IAEA TECDOC SERIES

Methodology for the Systematic Assessment of the Regulatory Competence Needs (SARCoN) for Regulatory Bodies of Nuclear Installations

IAEA
International Atomic Energy Agency

IAEA SAFETY STANDARDS AND RELATED PUBLICATIONS

IAEA SAFETY STANDARDS

Under the terms of Article III of its Statute, the IAEA is authorized to establish or adopt standards of safety for protection of health and minimization of danger to life and property, and to provide for the application of these standards.

The publications by means of which the IAEA establishes standards are issued in the **IAEA Safety Standards Series**. This series covers nuclear safety, radiation safety, transport safety and waste safety. The publication categories in the series are **Safety Fundamentals**, **Safety Requirements** and **Safety Guides**.

Information on the IAEA's safety standards programme is available at the IAEA Internet site

http://www-ns.iaea.org/standards/

The site provides the texts in English of published and draft safety standards. The texts of safety standards issued in Arabic, Chinese, French, Russian and Spanish, the IAEA Safety Glossary and a status report for safety standards under development are also available. For further information, please contact the IAEA at PO Box 100, 1400 Vienna, Austria.

All users of IAEA safety standards are invited to inform the IAEA of experience in their use (e.g. as a basis for national regulations, for safety reviews and for training courses) for the purpose of ensuring that they continue to meet users' needs. Information may be provided via the IAEA Internet site or by post, as above, or by email to Official.Mail@iaea.org.

RELATED PUBLICATIONS

The IAEA provides for the application of the standards and, under the terms of Articles III and VIII.C of its Statute, makes available and fosters the exchange of information relating to peaceful nuclear activities and serves as an intermediary among its Member States for this purpose.

Reports on safety and protection in nuclear activities are issued as **Safety Reports**, which provide practical examples and detailed methods that can be used in support of the safety standards.

Other safety related IAEA publications are issued as **Radiological Assessment Reports**, the International Nuclear Safety Group's **INSAG Reports**, **Technical Reports** and **TECDOCs**. The IAEA also issues reports on radiological accidents, training manuals and practical manuals, and other special safety related publications.

Security related publications are issued in the **IAEA Nuclear Security Series**.

The **IAEA Nuclear Energy Series** consists of reports designed to encourage and assist research on, and development and practical application of, nuclear energy for peaceful uses. The information is presented in guides, reports on the status of technology and advances, and best practices for peaceful uses of nuclear energy. The series complements the IAEA's safety standards, and provides detailed guidance, experience, good practices and examples in the areas of nuclear power, the nuclear fuel cycle, radioactive waste management and decommissioning.

METHODOLOGY FOR THE SYSTEMATIC ASSESSMENT OF THE REGULATORY COMPETENCE NEEDS (SARCoN) FOR REGULATORY BODIES OF NUCLEAR INSTALLATIONS

The following States are Members of the International Atomic Energy Agency:

AFGHANISTAN
ALBANIA
ALGERIA
ANGOLA
ARGENTINA
ARMENIA
AUSTRALIA
AUSTRIA
AZERBAIJAN
BAHAMAS
BAHRAIN
BANGLADESH
BELARUS
BELGIUM
BELIZE
BENIN
BOLIVIA
BOSNIA AND HERZEGOVINA
BOTSWANA
BRAZIL
BRUNEI DARUSSALAM
BULGARIA
BURKINA FASO
BURUNDI
CAMBODIA
CAMEROON
CANADA
CENTRAL AFRICAN
  REPUBLIC
CHAD
CHILE
CHINA
COLOMBIA
CONGO
COSTA RICA
CÔTE D'IVOIRE
CROATIA
CUBA
CYPRUS
CZECH REPUBLIC
DEMOCRATIC REPUBLIC
  OF THE CONGO
DENMARK
DOMINICA
DOMINICAN REPUBLIC
ECUADOR
EGYPT
EL SALVADOR
ERITREA
ESTONIA
ETHIOPIA
FIJI
FINLAND
FRANCE
GABON
GEORGIA
GERMANY
GHANA

GREECE
GUATEMALA
GUYANA
HAITI
HOLY SEE
HONDURAS
HUNGARY
ICELAND
INDIA
INDONESIA
IRAN, ISLAMIC REPUBLIC OF
IRAQ
IRELAND
ISRAEL
ITALY
JAMAICA
JAPAN
JORDAN
KAZAKHSTAN
KENYA
KOREA, REPUBLIC OF
KUWAIT
KYRGYZSTAN
LAO PEOPLE'S DEMOCRATIC
  REPUBLIC
LATVIA
LEBANON
LESOTHO
LIBERIA
LIBYA
LIECHTENSTEIN
LITHUANIA
LUXEMBOURG
MADAGASCAR
MALAWI
MALAYSIA
MALI
MALTA
MARSHALL ISLANDS
MAURITANIA, ISLAMIC
  REPUBLIC OF
MAURITIUS
MEXICO
MONACO
MONGOLIA
MONTENEGRO
MOROCCO
MOZAMBIQUE
MYANMAR
NAMIBIA
NEPAL
NETHERLANDS
NEW ZEALAND
NICARAGUA
NIGER
NIGERIA
NORWAY
OMAN

PAKISTAN
PALAU
PANAMA
PAPUA NEW GUINEA
PARAGUAY
PERU
PHILIPPINES
POLAND
PORTUGAL
QATAR
REPUBLIC OF MOLDOVA
ROMANIA
RUSSIAN FEDERATION
RWANDA
SAN MARINO
SAUDI ARABIA
SENEGAL
SERBIA
SEYCHELLES
SIERRA LEONE
SINGAPORE
SLOVAKIA
SLOVENIA
SOUTH AFRICA
SPAIN
SRI LANKA
SUDAN
SWAZILAND
SWEDEN
SWITZERLAND
SYRIAN ARAB REPUBLIC
TAJIKISTAN
THAILAND
THE FORMER YUGOSLAV
  REPUBLIC OF MACEDONIA
TOGO
TRINIDAD AND TOBAGO
TUNISIA
TURKEY
UGANDA
UKRAINE
UNITED ARAB EMIRATES
UNITED KINGDOM OF
  GREAT BRITAIN AND
  NORTHERN IRELAND
UNITED REPUBLIC
  OF TANZANIA
UNITED STATES OF AMERICA
URUGUAY
UZBEKISTAN
VENEZUELA, BOLIVARIAN
  REPUBLIC OF
VIET NAM
YEMEN
ZAMBIA
ZIMBABWE

The Agency's Statute was approved on 23 October 1956 by the Conference on the Statute of the IAEA held at United Nations Headquarters, New York; it entered into force on 29 July 1957. The Headquarters of the Agency are situated in Vienna. Its principal objective is "to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world".

METHODOLOGY FOR THE SYSTEMATIC ASSESSMENT OF THE REGULATORY COMPETENCE NEEDS (SARCoN) FOR REGULATORY BODIES OF NUCLEAR INSTALLATIONS

COPYRIGHT NOTICE

FOREWORD

A regulatory body's competence is dependent, among other things, on the competence of its staff. A necessary, but not sufficient, condition for a regulatory body to be competent is that its staff can perform the tasks related to the functions of the regulatory body.

In 2001, the IAEA published TECDOC 1254, Training the Staff of the Regulatory Body for Nuclear Facilities: A Competency Framework, which examines the manner in which the recognized regulatory functions of a nuclear regulatory body results in competence needs. Using the internationally recognized systematic approach to training, TECDOC 1254 provides a framework for regulatory bodies for managing training and developing, and maintaining the competence of its staff. It has been successfully used by many regulatory bodies all over the world, including States embarking on a nuclear power programme.

The IAEA has also introduced a methodology and an assessment tool — Guidelines for Systematic Assessment of Regulatory Competence Needs (SARCoN) — which provides practical guidance on analysing the training and development needs of a regulatory body and, through a gap analysis, guidance on establishing competence needs and how to meet them.

In 2013, the IAEA published Safety Reports Series No. 79, Managing Regulatory Body Competence, which provides generic guidance based on IAEA safety requirements in the development of a competence management system within a regulatory body's integrated management system. An appendix in the Safety Report deals with the special case of building up the competence of regulatory bodies as part of the overall process of establishing an embarking State's regulatory system.

This publication provides guidance for the analysis of required and existing competences to identify those required by the regulatory body to perform its functions and therefore associated needs for acquiring competences. Hence, it is equally applicable to the needs of States embarking on nuclear power programmes. It is complemented by SARCoN and is to be used in conjunction with Safety Reports Series No. 79.

CONTENTS

1. INTRODUCTION

1.1. BACKGROUND

Different Regulatory Bodies have different regulatory and national approaches. This report is the result of years of experience and work of many experts. It has also been validated by the IAEA Steering Committee on Competence of Human Resources for Regulatory Bodies of Nuclear Installations.

The IAEA has published a number of safety standards and other publications, in which the need and importance of ensuring regulatory competence is emphasized.

Principle 2 of the IAEA Safety Fundamentals requires the regulatory body to "Have adequate legal authority, technical and managerial competence, and human and financial resources to fulfil its responsibilities;" [1].

The IAEA Safety Requirements publication No. GSR Part 1 on Governmental, Legal and Regulatory Framework for Safety includes overall requirements for responsibilities and functions of a regulatory body including staffing and competence [2].

IAEA Safety Requirements publication No.GS-R-3 on Management System for Facilities and Activities includes a section dealing with human resources. It states that "Senior management shall determine the amount of resources necessary and shall provide the resources to carry out the activities of the organization…" (para 4.1, [3]). Also, "Senior management shall determine the competence requirements for individuals at all levels and shall provide training or take other actions to achieve the required level of competence" (para 4.3, [3]).

IAEA Safety Guide publication No.GS-G-3.1 on Application of the Management System for Facilities and Activities gives a great deal of guidance for organizations in relation to human resource management (para 2.25) and training (para 4.4 et seq., [4]). This will not be repeated here, but the main ideas are to:

— Manage the organization's knowledge for decision making, whether internally or externally sourced;
— Define the competence needs and ensure that the competences are available;
— Plan and implement the necessary training to meet present and expected future competence needs, when internally sourced.

IAEA Safety Guide publication No.GS-G-1.1 provides guidance for training of the regulatory staff, including the training needs. It elaborates that, soon after recruitment, each member of the staff should be provided with a training plan, including, as appropriate, periodic retraining. The plan should specify the nature of the training needed, its timing and sequence and where it is to be obtained, and the levels of competence to be achieved. The basic elements of a regulatory training programme are also provided [5].

IAEA Safety Guide publication No. SSG-16 on Establishing the Safety Infrastructure for a Nuclear Power Programme provides guidance to embarking countries on Establishing a National Safety Infrastructure including all aspects of human capacity building [6].

IAEA Safety Reports Series No. 79 on Managing the Competence of the Regulatory Body provides generic guidance to assist in the development of the management systems of

regulatory bodies by establishing, implementing, assessing and continually improving a competence management system. It provides the guidance necessary to meet the requirements of systematically assessing competence needs, in the near term and longer term future, and planning and delivering training and other elements of competence development. It also provides a detailed and systematic competence framework for regulatory bodies describing some sample tasks, and setting out the required competences in a four-quadrant model. [7]

1.2. OBJECTIVES

The objective of this technical report is to provide information on specific and practical means to support the implementation of the IAEA safety standards in the area of ensuring regulatory competence. It is expected that this technical report will also support the Member States in the implementation of Article 8 of the Convention on Nuclear Safety (CNS) and Modules 3 and 4 of the Integrated Regulatory Review Service (IRRS) [8].

Systematic Assessment of Regulatory Competence Needs (SARCoN) provides a methodology for two essential complementary elements of the competence management process, developing competence profiles and conducting a competence gap analysis.

1.3. SCOPE

This technical report provides guidance for Competence Needs Assessment (CNA) and offers a step by step approach to develop competence profiles for specific regulatory tasks or positions and to analyze existing and required regulatory competences for individuals or organizational units in order to identify gaps and thus competence and training needs.

It also provides examples of a questionnaire for self-assessment and guidance on the development and implementation of tools and programmes to fill these gaps in conjunction with Safety Reports Series No.79 on Managing Regulatory Body Competence [7] which itself is a development of, and supersedes IAEA-TECDOC 1254. The questionnaires offered by SARCoN must be tailored and adapted to the particular situation of the regulator.

Safety Reports Series No. 79 provides guidance on developing an adequate competence management system and it contains an appendix giving detailed guidance for embarking countries in different phases of a nuclear power programme [9].

In this context, this technical document need to be examined with regard to the process of establishing and building competence, in addition to maintaining competence for their organizations.

This CNA is essential to ensure competent human resources as required in the IAEA safety standards and other documents, in which the need and importance of ensuring regulatory competence is emphasized. The methodology offered also looks at periodic reviews of competence needs and the developed methods to acquire competences.

The methodology and process described in this technical document, are based on both the IAEA safety standards and on the regulatory functions described in them [2], and are therefore applicable to any regulatory body including those in Member States "embarking" on a nuclear power programme or a new research reactor project. They are also applicable at all organizational levels and subdivisions in the regulatory body, from the individual to the organization as a whole [3].

The appendices and examples of this publication need to be examined in the context of the particular regulatory organization and its areas of competence within the national infrastructure [9].

However, the competences and overall information of this technical document and its tool are in no way prescriptive and are not intended to be a complete and perfect set of competence profiles.

