IAEA
International Atomic Energy Agency
Atoms for Peace

Methodology for Self-assessment of Capacity Building in Member States with Nuclear Power Programmes and Those Planning to Embark on Such a Programme

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1.INTRODUCTION

1.1. The accident at Tokyo Electric Power Company's (TEPCO's) Fukushima Daiichi Nuclear Power Plant (hereinafter the "Fukushima Daiichi accident") has brought into sharp focus the need to develop, strengthen, maintain and implement the capacity building programmes of those Member States with nuclear power programmes and those planning to embark on such a programme. This was highlighted at the Ministerial Conference on Nuclear Safety organized by IAEA in light of the Fukushima Daiichi accident and held from 21 to 24 June 2011 The Ministerial Declaration [1] adopted by the Ministerial Conference underlines the need for States operating nuclear power plants and the IAEA to promote capacity building, including education and training for both regulators and operators. The Ministerial Declaration also requested the Director General of the IAEA to prepare a draft Action Plan for Nuclear Safety, building on the conclusions and recommendations of the working sessions of the Ministerial Conference, the Declaration and the expertise and knowledge available within the IAEA. The Action Plan [2] was prepared by the Secretariat in consultation with Member States, and was approved by the Board of Governors and was unanimously endorsed by the 55th IAEA General Conference.

1.2. The purpose of the Action Plan is to define a programme of work to strengthen the global nuclear safety framework. The Action Plan proposes 12 main actions, each with corresponding subactions, focusing on: safety assessments in the light of the Fukushima Daiichi accident; IAEA peer reviews; emergency preparedness and response; national regulatory bodies; operating organizations; IAEA safety standards; the international legal framework; Member States planning to embark on a nuclear power programme; capacity building; protection of people and the environment from ionizing radiation; communication and information dissemination; and research and development. This document focuses on the item of the Action Plan dealing with capacity building. This action requires Member States with nuclear power programmes and those planning to embark on such a programme to strengthen, develop, maintain and implement their capacity building programme. The programme should include education, training and exercises at the national, regional and international levels. It should also cover all nuclear safety related areas including safe operation, emergency preparedness and response, and regulatory effectiveness. In this context, conducting or participating in emergency preparedness and response exercises at the national, regional and international levels should be seen as a key part of national capacity building for emergency preparedness and response. The IAEA is prepared to assist Member States in developing and implementing their capacity building programme, upon request.

Background

1.3. This document is focused on assisting Member States, upon request, to develop and/or review their capacity building programmes at the national, regional and international levels so that they are able to continuously ensure sufficient and competent human resources to fulfill their responsibility for the safe, secure and sustainable use of nuclear power.

1.4. The methodology proposed in this document is a self-assessment process that those Member States with a nuclear power programme and those planning to embark on such a programme may use to assess their present arrangements and to identify actual or potential gaps in their capacity building endeavours. Member States can then develop an action plan to close the gaps identified through the self-assessment. Using this methodology and sharing the results with the IAEA Secretariat will enable Member States to benchmark their activities and

will better enable the IAEA Secretariat to prioritize its capacity building support to Member States. It is important to note that the IAEA does not make any distinction between the need for or extent of capacity building activities for those Member States with a nuclear power programme and for those planning to embark on such a programme. However, it is recognized that significant capacity building efforts have already been expended with new entrant Member States in recent years. The main distinction will be that each Member State will have different capacity building needs, depending on the status of its nuclear power programme.

Objectives

1.5. The objectives of this document are: (i) to define the concept and essential elements of capacity building, (ii) to provide a methodology for Member States to assess their capacity building, (iii) to provide the opportunity for benchmarking between Member States, and (iv) to describe the relevant IAEA assistance activities available to help Member States to develop their capacity building programme. This process should also help Member States to clarify and/or confirm the role and responsibilities of the government in national capacity building activities. Although the document uses “should” but it is to be clarified that this document should not be considered in any way safety standards or a safety guide .

Scope

1.6. The scope includes Member State capacity building activities at the governmental and organizational levels, so as to continuously ensure sufficient capacity for a safe, secure and sustainable nuclear power programme. The document is also intended to address capacity building across the full spectrum of activities associated with nuclear power, including, but not limited to, operations, regulatory oversight, radiation protection and nuclear safety, security, and safeguards.

Users

1.7. The primary users of this publication are the decision makers, advisers and senior managers in governmental organizations, education and training institutions, regulatory bodies, utilities and industries of those Member States operating nuclear power plants and those planning to embark on a nuclear power programme.

Structure

1.8. This document consists of two main sections in addition to this introduction. In Section 2, the concept and definition of capacity building as well as the role of the government and organizations in capacity building are discussed. In Section 3, the process of self-assessment, categories of questions for self-assessment, how to analyse and respond to questions, and documenting the results of self-assessment are described. The appendices provide the questions for self-assessment for Modules I and II and a map of IAEA activities in the four elements of capacity building.

Using this guidance

1.9. This publication can be used as guidance on how to assess the capacity necessary for a State to achieve a safe, secure and sustainable nuclear power programme, and to aid in planning the necessary steps to develop and/or enhance a national capacity building programme. It is not a comprehensive guide on how to create all the capacities for a nuclear power programme, but rather presents the important elements of capacity building that should exist at all times in the development and sustainability of a safe and secure nuclear power programme. A map of all IAEA activities related to capacity building is also provided in the Appendix III, so that Member States can make use of it, as required.

2. CAPACITY BUILDING CONCEPT, DEFINITION AND ROLES

2.1. The concept of capacity building for the purpose of this publication is illustrated in Fig. 1, which describes capacity building as an ‘umbrella’ consisting of following four essential elements: education and training; human resource development; knowledge management; and knowledge networks.

FIG. 1. Capacity building umbrella.

Education and training

2.2. The establishment of sustainable education and training infrastructure and processes is fundamental to the capacity building strategy of Member States. Education and training programmes provide a structured knowledge base for individuals involved in the utilization or control of nuclear technologies to develop their individual capacity, which by implication also means improving national capacity. During training, students and participants also develop personal networks among themselves and with the experts who provide the training — a

fundamental part of knowledge networking. Education and training provide the basis for lifelong human resource development. IAEA Safety Standards Series No. GS-G-1.1 [3] provides detailed guidance on the organization and staffing of the regulatory body. The four quadrant competency model, as given in TECDOC-1254 [4], is a good basis for development of competencies in regulatory bodies. Similarly, IAEA Technical Reports Series No. 380 [5] provides guidance on training and evaluation of nuclear power plant personnel.

Human resource development

2.3. This element deals with the development of an effective workforce at both the national and the organizational levels by providing a structured approach to enable a Member State to estimate the human resource needs for its programme, to assess its existing capability, to identify competency gaps, and to plan and implement activities to fill these gaps according to the nature and scope of its nuclear power programme. Detailed guidance on managing human resources in the field of nuclear energy and workforce planning are available in numerous IAEA publications [6, 7].

Knowledge management

2.4. An important element of effective human resource management is the management of knowledge. The knowledge that individuals need as part of the competency requirements for assigned tasks and the additional knowledge they acquire in carrying out those tasks needs to be preserved and shared widely. Knowledge management deals with capturing, structuring and transmitting this knowledge. Knowledge is the key resource of most organizations [8]. Therefore, managing knowledge effectively requires the understanding of and attention to the concept of organizational knowledge rather than just the traditional notion of individual knowledge.

