for the front end and back end of the fuel cycle. For the front end, options for uranium sourcing and fuel manufacture and supply have been addressed. For the back end of the fuel cycle, spent fuel storage needs and capacities (onsite and offsite) and possible reprocessing have been considered.
	Examples of how the condition may be demonstrated (1) A document: (a) Identifying available national natural resources and capacities for individual steps in the nuclear fuel cycle; (b) Identifying potential sources of supply and services; (c) Assessing available options for a national fuel cycle strategy, taking into account non-proliferation issues. (2) A document clearly demonstrating that the NEPIO understands the long term commitments related to the back end of the nuclear fuel cycle and has considered the options and their implications. The document needs to address the need for adequate capacity for spent fuel storage at the reactor site, the possibility of interim storage of spent fuel at a dedicated facility and any plans for reprocessing. (3) Clear allocation of responsibilities for development of the fuel cycle policy and strategy (front end and back end) to be undertaken during Phase 2.
	Relevant IAEA publications — SSG16 (Rev. 1) (Actions 122 and 123) [3]; — NWG1.1 [7]; — NWT1.24 (Rev. 1) [8].

17. Radioactive waste management	Phase 1
Conditions	**Basis for evaluation**
17.1. The requirements for management of radioactive waste from NPPs recognized	**Summary of the condition to be demonstrated** The NEPIO understands the significantly increased requirements for the processing, storage and disposal of high, intermediate and low level radioactive waste from a nuclear power programme, and has developed options for the management of radioactive waste, taking into account existing arrangements.
	Examples of how the condition may be demonstrated A document addressing possible approaches to the management of radioactive waste arising from NPP operation and decommissioning, the capabilities and resources needed, and the options and technologies for its processing, handling, storage and disposal. If reprocessing is being considered, this needs to include the management of high level waste. The regulatory framework and financing schemes are addressed under infrastructure issues nos 7 and 4, regulatory framework, and funding and financing, respectively.
	Relevant IAEA publications — SSG16 (Rev. 1) (Actions 122 and 123) [3]; — NWT1.24 (Rev. 1) [8].
17.2. Options for disposal of all radioactive waste categories understood	**Summary of the condition to be demonstrated** The NEPIO understands the options for disposal of each of the different waste categories. Although the specific routes for disposal of the different waste categories (including spent fuel if considered as waste) can be decided later, the need to select and plan for adequate options is recognized.
	Example of how the condition may be demonstrated A document indicating that the NEPIO understands options for disposal of different radioactive waste categories and options for funding these activities.
	Relevant IAEA publications — NWG1.1 [7]; — NWT1.24 (Rev. 1) [8].

18. Industrial involvement	Phase 1
Conditions	**Basis for evaluation**
18.1. National policy developed with respect to industrial involvement	**Summary of the condition to be demonstrated** A policy for national involvement in the nuclear power programme has been developed, taking into account current industrial capacity and technical services, current and required quality standards, and potential investment requirements. The policy may include short term and longer term targets for industrial involvement.
	Examples of how the condition may be demonstrated (1) A survey of companies with the potential to participate in the nuclear power programme for construction, equipment provision or support services, with a review of their ability to satisfy the requirements of a nuclear power programme; (2) Meetings with, or training of, potential suppliers to explain standards and qualifications required, review feasibility of involvement, and identify required actions and funding requirements.
	Relevant IAEA publications — SSG16 (Rev. 1) (Action 61) [3]; — NGT3.4 [43].

19. Procurement	Phase 1
Conditions	**Basis for evaluation**
19.1. Requirements for purchasing NPP services recognized	**Summary of the condition to be demonstrated** Recognition of the requirements associated with purchasing services.
	Examples of how the condition may be demonstrated (1) Appropriate procurement of consulting services in Phase 1; (2) Evidence that the issues related to services for Phase 2 activities are recognized, allowing for both national and foreign suppliers.

3.3. EVALUATION OF INFRASTRUCTURE STATUS IN PHASE 2

1. National position	**Phase 2**
Conditions	**Basis for evaluation**
1.1. Government support role defined and effective	**Summary of the condition to be demonstrated** The government has approved a specific nuclear power programme, with a clear commitment to safety, security and non-proliferation. The NEPIO continues to ensure that the work to develop the nuclear infrastructure is coordinated and a government ministry has been assigned the responsibility to support the development of the programme to ensure that: (a) All the government actions needed to support the programme are monitored and coordinated with the project schedule; (b) A policy for nuclear fuel cycle, radioactive waste management and decommissioning is established; (c) Safety, security and safeguards responsibilities are formulated and understood by all relevant organizations; (d) Appropriate support and encouragement of knowledge transfer from States that have experience with a nuclear power programme are available through bilateral agreements; (e) The State fully participates in all the activities associated with the global nuclear safety and security and non-proliferation regime.
	Examples of how the condition may be demonstrated (1) Evidence that an ongoing government role for nuclear power programme implementation has been clearly defined and established within a government agency (e.g. energy or industry); (2) Evidence that the required government actions are monitored and coordinated with the project schedule; (3) Appropriate bilateral agreements are in place with vendor countries (e.g. an intergovernmental agreement); **Note:** These may not be complete at the end of Phase 2 or subject to review given that the detailed contract may still need to be agreed. (4) A defined responsibility for formulating a strategy for fuel cycle and radioactive waste management; (5) Examples of how the State participates in the global nuclear safety and security regime.
	Relevant IAEA publications — SSG16 (Rev. 1) (Actions 5 and 6) [3]; — NSS19 (Section 2) [4]; — NGT3.6 (Rev. 1) [6]; — NWG1.1 [7].

1. National position	Phase 2
Conditions	**Basis for evaluation**
1.2. Overall strategic approach established for contracting for the NPP	**Summary of the condition to be demonstrated** The State has a clear justification for its nuclear power programme and has established a strategy for developing contract arrangements for the NPP (e.g. build–own–operate, build–own–operate–transfer, strategic partnerships, and turnkey and multiple contracts) and has a rationale supporting the decision. The strategy may include requesting bids for more than one option.
	Examples of how the condition may be demonstrated (1) A document reviewing contracting strategies and justifying the chosen approach with evidence that the chosen strategy is consistent with national legislation and has been agreed to by all relevant stakeholders; (2) Implications recognized, and a plan to fulfil necessary requirements in place; a document setting out responsibilities of key national organizations and intended contracting strategy.
	Relevant IAEA publication — SSG16 (Rev. 1) (Actions 5–8) [3].
1.3. Commitments and obligations of owner, operator and regulatory body established	**Summary of the condition to be demonstrated** The owner, operator and regulatory body have been established and the responsibilities of each organization have been clearly defined and understood, including their safety, security and safeguards responsibilities. The role of any national supporting organization (e.g. a technical support organization) has been clearly defined, as has any significant role for nonnational organizations (e.g. vendor or other regulator). The latter is clearly defined in the contracting strategy.
	Examples of how the condition may be demonstrated (1) Roles and responsibilities clearly defined with respect to nuclear safety, security and safeguards in the operating, regulatory and technical support organizations; (2) Definition of the organization that will be the licensee of the NPP and evidence of adequate resources to comply with licence requirements. Definition of the roles and responsibilities of the owner if different from the operator; (3) Definition of any intended regulatory collaboration.
	Relevant IAEA publications — SSG16 (Rev. 1) (Actions 5, 7, 8, 14, 16 and 149) [3]; — IAEA Services Series 21 [26].

2. Nuclear safety	Phase 2
Conditions	**Basis for evaluation**
2.1. Safety responsibilities of key organizations recognized	**Summary of the condition to be demonstrated** The government has expanded its nuclear safety policy and strategy to include nuclear power. The owner/operator and the regulatory body have a detailed understanding of safety standards and have begun the task of understanding the safety basis of an NPP. Senior positions in the owner/operator and the regulatory body have been filled for some time and the leadership of both the owner/operator and the regulatory body have initiated programmes and practices to build a safety culture in their respective organizations. They have also agreed on a protocol for communication between the owner/operator, the regulatory body and the vendor that covers correspondence, meetings and actions, among other things. The regulatory body has specified requirements on how the competence of owner/operator staff in positions related to safety is ensured. The owner/operator, the regulatory body and technical support organizations, as appropriate, have the expertise to prepare for the review of safety assessments supplied by the vendor.
	Examples of how the condition may be demonstrated (1) Nuclear safety principles and requirements developed by the regulatory body and the owner/operator; (2) Appropriate training for regulators, owner/operators and technical specialists carried out; (3) Knowledge of international experience that is relevant to NPP designs being considered; (4) For key leadership positions, a summary of NPP safety related experience and development; (5) Programmes to promote safety culture through leadership; (6) Protocol agreed for interactions between owner/operator, regulator, vendor and technical support organizations; (7) Process and responsibilities defined for review and understanding of information supplied by the vendor during construction.
	Relevant IAEA publication — SSG16 (Rev. 1) (Actions 32, 149, 151, 152, 172, 190 and 191) [3].
2.2. Expectations for relationship with suppliers established	**Summary of the condition to be demonstrated** Future role of the vendor, or other bodies, in supporting safe operation has been defined by the owner/operator (e.g. any design authority role or support role in managing emergency situations). Training requirements from the vendor or other bodies have also been defined.
	Examples of how the condition may be demonstrated Statements defining the required levels of support from the vendor and other bodies and mechanisms for information exchange, training and technical support, among other things.
	Relevant IAEA publication — SSG16 (Rev. 1) (Actions 14–16 and 154) [3].

3. Management	Phase 2
Conditions	**Basis for evaluation**
3.1. Contract specifications and evaluation criteria determined	**Summary of the condition to be demonstrated** If competitive bidding for an NPP is being undertaken, a detailed bid invitation specification (BIS) has been completed, together with the criteria that will be used to evaluate the bids. If the vendor has already been selected (e.g. by an intergovernmental agreement), the owner/operator has included its requirements in the specifications for negotiating with a sole supplier[d]. Negotiating strategy and criteria have also been developed.
	Examples of how the condition may be demonstrated (1) Documented BIS available and evaluation criteria clearly defined; (2) Description of the negotiating strategy defined by the NPP owner/operator.
	Relevant IAEA publications — SSG16 (Rev. 1) (Actions 113, 153 and 173) [3]; — NGT3.9 [44].

d The rest of this publication refers to BISs, which are applicable to a State using a competitive bidding process. A State using an intergovernmental agreement, strategic partner or sole supplier, instead of a competitive process, therefore needs to interpret BISs as specifications for negotiating with a sole supplier.

3. Management	Phase 2
Conditions	**Basis for evaluation**
3.2. Owner/operator competence for procuring and managing the NPP contract evident and plans to develop operator competence available	**Summary of the condition to be demonstrated** The owner/operator is competent to manage the procurement requirements and to ensure that the contract requirements are fully met. This will include verification of project progress and quality requirements. This may include the appointment of the owner's engineer to support the owner organization. If this involves a split package or multipackage procurement approach, a significantly greater level of competence will be required. The owner/operator needs to have plans to develop the capability for safe and secure operation, including: (a) Recruitment and training of staff; (b) Procedures to ensure that knowledge critical to safe and secure operation will be preserved; (c) Procedures to create the required awareness with regard to the risk of proliferation of nuclear weapons through export or import.
	Examples of how the condition may be demonstrated (1) Description of the organization, including the roles and responsibilities of departments and individuals with respect to bid assessment, supervision of construction, development of knowledge base, and understanding of operating and maintenance requirements. (2) Evidence of a suitably qualified and experienced team with competence in all required areas, including: (a) Bid requesting and bid evaluation; (b) Awarding and issuing purchase orders; (c) Financing, letters of credit and taxes; (d) Quality programmes, including inspection of items under manufacturing, testing and receipt of goods and nonconformance procedures; (e) Transport, insurance and customs clearing; (f) Types of proven NPP designs and potential suppliers; (g) Main technical characteristics of potential plants; (h) Codes and standards; (i) Contracting methodologies; (j) Project management, manufacturing schedule and delivery time. (3) Plans to develop: (a) Project reporting mechanisms; (b) Acceptance procedures and criteria; (c) Commissioning skills; (d) The organization that will be required for commissioning and operating the NPP; (e) Commissioning, operating and maintenance procedures. (4) Interfaces with other organizations defined and agreed. (5) Evidence that appropriate staff have gained experience from operating plants similar to those being considered. (6) Plans to participate in appropriate owner groups.
	Relevant IAEA publication — SSG16 (Rev. 1) (Actions 66 and 152) [3].