1.4. STRUCTURE

This technical report consists of five main parts; the first part, Section 1 and 2, is an introduction and brief description of overall considerations for planning and development of competent regulatory personnel. The second part, Sections 3 and 4, introduce the four quadrant model for regulatory competence as well as the roles and responsibilities of the personnel in charge of managing the process of developing and maintaining regulatory competence. In particular the role of a training coordinator and its interaction with higher management levels and the regulatory staff is described. The third part, Sections 5 to 8, explain a step based procedure for developing competence profiles and identifying competence gaps in the organisation. Finally, Appendices I to III present comprehensive examples of questionnaires and competences related to the four quadrant model which can be used to conduct self-assessment of regulatory competence needs

2. PLANNING FOR FUTURE STAFFING NEEDS

Proper management of recruitment and training requires a prior analysis of the future needs of the regulatory body, in terms of competences. This must include a critical evaluation of the structure of the organization, and consideration of whether it is suitable for its future tasks. This analysis should take into account expected staff turnover (loss due to retirements and resignations), restructuring and the need for hand-over arrangements. The result can then be used as the basis for future recruitment and promotion.

In considering its future tasks and the best use of available resources, the regulatory body will need to examine critically those topics which it considers must be retained 'in-house' as core activities, and any which it might delegate to other authorities, or as candidate areas for self-regulation by the licensee, under suitable quality assurance arrangements.

As part of the planning process, the regulatory body needs to consider whether particular skills shortages could be better met through the use of external resources, such as Technical and Scientific Support Organizations (TSOs), other consultants or through the secondment (or other mutual aid agreements) of staff from elsewhere, rather than by recruitment and training of internal staff.

It is also important to take into account the plans in the Member State for new nuclear installations and transition of operating facilities to decommissioning

3. THE QUADRANT MODEL OF COMPETENCES

Safety Reports Series No. 79 describes a competence model which is based on a quadrant structure. "Each quadrant comprises a set of quadrant competence areas (QA), as illustrated in Figure 1 and each of these quadrant competence areas comprises a set of specific competences referred to as knowledge, skills and attitudes (KSAs). The quadrant model described is generally applicable to all regulatory bodies. However, the specific KSAs

associated with the quadrant competence areas need to be tailored to the individual characteristics of each regulatory body and the types of facilities under its regulatory supervision. This means each regulatory body needs to establish its own set of competences, assessment criteria (levels of competence) and standards for evaluation." [7]

1. Competences related to the legal, regulatory and organizational basis 1.1 Legal basis 1.2 Regulatory policies and approaches 1.3 Regulations and regulatory guides 1.4 Management system	2. Technical disciplines competences 2.1 Basic science and technology 2.2 Applied science and technology 2.3 Specialized science and technology
3. Competences related to regulatory body's practices 3.1 Review and assessment 3.2 Authorization 3.3 Inspection 3.4 Enforcement 3.5 Development of regulations and guides	4. Personal and behavioural competences 4.1 Analytical thinking and problem solving 4.2 Personal effectiveness and self-management 4.3 Communication 4.4 Team work 4.5 Managerial and leadership competences 4.6 Safety Culture

FIG. 1. Quadrant model of competences for regulatory bodies.

4. ROLES AND RESPONSIBILITIES

Analysis of the required competences and those available in the organization is a management responsibility. Regulatory Bodies need to define the organization, levels of authority, responsibilities and accountabilities for the competence management process [4, 5]. "The management of the regulatory body needs to assign the responsibilities for applying the Systematic Approach to Training (SAT). In some organizations, the person (or the leader of the team) is referred to as the training coordinator." [7]

4.1. TRAINING COORDINATOR (TC)

(1)   Typical tasks and responsabilities of the TC should include:

(a)   Plan the competence analysis;
(b)   Briefing the management and staff on the conduct of the competence analysis, explaining in particular the meaning of the questionnaire and how to use it.;
(c)   Organizing and supervising the implementation of each step of the competence analysis;
(d)   Using the results of the required competences to establish competence profiles;
(e)   Using the result of the existing competences to compare it to the competence profiles
(f)   Using the results to quantify the numbers of staff corresponding to each gap;
(g)   Considering how to fill the gaps by recruitment, reorganization, training and outsourcing, knowledge networks;
(h)   Reporting the results of the analysis and recommending means to fill the gaps to the regulatory body's management;

4

(i)   For those gaps to be filled by training, develop a training programme in consultation with other staff and management;

(j)   Supervising the implementation of the training programme;

(k)   Evaluating the training results;

(l)   Suggest future training actions or alternative measures to ensure regulatory competence in the short, medium, and long term.

(2)   The TC should study this technical report and become thoroughly familiar with the competence needs assessment procedure.

The TC is a demanding role in terms of time and qualification. Some countries outsource the service to an external consultant or TSO. Some regulators prefer to train and reassign internal resources to perform this task.

4.2. MANAGER

In order to develop and enhance a regulatory body's competence so as to achieve its mission objectives with efficiency and effectiveness, senior management needs to be committed to ensuring that the regulatory body has and maintains competence appropriate to its needs. In particular, since learning is a lifelong process, management needs to be committed to the on-going development of a professional, competent, versatile and motivated workforce.

Each manager needs to be made accountable for all aspects of the competence building of their staff. Managers need to be familiar with the process and should fully support the competence analysis. A person, or team, needs to be appointed to be responsible for the processes of the competence management (see below for definition of the competence management process) in the regulatory body. Additionally, senior managers need to seek to foster an organizational culture which supports individual staff members to recognize that they are accountable for the development of their own competence and contribute to the development of the competence of the organization as a whole.

Within this assessment managers are responsible for developing competence profiles and overseeing their staff during the self-assessment process. It is also recommended that managers discuss the self-assessment results with their staff to foster a coherent understanding of the assessment criteria and the subject in order to guard against misunderstandings.

"The management system should assign responsibility to achieve the organization's objectives and should empower the individuals in the organization to perform their assigned tasks." (para 2.11 [4])

4.3. STAFF

The role of the staff is to conduct an honest self-assessment of their existing competences. This very important task will enable the regulatory body not only to plan training activities effectively but also to plan for future needs.

The staff also has the responsibility to take actions on the basis of the results of the self-assessment in order to improve their competences under the direction of the TC.

5. LEVEL OF COMPETENCE – EVALUATION CRITERIA

Safety Reports Series No.79 recommends an approach that uses three different levels of competence (High, Medium and Basic) which are complemented by 'not applicable' (NA) and 'None'. Not applicable may be used in cases where the competence area is not required for the task or the position. None shall be used during the self-assessment in cases where no level of competence exists. This may especially be the case for newly recruited juniors.

The evaluation criteria need to be agreed on with the senior management before the start of the analysis. These criteria indicate the level of competence required to perform a certain task or activity. High, medium and basic are defined as:

(a) **Basic:** General competence in the area concerned;
(b) **Medium:** A competence level sufficient in routine cases;
(c) **High:** A competence level required for more sophisticated cases or at the strategic level within the regulatory body.

A regulatory body may opt for using more than three levels and might choose different and more specific definitions. In fact, regulatory bodies are encouraged to adapt these definitions to their national needs, making sure that these definitions are specific, measurable, attainable and relevant. It is very important to have a common understanding of the criteria within the organization. More specific definitions of the criteria for evaluating the levels of competence, which have been successfully used for conducting SARCoN, are provided for each quadrant area in APPENDIX III.

The definition of the evaluation criteria should take into consideration the fact that the depth of knowledge required for a task is not necessarily related to the hierarchical position. In most of these cases, the highest level of technical knowledge needed is in the lower positions that actually execute the work, while managers need an overall understanding of the topic.

6. TASKS AND POSITIONS

A task is a measurable, assigned piece of work often to be finished within a certain time frame. It can be split into sub-tasks. A position refers to a generic post of employment which may be assigned to multiple staff, as necessary. These positions consist of multiple tasks which are typically recorded, amongst others, in the job description of every staff of the regulatory body as required by the IAEA safety standards [3]. In established regulatory bodies this may already be the case and the tasks are identified in the management system documentation.

 "A typical job description should contain the following information:

— Job title;
— Purpose of the job;
— Name of the organization;
— Organizational structure;
— Position in the organization;
— Lines of reporting;
— Duties and authorities;
— Key tasks and responsibilities;

— Accountability;
— Necessary minimum training;
— Necessary qualifications;
— Necessary knowledge, skills and abilities;
— Necessary education;
— Necessary experience;
— Necessary medical fitness." (para 2.62 [4])

"Job descriptions should be used to establish baselines for identifying training and competence needs. While job descriptions are usually mandatory only at supervisory levels and above, they are an excellent way for senior management to communicate responsibilities, authority and interfaces to all individuals" (para 2.61 [4]).

7. COMPETENCE NEEDS ASSESSMENT (CNA)

Competence needs assessment (CNA) addresses required and existing competences of an organization and can therefore be very useful to either expand or refocus an existing training programme or to build a new training programme. However, it may require extensive manpower in terms of resources and time.

The processes related to CNA are applicable at all organizational levels. In order to conduct a CNA, the mission and functions of the organization need to be identified. This information should be documented as required. Chapter 2.8 of GS-R-3 entitled Management System for Facilities and Activities states:

"The documentation of the management system shall include the following:

— The policy statements of the organization
— A description of the structure of the organization
— A description of the functional responsibilities, accountabilities, levels of authority and interactions of those managing, performing and assessing work
— A description of the processes and supporting information that explain how work is to be prepared, reviewed, carried out, recorded, assessed and improved." [3]

Regulatory bodies may have different approaches to competence management. SARCoN offers the possibility to tailor the competence needs assessment to the organization by providing an approach that can be followed on different levels of depths and for either the individual and/ or the organization depending on various factors including:

— The regulatory mandate, approach and legal framework;
— The vision, mission and goals of the organization;
— The types of facilities and activities;
— The organizational structure and management system.

Before commencing with the assessment the organization needs to decide on a level and basis for the assessment.

SARCoN can be conducted on an individual or organizational level and either for the quadrant areas (QAs) or for the specific KSAs as shown in Table 1. The regulatory body usually has an organizational structure consisting of sections, divisions, departments, hereafter referred to as organizational units. An organizational unit is normally in charge of performing a number of tasks. Therefore the steps of developing competence profiles and determining the gaps between existing and required competences can be applied to the organization in different ways as shown in Table 1.

TABLE 1. POSSIBLE APPROACHES TO SARCON

No.	Level	Basis
1	Organizational	Quadrant areas (QAs)
2	Organizational	KSAs
3	Individual	Quadrant areas (QAs)
4	Individual	KSAs

8. COMPETENCE NEEDS ASSESSMENT PROCESSES

The competence model described herein suggests a basis for assessing competence needs for both the near and the medium future. Figure 2 describes a step based approach to CNA. A more detailed figure for the practical application of the steps is given in APPENDIX I.
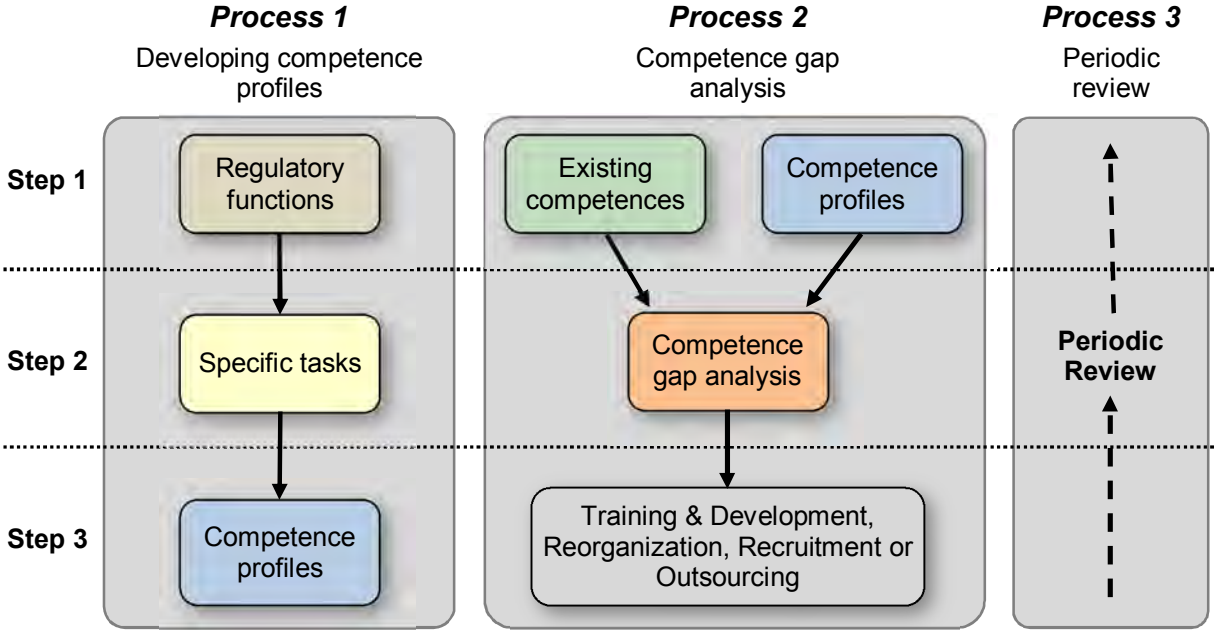
FIG. 2. The step based approach.

8.1. PROCESS 1: DEVELOPING COMPETENCE PROFILES

Competence profiles may have multiple purposes and benefits. A regulatory body may benefit from these profiles when outsourcing competence to TSOs. They also help the regulatory body during the internal or outsourced recruitment process.

If the regulatory body has a management system in place in accordance with GS-R-3 and GS-G-3.1, steps 1 and 2 of this process 1 are part of the management system. In such cases the tasks of each unit or each position can be taken directly from the management system in order to proceed directly with step 3 of this process.

8.1.1. Step 1: Determine the regulatory functions of each unit

The organizational mandate should take into account the present needs as well as the future aspirations of the organization. In order to perform the regulatory functions a regulator has to create and implement an organizational structure which is usually put on record in the management system (at level 1[1]) as show in Figure 3 (see para 2.52 [4]).