Knowledge networks

2.5. Knowledge networks are established to promote the pooling, analysis and sharing of nuclear technical, safety and security knowledge and experiences at the national, regional and international levels. The capacity building concept is applicable at three levels: the governmental level, the organizational level and the individual level.

2.6. Governmental level: Since a nuclear power programme extends well over the mandate of any single government (typically extending 100 years or more), it should be based on broad national consensus to ensure continuity to the extent possible, as it is intensive in terms of human and financial resources. Therefore ‘government’ in this document is understood to be the actual administration governing the country and accomplishing the tasks required by the country’s nuclear power programme. Governments have an essential role to play in the capacity building process to ensure a safe, secure and sustainable nuclear power programme. It is essential for the government to have a clear policy and strategy as well as to provide effective coordination for a sound capacity building programme and to allocate resources for its effective implementation.

2.7. Organizational level: Organizations and institutions have a dual role: (i) to communicate to the government their overall human resource requirements and help to identify the necessary infrastructure to ensure that the appropriate capacity is available to support a nuclear power programme, whether it is new, stable, expanding or being phased out, and (ii) to make effective use of the available infrastructure to ensure the capacity and competency of their personnel. Hence organizations and institutions are pivotal in the process. In the context

of the IAEA's mandate, and for the purpose of capacity building activities, the key relevant organizations are government ministries/NEPIOs (nuclear energy programme implementing organizations), regulatory bodies, operating organizations, technical and scientific support organizations , and education and training institutions.

2.8. Individual level: Individual capacity building often refers to the development of the knowledge and skills of individuals to enable them to fulfill specific responsibilities in specific organizations. Hence, the implementation of individual capacity building is considered to be part of the organizations' responsibility in this process and is not considered separately in this document.

2.9. The capacity building concept is consistent with the human aspects of infrastructure development for newcomer countries, but is equally relevant for those Member States that already have a nuclear power programme. For the concept to be implementable and sustainable, it should be integrated into national and organizational management processes and systems, and may need to be underpinned within the national legal framework.

2.10. Based on the above concept and for the purpose of this document the IAEA defines capacity building as:

a systematic and integrated approach that includes education and training, human resource development, knowledge management and knowledge networks to develop and continuously improve the governmental, organizational and individual competencies and capabilities necessary for achieving a safe, secure and sustainable nuclear power programme.

2.11. An appropriate capacity building programme is essential for the safety, security and sustainability of a nuclear power programme. Decision makers must be aware that capacity building for a nuclear power programme is multidisciplinary and multi-institutional, and is an undertaking with a scope, level of effort and cost well beyond what is normally required for other industrial developments. This awareness is essential for an informed government commitment, should a decision to embark on or expand an existing nuclear power programme be made.

2.12. Capacity building takes time, and States embarking on or expanding existing programmes need to get efforts under way early in the planning stage. For those countries with stable or even declining programmes, the need to maintain and/or strengthen capacity building programmes should not be underestimated, as significant resources may still be needed for decades into the future.

Role of government in capacity building

2.13. Requirement 11 of The Governmental, Legal and Regulatory Framework for Safety (IAEA Safety Standards Series No. GSR Part 1 [9]) sets the requirement for 'Competence for safety', stating that "The government shall make provisions for building and maintaining the competence of all parties having responsibilities in relation to the safety of facilities and the activities." Therefore, the government should take ultimate responsibility for the definition

and implementation of the optimal way of using national, regional and international resources to build, maintain and continuously improve the capacity building programme within the country. Specifically ‘how’ governments discharge this responsibility will vary from Member State to Member State, depending on many factors, and it is not the purpose of this guidance to tell Member States how to do so, but rather to offer a consistent way of assessing the effectiveness of their arrangements.

2.14. The development of sufficient and sustainable human resource capability within both the government and the industrial sectors to successfully manage, operate, maintain and regulate nuclear facilities and activities should be ensured at the national level. In this context, the government should: ensure the provisions for building and maintaining the competency of suitably qualified and experienced staff; be part of the global nuclear safety framework; and promote participation in national and international knowledge networks.
Specifically, it is recommended that the government:

i. Give due consideration to the essential role of capacity building, including the strategy for capacity building within the national nuclear power programme/policy. This strategy should be implemented in a coordinated manner with the participation of all relevant stakeholders.

ii. Make within its legal framework provisions to serve as a basis for the formulation and implementation of the capacity building programme.

iii. Establish the organizational arrangements for capacity building defining specific responsibilities to ensure effective and efficient implementation of the capacity building programme. This will define the duties and authorities of various institutions and provide central coordination.

iv. Allocate appropriate resources to ensure: (a) the effective implementation of the capacity building programme, and (b) that key nuclear stakeholders are able to attract and retain sufficient human resources in the short, medium and long term.

v. Evaluate the adequacy of the national education and training infrastructure to support the human resource development required for the nuclear power programme.

vi. Introduce and promote the concept of knowledge management and the utilization of knowledge networks to support their capacity building programme.

vii. Ensure that mechanisms are in place to facilitate cooperation, and to monitor organizational development, among all organizations important for a nuclear power programme, and to enable organizations to feed back issues of national concern to the government.

viii. Ensure that mechanisms are in place at the national level that enable organizations to cooperate with the respective international organizations/networks/stakeholders.

Role of organizations

2.15. It is usually at the organizational rather than the governmental level that the detailed knowledge of, and expertise in, a particular process or activity resides. In the case of nuclear power, this will be especially the case for those countries with well established programmes, although it may be less true for countries embarking on a new programme. Therefore, it is the role of the various organizations involved in a nuclear power programme to communicate to the government the overall needs of such a programme, including the numbers of personnel needed by the various organizations, their background educational and training needs, and their preferred qualification levels. It is essential that these needs be identified, not only for the short term but also over the lifetime of the nuclear power programme. Organizations should be actively involved with the government in developing the national capacity building strategy to ensure that it fits with their needs, and in providing feedback when gaps and/or new or emerging needs are identified.

2.16. Finally, organizations are responsible for developing their own arrangements, processes and procedures to ensure that those personnel recruited from the national capacity building programmes are provided with the necessary job specific education, training and qualification to ensure their competency for their individual roles and responsibilities. Therefore, it is recommended that each organization work closely with the government to ensure the adequacy of the national capacity building programme, by:

i. Developing short, medium and long term workforce plans to identify their overall human resource needs;

ii. Communicating overall needs to the government to ensure the adequacy of national capacity building activities;

iii. Providing feedback to the government on any identified gaps or deficiencies in existing arrangements;

iv. Working closely with other organizations with responsibilities under the national capacity building programme, such as education and training institutions, to improve the quality of the national capacity building plan;

v. Developing and implementing, as part of their management system, a systematic approach to ensure the competency of their personnel;

vi. Having mechanisms in place to monitor the performance of their personnel and promote feedback at the individual level to identify competency gaps or necessary improvements in personnel training.

3. SELF-ASSESSMENT OF CAPACITY BUILDING ACTIVITIES

Introduction

3.1. Based on the role of the government and the role of organizations to support the capacity building efforts in the Member States, the self-assessment intends to help the

Member State to identify and understand the needs, resources and gaps in its capacity building programme.