3. Management	Phase 2
Conditions	**Basis for evaluation**
3.3. Management systems established	**Summary of the condition to be demonstrated** Management systems have been defined for each of the three key organizations and include roles, responsibilities, organizational structure and processes (for Phase 2), including record keeping. The processes for Phase 3 are in place or planned to be produced before they are required. The management systems cover safety, nuclear security and safeguards, and are consistent with IAEA Safety Standards Series No. GSR Part 2, Leadership and Management for Safety [45]. The systems promote a strong safety and security culture, include plans for self and independent evaluation, and include procedures to ensure that knowledge critical to the safe, secure and peaceful use of nuclear energy will always be preserved. For the NEPIO and the regulatory body, they also include mechanisms to monitor the programme for infrastructure development and to ensure that it is consistent with the project schedule.
	Examples of how the condition may be demonstrated (1) For each organization, availability of the integrated management system manual, definition of key processes and responsibilities, and plans to produce required detailed documentation; (2) Mechanism for the NEPIO to manage the infrastructure development programme.
	Relevant IAEA publications — SSG16 (Rev. 1) (Actions 75–77 and 151) [3]; — GSR Part 2 [45]; — NSS19 (Actions 4.19–4.23) [4].

4. Funding and financing	Phase 2
Conditions	**Basis for evaluation**
4.1. Funding plan available	**Summary of the condition to be demonstrated** The plans for funding the infrastructure development costs that are not the fiscal responsibility of the owner/operator have been developed. Depending on the contracting model, these may include costs associated with legislation, setting up the owner/operator, education, training, research, government roles (e.g. environmental assessment process, stakeholder involvement), the regulatory body, emergency planning, spent fuel and radioactive waste management and decommissioning.
	Examples of how the condition may be demonstrated (1) Mechanisms established for funding the regulatory body, including technical support organizations; (2) Proposed means identified for funding spent fuel and radioactive waste management and decommissioning; (3) Phase 3 funding plan matched to NPP project plan, including all national commitments for participation in construction, owner/operator costs, regulator costs, other stakeholders and emergency planning.
	Relevant IAEA publication — SSG16 (Rev. 1) (Actions 52–55) [3].
4.2. Means of financing established and strategy for management of financial risks available	**Summary of the condition to be demonstrated** A credible feasibility study has been finalized and realistic financing options for the NPP have been identified. An owner/operator financial team has been established, and is competent to identify potential lenders and additional investors, evaluate and/or negotiate financing offers, analyse the extent of, and the risks associated with, any State backed power purchase agreement and/or sovereign guarantees, and identify and analyse additional financial risks. A clear sense of what is acceptable to senior decision makers is available. The financial risks have been clearly identified and a strategy for negotiation and/or evaluation of key finance related proposals has been developed.
	Examples of how the condition may be demonstrated (1) A document identifying how the project will be financed and demonstrating the financial viability of the project, including implications for electricity tariffs; (2) Risk management proposals identifying all the key financial risks, and how they can be addressed through contracts and/or guarantees. These need to cover operational difficulties, public liabilities, delays in construction, regulatory delays, government/public intervention and electricity price fluctuations; (3) A negotiating mandate and/or more detailed guidance based, for example, on the high level terms in an intergovernmental agreement. **Note:** There are likely to be constraints on how much of this specific information will be available, but information on the process that has been used to develop and underwrite the plan needs to be available.
	Relevant IAEA publications — NGT4.1 [10]; — NGT4.2 [11].

5. Legal framework	Phase 2
Conditions	**Basis for evaluation**
5.1. Adherence to all international legal instruments governing nuclear activities	**Summary of the condition to be demonstrated** The Member State has adhered to the following international legal instruments and is following an action plan for their implementation: (a) Convention on Early Notification of a Nuclear Accident (INFCIRC/335) [12]; (b) Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency (INFCIRC/336) [13]; (c) Convention on Nuclear Safety (INFCIRC/449) [14]; (d) Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (the 'Joint Convention') (INFCIRC/546) [15]; (e) Convention on the Physical Protection of Nuclear Material (INFCIRC/274/Rev.1) [16] and Amendment thereto (INFCIRC/274/Rev.1/Mod.1) [17]; (f) Vienna Convention on Civil Liability for Nuclear Damage (INFCIRC/500) [18][e]; (g) Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage (INFCIRC/566) 9 [19]; (h) Convention on Supplementary Compensation for Nuclear Damage (INFCIRC/567) [20]; (i) Joint Protocol Relating to the Application of the Vienna Convention and the Paris Convention (INFCIRC/402) [21]; (j) Comprehensive safeguards agreement — based on The Structure and Content of Agreements Between the Agency and States Required in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons (INFCIRC/153 (Corrected)) [22]; (k) Additional protocol — following the provisions of Model Protocol Additional to the Agreement(s) Between States(s) and the International Atomic Energy Agency for the Application of Safeguards (INFCIRC/540 (Corrected)) [23]; (l) Revised Supplementary Agreement Concerning the Provision of Technical Assistance by the IAEA.
	Example of how the condition may be demonstrated Evidence that the State has adhered to the relevant international legal instruments and is implementing the obligations arising from them.
	Relevant IAEA publications — Handbook on Nuclear Law [24]; — Handbook on Nuclear Law: Implementing Legislation [25]; — SSG16 (Rev. 1) (Action 15) [3].

[e] The Convention on Third Party Liability in the Field of Nuclear Energy (Paris Convention) [27] is another relevant legal instrument under the auspices of the Organisation for Economic Co-operation and Development.

5. Legal framework	Phase 2
Conditions	**Basis for evaluation**
5.2. A comprehensive nuclear law enacted	**Summary of the condition to be demonstrated** The Member State has enacted the national nuclear legislation that: (a) Establishes an independent nuclear regulatory body with adequate human and financial resources, and a clear and comprehensive set of functions; (b) Identifies responsibilities for safety, security and safeguards; (c) Formulates safety principles and rules (radiation protection, nuclear installations, radioactive waste and spent fuel management, decommissioning, mining and milling, EPR and the transport of radioactive material); (d) Formulates nuclear security principles; (e) Gives appropriate legal authority for, and definition of, the responsibilities of the regulatory body and all competent authorities establishing a regulatory control system (authorization, inspection and enforcement, review and assessment, and development of regulations and guides); (f) Implements IAEA safeguards, including an SSAC; (g) Implements import and export control measures for nuclear and radioactive material and items; (h) Establishes compensation mechanisms for nuclear damage.
	Example of how the condition may be demonstrated Evidence that a comprehensive nuclear law is enacted and promulgated.
	Relevant IAEA publications — Handbook on Nuclear Law [24]; — Handbook on Nuclear Law: Implementing Legislation [25]; — IAEA Services Series 21 [26]; — SSG16 (Rev. 1) (Actions 22 and 108) [3]; — NSS19 (Actions 3.3–3.12) [4].

5. Legal framework	Phase 2
Conditions	**Basis for evaluation**
5.3. All other legislation affecting the nuclear power programme reviewed	**Summary of the condition to be demonstrated** Legislation has been reviewed and amended as necessary to cover: (a) Environmental protection; (b) EPR; (c) Occupational health and safety of workers; (d) Protection of intellectual property; (e) Local land use controls; (f) Foreign investment; (g) Taxation, fees, electricity tariffs and incentives; (h) Funding of long term liabilities related to spent fuel, radioactive waste and decommissioning; (i) Roles of national and local governments; (j) Stakeholders and public involvement; (k) International trade and customs; (l) Financial guarantees and any other required financial legislation; (m) R&D.
	Example of how the condition may be demonstrated Presentation of a review identifying relevant laws and evidence that the necessary laws have been enacted, or there is a clear plan to enact them at the appropriate time.
	Relevant IAEA publications — Handbook on Nuclear Law [24]; — Handbook on Nuclear Law: Implementing Legislation [25]; — IAEA Services Series 21 [26]; — NSS19 (Actions 3.6–3.12) [4].

6. Safeguards	Phase 2
Conditions	**Basis for evaluation**
6.1. Strengthening of the SSAC underway	**Summary of the condition to be demonstrated** The State authority responsible for safeguards implementation is established and has defined roles and responsibilities within the SSAC. Measures are implemented to enhance the SSAC's capability to regulate and control all nuclear activities in the State to ensure that the nuclear material is used only for peaceful purposes, including: (a) To collect, process and report, on time, correct and complete safeguards relevant information to the IAEA; (b) To facilitate IAEA activities and to provide access for IAEA infield verification; (c) To confirm or verify the information provided; (d) To resolve questions and inconsistencies through institutional arrangements.
	Examples of how the condition may be demonstrated (1) Description of the SSAC roles and responsibilities; (2) Evidence that all organizations involved in the establishment or adjustment of the SSAC are prepared for the increase of activity, the increase of resources and the enhancement of capabilities needed to embark successfully on a nuclear power programme; (3) A plan to develop operation safeguards relevant procedures; (4) A programme in place to build up the required technical and administrative competence on timescales consistent with the development of the nuclear power programme; (5) Evidence through information exchange with the IAEA that the SSAC has a good understanding of the principles of safeguarding an NPP, including the type of equipment the IAEA may install in the facility.
	Relevant IAEA publications — IAEA Services Series No. 21 [26]; — IAEA Services Series No. 15 [29].
6.2. SSAC requirements for the NPP recognized and addressed	**Summary of the condition to be demonstrated** The owner/operator is aware of the requirements of nuclear materials accounting and control, including the necessary staffing, training and technical resources.
	Examples of how the condition may be demonstrated (1) Human technical and financial resource requirements are included in the owner/operator organization plans; (2) Plans to develop the required system and related procedures for collecting, processing and reporting safeguards relevant information.
	Relevant IAEA publications — IAEA Services Series 21 [26]; — IAEA Services Series 15 [29].

6. Safeguards	Phase 2
Conditions	**Basis for evaluation**
6.3. Design information requirements for safeguards recognized	**Summary of the condition to be demonstrated** The State has notified the IAEA of its plans for NPP construction, understands the need for early planning of safeguards relevant features in the design and construction phases (including such requirements in the BIS), and plans to submit early design information to the IAEA as soon as the technology has been decided on. Any plans for fuel cycle facilities have been communicated to the IAEA.
	Examples of how the condition may be demonstrated (1) Additional protocol [23] declaration (under Article 2.a.x) on 10 year plans for the NPP submitted and regularly updated; (2) Evidence through information exchange with the IAEA that the owner/operator has a good understanding of the principles of safeguarding an NPP, including the type of equipment the IAEA may install in the facility; (3) Information on technology and list of designs being included in the BIS provided to the IAEA; if a design has already been chosen, design information has been submitted to the IAEA with any specific national variations; (4) Future safeguards requirements for the NPP identified and included in the BIS; (5) Any proposals for fuel cycle facilities discussed with the IAEA.
	Relevant IAEA publications — IAEA Services Series 21 [26]; — IAEA Services Series 11 [46]; — NPT2.8 [47].