One unit may focus on one or more of these regulatory functions. The list of units should be presented with corresponding functions even if the unit does not yet exist. All anticipated needs should be accounted for in the development of competence profiles and training programmes, including the continuing development needs of established staff and managers.
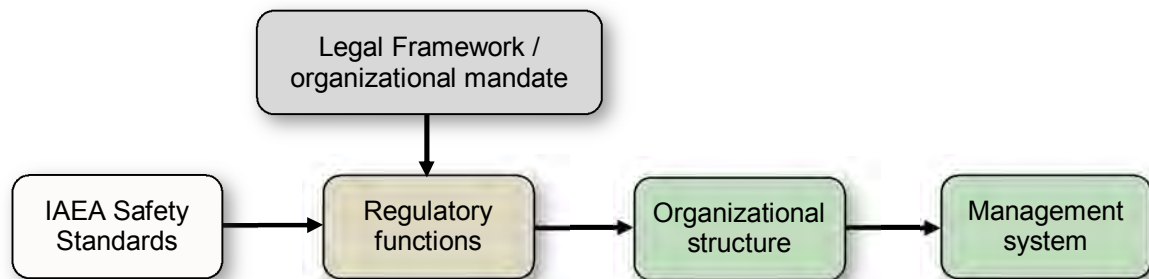
FIG. 3. Determining the regulatory functions.

Guidance for the regulatory functions is provided by the organizational mandate of the organization, hence the legal framework of the country, and the IAEA safety standards such as GSR Part 1 [4] and GS-G-1.1 [5].

Core functions of the regulatory body are:

— Authorization and notification;
— Review and assessment of facilties and activities;
— Inspection of facilties and activities;
— Enforcement of regulatory requirements;
— Development of regulations and guides;
— Emergency preparedness;

---

[1]GS-G-3.1 recommends a "three level structure of information promotes clarity and avoids repetition by establishing the amount of information and the level of detail appropriate to each type of document and by using cross-references between specific documents at the different levels" (para 2.52 [4]). "Level one should provide an overview of the policies and objectives of the organization and should describe the management system that addresses the requirements that apply to the organization's work" (para 2.53 [4]).

— Communication and consultation with other national organizations and interested parties.

Functions supporting the discharge of the regulatory mandate are:

— Administrative support;
— Legal assistance;
— External expert support;
— Advisory committees;
— Research and development;
— Liaison with other organizations;
— International cooperation.

Every person in the regulatory body should understand the functions and the management system of the organization.

8.1.2. Step 2: Determining the specific tasks

The unit's function leads to the associated tasks that are required to fulfil its responsibilities. Each task requires a certain competence in each quadrant area in terms of knowledge, skills, and attitudes (KSAs). The quadrant model of competences represented in Figure 1 and the KSAs in APPENDIX III provide a general compilation of competences based on the regulatory functions and experience from Member States, which can help identify the needs.

Figure 4 below shows the relationship between step 1 and step 2 (see APPENDIX I). Some factors that influence tasks are the regulatory functions identified in step 1 and the IAEA Safety Standards and safety publications. Another important factor influencing the tasks is the structure of the organization. This structure can be found in the documentation of the management system of the regulatory body (para 2.8-2.10 [3]).
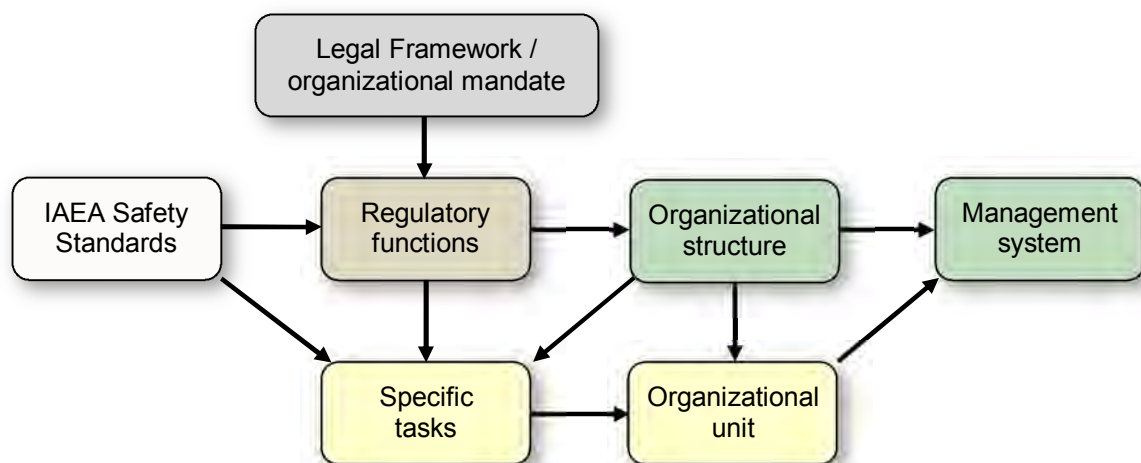
FIG. 4. Determining specific tasks for the organizational units.

Appendix I of Safety Reports Series No. 79 shows a list of sample tasks and associated quadrant competence areas for the core regulatory functions. In cases where tasks are not yet

identified and described in the management system, this needs to be developed before continuing this assessment.

Each organizational unit has to perform specific tasks assigned to it which should be put on record in the management system usually at level 3 (para 2.52 [4]). In order to "determine the competence requirements for individuals at all levels" (para 4.3 [3]) these tasks need to be very clear and understandable. An indicator for the size of a task is the time needed to perform it.

Table 2 gives an example of a template for recording tasks for the whole organization. It is important to identify the affiliation of the tasks to the organizational unit. Some tasks might be applicable to multiple units.

TABLE 2. EXAMPLE OF A TEMPLATE FOR A LIST OF TASKS

	List of task for the organization	Lead organizational unit	Support organizational unit	Comments
TA001				
TA002				
TA003				
…				

8.1.3. Step 3: Developing competence profiles

This step consists of three parts that can be conducted consecutively or separately. In case of subsequent consideration the assessment only needs to be conducted in one part:

- The first part consists of assessing the required level of competences for each task on the basis of quadrant areas or KSAs (8.1.3.1);

- The second part consists of assigning tasks to positions (8.1.3.2);

- The third part consists of assigning positions to individuals or to organizational units (8.1.3.3).

8.1.3.1. Assessment of required competences for tasks

In this part supervisors/ managers should specify the level of competence required to perform the tasks, paying close attention to the defined levels of competence (evaluation criteria) (see Section 5). This can be done at the level of the quadrant areas (see Table 3) or the specific KSAs provided in APPENDIX III as outlined in Section 7. This compilation of competences should first be adapted to the particular situation of the regulatory body, and adjusted taking into account the tasks identified in step 2. This is a time-consuming task that may be effectively performed by a team.

(1) On the basis of quadrant areas:

TABLE 3. EXAMPLE OF A TEMPLATE FOR RECORDING THE REQUIRED LEVEL
OF COMPETENCE FOR EACH TASK ON THE BASIS OF THE QUADRANT AREAS

	Quadrant area	Level of competence for tasks on the basis of quadrant areas				Comments
		Task001	Task002	Task003	…	
Q1	1.1	B	…	…	…	
	1.2	M	…	…	…	
	1.3	H	…	…	…	
	1.4	B	…	…	…	
Q2	2.1	B	…	…	…	
	2.2	M	…	…	…	
	2.3	M	…	…	…	
Q3	3.1	H	…	…	…	
	3.2	M	…	…	…	
	3.3	NA	…	…	…	
	3.4	NA	…	…	…	
	3.5	B	…	…	…	
Q4	4.1	M	…	…	…	
	4.2	B	…	…	…	
	4.3	B	…	…	…	
	4.4	M	…	…	…	
	4.5	B	…	…	…	
	4.6	M	…	…	…	

Table 3 provides an example of a template for recording the level of competence for the tasks. Each task is assessed on the basis of quadrant areas. The managers responsible for conducting the assessment need to have a thorough understanding of each quadrant area. It is recommended to look at the list of KSAs (APPENDIX III) before commencing the assessment for the quadrant areas.

(2)   On the basis of knowledge, skills and attitudes:

TABLE 4. EXAMPLE OF A TEMPLATE FOR RECORDING THE REQUIRED LEVEL
OF COMPETENCE FOR EACH TASK ON THE BASIS OF KSAS

KSAs	Task001	Task002	Task003	…	Comments
KSA001	Level of Competence	Level of Competence	Level of Competence	…	
KSA002	…	…	…		
…					

Table 4 provides an example of a template for recording the required level of competence for each task of the regulatory body on the basis of KSAs. Developing competence profiles on this gives a more detailed overview of the competences within the organization.

Tables III.1 and III.2 of APPENDIX II provide guidance on the quadrant competence areas required for the regulatory functions.

8.1.3.2. Assessment of required competences for positions

This part can be conducted after the first part by assigning tasks to positions. However it is possible to assess the required level of competence for each position directly after step 2 skipping the first part related to the assessment of competences per task. This allows for a faster process but a loss in depth of the assessment.

If the complete sequence is followed, when creating competence profiles for a certain position, the required level of competence for a certain KSA or QA needs to be the maximum value of all of the assigned tasks, as shown in the example in table 6. Table 5 gives an example of a template for recording the tasks for each position. It is also possible to record this in the job descriptions of each position (see Section 6).

TABLE 5. EXAMPLE OF A TEMPLATE FOR RECORDING THE TASKS FOR GENERIC POSITIONS

Positions	Task Number							
Position001	T001	T005	T006	T056	T117	T118	…	…
Position002	T001	T002	T005	T032	T075	T100	T129	…
Position003	T001	T002	T043	T045	T093	T094	T095	…
…								

When assigning tasks to position, every task has a certain level of competence for one KSA or one QA. The example below provides guidance on how to combine these levels of competence.

An individual assigned to this position needs to have a certain level of competence in a KSA to perform all of the tasks of this position. Table 6 shows an example of the total required competence for the tasks of Position001 in KSA001.

TABLE 6. EXAMPLE OF A LIST OF REQUIRED COMPETENCES FOR THE TASKS OF POSITION001 IN KSA001

Position001	TA001	TA005	TA006	TA056	…	Total
KSA001	H	M	M	B	…	H

The resulting required competence in KSA 001 for this position should be the maximum level of all tasks. In this example, the required competence of TA001 is high which results in a total score of high. If TA001 was medium, then the total would be medium.

After assigning tasks to positions and determining the required level of competence for each QA or KSA related to a position, the following tables can be established:

(1)   On the basis of quadrant areas:

TABLE 7. EXAMPLE OF A TEMPLATE FOR RECORDING THE REQUIRED LEVEL OF COMPETENCE PER POSITION ON THE BASIS OF THE QUADRANT AREAS

	Quadrant area	Level of competence for positions on the basis of quadrant areas				Comments
		Position001	Position 002	Position 003	…	
Q1	1.1	B	…	…	…	
	1.2	M	…	…	…	
	1.3	H	…	…	…	
	1.4	B	…	…	…	
Q2	2.1	B	…	…	…	
	2.2	M	…	…	…	
	2.3	M	…	…	…	
Q3	3.1	H	…	…	…	
	3.2	M	…	…	…	
	3.3	NA	…	…	…	
	3.4	NA	…	…	…	
	3.5	B	…	…	…	
Q4	4.1	M	…	…	…	
	4.2	B	…	…	…	
	4.3	B	…	…	…	
	4.4	M	…	…	…	
	4.5	B	…	…	…	
	4.6	M	…	…	…	

(2)　On the basis of knowledge, skills and attitudes:

TABLE 8. EXAMPLE OF A TEMPLATE FOR RECORDING THE REQUIRED LEVEL OF COMPETENCE PER POSITION ON THE BASIS OF KSAS

KSAs	Position001	Position002	Position003	…	Comments
KSA001	Level of Competence	Level of Competence	Level of Competence	…	
KSA002	…	…	…		
…					

For one KSA, the required level of competence is usually the same for several tasks assigned to a position. It is mainly in QA3.3 that the required level of competence can be different from one task to another.

8.1.3.3.　Competence profiles at organizational level and individual level.

(1)　For the organization level:

Developing competence profiles for the organization has the advantage that the regulatory body is aware of all the competences required for the specific organizational units. It may also help in the processes of identification, acquisition, use, sharing and preservation of knowledge relevant to the regulatory body. These profiles can be developed from Table 2 on the basis of quadrant areas and KSAs as shown in Tables 3 to 8. The example of Table 6 recommends a way to sum up the competences for one KSA or one quadrant area.

TABLE 9 – EXAMPLE OF A TEMPLATE FOR RECORDING THE REQUIRED LEVEL OF COMPETENCE FOR EACH UNIT ON THE BASIS OF KSAS

KSAs	Unit001	Unit002	Unit003	…	Comments
KSA001	Level of Competence	Level of Competence	Level of Competence	…	
KSA002	…	…	…		
…					

TABLE 10 – EXAMPLE OF A TEMPLATE FOR RECORDING THE REQUIRED LEVEL OF COMPETENCE FOR EACH UNIT ON THE BASIS OF THE QUADRANT AREAS

QAs	Unit001	Unit002	Unit003	…	Comments
QA1.1	Level of Competence	Level of Competence	Level of Competence	…	
QA1.2	…	…	…		
…					

(2)   For the individual level:

Developing competence profiles on the individual level gives a more explicit and modular result of the required competence. It also provides additional uses for recruitment and reorganization of competence. However when the tasks of a position change or additional tasks are assigned, the competence profiles need to be adjusted accordingly.