3.2. The self-assessment of the government and each relevant organization should address the following four fundamental questions (NAMA):

1. **What is needed? (Need)**
2. **What is available and adequate to meet the needs? (Availability)**
3. **What is missing or needs improvement in order to meet the needs? (Missing/gaps)**
4. **What actions are needed? (Actions)**

3.3. The result of the self-assessment will be the identification of weaknesses and gaps (if any), which should be used for asking the fourth question: How can deficiencies be remedied and a plan be defined to strengthen the capacity building system in the country? Two levels of self-assessment are distinguished: governmental (Module I) and organizational (Module II).

3.4. The self-assessment should consider all nuclear power related organizations, including: the relevant bodies responsible for nuclear policy and strategy for safety at the national level (self-assessment **Module I**), the NEPIO [10], the organizations operating nuclear power plants or research reactors, the regulatory body, technical and scientific support organizations, relevant academic organizations, universities and technical institutes (self-assessment **Module II**). The questionnaire for self-assessment at the governmental level is given in Appendix I. The question addresses the governmental responsibility in each of the following areas:

Area I Education and training

Area II Human resource development

Area III Knowledge management

Area IV Knowledge networks

3.5. Similarly for organizations, within each of the four areas, the four fundamental questions stated above should be addressed by all organizations. The matrix structure of the self-assessment is illustrated in Fig. 2.

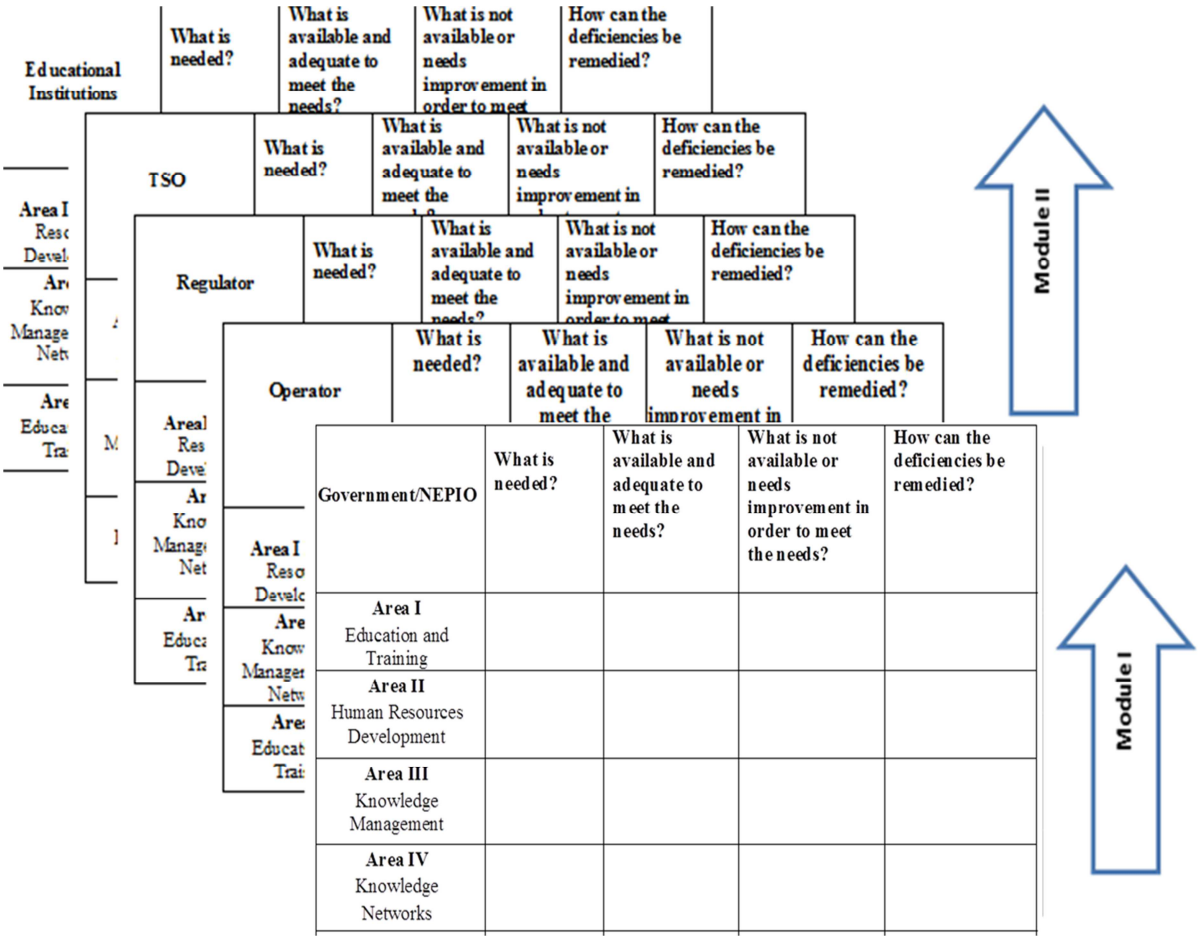

FIG. 2. Matrix structure the of self-assessment.

3.6. Additionally, the Member State might analyse current tools and resources for self-assessment at the level of individuals (**Module III**) (i.e. Systematic Assessment of Regulatory Competence Needs for Regulatory Bodies of Nuclear Facilities (SARCoN) for regulatory bodies, other competency frameworks (http://www-ns.iaea.org/training/ni/tools-networking.asp)). However, *the self-assessment approach suggested to the Member States will not focus on the individual level.*

Self-assessment process

3.7. In the self-assessment process of the national capacity building system, the government is the natural coordinator, and there should be a national contact person from the coordinating ministry or agency in the Member State. The appendices to this document provide a set of important questions to be addressed in Modules I and II. Module I addresses the Government itself, and Module II addresses the various stakeholders, actors and organizations who are important within the national capacity building system (i.e. regulatory body, operating organizations, technical and scientific support organizations, and educational institutions).

3.8. Based on experience gained in Finland and Spain [11, 12], a four stage process is proposed:

i. The Governmental agency or the responsible ministry organizes a meeting, to include all stakeholders, where the scope of the self-assessment is discussed and agreed and any necessary training is provided. The Member States may wish to expand the scope of the capacity building self-assessment to address more detailed aspects of the identified elements based on their national needs.

ii. The stakeholders are to complete the questionnaires and return them to the coordinating ministry within an agreed period (e.g. three months).

iii. The coordinating ministry then convenes a second meeting at which each organization will present a summary of its findings, to be discussed, and the initial draft of the national report, including the national action plan, developed based on these inputs (see section on documenting the self-assessment results).

iv. The coordinating ministry circulates the draft report to the stakeholders for review and comment. On the basis of comments received, a final report is prepared by Member States. It is recommended that Member States share it with the IAEA Secretariat.

3.9. In case of such sharing, the IAEA Secretariat will compile a report of the status of the capacity building programmes and their action plans, and give recommendations based on the analysis of the Member State reports.

Responsibilities

3.10. Both general and specific questions should be analysed by the Government, therefore completing Module I of the self-assessment, and by the organizations, therefore completing Module II (see the explanation of the self- assessment process above).

3.11. The governmental agency or the responsible ministry is responsible for conducting the analysis of questions addressed to itself and for coordinating, communicating and managing the flow of information among the various organizations conducting the self-assessment in Module II (self-assessment of the regulatory body, operating organizations, technical and scientific support organizations, etc.).