7. Regulatory framework	Phase 2
Conditions	**Basis for evaluation**
7.1. Competent, effectively independent nuclear regulatory body established	**Summary of the condition to be demonstrated** The regulatory body has the legal authority, technical competence, resources and procedures to fulfil the statutory obligations, and is ready to assess an application for a licence, issue a licence with licence conditions and inspect the construction of the NPP against a clearly defined set of regulatory requirements. Its regulatory decisions are free from undue political and economic influence.
	Examples of how the condition may be demonstrated (1) Demonstration of effective independence, including separation from the promotional aspects of nuclear power; (2) Evidence of adequate human and financial resources, including technical and leadership competence; (3) Processes for communications with the public and liaison with the international community; (4) A documented, formal management system, including roles, responsibilities, organizational structure and processes and record keeping (see infrastructure issue no. 3, management); (5) Technical support organizations and advisory experts available to support the regulatory function; (6) Arrangements for interfaces with operating organizations, other regulatory bodies, transport organizations and international forums; (7) Defined process for the assessment of applications for licence, licence issuance, inspections and enforcement actions. **Note:** A report evaluating the regulatory framework against the actions described in SSG16 [3] would address these conditions with respect to safety. If an IAEA Integrated Regulatory Review Service mission (tailored for embarking countries) has been conducted, the results of this mission could be used as evidence. However, subsequent work on any identified recommendations would be noted but not reviewed in detail, as that would occur during an Integrated Regulatory Review Service follow-up mission.
	Relevant IAEA publications — SSG16 (Rev. 1) (Actions 27–32, 108, 109, 126, 161, 174, 190 and 191 (addressing thematic aspects of the regulatory framework; see also the other relevant Milestone issues)) [3]; — NSS19 (Actions 3.4, 3.5 and 3.13–3.19) [4].

7. Regulatory framework	Phase 2
Conditions	**Basis for evaluation**
7.2. Regulatory framework developed	**Summary of the condition to be demonstrated** The regulatory framework addresses all the relevant aspects for safety, security and safeguards related to siting, design and construction of the proposed NPP (including arrangements for spent fuel, waste management and the transport of radioactive material). The framework will ultimately need to cover all the phases of the programme, but at this stage some aspects (e.g. commissioning, operation, decommissioning) may be covered by future work plans.
	Examples of how the condition may be demonstrated (1) A comprehensive list of regulations identifying those issued, those in draft and those yet to be developed; (2) Evidence showing how the regulations have been developed and how they are consistent with IAEA safety standards, security guidance and safeguards requirements.
	Relevant IAEA publications — SSG16 (Rev. 1) (Actions 27–32, 108, 109, 126, 161, 174, 190 and 191 (addressing thematic aspects of the regulatory framework; see also the other relevant Milestone issues)) [3]; — NSS19 (Actions 3.4, 3.5 and 3.13–3.19) [4].

8. Radiation protection[f]	Phase 2
Conditions	**Basis for evaluation**
8.1. Development of radiation protection programmes and expansion of appropriate infrastructure planned	**Summary of the condition to be demonstrated** Plans have been developed for programmes to control and monitor the exposure of individuals onsite before any radioactive material arrives on the site, including staff training, procurement of equipment and services, and design requirements. The plans take into account increased requirements during construction and commissioning.
	Examples of how the condition may be demonstrated (1) Plans in place to implement radiation monitoring and protection programmes for exposure of workers and the public onsite before any radioactive material arrives on the site; (2) The appropriate equipment and systems for radiation monitoring are included in the BIS; (3) A review of the national infrastructure for monitoring and recording radiation doses with plans for the required expansion; (4) Evidence of visits to other NPPs to understand the issues of dose and contamination control; (5) Availability of competent staff to review vendor proposals for dose and contamination control.
	Relevant IAEA publication — SSG16 (Rev. 1) (Action 105) [3].

[f] This covers protection of workers and the public onsite during planned operation. Offsite releases from planned operation are addressed in infrastructure issue no. 13, environmental protection. Accidental releases and associated radiation protection are addressed in infrastructure issue no. 14, emergency planning.

9. Electrical grid	Phase 2
Conditions	**Basis for evaluation**
9.1. Detailed studies undertaken to determine grid enhancements	**Summary of the condition to be demonstrated** An analysis of the grid system has been completed to identify any enhancements needed to: (a) Cope with the enhanced generating capacity; (b) Achieve grid stability and reliability requirements to allow safe and efficient operation of the NPP (ability to reliably take the power generated and provide supplies to safety equipment). The requirements of the planned NPP have been agreed with the transmission system operator and they are compatible with the capability of NPP designs being considered.
	Examples of how the condition may be demonstrated Plans to address the grid requirements associated with the inclusion of the NPP. The plans need to include: (a) Enhancement and/or expansion compatible with the increased generating capacity; (b) Achieving the overall grid stability and reliability requirements for safe operation of the NPP; (c) Justification of the reliability and capacity of the offsite power for the NPP; multiple grid connections to the NPP site, including provisions for their robustness, diversity, physical security and cybersecurity; (d) Grid related plant characteristics and reliability requirements included in the BIS.
	Relevant IAEA publication — NGT3.8 [32].
9.2. Plans, funding and schedule for grid enhancement available	**Summary of the condition to be demonstrated** The plans for, and funding of, the identified enhancements are available, and the enhancement programme is consistent with the NPP construction programme.
	Examples of how the condition may be demonstrated (1) Evidence that funding and schedules for grid enhancements, compatible with the foreseen construction, testing and commissioning, have been approved, and that the delivery times for towers, lines and components, substations and switch yards are consistent with the construction schedule; (2) If the grid system will be interconnected to other countries, plans for appropriate legal and commercial agreements and operating procedures are in place for proper control of system frequency after an NPP trip and for grid emergency situations; (3) If the required performance of the future grid is a significant improvement over the current performance, firm and realistic plans exist to ensure this performance will be achieved in time for the commissioning of the NPP.

10. Human resource development[g]	Phase 2
Conditions	**Basis for evaluation**
10.1. Knowledge and skills needed in organizations for Phase 3 and operational phase identified	**Summary of the condition to be demonstrated** All relevant organizations have identified an appropriate organizational structure and the staff requirements for Phase 3, and the operational phase and key staff are already in place. The plans need to take into account the staffing requirements for any future units and the strategy for transferring staff between units.
	Examples of how the condition may be demonstrated For each organization (including support organizations), an analysis of what resources and competences are needed at what time during Phase 3 and the initial operational phase and which positions need to be formally licensed. The competence areas need to include: (a) Technical (including those that are nuclear specific); (b) Business (e.g. legal, finance); (c) Licensing; (d) Stakeholder involvement; (e) Fuel cycle management and procurement; (f) Construction management and commissioning; (g) Operation and maintenance; (h) Spent fuel, and radioactive waste management and decommissioning; (i) Training and development (including a systematic approach to training).
	Relevant IAEA publications — SSG16 (Rev. 1) (Actions 52, 90–94, 101–103, 118 and 150) [3]; — NSS19 (Actions 4.45–4.49) [4]; — NGT3.10 [33]; — NGT2.2 [48].

[g] This issue addresses the future development of capability for Phase 3 and beyond. The skills already required to be in place for Phase 2 are covered under the appropriate issues (e.g. infrastructure issue no. 7, regulatory framework).

10. Human resource development[g]	Phase 2
Conditions	**Basis for evaluation**
10.2. A plan is available to develop and maintain human resources	**Summary of the condition to be demonstrated** A gap analysis has been completed (based on the requirements of 10.1, above) and recruitment and training plans developed (for each organization). The plans cover education, training and experience requirements and also include consideration of bilateral and international training activities.
	Examples of how the condition may be demonstrated (1) Training plans for senior executives. (2) Recruitment, training and development programmes to provide the competences defined in 10.1, including: (a) The nature of, and time required for, development of each competence; (b) Proposed courses and location of training; (c) The need for training abroad at a similar operating plant to those being considered, with any necessary language training planned; (d) Programmes in place for the involvement of future operation and maintenance personnel with the construction and commissioning groups; (e) The licensing of identified management and operating staff. (3) Proposals for training infrastructure requirements and development of training expertise. (4) The BIS addresses what is required from suppliers, including competence development of national personnel (training and on the job experience), the provision of a simulator and other training infrastructure requirements, and the development of national trainers.
	Relevant IAEA publications — SSG16 (Rev. 1) (Actions 52, 90–94, 101–103, 118 and 150) [3]; — NSS19 (Actions 4.45–4.49) [4]; — NGT3.10 [33]; — NGT2.2 [48].

[g] This issue addresses the future development of capability for Phase 3 and beyond. The skills already required to be in place for Phase 2 are covered under the appropriate issues (e.g. infrastructure issue no. 7, regulatory framework).

10. Human resource development[g]	Phase 2
Conditions	**Basis for evaluation**
10.3. An integrated national strategy has been developed	**Summary of the condition to be demonstrated** The plans of the different organizations (including educational institutions, research organizations and technical support organizations) have been considered in an integrated manner so as to optimize the development programme.
	Examples of how the condition may be demonstrated (1) Integration of the plans of the individual organizations (including support organizations) to enable development of a national strategy, including: (a) An appropriate balance of resources and competence between the operating organization, regulatory body and specialist organizations, with adequate training provision in each; (b) A long term strategy to ensure sustainable, competent resources for each organization; (c) A remuneration structure that will ensure that all organizations are adequately staffed and that staff are retained; (d) Integration and optimization of opportunities for training abroad; (e) Confirmation of the adequacy of the national education infrastructure (at the secondary and tertiary levels) or identification of any necessary improvements. (2) Evidence that key stakeholder organizations have participated in the development and review of the above plan.
	Relevant IAEA publications — SSG16 (Rev. 1) (Actions 52, 90–94, 101–103, 118 and 150) [3]; — NSS19 (Actions 4.45–4.49) [4]; — NGT3.10 [33]; — NGT2.2 [48].

[g] This issue addresses the future development of capability for Phase 3 and beyond. The skills already required to be in place for Phase 2 are covered under the appropriate issues (e.g. infrastructure issue no. 7, regulatory framework).

11. Stakeholder involvement	Phase 2
Conditions	**Basis for evaluation**
11.1. Stakeholder involvement plans being implemented	**Summary of the condition to be demonstrated** Each of the key organizations (government, regulatory body and owner/operator) has a proactive stakeholder involvement plan that is in use and updated regularly.
	Examples of how the condition may be demonstrated (1) Documented stakeholder involvement strategy and plan for each of the key organizations (government, regulatory body and owner/operator) addressing the full range of issues, including technology choice, safety, security, waste management, severe accidents, health and environmental impact; (2) Evidence of a competent communications team in each organization, with experience and evidence of engagement with senior staff; (3) Examples of communications in a range of formats with the public, local government, industry, media, nongovernmental organizations, opposition groups, educational institutions and neighbouring countries; (4) Evidence of training and experience of spokespersons; (5) Evidence of ongoing government communications with regard to energy policy and energy needs, the role of nuclear power in the energy mix, the benefits and risks of nuclear power, the nonzero potential for severe accidents and response to issues raised; (6) Regular reviews of public understanding and acceptance through means such as opinion polls or meetings; (7) Effective public information centres in place or planned, including required budgets and facility design; (8) Evidence that the owner/operator engages, on a regular basis, with local stakeholders on, for example, construction plans, opportunities for local jobs and benefits to the community; (9) Regulator strategy regarding the availability of information to the public, regulatory communication and consultation with stakeholders; (10) Evidence that the role of the regulatory body is understood by stakeholders and that it is perceived as competent and independent.
	Relevant IAEA publications — SSG16 (Rev. 1) (Actions 41 and 42) [3]; — NGT1.4 [34].
11.2. Stakeholder involvement plans coordinated	**Summary of the condition to be demonstrated** The NEPIO provides a continuing forum for communication and cooperation among the key organizations, ensuring that the roles and responsibilities of each organization in stakeholder involvement are clear and that all stakeholders are being involved (including the public, local government, industry, media, nongovernmental organizations, opposition groups and neighbouring States).
	Examples of how the condition may be demonstrated (1) Integrated national strategy agreed among the key organizations, with a commitment to share plans and to ensure consistency of messages; (2) Evidence of regular review by the key organizations of the effectiveness of the strategy.
	Relevant IAEA publications — SSG16 (Rev. 1) (Actions 41 and 42) [3]; — NGT1.4 [34].