TABLE 11 – EXAMPLE OF A TEMPLATE FOR RECORDING THE REQUIRED LEVEL OF COMPETENCE FOR INDIVIDUAL STAFF MEMBER ON THE BASIS OF KSAS

KSAs	Staff001	Staff002	Staff003	…	Comments
KSA001	Level of Competence	Level of Competence	Level of Competence	…	
KSA002	…	…	…		
…					

TABLE 12 – EXAMPLE OF A TEMPLATE FOR RECORDING THE REQUIRED LEVEL OF COMPETENCE FOR INDIVIDUAL STAFF MEMBER ON THE BASIS OF THE QUADRANT AREAS

QAs	Staff001	Staff002	Staff003	…	Comments
QA1.1	Level of Competence	Level of Competence	Level of Competence	…	
QA1.2	…	…	…		
…					

8.2. PROCESS 2: COMPETENCE GAP ANALYSIS

The competence gap analysis enables the regulatory body to compare existing competences of its staff to the required competences determine in the competence profiles explained in the previous section. From this comparison the regulatory body is able to identify reorganization possibilities of staff whose competence matches better to another position. It may also identify gaps for developing a training programme of existing staff.

8.2.1.   Step 1: Determining the existing competence levels

For each quadrant area or KSA, the staff of a unit should self-assess the existing level, using the definitions of the levels as described in Section 5, with guidance but without knowing the required levels, to avoid bias. To ensure coherency, it is also recommended that the manager assess their staff. The differences between the results can then be compared and discussed by the staff and the manager, in order to ensure a common understanding of the levels of competence.

This exercise can be performed also at the level of the organizational units: assessment of the existing level of competence for each QA or KSA has to be performed by the Head of unit.

All the staff of the Regulatory Body must have basic knowledge of all the four quadrants represented in Figure 1. However, depending on the specific function of the unit under

assessment i.e. drafting regulations or conducting inspections, one of the quadrants i.e. quadrant 1 related to Legal basis or i.e. quadrant 3 related to Regulatory practices, might be more important and competence demanding for the unit.

At the end of this step of the process, data on the existing competence level of all quadrant areas or KSAs (competence profiles) should be available and the competence gaps can be assessed either at individual or organizational level.

8.2.2.   Step 2: Competence Gap Analysis

To begin with step 2 it is necessary to have comparable results. This means comparing KSAs against KSAs or quadrant areas against quadrant areas. Table 1 demonstrates possible combinations of results for the gap analysis.

The following figures show an example of the gap chart for each of the four quadrants and details for quadrant area 1.1 (Legal basis). In Figure 5, the green line signifies the gap between the existing and required competence. Please note that gaps where the existing level is higher than the required level are not counted as gaps. The horizontal axis indicates the quadrants or quadrant areas and the vertical axis refers to the value of the level of competence, whereas 0 is equivalent to NA, 1 to Basic, 2 to Medium and 3 to High.
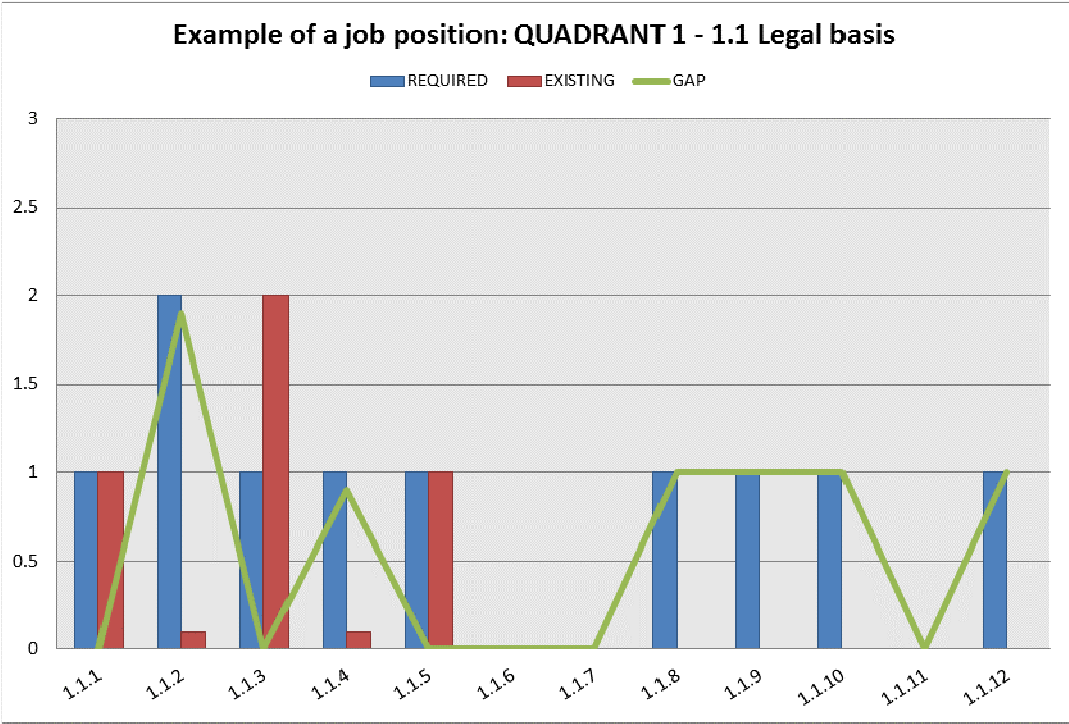
FIG. 5. Example of a gap analysis result.

In Figure 6 the scale of the vertical axis shows the size of the gaps, whereas two represents the biggest gap and zero indicates no gap.
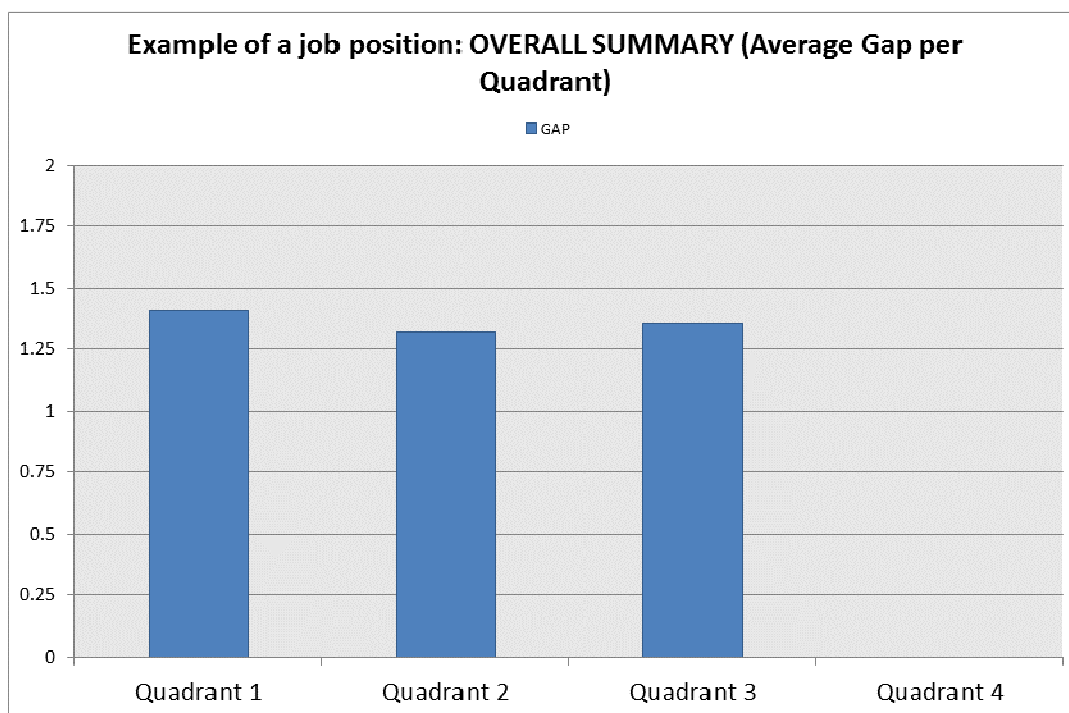
FIG. 6. Chart example of a gap analysis result.

The TC and managers should analyze the gaps for each individual staff or each organizational unit, comparing the existing competence against the required competence profiles and determining how many people correspond to each gap. This needs to be done for each organizational unit, to produce a map of gaps for the whole organization.

"The IAEA has produced a software based tool[2], which assists in the implementation of the approach described above. It helps in the gathering and analysing of information on competence needs, existing competences and the implementation of gap analyses.

The software tool includes a comprehensive question set to identify KSA gaps in each of the quadrant competence areas of the four-quadrant model outlined in Section 3. Additionally, it automates the gathering and processing of data." [7]

8.2.3. Step 3: Prioritization of the gaps and determining methods to fill them

Management and the TC should prioritize the gaps according to their importance to the regulatory functions and allocate resources to fill the gaps by methods such as reorganization, recruitment, training, and outsourcing, as shown in Figure 1. Safety Reports Series No. 79 provides generic guidance on methods of acquiring competence [7]. Managers and the TC need to analyse whether the gaps are due to a lack of competence or a lack of workforce, as this helps to determine further actions.

8.2.3.1. Reorganization and mapping

---

[2] It is available at http://www-ns.iaea.org/training/ni/sarcon.asp?s=100&l=103#1222

The self-assessment results from the staff enable the regulatory body to compare their staff against each competence profile and the associated required level of competence. Through this an organization might identify staff whose qualifications fit better for a different position or in a different unit.

8.2.3.2. *Establishing training and development programmes*

Once decided that the gap can be filled by training, the TC and the managers of the individual staff have to determine the training needs, thus performing training needs assessment (TNA).

"Learning is a lifelong process. Organizations should be committed to the training and development of their employees in order to enhance the efficiency and effectiveness of their operations, achieve their mission objectives and permit the ongoing development of a professional, competent, versatile and motivated workforce. It is important that all regulatory organizations develop a training policy that reflects this principle" [TECDOC 1254].

"The results from SARCoN should be used to establish a training programme using the systematic approach to training (SAT) [TRS-380]. SAT is recognized as a model for assisting in identifying the training needs and for designing, planning, implementing and evaluating training programmes. It has been used in the last 20 years by several regulatory and government agencies, as well as several other organizations." [7].

SAT consists of five interrelated phases which are explained in Safety Reports Series No. 79 [7]. These phases are:

(1) Analysis
(2) Design
(3) Development
(4) Implementation
(5) Evaluation

Training needs and learning points related to specific competences are converted to learning objectives, including evaluation strategies, which are then organized into training plans, taking into account the available options and methods for training. The choice of which will be determined by factors such as the geographical location of the participants, availability of leave for training purposes, and the costs and availability of equipment and materials.

Possible training modes include:

⸺ Internal classroom training;
⸺ External classroom training;
⸺ Distance learning, using manuals, computers and videos, among others;
⸺ On-the-job training (OJT);
⸺ Structured self-study;
⸺ Laboratory training, such as instrument use;
⸺ Coaching and mentoring.

These methods of training are identified and explained in more detail in Appendix IV of Safety Reports Series No. 79 [7].

The results of the application of SARCoN should be used by the management and the TC to help develop initial annual training programmes for different positions within the regulatory body, according to the following methodology:

(1) Choose the method for acquiring competence for each KSA [7];
(2) Identify and assess the training needs (TNA) from the CNA results if training is chosen to fill the gap;
(3) List the training courses and materials available from different sources, such as the IAEA[3], regional networks and the own organization and map them to the KSA of the quadrant model;
(4) Define the objectives of the training activity to be organized to satisfy the needs;
(5) Identify the possible training modes for each KSA;
(6) Prioritize the gaps taking into account the strategy of the regulatory body;
(7) Select the appropriate training activities to fill the gaps as prioritized in step 6;
(8) Establish the individual training programs which may consist of different training modes.

8.2.3.3. *Outsourcing (use of external support)*

A broadly used approach is to outsource (i.e. to contract out) services to an external independent body that provides assistance such as the TSO to the regulatory body. In these cases competence profiles can be used to specify the outsourced competence needed. It is important that within the regulatory staff there is at least one senior expert well-trained in the subject matter to serve as a 'knowledgeable customer'. The regulatory body must also have sufficiently qualified staff to specify, monitor and evaluate the work of the TSO. [7]

8.2.3.4. *Participation in Knowledge networks*

"An important method for acquiring knowledge and developing competence is the participation in knowledge networks. The IAEA, as well as other international organizations, and professional bodies and associations facilitate networking, exchanging information and mutual learning based on good practices and experience from different States" [7]. Safety Reports Series No. 79 provides more details on this topic.

8.2.3.5. *Recruitment*

Most regulatory bodies have a policy for recruitment and selection, whether written or tacit. The age and experience levels of potential staff can vary, but most jobs would require a qualification in some relevant technical specialities. Safety Reports Series No. 79 provides lists of typical specialities. Some of these specialities can also be taken from quadrant area 2.2 and 2.3 of the questionnaire in APPENDIX III.

The IAEA publications listed in the Introduction do not make any particular recommendations on matters such as entrance qualifications and prior experience of recruits to the regulatory

---

[3] NOTE: Information on training materials offered by the IAEA can be found at:
http://www.iaea.org/Publications/Training/index.html and
http://www-ns.iaea.org/training/ni/materials.asp?s=100&l=75.

body. Each Member State (MS) may determine its policy based on national circumstances, such as the salary levels and training resources needed to attract and retain high quality staff.

There should be a systematic recruitment process, which may include, for example, recruitment at universities and technical institutes, through technical societies and their publications, general advertisement of openings and other suitable means. It is recommended to integrate this process into the management system.

The main, though not exclusive, options for recruitment are:

- Recruiting experienced staff from industry (including foreign industry) and then redeveloping them.
- Recruiting entry–level staff and then training them.