3.12. The organizations conducting the self-assessment are responsible for analysing responses to the questions, for communicating and interacting with other organizations, as appropriate, and for documenting the results of their analysis of responses.

3.13. The Government is responsible for compiling the analysis reports from each organization. It should also conduct a global final examination of all the conclusions from the self-assessment conducted by each organization and produce an integrated summary and conclusions report.

Documenting the self-assessment results

3.14. It is recommended a report be produced on “Self-Assessment and the Action Plan to Strengthen National Capacity Building for Nuclear Power Programme”. The report should contain a summary of the integrated analysis conducted by the Government based on the results of the self-assessment of Modules I and II, and include findings and actions to develop

and strengthen the capacity building system. As a minimum, this report should contain the following elements:

i. A short description of the process used to conduct the capacity building self-assessment;
ii. Identification of the 'team of evaluators' by position/role in the organizations;
iii. Conclusions giving the status of development of each element of capacity building, including any specific actions identified for improvement and a plan for implementation (see below);
iv. References to any relevant material used for conducting the evaluation;
v. Confidentiality requirements, if any.

3.15. In order to assess overall progress in each area of capacity building (human resource development, education and training, knowledge management, and knowledge network) or specific component of each area, and to assign priorities, it is suggested that a 'status' be given to each. Three categories are suggested:

i. Significant actions needed;
ii. Minor actions needed;
iii. No action needed.

3.16. Performance indicators or criteria for these categories should be determined by the ministry organizing the self-assessment in terms of the nature and extent of the national programme.

3.17. Upon completion of the self-assessment, it is recommended to develop an action plan, as part of the report. The observations from the self-assessment report should be used by the Member State to determine this action plan. Each Member State should decide the most appropriate way for preparing the action plan, but it is recommended that it include:

i. The component of the element being addressed;
ii. A clear statement of the action showing how it will address the identified shortfall or gap;
iii. An agreed completion time;
iv. The organization/function/post holder responsible for the completion of the actions.

3.18. It is important that each action be 'owned' by the organization responsible for its completion, and that these organizations ensure that they have the resources to complete the action to the agreed timescale.

3.19. Taking into account that the action plan refers to strengthening and maintaining national capacity for a nuclear power programme, it is recommended that it be subject to Government approval.

3.20. The IAEA will assist the Government, upon request, in preparing such a national action plan based on the self-assessment report on capacity building. For those Member States planning to embark on a nuclear power programme, the action plan included in this report can be used for the preparation of the national integrated work plan for required technical assistance from different potential sources, including the IAEA.

Categories of questions

3.21. The questions in the appendices to this document belong to two categories:

a. General questions, mostly related to strategic and managerial aspects.

b. Specific questions, mostly related to four important elements of a capacity building system:

i. Education and training;
ii. Human resource development;
iii. Knowledge management;
iv. Knowledge networks.

3.22. There is one appendix containing questions in categories C.1 and C.2 for the Government and one for the organizations conducting the self-assessment in Module II regulatory bodies, operating organizations, technical and scientific support organizations, etc.).

How to address the questions

3.23. The questions in the appendices are intended to be a set of essential aspects to be considered in the process of self-examination. They deal with four important elements of capacity building (E&T, HRD, KM, KN).

3.24. The questions represent a minimum set of questions for the self-assessment process. They should not be considered as a final, detailed, comprehensive and complete set of questions; depending on the national culture, history and resources, additional questions might be identified and addressed.

3.25. The questions should not be answerable with a simple ‘yes’ or ‘no’; rather, they are a starting point for reflection on what is needed and what might be needed, taking into account the current situation of the Member State and its future plans.

Analysis of and response to the questions

3.26 Each question should be looked at in terms of the three basic questions:

i. What is needed in the given area?
ii. What is available and adequate to meet the needs?
iii. What is not available or needs improvement in order to meet the needs?

3.27 For instance: Does the Government have a national policy and strategy for education and training?

Possible answer:

i. A strategy considering future plans is needed (analysis and description).
ii. A policy exists but needs to be reviewed (what and why).
iii. A national evaluation of current educational institutions is not available and a strategic plan needs to be produced.

Appendix I

SELF-ASSESSMENT: QUESTIONS FOR THE GOVERNMENTAL LEVEL (MODULE I)

Introduction

The purpose of the questions below is to guide governments in the analysis of important aspects of capacity building, with a view to identifying the main areas to improve and strengthen. These questions address the key considerations for a capacity building programme, and the answers should reflect the current status and identify gaps and areas for improvement.

The answers should provide a description of the current situation rather than being a simple 'yes' or 'no'.

The questions here are derived from IAEA guidance such as Milestones in the Development of a National Infrastructure for Nuclear Power (IAEA Nuclear Energy Series No NG-G-3.1 [10]) and Establishing the Safety Infrastructure for a Nuclear Power Programme (IAEA Safety Standards Series No. SSG-16 [13]). They have also been drawn from various meetings and from the expertise of Member States through various consultants meetings.

Area	Subject	What is needed?	What is available?	What is missing?	Action to fill gap?
General	Nuclear Strategy	Short and long term strategy for the national nuclear power programme is needed			
		Milestones need to be defined in national nuclear strategy			
		Capacity building aspects need to be addressed in national nuclear strategy			
	Capacity Building Strategy	Long term policy and strategy for capacity building to support nuclear power programme			
		Legal framework to support the capacity building strategy			
	Coordinating Organization	A Governmental organization is necessary to coordinate and implement the national capacity building programme			
		Clear responsibilities of the coordinating organization need to be defined			
		Coordinating organization should have enough power on the other relevant organizations			
	Financial and Human Resources	Government should allocate adequate financial and human resources to support coordination and implementation of the capacity building programme			
	Evaluation of Capacity Building Programme	Government should have in place an evaluation system to ensure the effectiveness of the national capacity building programme			
	Stakeholder Involvement	Government should involve the relevant organizations in the process of determining/revising the needs related to the capacity building programme			
		A mechanism should be in place to enable relevant organizations to communicate their needs to the Government			
	International Legal Framework and Cooperation	The national capacity building programme needs to be supported by appropriate international cooperation framework.			
		A governmental policy is needed to enable organizations to cooperate with relevant international organizations/networks/stakeholders			
Human Resource Development	Human Resource and Competency Needs	The government should identify the necessary human resources to implement and sustain the nuclear power programme			
		The government should identify the competencies needed to implement and sustain a nuclear power programme			
	Strategy for Recruitment	The government should have a strategy for attracting, training and retaining			

Area	Subject	What is needed?	What is available?	What is missing?	Action to fill gap?
		adequate number of competent human resources for the needs of all organizations involved in the nuclear power programme			
Education and Training	National Educational System	The Government should establish a suitable education system which takes into account the nuclear power programme of the country			
		The Government should have a systematic approach in place to identify education and training needs for the country`s nuclear power programme			
		The Government should establish working relationships with other States or international organizations to support education and training			
		The government should ensure that the basics of nuclear knowledge are taught in secondary schools to improve the nuclear literacy needed tomotivate young people to pursue a career in the nuclear field			
	National Training Institutes	The government should identify the gaps in existing national training institutions and plan to strengthen existing institutions or to establish new institutions, as needed			
		The government should have a plan to strengthen existing institutions			
		The government should have a plan to establish new institutions as needed			
		The government should have plan to establish new curricula to support the nuclear power programme			
Knowledge Management	Knowledge Management Strategy	The government should have a policy and strategy on nuclear knowledge management			
		The government should have the infrastructure and adequate resources (including identification of roles and responsibilities) to support the development of knowledge management systems as part of an integrated management system			
	Knowledge Management in Capacity Building	The government should establish a mechanism (leadership, knowledge sharing environment and culture) to identify, store and distribute the knowledge generated in the capacity building programme			
		The Government should develop a nuclear terminology in order to have common understanding among the stakeholders in nuclear power programme			
		The Government should establish a			