12. Site and supporting facilities[h]	Phase 2
Conditions	**Basis for evaluation**
12.1. Detailed site characterization completed	**Summary of the condition to be demonstrated** The basis for the site selection has been justified against clearly defined siting criteria. These cover safety, engineering, security, environmental, emergency response, social and economic aspects. Site characterization and an evaluation by the regulatory body have been completed (the detailed approach will depend on the specific authorization stages defined in the State). Site related design basis information is available and included in the NPP requirements. A plan for addressing the siting of fuel cycle and waste facilities is available.
	Examples of how the condition may be demonstrated (1) A report demonstrating the ranking of possible sites and basis of the chosen site or sites; (2) Evidence that the site meets all siting requirements and the necessary characterization studies have been completed (see publications listed below for list of topics to be addressed); (3) Evidence that local legal, political and public acceptance issues have been identified and resolved or their resolution is planned; (4) Analysis of sites required for fuel interim storage, and for waste conditioning, storage and, where appropriate, disposal; plans for selecting sites available; (5) Evidence that, where appropriate, transport between the NPP and any waste storage/disposal sites has been considered.
	Relevant IAEA publications — SSR1 [35]; — SSG35 [36]; — SSG16 (Rev. 1) (Actions 162–165) [3]; — NGT3.7 [37].
12.2. Plans in place to prepare site for construction	**Summary of the condition to be demonstrated** Infrastructure either exists, or is planned, to support construction, for example access, workforce housing, water and construction materials. Any outstanding work is planned in accordance with the construction requirements or is included in the BIS.
	Examples of how the condition may be demonstrated (1) A review of the current infrastructure and plans to implement any enhancements required; (2) Existing and planned site facilities are clearly described in the BIS.

[h] There are also some siting related requirements addressed in infrastructure issue no. 13, environmental protection.

13. Environmental protection[i]	Phase 2
Conditions	**Basis for evaluation**
13.1. Environmental impact assessment performed	**Summary of the condition to be demonstrated** A complete assessment of the environmental impact of the proposed NPP has been carried out in accordance with national requirements and anenvironmental impact assessment report has been submitted to the appropriate authority. Plans for monitoring to provide a baseline for the site and its surroundings have been developed.
	Examples of how the condition may be demonstrated (1) Availability of the environmental impact assessment report and the status of approval by all relevant regulators and agencies; (2) Mitigation measures evaluated; (3) Plans to develop systems and facilities for necessary environmental monitoring (including radiation monitoring), with clearly assigned roles for the operating organization and the environmental regulator.
	Relevant IAEA publications — SSG16 (Rev. 1) (Actions 110–112 and 166) [3]; — NGT3.11 [38].
13.2. Environmental characteristics provided	**Summary of the condition to be demonstrated** Comprehensive specification of environmental site conditions, factors, characteristics and data have been included in the BIS in as much detail as possible.
	Examples of how the condition may be demonstrated (1) BIS identifying local environmental factors. Areas to consider include: (a) Pathways for effluent transport and concentration in the surrounding environment; (b) Local population demographics and trends; (c) Predominant plant and animal life and relevant radioecological sensitivities; (d) Predominant land use; (e) Data relevant to justifying heat removal capability; (f) Sites and means for disposal of hazardous waste; (g) Local environment issues affecting construction. (2) Bidders have free access to all detailed site studies, including environmental impact assessment documents and collected site data, with the environmental limitations, commitments and conditions. (3) Established procedure for resolution of vendor questions with regard to the interpretation of the site data.

[i] This covers offsite releases from planned operation and all other environmental issues. Protection of workers and the public onsite during planned operation are addressed in infrastructure issue no. 8, radiation protection. Accidental releases and radiation are addressed mainly in infrastructure issue no. 14, emergency planning.

13. Environmental protection[i]	Phase 2
Conditions	**Basis for evaluation**
13.3. Clear and effective regulation of environmental issues established	**Summary of the condition to be demonstrated** The environmental regulator for the nuclear power programme has the skills and resources required to fulfil the roles and responsibilities assigned. The interface between this organization and the nuclear regulator has been defined.
	Examples of how the condition may be demonstrated (1) Roles and responsibilities of the environmental regulator for the NPP defined; (2) Memoranda of understanding between the environmental and nuclear regulatory bodies; (3) Evidence of adequate skills and resources to evaluate the environmental impact assessment, and plans to develop adequate skills to assess the acceptability of design information, inspect/audit activities during construction and evaluate monitoring results.

[i] This covers offsite releases from planned operation and all other environmental issues. Protection of workers and the public onsite during planned operation are addressed in infrastructure issue no. 8, radiation protection. Accidental releases and radiation are mainly addressed in infrastructure issue no. 14, emergency planning.

14. Emergency planning	Phase 2
Conditions	**Basis for evaluation**
14.1. Responsibilities of each organization clearly defined and approach for emergency planning being developed	**Summary of the condition to be demonstrated** An overall action plan is being implemented to provide the required EPR arrangements and capabilities to be demonstrated before fuel is brought to the site. The organizations involved have identified the resources that will be required to execute the action plan and have made a commitment to provide those resources.
	Examples of how the condition may be demonstrated (1) Action plan that addresses the gaps and leads to a demonstration of adequate EPR arrangements and capabilities prior to fuel being brought to site, including: (a) Actions to be completed, schedule and milestones; (b) Organizations responsible for each action; (c) Resources required for the implementation of the action plan; (d) Action plan implementation progress report. (2) Regulations related to EPR have been developed. (3) EPR roles and responsibilities at all levels are documented. (4) The types of accident have been identified and potential consequences have been assessed, including the likely size of emergency planning zones and distances for an NPP. (5) A generic protection strategy has been defined based on assessed hazards and consequences.
	Relevant IAEA publications — GSR Part 7 [39]; — GSG2 [40]; — GSG2.1 [41]; — SSG16 (Rev. 1) (Actions 135–139) [3]; — EPR 2012 [42].

15. Nuclear security	Phase 2
Conditions	**Basis for evaluation**
15.1. Required physical protection measures developed	**Summary of the condition to be demonstrated** The national threat assessment and design basis threat for the NPP have been completed. Requirements for the design of physical protection for the NPP have been defined in the BIS or in other appropriate documents. Specific physical protection requirements during the construction and transport of nuclear material have also been developed. Roles and responsibilities for preparing for, detecting and responding to nuclear security events have been defined.
	Examples of how the condition may be demonstrated (1) A documented national threat assessment that covers the full range of threats affecting nuclear material and nuclear facilities; (2) A competent authority defined with assigned responsibility for developing the design basis threat in coordination with other relevant authorities; (3) Clear definition of roles and responsibilities for each organization involved in the response to nuclear security events; (4) A design basis threat has been developed, and the BIS includes physical protection requirements for the NPP; (5) Nuclear security requirements during the construction and transport of nuclear material have been defined.
	Relevant IAEA publications — NSS19 (Actions 4.3, 4.4, 4.6–4.14, 5.1–5.8 and 5.31–5.33) [4]; — NSS10 [49]; — NSS13 [50].
15.2. Programmes in place for the management of sensitive information	**Summary of the condition to be demonstrated** For each of the key organizations, a process for categorization andmanagement of sensitive information has been developed. This includes control of any sensitive information made available to contractors.
	Examples of how the condition may be demonstrated Processes for the protection of sensitive nuclear security information and protection of computer systems, networks and other digital systems that store sensitive information.
	Relevant IAEA publication — NSS19 (Actions 4.27–4.33) [4].

15. Nuclear security	Phase 2
Conditions	**Basis for evaluation**
15.3. Programmes in place for the trustworthiness of personnel	**Summary of the condition to be demonstrated** For each of the key organizations, a screening/vetting process for recruitment and selection of personnel with access to facilities, nuclear material and sensitive information has been developed.
	Examples of how the condition may be demonstrated Processes for the screening/vetting of personnel, including a graded approach depending on the level of access required.
	Relevant IAEA publication — NSS19 (Action 4.34) [4].
15.4. Programmes in place for promotion of nuclear security culture	**Summary of the condition to be demonstrated** All relevant organizations understand the importance of a nuclear security culture and have plans to develop a nuclear security culture at all levels of the organization.
	Examples of how the condition may be demonstrated Evidence of the promotion of a security culture by leaders and managers within all key organizations involved in the nuclear power programme, including recognition of the importance of integrated management systems and leadership for security, security of information and trustworthiness.
	Relevant IAEA publications — NSS19 (Actions 4.54–4.58) [4]; — NSS7 [51].

16. Nuclear fuel cycle	Phase 2
Conditions	**Basis for evaluation**
16.1. Front end fuel cycle strategy defined	**Summary of the condition to be demonstrated** Based on the national policy, a clear front end fuel cycle strategy has been defined identifying how new fuel will be available in the short and long term or which options are being pursued.
	Examples of how the condition may be demonstrated (1) A document defining a realistic front end nuclear fuel cycle strategy at a level of detail appropriate for Milestone 2; (2) Evidence that basic decisions needed for Milestone 2 have been made. This includes a decision on the number of reloads to be requested with the first core, and a short and long term purchasing strategy for the fuel services (natural uranium, conversion, enrichment and fuel manufacturing); (3) An integrated plan for bidding and construction of any intended front end fuel cycle facilities consistent with the national long term fuel cycle strategy, the power plant construction programme and the national non-proliferation commitment.
16.2. Back end fuel cycle strategy defined	**Summary of the condition to be demonstrated** Based on the national policy, a back end fuel cycle strategy has been defined, including plans/options for storage (onsite and offsite), possible reprocessing or arrangements for fuel take back. Actions and timescales are consistent with the planned NPP construction programme.
	Examples of how the condition may be demonstrated (a) A document on spent fuel management strategy, including identification of facilities needed, actions, resources and timescales; (b) Evidence that basic decisions needed for Milestone 2 have been made. This includes a decision on fuel take back if considered, a decision on spent fuel storage capacity onsite and offsite, and a strategy for purchasing and building these capacities; (c) Initial requirements clearly defined in the BIS.
	Relevant IAEA publications — SSG16 (Rev. 1) (Actions 124 and 127) [3]; — NWT1.24 (Rev. 1) [8].

17. Radioactive waste management	Phase 2
Conditions	**Basis for evaluation**
17.1. Handling the burdens of radioactive waste considered	**Summary of the condition to be demonstrated** Based on the national policy, a clear strategy for the processing, storage and disposal of radioactive waste (including spent fuel if considered as waste) has been developed. If the reprocessing of spent fuel is considered, the waste management strategy includes consideration of the transport, storage and disposal of high level waste. Requirements for processing and storage facilities to be provided by the vendor have been included in the BIS. Plans for any national facilities for radioactive waste management and waste management organizations have been defined and are consistent with the construction programme.
	Examples of how the condition may be demonstrated (1) Policy and strategy documents for the management of radioactive waste (this may include the creation of a specific national waste management organization): (a) Disposal of all waste types; (b) Consideration of regulatory and implementation infrastructures; (c) Allocation of responsibilities; (d) Technical approaches; (e) Funding schemes. (2) Consideration of the suitability of geological conditions in the country for disposal of all types of radioactive waste and/or the potential for contracting for waste disposal with other States. (3) Requirements for facilities to be provided as part of the NPP and provisions for minimizing waste volumes and toxicity included in the BIS. (4) A plan for bidding and construction of any separate waste facilities available and consistent with the power plant construction programme. (5) A plan to initiate or enhance national waste disposal programmes.
	Relevant IAEA publications — SSG16 (Rev. 1) (Actions 124–127) [3]; — NWG1.1 [7]; — NWT1.24 (Rev. 1) [8].
17.2. Preliminary decommissioning plan requested	**Summary of the condition to be demonstrated** A request for a preliminary decommissioning plan from the vendor has been included in the BIS. Specific national requirements have been included.
	Examples of how the condition may be demonstrated (1) A document discussing national requirements for decommissioning; (2) Requirements for a decommissioning plan included in the BIS.
	Relevant IAEA publications — SSG16 (Rev. 1) (Actions 124–127) [3]; — NWT1.24 (Rev. 1) [8].