Some MSs may regard it as preferable, when recruiting from a foreign country, to avoid cultural conflicts by preferring to recruit only from the same region. Other MSs may take the opposite view to improve the diversity of recruited staff.

Evaluation of applicants may include aptitude tests, personality tests, and assessment of the applicant's particular skills relative to those that are required for each vacancy. Experienced recruits are likely to have more appropriate skills and require less training but may bring safety views that might need to be realigned to the mission of the regulatory body.

Regardless of the source of new staff members, some training will be needed to introduce them to the organization and prepare them to assume their role in the organization. All regulatory bodies should have an induction training programme, which can be modified for some new staff in accordance with their experience before joining. In addition, a continuing program of training for personnel at all levels in the organization is required to maintain and ensure continuous improvement of their competences.

Some MSs may benefit from using the competence profile from SARCoN to recruit new staff as it shows the requirements for a certain task or job position.

8.3. PROCESS 3: PERIODIC REVIEW AND ASSESSMENT

Circumstances, such as reorganization, assignment of new regulatory functions and recruitment of new staff, may make it necessary to repeat the CNA process either for the whole organization or for affected parts. In addition, it is advisable to conduct a new CNA periodically to assess the effectiveness of the training programme, design new training cycles and foster continuous improvement.

To evaluate the success and effectiveness of action taken from the results of applying SARCoN a periodic review should be conducted. Through this review the progress can be assessed in order to monitor its effectiveness.

The periodicity for conducting SARCoN depends on many factors, such as the resources of the regulatory body and changes within the national nuclear installations park. However a three year periodic review is normally considered a good practice.

APPENDIX I.

PROCESS DETAILS FOR THE PRACTICAL APPLICATION OF SARCON
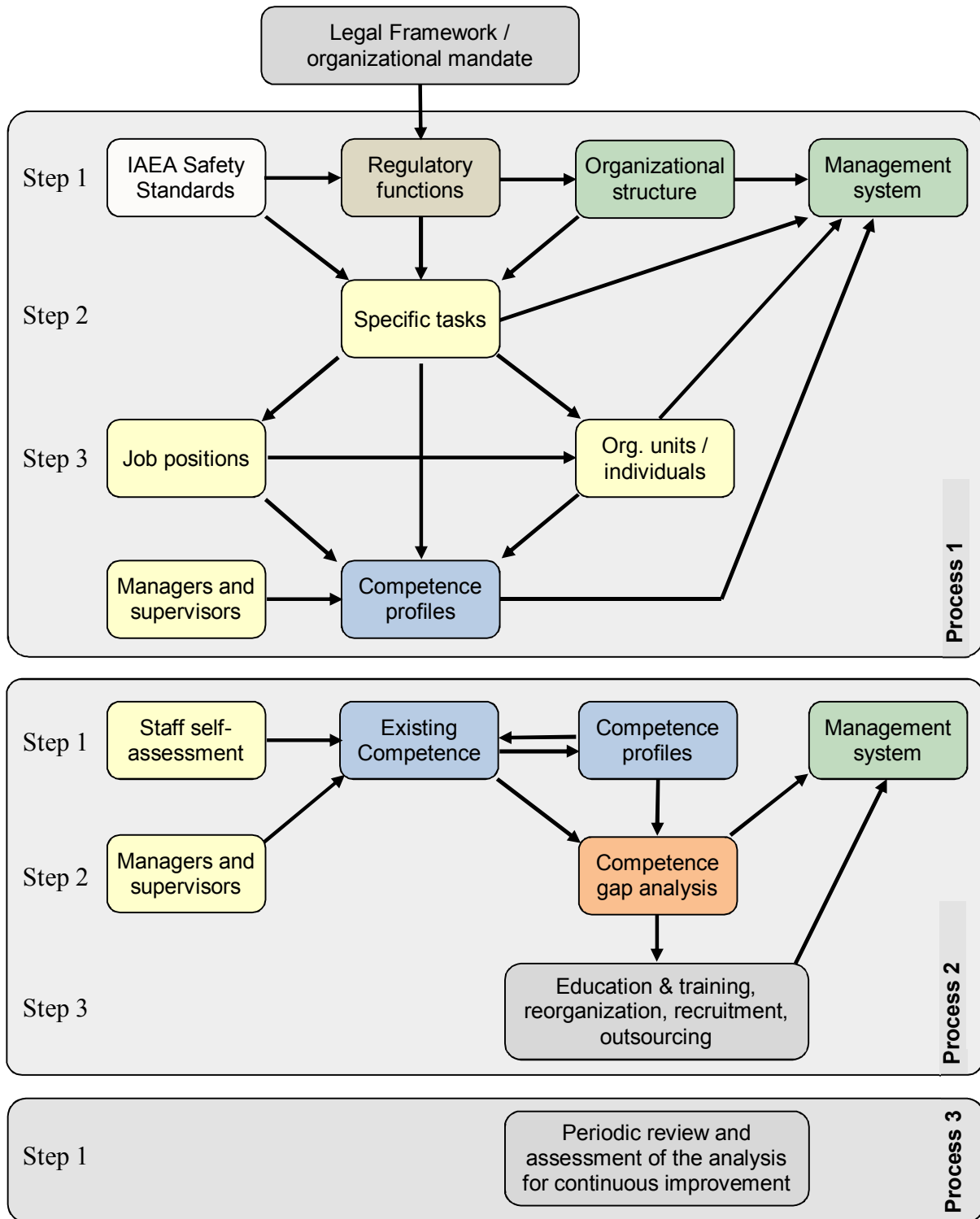
FIG. 7. Details to the step wise approach.

APPENDIX II.

**QUADRANT COMPETENCE AREAS TYPICALLY REQUIRED FOR
REGULATORY FUNCTIONS**

Table 9 and Table 10 of this Appendix (reproduced from SAFETY REPORTS SERIES NO. 79 [7]) provide an example of possible links between the functions of the regulatory body and the quadrants competence areas based on expert judgement. This link is useful to develop an initial overall picture of the quadrant competence areas required to perform the functions of the regulatory body before going into the detailed analysis of tasks and KSAs.

Table 9 provides the quadrant competence areas required to perform the core regulatory functions, while Table 10 provides the same for some additional functions that might be assigned to a regulatory body.

It is worth emphasizing that although the tables in this appendix are based on general expert judgement, a regulatory body may need to adjust them in accordance with its organization, management and the regulatory approach adopted.

TABLE 9. QUADRANT COMPETENCE AREAS TYPICALLY REQUIRED FOR THE CORE REGULATORY FUNCTIONS

		Review and assessment	Authorization	Inspection	Enforcement	Development of regulations and guides
1. Competence related to the legal, regulatory and organizational basis						
1.1	Legal basis	-	X	X	X	X
1.2	Regulatory policies and approaches	X	X	X	X	X
1.3	Regulations and regulatory guides	X	X	X	X	X
1.4	Management system	X	X	X	X	X
2. Technical disciplines competences						
2.1	Basic science and technology	X	-	X	-	X
2.2	Applied science and technology	X	-	X	-	X
2.3	Specialized science and technology	X	-	X	-	X
3. Competences related to regulatory body's practices						
3.1	Review and assessment	X	X	-	-	-
3.2	Authorization	-	X	-	-	-

		Review and assessment	Authorization	Inspection	Enforcement	Development of regulations and guides
3.3	Inspection	-	-	X	-	-
3.4	Enforcement	-	-	X	X	-
3.5	Development of regulations and guides	-	-	-	-	X
4. Personal and behavioural competences						
4.1	Analytical thinking and problem solving	X	X	X	X	X
4.2	Personal effectiveness and self-management	X	X	X	X	X
4.3	Communication	X	X	X	X	X
4.4	Team work	X	X	X	-	X
4.5	Managerial competences and leadership	-	X	X	-	X
4.6	Safety culture competence	X	X	X	X	X

TABLE 10. QUADRANT COMPETENCE AREAS TYPICALLY REQUIRED FOR SOME ADDITIONAL FUNCTIONS OF THE REGULATORY BODY

		Research and development	Emergency preparedness	International cooperation[4]	Public Communication
1. Competence related to the legal, regulatory and organizational basis					
1.1	Legal basis	-	X	X	X
1.2	Regulatory policies and approaches	-	X	X	X
1.3	Regulations and regulatory guides	-	X	X	X
1.4	Management system	-	X	X	X

---

[4] This function includes international safeguards commitments

	Research and development	Emergency preparedness	International cooperation[4]	Public Communication
2. Technical disciplines competences				
2.1 Basic science and technology	X	X	X	-
2.2 Applied science and technology	X	X	X	-
2.3 Specialized science and technology	X	-	-	-
3. Competences related to regulatory body's practices				
3.1 Review and assessment	-	X	X	-
3.2 Authorization	-	X	X	-
3.3 Inspection	-	-	X	-
3.4 Enforcement	-	-	X	-
3.5 Development of regulations and guides	-	-	X	-
4. Personal and behavioural competences				
4.1 Analytical thinking and problem solving	X	X	X	X
4.2 Personal effectiveness and self-management	X	X	X	X
4.3 Communication	-	X	X	X
4.4 Team work	X	X	X	X
4.5 Managerial competences and leadership	X	X	X	X
4.6 Safety culture competence	X	X	X	X

APPENDIX III.

QUESTIONNAIRE FOR DEVELOPING COMPETENCE PROFILES AND FOR REGULATORY BODIES

This appendix gives comprehensive examples of KSAs for each quadrant area. These KSAs are in line with the general examples provided in Safety Reports Series No. 79 [7]. Additionally, Safety Reports Series No. 79 offers the following generic definition for the levels of competence in terms of basic, medium and high:

Basic: General competence in the area concerned;

Medium: A competence level sufficient in routine cases;

High: A competence level required for more sophisticated cases or at the strategic level within the regulatory body.

In this appendix more specific definitions of level of competence are provided for each quadrant as examples. Please note that both the definitions of KSAs, as well as the definitions of the levels of competence offered in this appendix are based on expert judgement and are therefore non-prescriptive. It is indeed strongly recommended to review and adjust all of them to the particular organisation undergoing the assessment (see Section 5). The IAEA SARCoN software tool was upgraded in order to facilitate editing and adjusting of these definitions. Before using the questionnaires it is also recommended to translate them to the local language as appropriate.

III.1. QUADRANT 1: COMPETENCE RELATED TO THE LEGAL, REGULATORY AND ORGANIZATIONAL BASIS

III.1.1. Legal basis:

This competence area is the knowledge of, and skills needed to comprehend and use, relevant documents that establish the legal framework for regulatory control of facilities and activities.

Typically, the regulatory body needs certain levels of knowledge in laws related to:

—— Radiation and nuclear safety
—— Environmental protection
—— Public health and safety
—— Labour health and safety
—— Criminal law
—— Rights of individuals
—— Nuclear law, liability

The regulatory body may need also knowledge in relevant international instruments and documentation such as:

—— Convention on nuclear safety
—— Joint convention on safe management of spent fuel and radioactive waste
—— Convention on early notification

— Convention on assistance in case of nuclear or radiological emergency
— IAEA safety standards
— Code of conduct on safety of research reactors
— Code of conduct on safety and security of radioactive sources

Basic: Basic understanding of national nuclear and non-nuclear legislation relevant/applicable to nuclear regulation (e.g.: acts, decrees regulations in nuclear/industrial safety, environmental regulations, applicable international commitments, etc.);

Medium: Thorough understanding of the basic relationship between the relevant/applicable legal requirements and one's own regulatory duties and those of subordinates;

High: In-depth understanding and capability or work experience to factor in complex relevant legal considerations while performing own regulatory duties or supervising others in their duties.

KSAs	Required Level (B, M, H, NA)[5]	Existing Level (B, M, H, None)
1.1.1 Comprehension of the legal system in the country and the hierarchy and interrelationship of laws, regulations and guidelines		
1.1.2 Comprehension of relevant laws and decrees, related to radiation and nuclear safety		
1.1.3 Comprehension of relevant laws and decrees, related to environmental impact assessment and protection		
1.1.4 Comprehension of relevant laws and decrees, related to public health and safety		
1.1.5 Comprehension of relevant laws and decrees, related to labour health and safety		
1.1.6 Comprehension of relevant laws and decrees, related to criminal law		
1.1.7 Comprehension of relevant laws and decrees, related to rights of individuals		
1.1.8 Comprehension of the local authorities' laws and decrees relating to facilities and activities		
1.1.9 Comprehension and use of other legal instruments such as interpretations offered by legal counsels and courts		
1.1.10 Comprehension of relevant international instruments, conventions and guidance applicable to the regulatory body such as the convention on nuclear safety		

---

[5] The abbreviations used here are explained in Section 5.

KSAs	Required Level (B, M, H, NA)[5]	Existing Level (B, M, H, None)
1.1.11 Comprehension of relevant international instruments, conventions and guidance applicable to the regulatory body such as the joint convention on safe management of spent fuel and radioactive waste		
1.1.12 Comprehension of relevant international instruments, conventions and guidance applicable to the regulatory body such as the convention on early notification		
1.1.13 Comprehension of relevant international instruments, conventions and guidance applicable to the regulatory body such as the convention on assistance in case of nuclear or radiological emergency		
1.1.14 Comprehension of relevant international instruments, conventions and guidance applicable to the regulatory body such as the IAEA safety standards, in particular regarding the safety fundamentals and general structure and role of these standards		
1.1.15 Comprehension of relevant international instruments, conventions and guidance applicable to the regulatory body such as the code of conduct on the safety of research reactors		
1.1.16 Comprehension of relevant international instruments, conventions and guidance applicable to the regulatory body such as the code of conduct on safety and security of radioactive sources		
1.1.17 Comprehension of the powers and authority of the regulatory body and its staff		
1.1.18 Ability to apply relevant laws, decrees and international instruments		
1.1.19 Ability to cooperate with international organizations and other foreign regulatory bodies		
1.1.20 Appreciation of the rights of all interested parties affected directly or indirectly by the provisions of the legal basis of the regulatory body		

III.1.2. Regulatory policies and approaches:

This competence area is the knowledge of, and skills needed to comprehend and apply, the regulatory policies and approaches in order to achieve the relevant regulatory objectives.