Area	Subject	What is needed?	What is available?	What is missing?	Action to fill gap?
		community of practice on nuclear knowledge management			
Knowledge Networks	Regional or International Knowledge Networks	The Government and any other relevant organizations in the Member State should participate in the knowledge networks (e.g. ANSN, GNSSN, FORO, FNRBA, ANNuR, ANENT, LANENT, AFRA-NEST, RANET, ENEN, EHRON) to support capacity building programmes			
		The Government should make use of the information about capacity building activities conducted via knowledge networks to facilitate national capacity building programmes			
	National Knowledge Networks	The Government should establish national capacity building centre(s)			
		The Government should identify the technical and scientific support organizations (TSOs) in the nuclear power programme			
		The Government should ensure the existence of technical and scientific support organizations (TSOs) in the nuclear power programme			

Appendix II

SELF-ASSESSMENT: QUESTIONS FOR THE ORGANIZATIONAL LEVEL

(MODULE II)

Before conducting the self-assessment at the organizational level, any self-assessment conducted as a part of earlier IAEA peer review missions, advisory services or expert missions may be taken into account. The results of such self-assessments conducted for the regulatory body, technical support organizations or educational institutions can be used as an alternative to the following questionnaire.

Area	**Subject**	**What is needed?**	**What is Available?**	**What is Missing?**	**Action to Fill Gap?**
General	Policy and Strategy	The duties and functions of the organization should be clearly defined in the statute of the organization			
		The organization should have a formal capacity building programme/activity			
	Coordinating Unit	A unit should be established within the organization to coordinate and implement capacity building activities			
		There should be adequate financial and human resources for the coordinating unit to coordinate and implement capacity building activities			
		The organization needs proper channels to communicate to the relevant Governmental organizations about its capacity building programme needs			
Human Resource Development	Recruitment	The organization should actively recruit new staff in order to ensure the qualifications and capabilities of its personnel			
	Needs Assessment	The organization should perform a competency needs assessment based on the prospective			

Area	Subject	What is needed?	What is Available?	What is Missing?	Action to Fill Gap?
		nuclear power programme of the country			
		The organization should perform a training needs assessment based on the prospective nuclear power programme of the country			
		The organization may use the IAEA tools to assess their competency and training needs			
Education and Training	Internal Capacity	The organization may have its own training facilities and trainers to support its capacity building activities			
	External Support	The organization should have formal arrangements with national educational and training institutions in order to support its capacity building activities			
		The organization should use regional or international training institutions/nuclear organizations to train its personnel			
Knowledge Management	Knowledge Management Strategy	The organization should have a knowledge management strategy			
	Management System	The organization should have a management system in place including knowledge management issues			
Knowledge Networks	Participation in Knowledge Networks	The organization should participate in national, regional or international knowledge networks, tosupport its capacity building activities			

Appendix III

MAP OF IAEA CAPACITY BUILDING ACTIVITIES

Education and Training

CAPACITY BUILDING - EDUCATION & TRAINING (E&T)			
REFERENCE DOCUMENTS & PUBLICATIONS	Governmental, Legal and Regulatory Framework for Safety, General Safety Requirements Part 1, No. GSR Part 1, IAEA, Vienna (2010)	Guidelines for Integrated Safety Evaluation of Nuclear Installations, EBP-ASIA-120, (Rev. July 2007), IAEA, Vienna (2007)	International Basic Safety Standards for Protection Against Ionizing Radiation and the Safety of Radiation Sources, BSS115, IAEA, Vienna (YEAR) (Under revision, see DS379)
	The Management System for Facilities and Activities, Safety Requirements No. GS-R-3, IAEA, Vienna (2006)	Guidelines for the Systematic Assessment of Regulatory Competence Needs, SARCoN, IAEA, Vienna (2010)	Safety of Nuclear Power Plants: Operation, Safety Requirements No. NS-R-2, IAEA, Vienna (YEAR) (Under revision, see DS413)
	Milestones in the Development of a National Infrastructure for Nuclear Power, NG-G-3.1, IAEA, Vienna (2007)	Safety Report on "Managing Regulatory Competence" (to be published end of 2012)	Nuclear Power Plant Personnel Training and its Evaluation: A Guidebook, Technical Reports Series No. 38, IAEA, Vienna (1996) (A replacement NE Series, document under final review)
	The Operating Organization for Nuclear Power Plants, Safety Guide No. NS-G-2.4, IAEA, Vienna (2001)	Training the Staff of the Regulatory Body for Nuclear Facilities: A Competency Framework, TECDOC-1254, IAEA, Vienna (2001)	Handbook on Nuclear Law, STI/PUB/1160, IAEA, Vienna (2003)
	Recruitment, Qualification and Training of Personnel for Nuclear Power Plants, Safety Guide No. NS-G-2.8, IAEA, Vienna (2002)	Establishing a Safety Infrastructure for a National Nuclear Power Programme, DS 424, IAEA, Vienna (2009)	Handbook on Nuclear Law (Implementing Legislation), STI/PUB/1456, IAEA, Vienna (2010)
	The Operating Organization and the Recruitment, Training and Qualification of Personnel for Research Reactors, Safety Guide No. NS-G-4.5, IAEA, Vienna (2008)	Maintaining Knowledge, Training and Infrastructure for Research and Development in Nuclear Safety, INSAG-16, IAEA, Vienna (2003)	
	Analysis Phase of Systematic Approach to Training SAT for NPP Personnel, TECDOC 1170, IAEA, Vienna (2000)	Assuring the competence of NPP Contractor Personnel, TECDOC 1232, IAEA, Vienna (2001)	
	Status and Trends in Nuclear Education, NE Series Report NG-T-6.1, IAEA, Vienna (2011)	Experience in the use of Systematic Approach to Training SAT for NPP Personnel, TECDOC 1057, IAEA, Vienna (1998)	
Advisory & Review Services	Education and Training Appraisal (EduTA)	Education and Training Peer Review Service (EPReS)	Integrated Regulatory Review Service (IRRS), partly
Tools	Systematic Assessment of Regulatory Competence Needs (SARCoN)	Self Assessment of Safety Culture for Regulators and Operators	