18. Industrial involvement	Phase 2
Conditions	**Basis for evaluation**
18.1. National capabilities assessed and plans to enhance capability defined	**Summary of the condition to be demonstrated** A review of national capability has been completed, identifying areas where national supply is available or can be developed. Based on this, volume targets, or specific areas, for national involvement have been developed. Plans for upgrading national capability have been defined and funded. The transfer of technology, including intellectual property, has been considered.
	Examples of how the condition may be demonstrated (1) A realistic assessment of the national and local supplier capabilities based on the national policy recommended by the NEPIO. (2) An assessment of the training and funding requirements to upgrade quality. (3) Extent of national industrial participation agreed, desired targets for local and national industrial involvement specified, and requirements for the transfer of technology, including intellectual property, included in the BIS. (4) Clear plans and programmes identifying: (a) Specific industrial involvement in future construction, maintenance or operational support services; (b) Audits of the progress of industrial preparation and ability to meet the requirements for addition to the approved supplier list; (c) Short term and long term programmes (including future projects) to develop the ability to produce items initially being supplied by foreign suppliers; (d) Requirements for industries to be added to the potential vendor/service supplier lists; (e) Requirements for export and import consistent with the State's commitment and obligations with regard to non-proliferation of nuclear weapons and safeguards implementation.
	Relevant IAEA publications — SSG16 (Rev. 1) (Actions 63–65 and 175) [3]; — NGT3.4 [43].

19. Procurement	Phase 2
Conditions	**Basis for evaluation**
19.1. Procurement capability available	**Summary of the condition to be demonstrated** A procurement capability has been established for specific services, such as siting work and consultancy services.
	Examples of how the condition may be demonstrated (1) Procedures or audits to ensure suppliers have appropriate expertise and experience; (2) Evidence of preparation of formal specifications for the services required; (3) Quality standards included in the service specifications; (4) Awareness of the non-proliferation regime with regard to nuclear or nuclear related trade.

3.4. EVALUATION OF INFRASTRUCTURE STATUS IN PHASE 3

The evaluation methodology for Phase 3 recognizes that several of the infrastructure issues are covered by existing IAEA review and advisory service missions that may well have taken place in the country. References to these missions are incorporated into the evaluation methodology.

1. National position	**Phase 3**
Conditions	**Basis for evaluation**
1.1. Government role assigned and effective	**Summary of the condition to be demonstrated** The government responsibilities for the sustainability of the nuclear power infrastructure have been assigned. There are agreed mechanisms for coordination among all the involved organizations.
	Examples of how the condition may be demonstrated (1) Clearly defined ongoing and future roles and responsibilities; (2) A plan to address remaining infrastructure elements.
	Relevant IAEA publications — NGT3.6 (Rev. 1) [6].
1.2. National strategy successfully implemented	**Summary of the condition to be demonstrated** The nuclear power programme has successfully met the national expectations defined in the policies and strategies for the introduction of nuclear power.
	Examples of how the condition may be demonstrated A review of the implementation of the project against the national expectations covering, for example, HR development, industrial involvement, financing, radioactive waste management, etc.
	Relevant IAEA publications — SSG16 (Rev. 1) (Actions 9 and 10) [3]; — NSS19 (Action 2.12) [4]; — NGT3.6 (Rev. 1) [6].
1.3. Long term support through international cooperation evident	**Summary of the condition to be demonstrated** Effective mechanisms are in place for provision of required support and exchange of information with other countries operating nuclear power plants and with international organizations.
	Examples of how the condition may be demonstrated (1) Participation in nuclear safety, security and non-proliferation regimes. Intergovernmental agreements for provision of support from experienced countries, including supplier country; (2) Participation in IAEA activities aimed at information exchange and competence building; (3) Collaboration with international organizations.
	Relevant IAEA publications — SSG16 (Rev. 1) (Action 17) [3]; — NSS19 (Actions 5.9, 8.1–8.5, 8.11, 8.12 and 8.14–8.18) [4].

2. Nuclear safety	Phase 3
Conditions	**Basis for evaluation**
2.1. Responsibilities for safety demonstrated	**Summary of the condition to be demonstrated** Safety analysis reports have been developed by the operating organization (with the support of the vendor) and reviewed/approved/accepted by the regulatory body. Operational limits and conditions and other documents and programmes required by the regulatory body have been developed by the operating organization and reviewed/approved/accepted by the regulatory body.
	Examples of how the condition may be demonstrated (1) A summary of the work undertaken by the operating organization to obtain the construction and operating licence for the NPP; (2) A summary of the work undertaken to ensure the operational limits and conditions and other documents and programmes are understood by the technical and operating staff; (3) Safety evaluation reports and inspection reports of the regulatory body. (The details of the regulatory processes and their implementation will be discussed in issue no. 7.) *If a preOSART has been conducted, the following can be used to provide evidence as to whether the condition has been met:* (1) The technical support module of preOSART covers safety assessment (Module 4.5); (2) The operations and technical support modules of preOSART include consideration of operational limits and conditions (Modules 4.3 and 4.5). *If an Integrated Regulatory Review Service (IRRS) addressing the actions for Phase 3 has been conducted, has been conducted the mission report will provide information relevant to this condition.*
	Relevant IAEA publication — SSG16 (Rev. 1) (Actions 119, 155, 157, 178 and 181) [3].

2. Nuclear safety	Phase 3
Conditions	**Basis for evaluation**
2.2. Leadership and safety culture evident	**Summary of the condition to be demonstrated** The senior management of all organizations provides effective leadership; a positive safety culture is evident in all organizations.
	Examples of how the condition may be demonstrated (1) Evidence of leadership behaviours to implement and promote a safety culture including self-assessment; (2) Policies and actions with respect to events reporting, questioning attitude; (3) Results of regulatory review and inspections of processes and behaviours; (4) Inspection plans for operating phase. *If a preOSART has been conducted, the following can be used to provide evidence as to whether the condition has been met:* — The Leadership and Management for Safety module of OSART (Module 4.1) includes safety culture; in particular the subsection on leadership for safety. Also Module 4.11 of OSART.
	Relevant IAEA publication — SSG16 (Rev. 1) (Actions 78 and 83) [3].
2.3. Action plan in place to address any outstanding safety issues	**Summary of the condition to be demonstrated** An action plan is in place and adequately resourced to address resolution of all outstanding safety issues identified by the regulatory body.
	Examples of how the condition may be demonstrated (1) A list of issues with timescales for resolution agreed with the regulator with a corresponding action plan; (2) The process for managing and closing out issues; (3) Report on status of actions related to the licensing conditions.

2. Nuclear safety	Phase 3
Conditions	**Basis for evaluation**
2.4. Operating organization design integrity process defined and effective	**Summary of the condition to be demonstrated** The operating organization has established an internal entity that will maintain the knowledge of the design and its configuration management (often called the design authority). The operating organization has agreed with the supplier country (countries) how ongoing support for this design authority function will be provided in order to ensure nuclear safety.
	Examples of how the condition may be demonstrated (1) Company or departmental manual defining where the entity is located and the number of staff and their competence; (2) Process description of how design integrity is maintained; (3) Evidence of interactions with other organizations operating similar plants; (4) Arrangements defining the required levels of support from the vendor and other bodies. *If a preOSART has been conducted, the following can be used to provide evidence as to whether the condition has been met:* — Several modules of preOSART contain expectations on configuration management and the management of modifications (Modules 4.3, 4.4, 4.5). These may explain the function of ensuring design integrity.
	Relevant IAEA publication — SSG16 (Rev. 1) (Actions 177 and 184) [3].

3. Management[j]	Phase 3
Conditions	**Basis for evaluation**
3.1. Ongoing arrangements for support clear	**Summary of the condition to be demonstrated** The arrangements with the suppliers, technical support organizations (TSOs) and industry organizations to support ongoing operation are clear.
	Examples of how the condition may be demonstrated (1) Statements defining the required levels of support from the vendor and other bodies and mechanisms for information exchange, training, technical support, etc. (note: maintenance of design integrity requirements are covered by 2.4); (2) Memoranda of understanding or other contractual arrangements between operating organization and the suppliers; (3) Long term contracts for maintenance and support for operations; (4) Cooperation with World Association of Nuclear Operators and other relevant industry organizations.
	Relevant IAEA publication — SSG16 (Rev. 1) (Action 18) [3].
3.2. Structure and staffing of the operating organization for commissioning and operation in place	**Summary of the condition to be demonstrated** The operating organization has developed the structures and has staff in place for commissioning and operation.
	Examples of how the condition may be demonstrated (1) Organizational structure with clearly defined functions and responsibilities; (2) Staffing table for all organizational units for commissioning and operation. *If a preOSART has been conducted, the following can be used to provide evidence as to whether the condition has been met:* (1) The Operations module of OSART (Module 4.3) includes review of readiness to operate safely; (2) The Maintenance module of OSART (Module 4.4) includes review of readiness to maintain the plant safely.
	Relevant IAEA publications — SSG16 (Rev. 1) (Actions 158 and 186) [3]; — SSG28 [52].

[j] Management for the regulatory body is covered in issue no. 7.

3. Management[j]	Phase 3
Conditions	**Basis for evaluation**
3.3. Management system for operation developed	**Summary of the condition to be demonstrated** The operating organization has a management system that defines responsibilities, lines of authority and interfaces with external organizations, describes processes for operation and qualification of suppliers and includes processes to assess the effectiveness of the system.
	Examples of how the condition may be demonstrated (1) A documented management system addressing all the organization's drivers (e.g. health, quality, safety, security, safeguards, environment, economic), defining roles and responsibilities for each part of the organization, identifying the processes of the organization, and a process for review of its effectiveness; (2) The main procedures for operation have been developed and are understood by relevant staff. They include procedures for operations, demonstration of compliance with operational limits and conditions, maintenance and plant configuration, event reporting, auditing or assessment, etc.; (3) Processes for qualification of suppliers; (4) Document management system for operation. *If a preOSART has been conducted, the following can be used to provide evidence as to whether the condition has been met:* (1) The Leadership and Management for Safety module of OSART (Module 4.1) includes review of the integrated management system; in particular the subsection on integrated management systems; (2) The Operational Experience Feedback module of OSART (Module 4.6) includes reviews of the effectiveness of OEF processes; (3) The Commissioning module of OSART (Module 4.13) includes review of readiness for commissioning.
	Relevant IAEA publications — SSG16 (Rev. 1) (Actions 71, 79 and 80) [3]; — GSR Part 2 [45]; — GSG3.1 [53]; — GSG3.5 [54]; — IAEA Services Series 21 [26]; — NSS19 (Actions 4.24–4.25) [4].

[j] Management for the regulatory body is covered in issue no. 7.

3. Management[j]	Phase 3
Conditions	**Basis for evaluation**
3.4. Mechanisms for verification of construction and handover of systems, structures and components	**Summary of the condition to be demonstrated** The mechanisms (procedural and contractual) for verification of construction and handover of systems, structures and components from the main supplier to the operating organization are clearly defined and in use.
	Examples of how the condition may be demonstrated (1) Procedures for how the owner/operator has verified the plant construction and reports of implementation of those procedures; (2) Handover procedures available; (3) Examples of some systems handed over, including relevant documentation; (4) The commissioning programme, including definition of responsibilities and how test procedures and reporting of results will be approved. *If a preOSART has been conducted, the following can be used to provide evidence as to whether parts of the condition have been met:* — The Commissioning module of preOSART (Module 4.13) includes transfer of systems and handover of plant.
	Relevant IAEA publication — SSG16 (Rev. 1) (Actions 159, 183 and 187) [3].
[j] Management for the regulatory body is covered in issue no. 7.	