Basic: Basic understanding of the mandate, mission and objectives of the regulatory body; basic knowledge of policies, procedures, guidance documents and licensing documents; basic knowledge of regulatory processes (authorization, inspection and enforcement, development of regulations and guides, review and assessment).

Medium: Thorough understanding and capability to relate policies, procedures, guidance documents and licensing documents to duties within the regulatory body. If a management system is in place, a full understanding of the system and its application to one's own work.

High: In-depth understanding and capability in applying the regulatory body's policies, procedures, guidance documents and licensing documents in complex situations and in providing guidance in their application.

KSAs	Required Level (B, M, H, NA)	Existing Level (B, M, H, None)
1.2.1 Comprehension of the mandate, mission and objectives of the regulatory body		
1.2.2 Comprehension of the values of the regulatory body and the principles of good regulation, e.g., independence, openness, effectiveness, efficiency, clarity, objectivity, stability, proportionality, accountability and consistency		
1.2.3 Comprehension of regulatory body governance regarding its short-term and long-term strategic objectives and goals		
1.2.4 Comprehension of the policies and principles which form the basis for all regulatory processes		
1.2.5 Comprehension of regulatory body policies and principles for emergency preparedness and response		
1.2.6 Comprehension of regulatory body policies and principles for research and development activities		
1.2.7 Comprehension of regulatory body policies and principles for communication with interested parties, including the public		
1.2.8 Comprehension of regulatory body policies and principles for international cooperation		
1.2.9 Comprehension of regulatory body policies and principles for human resource management and training activities		
1.2.10 Comprehension of regulatory body policies and arrangements for operational experience feedback		
1.2.11 Comprehension of the need to involve interested parties in the performance of regulatory functions		
1.2.12 Appreciation of the mandate, mission, objectives and values of the regulatory body		
1.2.13 Appreciation of measures for implementing actions to achieve the short term and long term strategic objectives and goals of the regulatory body		

III.1.3. Regulations and regulatory guides:

This competence area is knowledge of, and skills needed to comprehend and use, the regulations and regulatory guides.

Regulations and regulatory guides typically cover:

—— Nuclear safety areas:
- Technical safety requirements for siting, design, construction, commissioning, operation, decommissioning and waste management of nuclear facilities or devices;
- Requirements related to the safety analysis report (SAR);
- Operational limits and conditions, surveillance and maintenance;
- Emergency preparedness and response;
- Requirements related to the periodic safety review.

—— Radiation protection areas:
- Requirements related to radioactive sources;
- Planned exposure situations;
- Occupational exposure;
- Medical exposure;
- Public exposure;
- Existing exposure situations;
- Emergency exposure situations.

Basic: Basic understanding of the regulations and guidance documents with the capability to interpret, apply and revise existing documents within a specific area of expertise.

Medium: Thorough understanding of the regulations and guidance documents with the capability to draft new regulations and guidance documents for satisfying regulatory requirements and guiding regulatory adjudications, keeping in mind responsibilities and commitments of all stakeholders.

High: In-depth understanding of the regulations and guidance documents with the capability and practical experience to produce regulations and guidance documents, to train others in their use and to monitor and guide their practical use in the relevant regulatory processes, taking into account legal implications. Awareness and understanding of safety requirements applied in other countries in addition to national regulatory requirements.

KSAs		Required Level (B, M, H, NA)	Existing Level (B, M, H, None)
1.3.1	Comprehension of nuclear regulations and regulatory guidance documents		
1.3.2	Comprehension and ability to apply the technical requirements in the area of nuclear safety for siting, design, construction, commissioning, operation, decommissioning and waste management of nuclear facilities or devices		
1.3.3	Comprehension and ability to apply the requirements in the area of nuclear safety related to the Safety Analysis Report (SAR)		

KSAs	Required Level (B, M, H, NA)	Existing Level (B, M, H, None)
1.3.4 Comprehension and ability to apply the requirements in the area of nuclear safety related to operational limits and conditions, surveillance and maintenance		
1.3.5 Comprehension and ability to apply the requirements in the area of nuclear safety related to emergency preparedness and response		
1.3.6 Comprehension and ability to apply the requirements in the area of nuclear safety related to periodic safety review		
1.3.7 Comprehension and ability to apply the requirements in the area of radiation protection related to radioactive sources		
1.3.8 Comprehension and ability to apply the requirements in the area of radiation protection related to planned exposure situations		
1.3.9 Comprehension and ability to apply the requirements in the area of radiation protection related to medical exposure		
1.3.10 Comprehension and ability to apply the requirements in the area of radiation protection related to public exposure		
1.3.11 Comprehension and ability to apply the requirements in the area of radiation protection related to existing exposure situations		
1.3.12 Comprehension and ability to apply the requirements in the area of radiation protection related to emergency exposure situations		
1.3.13 Comprehension and ability to apply a graded approach to the regulation of facilities and activities		
1.3.14 Comprehension of industry codes and standards such as ASME, IEEE and other codes		
1.3.15 Comprehension of the regulatory criteria for ageing management of facility components, including Long Term Operation management		
1.3.16 Ability to use the nuclear regulations and guidance document and the industry codes and standards		
1.3.17 Appreciation of the requirements and implications of international and national safety and industrial standards		
1.3.18 Awareness of the safety requirements applied in other countries		

III.1.4. Management system:

This competence area is the knowledge of, and skills needed to comprehend and apply, the regulatory body's management system.

Basic: Basic understanding of the management system principles.

Medium: Thorough understanding of the management system principles and capability to implement to one's own work.

High: In-depth understanding of the area concerned, of its integration into the management system and of its implementation to one's own work and that of subordinates

KSAs	Required Level (B, M, H, NA)	Existing Level (B, M, H, None)
1.4.1 Comprehension of the overall structure of the regulatory body's management system		
1.4.2 Comprehension of the development of Management Systems, including safety management, safety culture and quality management		
1.4.3 Comprehension of the regulatory body's strategic and other plans		
1.4.4 Comprehension of the allocation of responsibilities and accountabilities within the regulatory body		
1.4.5 Comprehension of the graded approach to the implementation of the management system		
1.4.6 Comprehension of the regulatory body's system for the control of information, documentation and records		
1.4.7 Comprehension of regulatory body's processes and the interfaces between them		
1.4.8 Comprehension of the regulatory body's approaches to measuring, assessing and improving the effectiveness of the management systems		
1.4.9 Ability to apply and implement processes related to the regulatory body's management system in a timely manner		
1.4.10 Appreciation of the added value of the management system for rigorous and timely processing of an application for a nuclear installation or activity		

III.2. QUADRANT 2: TECHNICAL DISCIPLINES COMPETENCES

Note that the need for a specific subject matter on this list related to the technical competences in Quadrant 2 will depend on the scope of the national nuclear programme and the specific responsibilities of the regulatory body. A particular regulatory body may require competences in some or all of the technical disciplines listed below or even in other areas of science and engineering.

III.2.1. Basic science and technology:

This competence area is the knowledge of, and skills needed to comprehend and apply science and/or engineering fundamentals in a particular field.

Some typical science and engineering fields that are common to many regulatory bodies include:

— Mathematics
— Physics
— Chemical, electrical, civil and mechanical engineering;
— Chemistry, including radiochemistry;
— Earth sciences, including geology, seismicity, meteorology, hydrology, etc.;
— Computer science;
— Nuclear engineering, including nuclear reactor concepts, nuclear physics, reactor physics, etc.;
— Environmental engineering;
— Materials, metallurgical engineering;
— Radiography including medical applications;
— Thermodynamics and thermo hydraulics;
— Behavioural sciences.

Basic: Basic knowledge of a field of science or engineering such as would be typical of a university graduate with a major in the field, but without practical experience.

Medium: Advanced knowledge of a field of science or engineering such as would be typical of a holder of an advanced degree in the field or of an experienced practitioner, preferably with some experience in nuclear applications.

High: Comprehensive knowledge of a field of science or engineering such as would be typical of a holder of an advanced degree with extensive practical experience, preferably with extensive experience in nuclear applications.

KSAs	Required Level (B, M, H, NA)	Existing Level (B, M, H, None)
2.1.1 Comprehension of science and/or engineering fundamentals in the field of mathematics		
2.1.2 Comprehension of science and/or engineering fundamentals in the field of physics		

KSAs	Required Level (B, M, H, NA)	Existing Level (B, M, H, None)
2.1.3 Comprehension of science and/or engineering fundamentals in the field of chemical, electrical, civil and mechanical engineering		
2.1.4 Comprehension of science and/or engineering fundamentals in the field of earth sciences, including geology, seismicity, meteorology, hydrology, etc.		
2.1.5 Comprehension of science and/or engineering fundamentals in the field of computer science		
2.1.6 Comprehension of science and/or engineering fundamentals in the field of nuclear engineering, including nuclear reactor concepts, nuclear physics, reactor physics, etc.		
2.1.7 Comprehension of science and/or engineering fundamentals in the field of environmental engineering		
2.1.8 Comprehension of science and/or engineering fundamentals in the field of materials, metallurgical engineering		
2.1.9 Comprehension of science and/or engineering fundamentals in the field of radiography including medical applications		
2.1.10 Comprehension of science and/or engineering fundamentals in the field of thermodynamics and thermo hydraulics		
2.1.11 Comprehension of science and/or engineering fundamentals in the field of behavioural sciences		

III.2.2. Applied science and technology:

This competence area is the knowledge of, and skills needed to comprehend and apply, engineering and science concepts in specific areas.

The main areas may include:

— Nuclear reactor and power plant technology;
— Research reactor technology;
— Nuclear fuel cycle technology;
— Nuclear safety technology;
— Technologies regarding the application of radiation in industry, research and agriculture;
— Medical physics;
— Radiation physics, including shielding;
— Health physics, radiation protection and naturally occurring radiation;
— Environmental sciences;
— Management systems, including safety management, safety culture and quality management.

Basic: Basic knowledge of a field of applied science or engineering such as would be typical of a university graduate with academic study in the field, but without practical experience.

Medium: Advanced knowledge of a field of science or engineering such as would be typical of a holder of an advanced degree in the field or of an experienced practitioner with some experience in the nuclear applications relating to that field.

High: Comprehensive knowledge of a field of science or engineering such as would be typical of a holder of an advanced degree in the field or with extensive practical experience in the nuclear applications relating to that field.

	KSAs	Required Level (B, M, H, NA)	Existing Level (B, M, H, None)
2.2.1	Comprehension of engineering and science concepts in the specific area of nuclear reactor and power plant technology		
2.2.2	Comprehension of engineering and science concepts in the specific area of research reactor technology		
2.2.3	Comprehension of engineering and science concepts in the specific area of nuclear fuel cycle technology		
2.2.4	Comprehension of engineering and science concepts in the specific area of nuclear safety		
2.2.5	Comprehension of technologies regarding the application of radiation in industry, research and agriculture		
2.2.6	Comprehension of medical physics		
2.2.7	Comprehension of radiation physics, including shielding		
2.2.8	Comprehension of health physics, radiation protection and naturally occurring radiation		
2.2.9	Comprehension of environmental sciences		
2.2.10	Comprehension of management systems, including safety management, safety culture and quality management		
2.2.11	Ability to apply engineering and science concepts in the specific areas above		

III.2.3. Specialized science and technology:

This competence area is the knowledge of, and skills needed to apply specialized technology, engineering and science.

Some typical specialized areas that are common to many regulatory bodies include:

— Methodologies and analysis:
  - Safety assessment methodology;
  - Deterministic accident analysis;
  - Probabilistic safety analysis;
  - Severe accident analysis;

- Reliability analysis;
- Human and organizational factors and human performance;
- Site evaluation;
- Fire analysis and protection systems.

— Specialized areas:
- Instrumentation and control systems of nuclear installations, including software reliability;
- Criticality safety;
- Materials: including radiation effects on materials, corrosion, corrosion chemistry, etc.;
- Dosimetry.

— Additional areas:
- Security, nuclear materials protection, control and accountability;
- Safety in transportation of radioactive material;
- Management of spent fuel and radioactive waste;
- Decommissioning of nuclear installations;
- Industrial safety;
- Radio-ecology.

Basic: Basic knowledge of a specialized technology such as would be typical of a university graduate with academic study in a related field, but without specific training or practical experience in the specialized technology.

Medium: Advanced knowledge of a specialized technology such as would be typical of a holder of an advanced degree in a related field or of an experienced practitioner of the technology with some experience in nuclear technology applications.

High: Comprehensive knowledge of a specialized area such as to be noted as an expert of the specialized area within the regulatory body (and perhaps the country and rest of the world).