Human Resource Development

CAPACITY BUILDING - HUMAN RESOURCE DEVELOPMENT (HRD)			
REFERENCE DOCUMENTS & PUBLICATIONS	Milestones in the Development of a National Infrastructure for Nuclear Power, NG-G-3.1, IAEA, Vienna (2007)	Evaluation of the Status of National Nuclear Infrastructure Development, NG-T-3.2, IAEA, Vienna (2007)	Means of Evaluating and Improving the Effectiveness of Training of Nuclear Power Plant Personnel, TECDOC-1358, IAEA, Vienna (2003)
	Managing Human Resources in the Field of Nuclear Energy, NG-G-2.1, IAEA, Vienna (2009)	Commissioning of Nuclear Power Plants: Training and Human Resource Considerations, NG-T-2.2, IAEA, Vienna (2008)	Competency Assessments for Nuclear Industry Personnel, STI/PUB/1236, IAEA, Vienna 2006
	Workforce Planning for New Nuclear Power Programmes, NG-T-3.10, IAEA, Vienna (2011)	Selection, Competency Development and Assessment of Nuclear Power Plant Managers, IAEA-TECDOC-1024, IAEA, Vienna (1998)	Managing Human Resources in the Nuclear Power Industry: Lessons Learned, TECDOC-1364, IAEA, Vienna (2003)
	Responsibilities and Capabilities of a Nuclear Energy Programme Implementing Organization, NG-T-3.6, IAEA, Vienna (2009)	Selection, Competency Development and Assessment of Nuclear Power Plant Managers, IAEA-TECDOC-1358, IAEA, Vienna (1998)	Human Performance Improvement in Organizations: Potential Application for the Nuclear Industry, TECDOC-1479, IAEA, Vienna (2005)
	Initiating Nuclear Power Programmes: Responsibilities and Capabilities of Owners and Operators, NG-T-3.1, IAEA, Vienna (2009)	Human Resource Issues Related to an Expanding Nuclear Power Programme, TECDOC-1501, IAEA, Vienna (2006)	
Advisory & Review Services	Integrated Nuclear Infrastructure Review (INIR), Issue 10 focuses on Human Resources		
Tools	Nuclear Power Human Resources (NPHR) software modelling to aid Workforce Planning (to be implemented in 2012)	Self Assessment of HRD for SSG16 "Establishing the Safety Infrastructure for a Nuclear Power Programme"	

Knowledge Management

CAPACITY BUILDING - KNOWLEDGE MANAGEMENT (KM)			
REFERENCE DOCUMENTS & PUBLICATIONS	Knowledge Management for Nuclear Industry Operating Organizations, TECDOC-1510, IAEA, Vienna (2006)	Planning and Execution of Knowledge Management Assist Missions for Nuclear Organisations, TECDOC-1586, IAEA, Vienna (2008)	Innovative methods and tool in Nuclear Education, Nuclear Energy Series NG-T-XXX, IAEA, Vienna (2012) (under preparation)
	Workforce Planning for New Nuclear Power Programmes, Nuclear Energy Series No.NG-T-3.10, IAEA, Vienna (2011)	Evaluation of Human Resource Needs for a New Nuclear Power Plant: Armenian Case Study, TECDOC-1656, IAEA, Vienna (2011)	Practical Approaches to Risk Management of Knowledge Loss in Nuclear Organizations (under development)
	Status and Trends in Nuclear Education, NE Series Report NG-T-6.1, IAEA, Vienna (2011)	Risk Management of Knowledge Loss in Nuclear Industry Organizations, STI/PUB/1248, IAEA, Vienna (2006)	Knowledge Management and Safety Culture (under development)
	Comparative Analysis of Methods and Tools for Nuclear Knowledge Preservation, Nuclear Energy Series No. NG-T-6.7, IAEA, Vienna (2011)	Process Oriented Knowledge Management in Nuclear Industry Operating Organizations, Nuclear Energy Series NG-T-XXX, IAEA, Vienna (2012) (under preparation)	Knowledge Preservation in Major Nuclear Accidents (under development)
	Development of Knowledge Portals for Nuclear Power Plants, Nuclear Energy Series No. NG-T-6.2, IAEA, Vienna (2009)	National Approaches And Strategies for Nuclear Knowledge Management, Nuclear Energy Series NG-T-XXX, IAEA, Vienna (2012) (under preparation)	Implementing Knowledge management in Integrated Management Systems of Nuclear Organizations (under development)
	Fast Reactor Knowledge Preservation System: Taxonomy and Basic Requirements, Nuclear Energy Series No. NG-T-6.3, IAEA, Vienna (2008)	Guide on Nuclear Knowledge Management, Nuclear Energy Series NG-T-XXX, IAEA, Vienna (2012) (under preparation)	Mapping Competencies in Nuclear Organizations (under development)
	Web Harvesting for Nuclear Knowledge Preservation, Nuclear Energy Series, No. NG-T-6.6, IAEA, Vienna (2008)	Knowledge Management for Nuclear Research & Development Organizations, Nuclear Energy Series NG-T-XXX, IAEA, Vienna (2012) (under preparation)	
	The Nuclear Power Industry's Ageing Workforce: Transfer of Knowledge to the Next Generation, TECDOC-1399, IAEA, Vienna (2004)	Knowledge Management for Radioactive Waste Management Organizations, Nuclear Energy Series NG-T-XXX, IAEA, Vienna (2012) (under preparation)	
ADVISORY & REVIEW SERVICES	Knowledge Mangement Assist Visits (based on TECDOC-1586) for Nuclear Education, Nuclear Power Plants, R&D and RadWaste organizations		
TOOLS	Knowledge Management Assessment Tool (based on TECDOC-1586, Appendix I) for Nuclear Education, Nuclear Power Plants, R&D and RadWaste organizations		