4. Funding and financing[k]	Phase 3
Conditions	**Basis for evaluation**
4.1. Adequate income to sustain operation available	**Summary of the condition to be demonstrated** The operating organization has sufficient income to provide adequate resources to sustain operation of the nuclear power plant and related facilities.
	Examples of how the condition may be demonstrated Information available will depend on the contractual model and arrangements (and may be confidential) but could include: (a) Evidence that the costs of operation and maintenance have been assessed, budgets have been agreed, and a review mechanism is in place; (b) Information regarding the adequacy of resourcing of the operating organization (e.g. an independent review); (c) Evidence that tariffs will provide adequate returns or a compensatory mechanism is in place.
	Relevant IAEA publications — IAEA TECDOC 1750 [55]; — NGT4.1 [10]; — SSG16 (Rev. 1) (Actions 57 and 59) [3]; — NSS19 (Action 4.61) [4].
4.2. Funding mechanisms in place for radioactive waste management, long term spent fuel management and decommissioning	**Summary of the condition to be demonstrated** An appropriate funding mechanism has been established for radioactive waste management, long term spent fuel management and the decommissioning of the nuclear power plant. The mechanism includes the regular review of the adequacy of the funding arrangements.
	Examples of how the condition may be demonstrated (1) Evidence that costs of radioactive waste management, spent fuel management and decommissioning have been estimated; (2) Evidence that a secure funding mechanism is in place to meet the cost estimates.
	Relevant IAEA publications — NGT4.1 (section 4.2.4) [10]; — NGT4.2 [11]; — SSG16 (Rev. 1) (Actions 58 and 60) [3].
4.3. Funding for compensation for nuclear damage in place	**Summary of the condition to be demonstrated** Mechanisms are in place to implement the provisions of nuclear legislation on civil liability for nuclear damage.
	Examples of how the condition may be demonstrated (a) Financial security arrangements for the operator; (b) Mechanisms to ensure contribution to international fund, where appropriate.

[k] Funding of government role and regulatory body covered under issues no. 1 and 7.

5. Legal framework	Phase 3
Conditions	**Basis for evaluation**
5.1. International instruments being implemented	**Summary of the condition to be demonstrated** Provisions of the relevant international legal instruments (as identified in Phase 2) are being implemented.
	Examples of how the condition may be demonstrated Demonstration of how each of the international legal instruments are implemented (e.g. identification of contact points/competent authorities, participation in review meetings, and submission of copies of laws and regulations to the IAEA, as required by the relevant conventions).
	Relevant IAEA publications — Handbook on Nuclear Law [24]; — Handbook on Nuclear Law: Implementing Legislation [25]; — SSG16 (Rev. 1) (Action 23) [3]; — NSS 19 (Action 3.1) [4].
5.2. National legislation in force and being reviewed and revised as necessary	**Summary of the condition to be demonstrated** National legislation is being updated and amended as necessary to address any identified issues. Mechanisms and plans for review of relevant laws are in place.
	Examples of how the condition may be demonstrated Identification of any unresolved issues or issues arising in the implementation of the laws together with a plan for how they are to be addressed.
	Relevant IAEA publications — SSG16 (Rev. 1) (Action 23) [3]; — NSS19 (Action 3.2) [4].

6. Safeguards	Phase 3
Conditions	**Basis for evaluation**
6.1. State safeguards infrastructure in place for an operational nuclear power programme	**Summary of the condition to be demonstrated** The State authority responsible for safeguards implementation (SRA) has ensured the completion of all necessary enhancements to the State system of accounting for and control of nuclear material (SSAC) and is prepared to: (a) Regulate and control all activities associated with the nuclear power programme; (b) Provide correct and complete information on time to the IAEA; (c) Facilitate IAEA verification activities.
	Examples of how the condition may be demonstrated (1) Evidence of the SRA's legal authority, technical capability and human and financial resources with regard to the needs of the nuclear power programme; (2) Requirements and procedures in place for accounting for and controlling nuclear material at the NPP based on a system of reports, records and measurements that permit the tracking of inventory changes and the closing of material balances; (3) Evidence of institutional arrangements in place to collect, manage, verify and submit all required information to the IAEA; (4) Evidence of State-level procedures and arrangements to ensure access to the NPP by IAEA safeguards inspectors and technicians and facilitate the receipt and use of necessary equipment; (5) Timely submission of NPP design information and operational programme information to the IAEA.
	Relevant IAEA publications — IAEA Services Series 21 [26]; — IAEA Services Series 31 [56].
6.2. Operating organization ready to fulfil all its safeguards related obligations	**Summary of the condition to be demonstrated** The operating organization has procedures, sufficient competent staff, equipment and all necessary institutional arrangements in place to meet SSAC requirements, provide correct and complete information on time to the SRA and facilitate IAEA verification activities.
	Some examples of how the condition may be demonstrated (1) Description of organizational structure, staffing arrangements and training programmes at the NPP related to safeguards implementation; (2) Adequate nuclear material accounting and control system and procedures in place, tested in line with national regulatory requirements; (3) Timely provision of design information and operational programme information to the SRA; (4) Procedures and arrangements in place regarding access for IAEA inspectors and facilitation of verification activities; (5) Evidence of arrangements for timely installation of IAEA containment and surveillance equipment.
	Relevant IAEA publications — IAEA Services Series 21 [26]; — IAEA Services Series 15 [29].

7. Regulatory framework	Phase 3
Conditions	**Basis for evaluation**[1]
7.1. Competent and independent regulatory body operating effectively	**Summary of the condition to be demonstrated** An independent regulatory body is in place with sufficient funding and competent staff to oversee the peaceful, safe and secure operation of the NPP including review and assessment, licensing, and inspection and enforcement activities, etc.
	Examples of how the condition may be demonstrated (1) Evidence from review and assessment carried out during licensing; (2) Evidence from inspections carried out during construction; (3) A comprehensive inspection programme for operations; (4) TSO arrangements in place to support the regulatory body during commissioning and operation.
	Relevant IAEA publications — SSG16 (Rev. 1) (Actions 34, 37, 38, 56, 120, 121 and 182) [3]; — NSS19 (Actions 3.20–3.26) [4]; — IAEA Services Series 21 [26].
7.2. Management system extended to cover commissioning and operation	**Summary of the condition to be demonstrated** The regulatory body has extended its management system to cover commissioning and operation. The management system clearly defines responsibilities, lines of authority and interfaces with external organizations. Processes are also in place to assess the effectiveness of the system.
	Examples of how the condition may be demonstrated (1) A suite of documentation defining the organization and its processes; (2) Results of internal or external audits; (3) Defined requirements for review and improvement of the management system.
	Relevant IAEA publications — SSG16 (Rev. 1) (Actions 70, 71, 79, 80 and 81) [3]; — NSS19 (Actions 4.24–4.25) [4]; — IAEA Services Series 21 [26].

[1] An IRRS (based on the identified action numbers in SSG16 (Rev. 1)), an IAEA State System of Accounting for and Control of Nuclear Material Advisory Service (ISSAS) and an International Physical Protection Advisory Service (IPPAS) focused on readiness to regulate an operational nuclear power programme will review all these conditions with respect to nuclear safety, safeguards and nuclear security.

7. Regulatory framework	Phase 3
Conditions	**Basis for evaluation**[1]
7.3. Regulations and guides in place and reviewed regularly	**Summary of the condition to be demonstrated** The regulatory body has put in place a comprehensive set of regulations and guides, and has a process for their regular review and reissue as required.
	Examples of how the condition may be demonstrated (1) A comprehensive set of regulations covering safety, security and safeguards; (2) The procedure for regular review/update of the regulations and guides.
	Relevant IAEA publications — SSG16 (Rev. 1) (Actions 35, 36 and 67) [3]; — NSS19 (Actions 3.20–3.26 and 4.5) [4]; — IAEA Services Series 21 [26].
7.4. Arrangements in place for cooperation with regulatory bodies in other countries	**Summary of the condition to be demonstrated** The regulatory body has reviewed opportunities for cooperation with regulatory bodies, especially in countries operating similar nuclear power plants and in the supplier country, and has put appropriate arrangements in place.
	Examples of how the condition may be demonstrated (1) Cooperation arrangements with other regulatory bodies; (2) Participation in international networks providing opportunities to exchange information concerning regulatory practices.
	Relevant IAEA publications — SSG 16 (Actions 17 and 19) [3]; — NSS19 (Actions 8.1–8.5, 8.11, 8.12 and 8.15–8.18) [4].

[1] An IRRS (based on the identified action numbers in SSG16 (Rev. 1)), an ISSAS and an IPPAS focused on readiness to regulate an operational nuclear power programme will review all these conditions with respect to nuclear safety, safeguards and nuclear security.

8. Radiation protection[m]	Phase 3
Conditions	**Basis for evaluation**
8.1. Radiation monitoring and dosimetry system in place	**Summary of the condition to be demonstrated** Onsite radiation monitoring equipment and record keeping in place. Arrangements for dosimetry system are in place.
	Examples of how the condition may be demonstrated (1) NPP arrangements for onsite radiation monitoring; (2) Arrangements for dosimetry service and record keeping; (3) Availability of calibration services for radiation monitoring equipment. *If a preOSART has been conducted, the following can be used to provide evidence as to whether the condition has been met:* — The Radiation Protection module of OSART (Module 4.7), particularly the subsection on radiation protection equipment, addresses this issue.
	Relevant IAEA publication — SSG16 (Rev. 1) (Actions 114 and 115) [3].
8.2. Programmes to optimize doses from operation and maintenance in place	**Summary of the condition to be demonstrated** The operating organization has programmes to ensure that doses from operation and maintenance are optimized, and these have been reviewed by the regulatory body.
	Examples of how the condition may be demonstrated (1) Approved radiation protection programme; (2) Procedures for the planning and control of radiation exposures during operation and maintenance; (3) Provision and maintenance of adequate instrumentation, protective clothing, and facilities. *If a preOSART has been conducted, the following can be used to provide evidence as to whether the condition has been met:* — The Radiation Protection module of OSART (Module 4.7) includes review of radiation protection of staff on site.
	Relevant IAEA publication — SSG16 (Rev. 1) (Actions 114 and 115) [3].

[m] This covers the protection of workers and public onsite during operation. Offsite releases from normal operation are addressed in issue no. 13. Environmental Protection and accidental releases and associated radiation protection are addressed mainly in issue no. 14. Emergency Planning.

9. Electrical grid	Phase 3
Conditions	**Basis for evaluation**
9.1. Interface between operating organization and grid company effective	**Summary of the condition to be demonstrated** Arrangements in place for coordination of grid operation with power plant operation.
	Examples of how the condition may be demonstrated (1) MOU or other arrangements between grid operators and NPP operating organization on how grid will be managed to ensure reliable support for the NPP and prevent unnecessary shutdowns/ power reductions and transients; (2) Protocol for scheduling shutdowns (and power changes if projected) and managing grid maintenance; (3) Technical requirements for connection to the grid (grid code) reviewed and amended, as necessary. *If a preOSART has been conducted, the following can be used to provide evidence as to whether the condition has been met:* — The Maintenance module of OSART (Module 4.4) includes review of arrangements for scheduling grid maintenance.
	Relevant IAEA publications — NGT3.8 [32]; — NPT3.23 [57].
9.2. Plans for grid enhancement executed	**Summary of the condition to be demonstrated** Necessary upgrades and enhancements to the grid and interconnections completed and tested.
	Examples of how the condition may be demonstrated Report on current status of required enhancements.
	Relevant IAEA publication — SSG16 (Rev. 1) (Action 180) [3].
9.3. Grid reliability demonstrated	**Summary of the condition to be demonstrated** Results of analysis to confirm the reliability of the national grid system provided regularly and contingency arrangements in place for restoration of power in the event of a major loss of grid capability.
	Examples of how the condition may be demonstrated (1) Agreements of provision of regular reporting of grid reliability; (2) Defined arrangements for restoration of power in the event of a major loss of grid capability; (3) Tests planned to address impact of full power trip and major grid component failures; (4) Availability of tested redundant offsite power supplies to the NPP.
	Relevant IAEA publication — NGT3.8 [32].

10. Human resource development	Phase 3
Conditions	**Basis for evaluation**
10.1. Ongoing human resource development programme in the operating organization effective	**Summary of the condition to be demonstrated** Programmes for training, qualification and certification of staff in the operating organization are in place and effective. Programme for attraction and retention of staff and knowledge transfer is in place.
	Examples of how the condition may be demonstrated (1) Job positions and related competencies documented; (2) Training programmes, including mechanisms to review their effectiveness; (3) Availability of suitable training facilities, including a full scope plant specific simulator, and competent trainers; (4) Recruitment programmes that recognize the need for new and replacement staff; (5) Review/accreditation of training programmes against national or international standards; (6) Availability of a leadership development programme; (7) Availability of effective knowledge management process. *If a preOSART has been conducted, the following can be used to provide evidence as to whether the condition has been met:* — The Training and Qualification module of OSART (Module 4.2), particularly the subsection on review of training policy. Other subsections provide a detailed review of training programs in the operating organization.
	Relevant IAEA publications — SSG16 (Rev. 1) (Actions 68, 95 and 96) [3]; — NGG2.1 [58]; — NGT3.10 [33]; — NGT2.2 [48]; — NSS19 (Actions 4.51 and 4.52) [4].