KSAs	Required Level (B, M, H, NA)	Existing Level (B, M, H, None)
2.3.1 Comprehension of the safety assessment methodology		
2.3.2 Comprehension of the deterministic safety analysis		
2.3.3 Comprehension of the probabilistic safety analysis		
2.3.4 Comprehension of the severe accident analysis		
2.3.5 Comprehension of the reliability analysis methods		
2.3.6 Comprehension of human and organizational factors and human performance		
2.3.7 Comprehension of site evaluation		
2.3.8 Comprehension of fire analysis and protection systems		
2.3.9 Comprehension of the confinement systems and radioactive releases		

KSAs	Required Level (B, M, H, NA)	Existing Level (B, M, H, None)
2.3.10 Comprehension and awareness of mechanical analysis, including finite element methods, fracture mechanics and non-destructive testing techniques.		
2.3.11 Comprehension and awareness of seismic analysis		
2.3.12 Comprehension of thermal hydraulics, in particular fluid dynamics		
2.3.13 Comprehension of the specialized area related to instrumentation and control systems of nuclear installations, including software reliability		
2.3.14 Comprehension of electrical systems and communication systems		
2.3.15 Comprehension of the specialized area related to criticality safety		
2.3.16 Comprehension of materials, including Radiation Effects on materials, corrosion, corrosion chemistry, etc.		
2.3.17 Comprehension of dosimetry		
2.3.18 Comprehension of nuclear security, physical protection, control and accountability of nuclear materials		
2.3.19 Comprehension of safety and security in transportation of radioactive material		
2.3.20 Comprehension and management of spent fuel and radioactive waste		
2.3.21 Comprehension of decommissioning of nuclear installations		
2.3.22 Comprehension of industrial safety		
2.3.23 Comprehension of radio-ecology		
2.3.24 Ability to apply the knowledge of all applicable areas.		

III.3. QUADRANT 3: COMPETENCES RELATED TO REGULATORY BODY'S PRACTICES

III.3.1. Review and assessment:

This competence area is the ability to examine safety cases and other documentation submitted by applicants or licensees in support of their justifications regarding installations and the forming of judgements on the adequacy of the documents and the processes used in producing them.

Basic: Basic understanding of regulatory practices and processes.

Medium: Thorough understanding and practical experience in regulatory practices and processes and the capability to integrate information into a supportable regulatory conclusion.

High: In-depth understanding and practical experience in regulatory practices and processes and the capability to synthesize information from many sources into regulatory decisions.

KSAs	Required Level (B, M, H, NA)	Existing Level (B, M, H, None)
3.1.1. Comprehension of the regulatory body's requirements, processes and procedures of review and assessment		
3.1.2. Comprehension of the technical aspects of the subject matter of the safety case under review		
3.1.3. Comprehension of the applicant's or licensee's processes for producing, controlling, modifying, reviewing safety cases		
3.1.4. Ability to make judgment on the proper implementation by the applicant or licensee of the processes of producing safety cases by checking that the submitted documents are soundly based, conform to good practice, and are complete, clear, rational, accurate and objective		
3.1.5. Ability to examine documentation, recognize issues related to safety and synthesize information submitted by the licensee and to make judgments regarding the overall safety and compliance with regulatory requirements, taking into account past performance and inspection history		
3.1.6. Ability to produce assessment reports, emphasizing the findings relevant to safety of a facility or activity		
3.1.7. Ability to identify the need for further information in relation to review and assessment		
3.1.8. Ability to initiate other regulatory processes when needed (such as inspection)		
3.1.9. Ability to take the outcomes of other regulatory processes into consideration in the review and assessment process		
3.1.10. Appreciation of the adequacy of the review and assessment process		

III.3.2. Authorization

This competence area is the capacity to ensure that the license and the associated licensing documents are in compliance in form and contents with the regulatory requirements.

Low: Basic understanding of the format and content of a license and licensing conditions for a nuclear facility.

Medium: Thorough understanding of the format and content of a license and associated license conditions sufficient to synthesize various licensing condition recommendations into the licensing documents.

High: In-depth understanding of the format and content of a license and license conditions and the capability to make licensing decisions and to reflect those decisions in the licensing documents.

KSAs	Required Level (B, M, H, NA)	Existing Level (B, M, H, None)
3.2.1. Comprehension of the regulatory body's requirements, processes and procedures of authorization		
3.2.2. Comprehension of the individual applicants' processes for producing and controlling authorization application documents		
3.2.3. Comprehension of the required format and content of the documents produced by the applicant to receive a license		
3.2.4. Ability to make judgment on the proper implementation by the applicant or licensee of the processes of production of authorization requests as required by the regulations		
3.2.5. Ability to examine licensing documentation and information relevant to an authorization (such as applicant's submission; past performance, enforcement and inspection history)		
3.2.6. Ability to make judgment regarding the impact of a license application on safety of facilities and activities and the compliance with regulatory requirements		
3.2.7. Ability to identify the need for further information from the applicant when needed		
3.2.8. Ability to initiate other regulatory processes when needed (such as inspection or review and assessment)		
3.2.9. Ability to take the outcomes of other regulatory processes into consideration in the authorization process		
3.2.10. Comprehension of the possible restrictions or conditions that may be imposed in an authorization		
3.2.11. Ability to make judgments on granting, modifying, suspending or withdrawing authorizations		
3.2.12. Appreciation of the adequacy of the authorization process		

III.3.3. Inspection

This competence area is the independent gathering of information through objective review, observation and open communications, and determining acceptability of information by comparing it to established criteria.

Basic: Basic understanding and capability to gather information and determine its acceptability and to assist experienced inspectors in performing their duties.

Medium: Thorough understanding and practical experience in using inspection techniques to gather information and compare it to established criteria to ensure licensee compliance with license conditions and regulations.

High: In-depth understanding, capability and practical experience in developing inspection programs and using inspection techniques and the capability to supervise inspections and verify that licensees rectify non-compliance with licensing conditions and regulations.

	KSAs	Required Level (B, M, H, NA)	Existing Level (B, M, H, None)
3.3.1	Comprehension of the regulatory body's requirements, processes and procedures for inspection		
3.3.2	Comprehension of the licensee's management system for modifications related to design, operation and organization		
3.3.3	Comprehension of licensees' surveillance programs		
3.3.4	Comprehension of licensees' maintenance programs		
3.3.5	Comprehension of facility specific or area specific technical information related to the inspections		
3.3.6	Comprehension of emergency preparedness and response arrangements		
3.3.7	Comprehension of operational experience feedback and licensee event reports		
3.3.8	Comprehension of root cause analyses techniques		
3.3.9	Ability to identify needed inspections and their scope either as planned inspections, as resulting from events, as investigations or initiated through other regulatory processes		
3.3.10	Ability to examine and synthesize information relevant to the inspection (such as authorization, past performance, enforcement and inspection history, work schedule of a facility or activity)		
3.3.11	Ability to take the outcomes of other regulatory processes into consideration in the inspection process		
3.3.12	Ability to initiate other regulatory processes when needed (such as review and assessment or enforcement)		
3.3.13	Ability to produce and implement an inspection plan for a specific facility or activity		
3.3.14	Ability to evaluate information and to recognize safety significant issues and possible non-compliances by field observation, interviews or examination of documents		
3.3.15	Ability to make judgments regarding the safety of a facility or activity and to assess the regulatory significance of inspection findings		
3.3.16	Ability to recognize when immediate actions are required to rectify non-compliances, such as a breach of licensing conditions		
3.3.17	Ability to prepare official inspection reports on the results of inspections and audits conducted in facilities		

KSAs	Required Level (B, M, H, NA)	Existing Level (B, M, H, None)
3.3.18 Ability to inspect the safety factors relative to the ageing management of Nuclear Installations in order to assure that the licensees operate them safely until the end of their lifetime		
3.3.19 Appreciation of the most effective and efficient processes to undertake inspection activities		

III.3.4. Enforcement

This competence area is the provision of a supportable recommendation of enforcement action in accordance with regulatory body policy in responding to non-compliance with a regulatory requirement.

Basic: Basic understanding of the national enforcement policy, program, procedures and the legal authority of an inspector; understanding of an event or issue; capability to assist experienced inspectors in conducting enforcement proceedings.

Medium: Thorough understanding of the enforcement process and application of the regulator's enforcement policy with the capability to identify non-compliant situations during an inspection, to differentiate between minor and major violations and experience to undertake a range of enforcement challenges and actions.

High: In-depth understanding and practical experience in addressing unusual situations and complex challenges, evaluating corrective measures proposed by the licensee and dealing with identified items of non-compliance with the capability to ensure that enforcement actions are carried out properly and in accordance with due legal processes.

KSAs	Required Level (B, M, H, NA)	Existing Level (B, M, H, None)
3.4.1 Comprehension of the regulatory body's enforcement policy, requirements, processes and procedures and related guides		
3.4.2 Ability to decide upon and initiate enforcement actions because of non-compliances in a facility or activity (such as those identified in other regulatory processes or due to events)		
3.4.3 Ability to determine whether other regulatory processes (such as inspection) are needed in order to support an enforcement action		
3.4.4 Ability to determine whether actions of or liaison with other agencies are needed in order to support an enforcement action (such as evidence gathering by law enforcement agencies, legal advice or actions by other regulators)		
3.4.5 Ability to make judgments on the significance for safety of non-compliances and to adopt commensurate enforcement actions (such as requests for corrective actions, verbal or written notifications, penalties or legal actions)		

KSAs	Required Level (B, M, H, NA)	Existing Level (B, M, H, None)
3.4.6 Ability to evaluate and decide on the adequacy of corrective measures proposed by the facility or activity, and to confirm their effective implementation		
3.4.7 Appreciation of the adequacy of the enforcement action with respect to the rights of the interested parties		

III.3.5. Development of regulations and guides

This competence area is the capacity to produce regulations and guidance documents, including policies and procedures, containing practical steps on how regulatory requirements could be satisfied by the licensees and be adjudicated by the regulatory staff.

Basic: Basic understanding of the regulations and guidance documents with the capability to interpret, apply and revise existing documents within a specific area of expertise.

Medium: Thorough understanding of the subject matter and capability to draft new regulations and guidance documents for satisfying regulatory requirements and guiding regulatory adjudications, keeping in mind responsibilities and commitments of all stakeholders.

High: In-depth understanding of the subject matter, capability and practical experience in producing regulations and guidance documents; capability to train others in their use; and monitor and guide their practical use in the relevant regulatory processes, taking into account legal implications. Awareness and knowledge of safety requirements applied in other countries in addition to national regulatory requirements.

KSAs	Required Level (B, M, H, NA)	Existing Level (B, M, H, None)
3.5.1 Comprehension of the regulatory body's requirements, processes and procedures for developing regulations and guides		
3.5.2 Comprehension of relevant information which could be considered in drafting or amending the regulations/guides, such as technical information, standards and other countries' regulations		
3.5.3 Ability to examine and identify the need for new regulations/guides or the amendment of existing regulations/guides based on feedback on the implementation of existing regulations, emerging technologies, changing standards and new laws		
3.5.4 Ability to identify and appropriately address interfaces with other laws, regulations and guides		
3.5.5 Ability to draft regulations and guides so as to meet technical and legal requirements in ways which are thorough, consistent, understandable and practicable		

KSAs	Required Level (B, M, H, NA)	Existing Level (B, M, H, None)
3.5.6 Ability to adequately assess and incorporate in drafting, as applicable, comments received from interested parties		

III.4. QUADRANT 4: PERSONAL AND BEHAVIOURAL COMPETENCES

III.4.1. Analytical thinking and problem-solving

This competence area is approaching problems objectively, gathering and integrating information and developing a comprehensive understanding for effective decision-making.

Basic: Capability equivalent to that of a university graduate to analyze and solve problems in a particular area of expertise, and to make decisions using guidance and criteria appropriate to the field of expertise.

Medium: Capability to analyze and solve problems involving multiple fields of expertise, and to select appropriate guidance and criteria and make decisions based on these criteria.

High: Capability to analyze and solve complex problems involving multiple fields of expertise, to integrate inputs from various sources, to select or develop appropriate guidance and criteria and make complex and difficult decisions.

KSAs	Required Level (B, M, H, NA)	Existing Level (B, M, H, None)
4.1.1 Ability to assimilate, analyse and synthesize information gathered from various sources, such as interviewing, observation, and examining documentation		
4.1.2 Ability to identify key issues related to safety in facilities or activities		
4.1.3 Ability to arrive at sound conclusions and make sound judgments		
4.1.4 Ability to recommend appropriate actions and strategies to the regulatory body management		
4.1.5 Ability to switch from one issue to another quickly and easily, distinguishing between essential and non-essential details		
4.1.6 Ability to follow a systematic approach to problem solving including defining and specifying the nature and extent of the problem, identifying all possible causes and making a decision		
4.1.7 Ability to deliver quality work that is timely, complete and accurate		

III.4.2. Personal effectiveness and self-management:

Information technology competence: This competence is using technology to create, gather, manipulate, communicate and/or share information.

Basic: Basic understanding of the availability and use of the information technology resources of the organization.

Medium: Thorough understanding of the availability and use of the information technology resources of the organization, and the capability to instruct and guide others in the use of these resources.

High: In-depth understanding of the availability and use of the information technology resources of the organization, and the capability to understand current and future needs and to specify improved systems and procedures.

KSAs	Required Level (B, M, H, NA)	Existing Level (B, M, H, None)
4.2.1 Ability to use computer software for word processing, spread sheets, internet communication and data storage		
4.2.2 Ability to record, store and retrieve information using electronic means		

Planning and organization of work competence: This competence is effective and efficient co-ordination of tasks to achieve a desired objective.

Basic: Capability to plan a limited number of tasks, to observe priorities, to meet schedules, and to produce results that meet the organization's quality standards.

Medium: Capability to organize a work load consisting of multiple tasks, to set priorities and schedules based on guidance, to co-ordinate inputs from others, and to produce results that meet the organizations quality standards.

High: Capability to organize a complex work load, to delegate responsibilities and tasks, to co-ordinate multiple contributions from others, to set priorities and schedules, and to produce integrated results that meet the organization's quality standards.

KSAs	Required Level (B, M, H, NA)	Existing Level (B, M, H, None)
4.2.3 Ability to set priorities, organize work and meet scheduled objectives		
4.2.4 Ability to find simple, faster and more effective ways of achieving objectives		

Self-management competence: This competence is working independently, exercising judgment and exhibiting flexibility in the completion of activities, especially during difficult or challenging situations.