Knowledge Networks

CAPACITY BUILDING - KNOWLEDGE NETWORKS (KN)			
REFERENCE DOCUMENTS & PUBLICATIONS	Building Communities of Practice for the Nuclear Field, TECDOC-XXXX, IAEA, Vienna (2012) (under preparation)		
ADVISORY & REVIEW SERVICES			
	NETWORK	**DEFINITION**	**MEMBER COUNTRIES**
Tools	**ANNuR** Arab Network for Nuclear Regulators	ANNUR is an association created in 2010 with the purpose of promoting high level of nuclear safety and security in Arab countries. www.annur.org	Egypt, Libya, Sudan, Tunisia, Mauritania, Morocco, Bahrain, Kingdom of Saudi Arabia, Kuwait, Oman, Qatar, United Arab Emirates, Iraq, Jordan, Lebanon, Palestine, Syria, Yemen
	ANSN Asian Nuclear Safety Network	ANSN was launched in 2002 to share nuclear safety knowledge and practical experiences in Asia and to support dynamic development of nuclear programmes in the region. Since 2009, ANSN realised a strong need of nuclear safety capacity building in Asia and drafted the Generic Action Plan to implement Vision 2020. www.ansn.org	Australia, Bangladesh, China, Indonesia, Japan, Kazakhstan, Korea, Malaysia, Philippines, Thailand, Vietnam
	FORO Ibero-American Nuclear and Radiation Safety Network	Ibero-American Forum of Radiological and Nuclear Regulatory Agencies was established in 1997 to promote radiological and nuclear safety at the highest level in the region and is implemented through an IAEA's extra-budgetary programme funded by the FORO. www.foroiberam.org	Argentina, Brazil, Chile, Cuba, Spain, Mexico, Peru, Uruguay
	FNRBA Forum of Nuclear Regulatory Bodies in Africa	FNRBA is an association for African Countries established in 2009. Its purpose is to provide platform for fostering regional cooperation; for the exchange of expertise, information and experience; to provide opportunity for mutual support and coordination of regional initiatives; and to leverage the development and optimisation of resource utilization. www.fnrba.org	Algeria, Angola, Botswana, Burkina Faso, Cameron, Cote d'Ivoir, Democratic Republic of Congo, Egypt, Ethiopia, Gabon, Ghana, Kenya, Libya, Madagascar, Malawi, Mali, Mauritania, Mauritius, Morocco, Mozambique, Namibia, Niger, Nigeria, Senegal, Seychelles, South Africa, Sudan, Tanzania, Tunisia, Uganda, Zimbabwe
	GNSSN Global Nuclear Safety and Security Network	GNSSN is a set of existing networks and information resources that support nuclear safety and security. GNSSN, provides open access to general information on nuclear safety and nuclear security on a common, collaborative platform designed so that experts can exchange and share information easily and quickly. www.gnssn.iaea.org	The GSAN Advisory Group is presently composed of 15 representatives and several NPP newcomer groups. Membership is open to all regulatory, owner-operator and technical support organizations.
	GSAN Global Safety Assessment Network	GSAN is a network of regulatory, owner-operator, and technical support organizations designed to support safety assessment, analysis and design safety capacity building in IAEA Member States. Its electronic collaboration system www.san.iaea.org provides a platform for safety assessment content and knowledge management, as well as a forum and collaboration space for related projects.	Membership is open to all regulatory, owner-operator and technical support organizations.
Tools	**RANET** Response and Assistance Network	The aim of RANET is to facilitate the provision of requested international assistance in case of nuclear or radiological incidents or emergencies; the harmonization of emergency assistance capabilities; and the relevant exchange of information and feedback of experience.The Competent Authorities of Member states are asked to identify their National Assistance Capabilities (NAC) and register them with RANET. RANET aims to ensure that there is a regional distribution of capabilities so to ensure the prompt provision of assistance upon request.	Argentina, Australia, Austria, Czech Republic, Egypt, Finland, France, Hungary, Japan, Mexico, Nigeria, Pakistan, Romania, Russian Federation, Slovenia, Sri Lanka, Sweden, Turkey, USA
	CSN Control of Sources Network	CSN is developed to create a collaborative platform among regulators for knowledge and experience exchange for mutual learning in regulatory activities, and to make available feedback and lessons learned for effective control of radiation sources.	Open to IAEA member states
	ANENT Asian Network for Education in Nuclear Technology	ANENT is a regional partnership to cooperate in capacity building, human resources development and knowledge management in the peaceful use of nuclear technology in the Asia-Pacific region. The ANENT Web-Portal has been established for exchanging information and facilitating education and training. www.anent.iaea.org.	Australia, Bangladesh, China, India, Indonesia, Japan, Jordan, Republic of Korea , Lebanon, Malaysia, Mongolia, Pakistan, Philippines, Sri Lanka, Syria, Thailand, United Arab Emirates, Vietnam
	LANENT Latin-American Network for Education in Nuclear Technology	Created in December 2010, LANENT was set up to promote, manage and preserve nuclear knowledge, to contribute to capacity building through education in nuclear in the Latin American and Caribbean region and to enhance the quality of the human resources for the sustainability of nuclear technology. The objective of LANENT is to facilitate and improve co-operation in education, training and outreach in nuclear technology in the Latin American and Caribbean region.	Argentina, Bolivia, Brazil, Chile, Cuba, Ecuador, Mexico, Peru, Paraguay, Uruguay; Associated Member: Spain; Organizations from ten countries from the region
	AFRA-NEST AFRA Network for Education in Nuclear Science and Technology	The Africa Regional Cooperative Agreement for Research Development and Training related to Nuclear Science and Technology (AFRA) established the AFRA Network for Education in Nuclear Science and Technology (AFRA-NEST) in order to implement to foster sustainable human resource development and nuclear knowledge management to satisfy the needs of African countries in the priority areas of non-power and power applications of nuclear energy.	Algeria, Angola, Benin, Botswana, Burkina Faso, Cameroon, Chad, Cote d'Ivoire, Democratic Republic of Congo, Egypt, Eritrea, Ethiopia, Gabon, Ghana, Kenya, Lesotho, Libyan Arab Jamahiriya, Madagascar, Mali, Mauritania, Mauritius, Morocco, Namibia, Niger, Nigeria, Senegal, Sierra Leone, South Africa, Sudan, Tanzania, Tunisia, Uganda, Zambia, Zimbabwe

All Capacity Building Activities Planned for 2012

CAPACITY BUILDING - CURRENT & PLANNED ACTIVITIES 2012			
HRD	On-going HRD/E&T workshops at national and regional level	Development of a 'HR Roadmap' for newcomer countries	Drafting an NE Series report on staffing of a first Nuclear Power Plant
	Initial roll-out/training in use of NPHR modelling tool for Workforce Planning	Meeting of the technical working group on Managing Human Resources	Development of a package of e-learning materials focused on infrastructure development for newcomer countries
	Workshop to identify professional and technical training needs for newcomer countries	National and Regional Workforce Planning, Human Resource Development and Education and training Workshops/Seminars	
KM	RCM on Increasing Nuclear Power Plant Performance through Process-oriented Knowledge Management	Implementing standardized curricula for Nuclear Knowledge Management in Universities	Implementing Community of Practice on knowledge management in nuclear science and technology (ICP NKM)
	Implementation of e-learning platforms for Nuclear Education and Training	Regional networking for education in nuclear technology (ANENT, LANENT, AFRA-NEST)	
KN	**ANSN:** Regional Workshop on Establishing a Nuclear Safety Infrastructure for a National Nuclear Power Programme, Workshop on Establishment of National Education System for Countries Embarking Nuclear Power Programme, Regional Workshop on Train the Trainers for Nuclear Safety, Regional Workshop on Regulatory control of Nuclear Power Plant, Regional Workshop on BPTC in Nuclear Safety, Special on the job training workshop on Nuclear Power Plant construction, Nuclear Safety Training Workshop tailored for Regulators	**ANNuR:** Experts meeting to formulate Arab technical cooperation project 'Strengthening the regulatory and legislative frameworks for nuclear and radiation activities in Arab countries', Training course about functions of regulatory bodies, Training course on fundamentals of Nuclear Power Palnt and its safety regulations, Training course on basic requirements of Regulatory Bodies	**FNRBA:** Self-assessment of regulatory infrastructures under the framework of TC projects, Technical workshop on Construction Permit Process and Requirements
	ANENT: Regional coordination meeting to review the best practices in nuclear knowledge management, Technical meeting on the ANENT, Development and installation of the new website (CLP4NET), Implementation of e-training course, Development & dissemination of e-learning	**RANET:** Workshop on the development of the RANET Operations Manual	**CSN:** User interface design presented and discussed in a TC project (RAF9038) Coordination Meeting
	GSAN: Global Safety Assessment Network Advisory Group Meeting to formulate capacity building and MS outreach strategies, Online Safety Assessment Forum developed to address MS questions on nuclear safety and in particular on safety analysis and design safety (in progress), Web-based seminar facility added to GSAN platform for online meetings and discussions among MS (Webinar); Based on the Safety Assessment Education and Training Programme (SAET): Workshops held on a variety of safety analysis and design safety topics (PSA Level 1 and Level 2, DBA, DBDA, Severe Accidents), Introductory workshops on safety assessment and design safety for newcomer countries, Web-based seminars (Webinars) held to assist in verification of safety analysis performed by MS	**LANENT:** Regional Training on e-learning tools usage, Technical meeting for LANENT development, Participation in Networking Educational Networks meeting, Preparation of regional hub infrastructure for installation of cyber learning platform (CLP4NET), Collection of data on courses and careers currently held in the region (Nuclear energy, nuclear sciences, radiation protection, safety, nuclear medicine/medical physics), Collection of data on educational material used for the courses in the region (to compile a data base), Development of a web page (under construction) to centralize nuclear education information for the region	**AFRA-NEST:** Sharing of information and materials of nuclear education and training, Promoting effective cooperation and sharing of resources and capabilities at national and regional level, Facilitating the exchange of students, teachers and researchers, Serving as facilitator for communication between the network member organizations and other regional networks, Developing harmonized approaches for education in nuclear science and technology in Africa by establishing reference curricula and facilitating mutual recognition of degrees, Plans to become a regional hub for the CLP4NET, the NKM flagship knowledge management tool, supporting the development and access to education and training materials for the Africa Region
E&T	Development of multimedia training materials in the area of nuclear safety	Development of a package for training in the area of safety culture and leadership	Annual regional courses of BPTC in Korea for the Asian region and in Argentina for the Latino American region
	Development of a self-study e-learning platform and train the trainers' package for the IAEA Basic Professional Training Course (TC/EC project)	Development of SAET and associated modules for training in the area of safety assessment	Meeting of the Steering Committee of Competence of Human Resources for Regulatory Bodies
	Updating a Regulatory Control Course	Improvement of the SARCoN software	First Pilot EPReS mission to Indonesia