10. Human resource development	Phase 3
Conditions	**Basis for evaluation**
10.2. Ongoing human resource development programme in the regulatory body effective	**Summary of the condition to be demonstrated** Programmes for training and development of staff in the regulatory body to oversee the commissioning and operational phase of the NPP are in place and effective.
	Examples of how the condition may be demonstrated (1) Job positions and related competences documented; (2) Training programmes, including mechanisms to review their effectiveness; (3) Availability of suitable training facilities and competent trainers; (4) Availability of a leadership development programme. *If an IRRS addressing the actions for Phase 3 has been conducted, this will provide information relevant to this condition.*
	Relevant IAEA publications — NGG2.1 [58]; — Safety Reports Series No. 79 [59]; — SSG16 (Rev. 1) (Action 82) [3]; — NSS19 (Actions 4.51 and 4.52) [4].
10.3. National educational programmes and research and development to support the nuclear power programme in place	**Summary of the condition to be demonstrated** National educational and research and development programmes required to support the nuclear power programme in place.
	Examples of how the condition may be demonstrated (1) University courses/research activities in support of the nuclear programme; (2) Support for research and development programmes; (3) Combined initiatives by government and industry to support educational programmes; (4) Availability of technician training institutes and craftsmen training; (5) National TSOs identified and developed.
	Relevant IAEA publication — SSG16 (Rev. 1) (Actions 98 and 104) [3].

11. Stakeholder involvement	Phase 3
Conditions	**Basis for evaluation**
11.1. Ongoing transparent and open communications	**Summary of the condition to be demonstrated** Government, operating organization, regulatory body and other relevant organizations have a programme of stakeholder involvement that maintains a proactive, transparent and open approach.
	Examples of how the condition may be demonstrated (1) Operational public information centres; (2) Qualified and experienced communication staff in all organizations; (3) Continued communication, led by the government explaining the rationale for nuclear power and public opinion surveys; (4) Implemented stakeholder involvement plan for the operating organization, including local stakeholders; (5) Examples of regulatory stakeholder communications, including communication and consultation with interested parties. *If an IRRS addressing the actions for Phase 3 has been conducted, this will provide information relevant to this condition with respect to the regulatory body.*
	Relevant IAEA publications — SSG16 (Rev. 1) (Actions 43, 45, 46 and 47) [3]; — NGT1.4 [34]; — NSS19 (Actions 7.1 and 7.19) [4].

12. Site and supporting facilities	Phase 3
Conditions	**Basis for evaluation**
12.1. Site characteristics confirmed/updated and ongoing site monitoring	**Summary of the condition to be demonstrated** The operating organization has confirmed the site characteristics, taking into account information obtained during construction. The operating organization has a plan for ongoing monitoring to ensure that the site continues to meet the design intent.
	Examples of how the condition may be demonstrated (1) A report confirming the site characteristics, taking into account monitoring data and information obtained during construction; (2) Arrangements to monitor the characteristics of appropriate natural and human induced hazards as well as the demographic, meteorological and hydrological conditions of relevance.
	Relevant IAEA publication — SSG16 (Rev. 1) (Action 169) [3].

13. Environmental protection[n]	Phase 3
Conditions	**Basis for evaluation**
13.1. Environmental limits defined	**Summary of the condition to be demonstrated** Environmental limits (radiological and nonradiological) have been defined and regulatory oversight/monitoring process is in place.
	Examples of how the condition may be demonstrated (1) Evidence that environmental limits for operation are established; (2) Evidence of how regulatory oversight is performed.
	Relevant IAEA publication — NGT3.11 [38].
13.2. Environmental monitoring programmes in place	**Summary of the condition to be demonstrated** An environmental monitoring programme is in place that allows the impact of operation to be assessed through comparison with the baseline study.
	Examples of how the condition may be demonstrated (1) An operational environmental monitoring programme in place, as agreed in the environmental impact assessment; (2) Reports of continuous and periodical review of monitoring results in comparison with the environmental baseline data.
	Relevant IAEA publication — SSG16 (Rev. 1) (Actions 114 and 116) [3].

[n] This covers offsite releases from planned operation and all other environmental issues. The protection of workers and public onsite during planned operation are addressed in issue no. 8. Radiation Protection and Accidental releases and associated radiation protection are addressed mainly in issue no. 14. Emergency Planning.

14. Emergency planning	Phase 3
Conditions	**Basis for evaluation**[o]
14.1. Owner/operator emergency arrangements in place, tested and verified	**Summary of the condition to be demonstrated** Onsite emergency preparedness and response programme has been developed and tested by the operating organization and verified/approved by the regulatory body. The operating organization has a programme for regular training, drills and exercises to demonstrate the ongoing capabilities.
	Examples of how the condition may be demonstrated (1) Documentation describing the operating organization's emergency arrangements; facilities and equipment in place to support the plan; (2) Criteria and mechanism of communication to the external stakeholders in case of nuclear emergency situations; (3) Documentation related to the approval of the emergency preparedness programme by the regulatory body; (4) Documentation related to the training, drills and exercises conducted. *If a preOSART has been conducted, the following can be used to provide evidence as to whether the condition has been met:* — The Emergency Planning and Preparedness module of OSART (Module 4.9) includes a review of emergency preparedness in the operating organization, including interfaces with other organizations.
	Relevant IAEA publications — GSR Part 7 [39]; — SSG16 (Rev. 1) (Actions 141, 144 and 145) [3]; — EPR 2012 [42]; — NSS19 (Action 4.16) [4].

[o] An Emergency Preparedness Review mission focused on readiness to commence operation of the first NPP will provide information relevant to all these conditions.

14. Emergency planning	Phase 3
Conditions	**Basis for evaluation**[o]
14.2. National emergency arrangements in place and tested	**Summary of the condition to be demonstrated** A national emergency preparedness and response programme has been developed. Arrangements have been demonstrated through a national emergency exercise involving all relevant organizations. A programme for regular training, drills and exercises has been developed to demonstrate the ongoing capabilities.
	Examples of how the condition may be demonstrated (1) Regulatory requirements for EPR defined, including operator notifications, emergency dose protection; (2) Procedures to implement each organization's roles with clear attribution of responsibilities; (3) Availability of facilities and equipment, including medical treatment facilities; (4) Arrangements for international notifications; (5) Arrangements for public communication during emergencies; (6) Documentation related to trainings, drills and exercises conducted, including a comprehensive full scope exercise involving local and national organizations.
	Relevant IAEA publications — GSR Part 7 [39]; — SSG16 (Rev. 1) (Actions 142, 143, 144, 145 and 196) [3]; — EPR 2012 [42]; — NSS19 (Action 5.18) [4].

[o] An Emergency Preparedness Review mission focused on readiness to commence operation of the first NPP will provide information relevant to all these conditions.

15. Nuclear security	Phase 3
Conditions	**Basis for evaluation**[p]
15.1. Nuclear security plans are developed and approved	**Summary of the condition to be demonstrated** The operating organization has developed, and the regulatory body has approved, the security plan for the operation of the nuclear power plant and the transport security plan, and an action plan has been agreed to address any outstanding issues.
	Examples of how the condition may be demonstrated (1) The operating organization receives threat information and changes in the threat assessment and design basis threat are reflected in the security plan; (2) Evidence of an approved security plan, including a contingency plan for the nuclear power plant; (3) Evidence of an approved security plan, including a contingency plan for the transport of nuclear fuel; (4) Evidence of regulatory evaluation and inspections; (5) An agreed action plan is being monitored to completion; (6) Evidence that the operator's contingency plans have been harmonized with the national level plans, and the coordination between the operator's plans and national plans has been tested.
	Relevant IAEA publications — NSS19 (Actions 4.15, 4.17, 4.18, 5.12, 5.14, 5.15–5.16, 518, 5.23–5.25 and 5.34–5.39) [4]; — NSS13 [50]; — NSS26G [60]; — NSS27G [61].

[p] If an IPPAS mission has been conducted, this will provide information relevant to these conditions.

15. Nuclear security	Phase 3
Conditions	**Basis for evaluation**[p]
15.2. The effectiveness of the physical protection system demonstrated	**Summary of the condition to be demonstrated** All elements of the physical protection system have been tested and implemented effectively.
	Examples of how the condition may be demonstrated (1) Evidence to demonstrate that the trustworthiness of personnel is regularly reviewed and revalidated; (2) Evidence to demonstrate that policy for the protection of sensitive information is implemented; (3) Evidence to demonstrate that targets to be protected are identified; (4) Evidence that the contingency plan is tested to demonstrate that response forces are familiar with the site and targets, and with potential prevention and mitigation actions; (5) Evidence to demonstrate that the operator developed effective compensatory measures to maintain the effectiveness of the physical protection system during abnormal situations; (6) Evidence to demonstrate that periodic evaluation of nuclear security system effectiveness, including performance testing, has been implemented; (7) Evidence to demonstrate that preventative and corrective maintenance procedures are implemented; (8) Evidence that the physical protection system has been demonstrated to be effective against attack scenarios developed based on the DBT; (9) Evidence to demonstrate that the effectiveness of the physical protection system is maintained during emergency conditions; (10) Evidence to demonstrate that nuclear security measures for fuel in temporary storage prior to loading into a reactor are consistent with the material category; (11) Evidence of proper interaction/communication between the nuclear material accountancy and control plan/unit and nuclear security plan/unit in the operating organization.
	Relevant IAEA publications — NSS19 (Actions 4.32–4.33, 4.35–4.36, 5.3, 5.10, 5.13, 5.17–5.22 and 5.26–5.30) [4]; — NSS13 [50]; — NSS26G [60]; — NSS27G [61].
[p] If an IPPAS mission has been conducted, this will provide information relevant to these conditions.	

16. Nuclear fuel cycle	Phase 3
Conditions	**Basis for evaluation**
16.1. Arrangements for fuel supply in place	**Summary of the condition to be demonstrated** The provisions to secure the first few fuel reloads (consistent with the national fuel cycle strategy) have been contractually committed and responsibility for implementing the long term strategy for fuel supply defined.
	Examples of how the condition may be demonstrated (1) Requirements specified in contract with fuel supplier; (2) Onsite arrangements for storing and handling fresh fuel in accordance with the established strategy; (3) Implementation plan for national fuel cycle strategy, including any planned national fuel cycle infrastructure, with well defined time schedules.
16.2. Spent fuel management arrangements in place	**Summary of the condition to be demonstrated** Plans to implement the spent fuel management strategy are in place. Adequate onsite storage is available and plans for interim spent fuel storage are consistent with the onsite storage capabilities. Any fuel take back arrangements are clear and agreed.
	Examples of how the condition may be demonstrated (1) Documented and approved strategy covering interim storage, and addressing timing, funding and responsibilities of future storage facilities. (2) Contractual arrangements for handling spent fuel (fuel take back, reprocessing) in place and consistent with the national storage capacities. Transport requirements and provisions are included.
	Relevant IAEA publications — SSG16 (Rev. 1) (Actions 128, 129 and 130) [4]; — NWT1.24 (Rev. 1) [8].