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CONTRIBUTORS TO DRAFTING AND REVIEW

EXTERNAL

J. Kenigsberg, Republican Scientific Practical Center of Hygiene, Belarus

Z. Wang, East China Regional Office of Nuclear and Radiation Safety, Ministry of Environmental Protection, China

L. Lederman, Brazil

J. Aurela, Ministry of Employment and the Economy, Energy Department, Finland

C. Sukosd, Budapest University of Technology and Economics, Institute of Nuclear Techniques, Hungary

Y. Ueda, Japan Nuclear Energy Safety Organization, Japan

H. Bin Mohd Ali, Atomic Energy Licensing Board, Malaysia

A. Habib, Pakistan Nuclear Regulatory Authority, Pakistan

R. Ioan, SC Elcomex IEA SA, Romania

M. Ceyhan, Turkish Atomic Energy Authority, Turkey

L. Chi Dung, Vietnam Agency for Radiation and Nuclear Safety, Vietnam

IAEA:

L. Bevington

G. Caruso

A. Cherf

P. Colgan

N.Delaunay

R. Evans

Y. Fukuda

R. Gibbs

L. Guo

S. Haber

J. Isotalo

H. K. Kim

S. Koenick

A. Luciani

S. Mallick

B. Molloy

M. Moracho Ramirez

A. Nicic

Z. Pasztory

R. Salinas

R. Spiegelberg Planer

A. Starz

R. Stevens

P. Vincze

P. Woodhouse

Y. Yanev

List of Participants of the Technical Meeting on Establishing, Developing and Maintenance Capacity Building in Members States, Vienna, 17–20 April 2012

Mr B. Meftah, Commisariat a l'Energie Atomique,ALGERIA

Ms O. Verbitskaia, Ministry of Energy of the Republic of Belarus, BELARUS

Mr H. Chang, CPI Nuclear Power Co. Ltd, CHINA

Mr S. Medakovic, State Office for Radiological and Nuclear Safety, CROATIA

Ms H. W. Elhakim Elham, Egyptian Atomic Energy Authority, EGYPT

Ms H. Negm, Permanent Mission of Egypt to the IAEA, EGYPT

Mr J. Aurela, Ministry of Employment and the Economy; Energy Department, FINLAND

Ms T. Brandt, Change Agent, Competence Management, Fortum Power and Heat Ltd, FINLAND

Mr J.P. Barbeau, Business Development Department, AREVA, FRANCE

Ms M-L. De Heaulme, Institut de radioprotection et de sûreté nucléaire (IRSN), FRANCE

Mr J.L. Lachaume, Autorité de Sûrete Nucléaire (ASN), FRANCE

Mr C. Sukosd, Budapest University of Technology and Economics; Institute of Nuclear Techniques, HUNGARY

Ms T. Handayani, Nuclear Energy Regulatory Agency (BAPETEN), INDONESIA

Mr A. Sudi, National Nuclear Energy Agency (BATAN), INDONESIA

Mr R. Jafarian, Atomic Energy Organization of Iran (AEOI); Iranian Nuclear Regulatory Authority (INRA), IRAN, ISLAMIC REPUBLIC OF

Mr N. Mohammadzadeh, Iran Nuclear Regulatory Authority (INRA), IRAN, ISLAMIC REPUBLIC OF

Mr M. Koyama, Nuclear and Industrial Safety Agency (NISA), JAPAN

Mr Y. Ueda, Japan Nuclear Energy Safety Organization (JNES), JAPAN

Mr J. Sharaf, Director General of Jordan Nuclear Regulatory Commission, JORDAN

Ms R.M. Stasiunaitiene, Radiation Protection Centre, LITHUANIA

Mr A. Hj. Khalid Mohd, Malaysian Nuclear Agency, MALAYSIA

Mr A. Habib, Pakistan Nuclear Regulatory Authority (PNRA), PAKISTAN

Mr U.K. Khan Rafat, Directorate of Human Resource Development, PAEC, PAKISTAN

Mr E. Kapralov, Federal State Unitary Enterprise (FSUE) VO "Safety", RUSSIAN FEDERATION

Mr D. Mistryugov, Scientific and Engineering Center of Nuclear and Radiation Safety (SECNRS), RUSSIAN FEDERATION

Mr A. Museridze, Federal State Unitary Enterprise VO Safety, RUSSIAN FEDERATION

Ms N. Matube, South African Nuclear Energy Corp. (NECSA), SOUTH AFRICA

Mr J.A. Cepas Campos, Consejo de Seguridad Nuclear (CSN), SPAIN

Mr D. Encinas, Consejo de Seguridad Nuclear (CSN), SPAIN

Ms T. Angwongtrakool, Office of Atoms for Peace (OAP), THAILAND

Mr T. Jaemjaroenchainon, Thailand Institute of Nuclear Technology, THAILAND

Ms N. Tanboon, Ministry of Science and Technology (MOST); Thailand Institute of Nuclear Technology (TINT), THAILAND

Mr N. Reguigui, Centre National des Sciences et Technologies Nucléaires (CNSTN), TUNISIA

Mr M. Ceyhan, Turkish Atomic Energy Authority (TAEK); Nuclear Safety Department, TURKEY

Mr T. Kozulko, Nuclear Regulatory Inspectorate of Ukraine, UKRAINE

Mr V.P. Nguyen, Vietnam Atomic Energy Agency (VAEA), VIETNAM

IAEA:

L. Bevington

P. Colgan

N. Delaunay

Y. Fukuda

R. Gibbs

L. Guo

J. Isotalo

H.K. Kim

S. Mallick

B. Molloy

M. Moracho

Z. Pasztory

R. Salinas

A. Starz

R. Stevens

P. Woodhouse