17. Radioactive waste management	Phase 3
Conditions	**Basis for evaluation**
17.1. Plans for decommissioning developed	**Summary of the condition to be demonstrated** An initial decommissioning plan has been developed and has been reviewed and/or approved by the regulatory body. A process is in place for the regular review of the decommissioning plan.
	Examples of how the condition may be demonstrated (1) Initial decommissioning plan is developed according to the national decommissioning strategy and consistent with regulatory requirements; (2) Documentation related to the review and/or approval of initial decommissioning plan by the regulatory body; (3) Evidence of a process for regular review of the decommissioning plan.
	Relevant IAEA publications — SSG16 (Rev. 1) (Actions 128 and 129) [3]; — GSR Part 6 [62]; — NWG2.1 [63].
17.2. Arrangements for managing low and intermediate level waste in place	**Summary of the condition to be demonstrated** Existing, enhanced or new facilities for the processing and/or storage of low and intermediate level waste are prepared to receive waste arising from operation of the nuclear power plant. Plans for the disposal of low and intermediate level waste are in place and the organization responsible for managing radioactive waste has been established. The arrangements for radioactive waste management have been reviewed/approved by the regulatory body.
	Examples of how the condition may be demonstrated (1) Facilities either operational or on schedule to receive waste as required from NPP; (2) Ownership and management responsibilities for radioactive waste and waste management facilities clear; (3) Documentation related to the review/approval of radioactive waste management plan by the regulatory body.
	Relevant IAEA publications — SSG16 (Rev. 1) (Actions 128, 129, 130 and 192) [3]; — NWT1.24 (Rev. 1) [8].

17. Radioactive waste management	Phase 3
Conditions	**Basis for evaluation**
17.3. Work to develop disposal arrangements for high level waste ongoing	**Summary of the condition to be demonstrated** The responsibility for ultimate disposal of high level waste, including spent fuel (if it is considered as waste), is clear. The responsible organization continues to follow international efforts and progress toward ultimate high level waste disposal, and plans to revise the national policy as appropriate**.** Timescales are consistent with interim storage arrangements.
	Examples of how the condition may be demonstrated (1) Responsibilities clearly defined for development and implementation of disposal plans; (2) Evidence of international interactions; (3) Current national policy available and adequate to meet future requirements; (4) Evidence of continuing to follow international efforts and research on geological disposal; (5) If fuel take back or reprocessing options are considered, the contractual arrangements address the disposal of high level waste, including transport arrangements and financial provisions.
	Relevant IAEA publication — SSG16 (Rev. 1) (Action 132) [3].

18. Industrial involvement	Phase 3
Conditions	**Basis for evaluation**
18.1. Industrial development established	**Summary of the condition to be demonstrated** The national industrial development for participation in the nuclear power programme continues as appropriate, depending on the national strategy.
	Examples of how the condition may be demonstrated (1) An assessment of the supply sources to support operation has been undertaken; (2) Support for development of appropriate industries, for example research and development, long term financing to upgrade capacity of national/local industries; (3) The plan for gradually increasing localization of suppliers of goods and services for the operations phase, as well as subsequent units after the first NPP is implemented; (4) National nuclear industries association is established for sharing knowledge/experience and mutual cooperation.
	Relevant IAEA publication — NGT3.4 [43].

19. Procurement	Phase 3
Conditions	**Basis for evaluation**
19.1. Procurement capability for operations available	**Summary of the condition to be demonstrated** The owner/operator has the competences to procure services and to procure and store all equipment necessary for the operational NPP.
	Examples of how the condition may be demonstrated (1) Description of the processes that will be used to specify, procure and accept services and equipment for the operational NPP; (2) Description of the processes that will be used to ensure that counterfeit, fraudulent or substandard/nonconforming items are not used; (3) Description of the processes and facilities that will be used to store equipment to ensure its suitability for use; (4) Demonstration of the competence of the procurement staff based on training and experience covering the specific requirements of safety, security and emergency related equipment; (5) Demonstration of the ready availability of design basis related information supporting the procurement process (e.g. specifications, bills of materials, spare parts lists). *If a preOSART has been conducted, the following can be used to provide evidence as to whether the condition has been met:* — The Maintenance module of OSART (Module 4.4).
	Relevant IAEA publication — NPT3.21 [64].

Appendix

EXAMPLES OF EVALUATION FORMS

A.1. EVALUATION FORM FOR EACH INFRASTRUCTURE AREA

1. National position **Condition 1.1. Long term commitment made and importance of safety, security and non-proliferation recognized**	**Phase 1**
Summary of the condition to be demonstrated	A clear statement adopted by the government of its intent to develop a nuclear power programme and of its commitment to safety, security and non-proliferation, with evidence that their importance is embedded in the ongoing work programme.
Examples of how the condition may be demonstrated	(1) A clearly stated government commitment; (2) Evidence of clear responsibilities for each issue, with government coordination of activities.
Observations	
Evidence	
EVALUATION: **Significant actions needed ☐** **Minor actions needed ☐** **No actions needed ☐**	

1. National position Condition 1.2. The NEPIO established	Phase 1
Summary of the condition to be demonstrated	The NEPIO: (a) Has clear terms of reference that call for a comprehensive review of all the issues relevant to making a decision to proceed with a nuclear power programme; (b) Is recognized by all relevant ministries as having that role; (c) Reports to a senior minister or directly to the head of government; (d) Has appropriate human and financial resources; (e) Involves all relevant stakeholders, including the country's major utilities, the regulatory body for security and radiation safety, other relevant government agencies, legislative representatives and other decision makers.
Examples of how the condition may be demonstrated	(1) The charter establishing the NEPIO and to whom it reports; (2) Evidence that the roles and responsibilities of the NEPIO are known by all its members and by other government ministries; (3) A document defining objectives and timescales and an adequate scope of investigations; (4) A clear description of how the NEPIO operates in terms of funding, planning, reporting, scope of studies and use of consultants; (5) Evidence that the NEPIO has adequate skills to address all issues either directly or through commissioning specialist studies; (6) Evidence of relevant interactions between the head of the NEPIO and appropriate ministries, such as those responsible for energy and the environment.
Observations	
Evidence	
EVALUATION: **Significant actions needed ☐** **Minor actions needed ☐** **No actions needed ☐**	

1. National position Condition 1.3. National strategy defined	Phase 1
Summary of the condition to be demonstrated	A comprehensive report, defining and justifying the national strategy for nuclear power, including: (a) An analysis of energy demand and energy alternatives; (b) An evaluation of the impacts of nuclear power on the national economy, for example gross domestic product and employment; (c) A preliminary technology assessment to identify technologies that are consistent with national expectations; (d) Consideration of siting possibilities and grid capacity; (e) Consideration of financing options, ownership options and operator responsibilities; (f) Consideration of long term costs and obligations relating to spent fuel, radioactive waste and decommissioning; (g) Consideration of the human resource needs and external support needs of the regulatory body and the owner/operator; (h) Recognition that there remains a nonzero possibility of a severe accident and the need to deal with the consequences of such an accident will need to be addressed; (i) Consideration of the demands of each of the infrastructure issues and a plan for how they will be met in the next phase of development. **Note:** Any prefeasibility study conducted during Phase 1 can provide a significant input to the comprehensive report, although it is important that the report fully addresses all 19 infrastructure issues.
Examples of how the condition may be demonstrated	(1) List of the studies that are feeding into the report(s); (2) Current status and conclusions; (3) Contents list for the report(s); (4) Executive summary of the report(s); (5) Evidence of ministerial review of the report(s).
Observations	
Evidence	
EVALUATION: **Significant actions needed ☐** **Minor actions needed ☐** **No actions needed ☐**	

A.2. EXAMPLE SUMMARY FORM

1. National position	**Phase 1**
Condition	**Status**
1.1. Long term commitment made and importance of safety, security and non-proliferation recognized	Minor actions needed
1.2. The NEPIO established	No actions needed
1.3. National strategy defined	No actions needed
2. Nuclear safety	**Phase 1**
Condition	**Status**
2.1. Key requirements of nuclear safety understood	Minor actions needed
2.2. Support through international cooperation initiated	No actions needed
3. Management	**Phase 1**
Condition	**Status**
3.1. Need for appropriate leadership and management systems recognized	Minor actions needed
4. Funding and financing	**Phase 1**
Condition	**Status**
4.1. Strategies for funding established	Significant actions needed
4.2. Potential strategies for financing identified	No actions needed

A.3. ACTION PLAN PRO FORMA

1. National position					
1.1. Long term commitment made and importance of safety, security and non-proliferation recognized					
Ref. number	**Observations/ recommendations**	**Action**	**Responsible organization**	**Due date**	**Status**
1.1.1.					
1.1.2.					
1.1.3.					
1.2. The NEPIO established					
1.2.1.					
1.2.2.					
1.3. National strategy defined					
1.3.1.					

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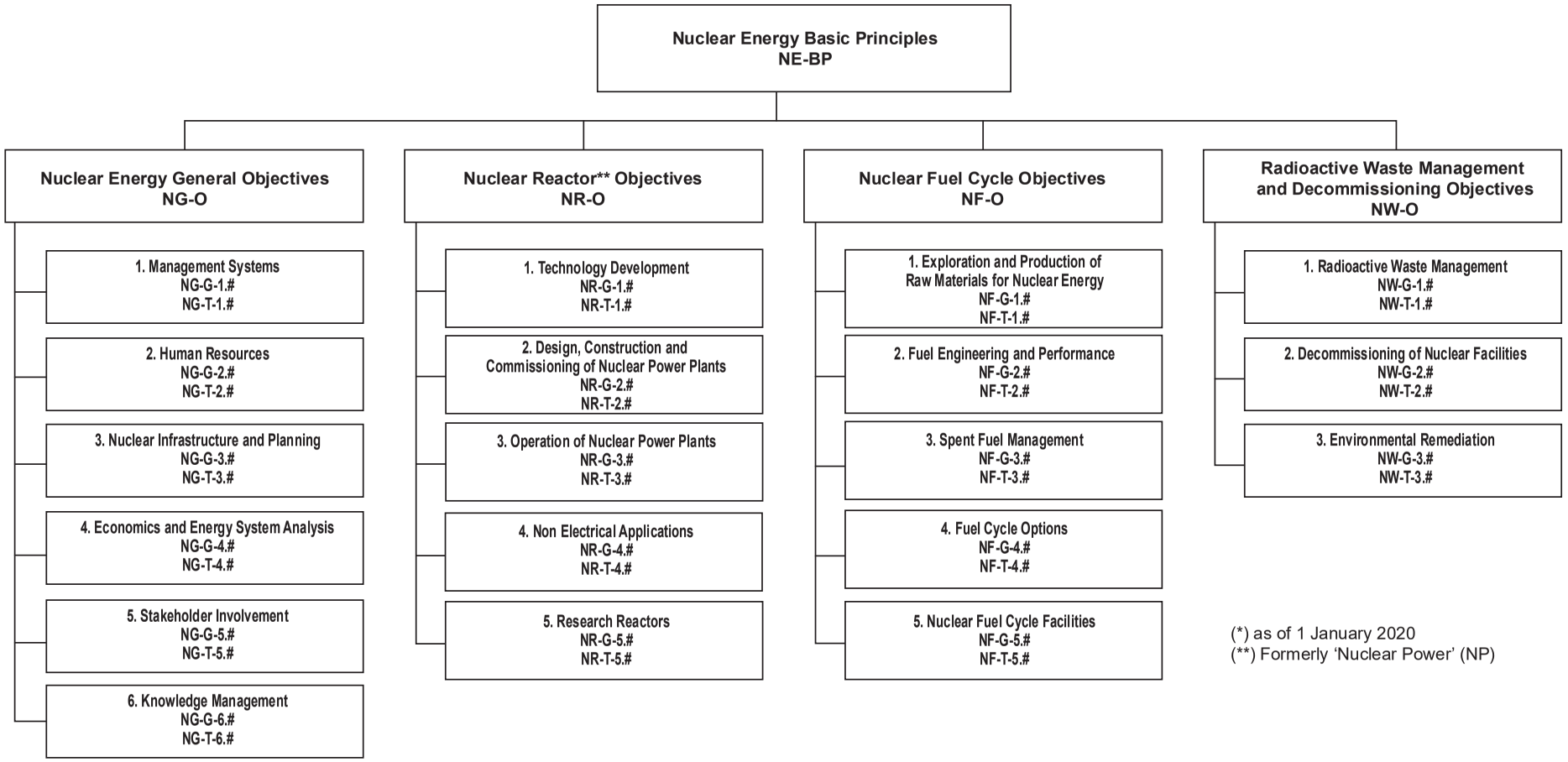

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