Basic: Capability to perform a limited number of assigned tasks independently, with flexibility in response to priorities, to exercise good judgment, and to produce quality results.

Medium: Capability to handle a workload of multiple tasks independently, with flexibility in setting priorities and schedules based on guidance, to obtain assistance as needed and integrate results, and to exercise good judgment in producing quality results, even in times of stress.

High: Capability to organize a complex work load, to set priorities and schedules for oneself, and to produce high quality results, even in times of stress.

KSAs	Required Level (B, M, H, NA)	Existing Level (B, M, H, None)
4.2.5 Ability to adapt behaviour to accommodate the sensitivities of others, to cope with stressful situations, and to sustain mental effort to achieve objectives		
4.2.6 Ability to act professionally and convincingly in front of interested parties when recommending actions having safety implications		
4.2.7 Ability to recognize one's own strengths and weaknesses and to plan accordingly for personal and professional development and training		
4.2.8 Ability to periodically assess one's own performance at appropriate intervals against current and anticipated work requirements and to identify means for improvement		
4.2.9 Ability to make realistic commitments based on workload and capabilities		
4.2.10 Ability to make use of time management techniques		
4.2.11 Ability to keep a positive attitude in difficult situations		
4.2.12 Ability to show flexibility and make adjustments in response to feedback and constructive criticism		

III.4.3. Communication

This competence area is engaging in effective dialogue, self-representation and interaction with others (i.e., licensees, colleagues and the public) through committed listening, speaking, writing or delivery of presentations, understanding the true interests of people and delivering meaningful messages.

Basic: Capability to communicate in speech and writing, primarily with colleagues and supervisors within the organization, with limited interactions outside the organization.

Medium: Capability to communicate clearly in speech and writing, both within and outside the organization, including interactions with colleagues, licensees and in public forums.

High: Capability to communicate clearly in speech and writing, both within and outside the organization, on technical, licensing and policy matters, including interactions with technical colleagues, licensees, the public, and leaders of industry and government.

KSAs	Required Level (B, M, H, NA)	Existing Level (B, M, H, None)
4.3.1 Ability to communicate effectively in small groups/meetings		
4.3.2 Ability to communicate effectively in front of a large audiences		
4.3.3 Ability to communicate complex issues and decisions in a manner that encourages clear understanding by all		
4.3.4 Ability to produce clear, concise, informed written reports which are appropriate to the needs of the reader		
4.3.5 Ability to use effective interview techniques to gather important information and to recognize safety significant issues identified during interviews		
4.3.6 Ability to respond appropriately to on-the-spot questions, using one's own knowledge when prepared answers are not available		
4.3.7 Ability to provide factual answers to questions consistent with the regulatory body's policies and official positions on issues		
4.3.8 Ability to communicate in a clear and respectful manner in order to build and maintain trust		
4.3.9 Ability to effectively use and maintain formal and informal networks inside and outside the regulatory body to share information, gather knowledge and find better solutions to problems		
4.3.10 Ability to communicate effectively in other languages, in particular English		
4.3.11 Appreciation of the needs, interests and expectations of various interested parties		

III.4.4. Teamwork

This competence area is working collaboratively with others to achieve common objectives

Basic: Capability to work collaboratively in a small team.

Medium: Capability to work collaboratively and lead a small team.

High: Capability to lead multiple teams or large teams, to work collaboratively with others on broad issues of the organization and to facilitate productivity and harmony within the team.

	KSAs	Required Level (B, M, H, NA)	Existing Level (B, M, H, None)
4.4.1	Ability to cooperate well with other team members at all levels and to maintain a positive and productive atmosphere		
4.4.2	Ability to share individual expertise and experience with others to achieve common objectives and to give timely and constructive feedback to other team members		
4.4.3	Ability to show flexibility in response to change, and to maintain commitment to team objectives even when one's own ideas are not supported		
4.4.4	Ability to understand the interests, motivations and needs of others from their perspective		
4.4.5	Ability to integrate and use feedback, progress reports and lessons learned to ensure commitments are met		
4.4.6	Appreciation of willingness to receive help from team members as well as offering assistance to them		

III.4.5. Managerial and leadership competences

Strategic management competence: This competence area is a deep understanding of an organization, its strategies and high-level goals, planning, work organization, follow-up activities and decision making.

Basic: Capability to set short term goals and monitor progress.

Medium: Capability to communicate strategy; to develop objectives from goals; to organize work effectively; to monitor and improve processes.

High: Capability to establish short term goals for the entire organization and to develop a vision and related strategy from the organization's mission, taking into account demands from society and possible future changes in the regulatory environment.

	KSAs	Required Level (B, M, H, NA)	Existing Level (B, M, H, None)
4.5.1	Ability to develop a viable strategic plan		
4.5.2	Ability to establish goals and targets and to allocate resources appropriately		
4.5.3	Ability to develop sound policies for the organization		
4.5.4	Ability to recognize the need to change the policies and strategies		
4.5.5	Appreciation of external factors, including environmental and social issues		

Leadership competence: This competence area is exemplified by practice of tolerance, objectivity, openness, fairness and ability to inspire others.

Basic: Capability to exhibit tolerance, objectivity, openness and fairness in dealing with a group of colleagues, and to lead such a group.

Medium: Capability to exhibit tolerance, objectivity, openness and fairness in dealing with colleagues, including subordinates and managers, and to lead groups.

High: Capability to exhibit tolerance, objectivity, openness and fairness in dealing with colleagues, including subordinates and senior managers and to lead multiple work groups.

KSAs	Required Level (B, M, H, NA)	Existing Level (B, M, H, None)
4.5.6 Ability to lead a team with objectivity, openness and fairness		
4.5.7 Ability to adjust the level of authority and support to suit individual circumstances		
4.5.8 Ability to convey confidence in others' abilities, to give constructive feedback, and to coach others		
4.5.9 Ability to motivate and to promote and maintain a sense of ownership in others by keeping them informed of any developments in the activities related to their duties		
4.5.10 Ability to resolve interpersonal conflict and ensure mutually beneficial solutions		

Negotiation competence: This competence area is to reconcile different views and persuade others to accept a resolution.

Basic: Capability to participate effectively in negotiations.

Medium: Capability to participate effectively in complex negotiations.

High: Capability to participate in highly complex negotiations, including those on policy matters with senior leaders of external stakeholders and to persuade participants that the compromise is in their best interest.

KSAs	Required Level (B, M, H, NA)	Existing Level (B, M, H, None)
4.5.11 Ability to resolve differences by encouraging alternative proposals, taking into account the positions of all interested parties and facilitating open discussion		
4.5.12 Ability to analyse the immediate environmental factors affecting the negotiations		
4.5.13 Ability to conduct effective negotiation keeping in mind program priorities		

Project management competence: This competence area is completing a set of complex tasks in a coordinated manner in accordance with a defined schedule, scope and budget.

Basic: Capability to co-ordinate and complete tasks of limited complexity within preset time, scope and budget.

Medium: Capability to define, organize, co-ordinate and complete complex tasks within preset time, scope and budget.

High: Capability to define, organize, co-ordinate and complete multiple complex tasks, and to set time, scope and budget for the tasks.

KSAs	Required Level (B, M, H, NA)	Existing Level (B, M, H, None)
4.5.14 Ability to develop project plans, establish deliverables and success criteria, and to schedule activities		
4.5.15 Ability to identify potential problems, to receive and allocate resources and to define alternate strategies for their resolution		
4.5.16 Ability to provide accurate, complete and timely project status reports		
4.5.17 Ability to establish a strategy appropriate to the circumstances and to provide advice on measures to mitigate the immediate risk		
4.5.18 Ability to review and evaluate results achieved against those planned		
4.5.19 Ability to use appropriate project management tools		

III.4.6. Safety culture competence

This competence area is the necessary knowledge, skills and attitudes to effectively promote and support a strong safety culture.

All regulatory staff should be sufficiently qualified to understand, apply and evaluate safety culture. However, depending on the job position a more in-depth knowledge might be required. A mechanism for assessing the level of competence for safety culture in the organization should be envisaged and applied. Based on these results, suitable levels of competence can be defined as appropriate.

Basic: Basic understanding of the attributes and characteristics of safety culture.

Medium: Thorough understanding of methods and tools available for the assessment of safety culture.

High: In-depth understanding of methods and tools for assessment of safety culture and capability to identify measures for improvement of safety culture in the regulatory body or utility.

KSAs	Required Level (B, M, H, NA)	Existing Level (B, M, H, None)
4.6.1 Comprehension of the key aspects of safety culture within the organization		
4.6.2 Comprehension of the interaction between Individuals, technology and the organization (ITO concept) in the regulatory body		
4.6.3 Comprehension of the importance of periodic self-assessment by which the organization continually seeks to develop and improve its safety culture		
4.6.4 Appreciation of the importance of a strong safety culture (learning and questioning attitude)		

REFERENCES

[1]   EUROPEAN ATOMIC ENERGY COMMUNITY, FOOD AND AGRICULTURE ORGNIZATION OF THE UNITED NATIONS, INTERNATIONAL ATOMIC ENERGY AGENCY, INTERNATIONAL LABOUR ORGANIZATION, INTERNATIONAL MARITIME ORGANIZATION, OECD NUCLEAR ENERGY AGENCY, PAN AMERICAN HEALTH ORGANIZATION, UNITED NATIONS ENVIRONMENT PROGRAMME, WORLD HEALTH ORGANIZATION, Fundamental Safety Principles, Safety Fundamentals 1, IAEA Safety Standards Series No. SF-1, IAEA, Vienna (2006).

[2]   INTERNATIONAL ATOMIC ENERGY AGENCY, Governmental, Legal and Regulatory Framework for Safety, General Safety Requirements Part 1, IAEA Safety Standards Series No. GSR Part 1, IAEA, Vienna (2010).

[3]   INTERNATIONAL ATOMIC ENERGY AGENCY, Management System for Facilities and Activities, General Safety Requirement 3, IAEA Safety Standards Series No. GS-R-3, IAEA, Vienna (2006).

[4]   INTERNATIONAL ATOMIC ENERGY AGENCY, Application of the Management System for Facilities and Activities, IAEA Safety Standards Series No. GS-G-3.1, IAEA, Vienna (2006).

[5]   INTERNATIONAL ATOMIC ENERGY AGENCY, Organization and Staffing of the Regulatory Body for Nuclear Facilities, Safety Guide Series No. GS-G-1.1, IAEA, Vienna (2002).

[6]   INTERNATIONAL ATOMIC ENERGY AGENCY, Establishing the Safety Infrastructure for a Nuclear Power Programme, Safety Guide Series No. SSG-16, IAEA, Vienna (2012).

[7]   INTERNATIONAL ATOMIC ENERGY AGENCY, Managing Regulatory Body Competence, Safety Reports Series No. 79, IAEA, Vienna (2013).

[8]   INTERNATIONAL ATOMIC ENERGY AGENCY, Integrated Regulatory Review Service (IRRS) Guidelines for the Preparation and Conduct of IRRS Missions, IAEA Services Series No. 23, IAEA, Vienna (2013).

[9]   INTERNATIONAL ATOMIC ENERGY AGENCY, Milestones in the Development of a National Infrastructure for Nuclear Power, IAEA Nuclear Energy Series No. NG-G-3.1, IAEA, Vienna (2007).

[10]   INTERNATIONAL ATOMIC ENERGY AGENCY, Nuclear Power Plant Personnel Training and its Evaluation: A Guidebook, Technical Reports Series No. 380, Vienna (1996).

GLOSSARY

competences. Competences are groups of related knowledge, skills and attitudes (KSAs) required to perform particular tasks of the functions of regulatory bodies [2]. Competences are the mental, physical and behavioural tools required for an activity or a task.

task. A task is a measurable, assigned piece of work often to be finished within a certain time frame. It can be split into sub-tasks.

knowledge. Knowledge is familiarity with something that can include facts, descriptions and information acquired through experience or education. It can refer to both the theoretical or practical understanding of a subject.

skill. A Skill is the learned capacity to perform a task to a specified standard.

attitude. Attitude is the feelings, opinions, ways of thinking, perceptions, values, behaviour, and interests of an individual which allow a job or task to be undertaken to the best ability of that individual. Attitudes cannot wholly be taught directly and are partly a consequence of organizational culture.

qualification. An official record of achievement awarded on the successful completion of a course of training or passing of an exam

CONTRIBUTORS TO DRAFTING AND REVIEW

Ayub, M.	Pakistan Nuclear Regulatory Authority (PNRA), Pakistan
Castelao Lopez, C.	Consejo de Seguridad Nuclear (CSN), Spain
Deitrich, L.W.	Consultant, USA
Dolan, T.J.	NPRE Department, University of Illinois, USA
Gabbott, M.	ONR, Health and Safety Executive (HSE), United Kingdom
Giersch, G.	Hessian Ministry for Environmental and Consumer Protection, Germany
Hughes, P.J.	International Atomic Energy Agency
Jamet, P.	International Atomic Energy Agency
Jelinski, M.	Gesellschaft fuer Anlagen und Reaktorsicherheit (GRS), Germany
Kennedy, W.	International Atomic Energy Agency
Koskinen, K.	Radiation and Nuclear Safety Authority (STUK), Finland
Lachaume, J.-L.	Autorité de Sûreté Nucléaire (ASN), France
Lipar, M.	International Atomic Energy Agency
Mallick, S.	International Atomic Energy Agency
Mignot, P.	Bel V, Belgium
Moracho-Ramirez, M.J.	International Atomic Energy Agency
Nicic, A.	International Atomic Energy Agency
Revuelta Lapique, R	Consultant, Spain
Ranguelova, V.	International Atomic Energy Agency
Sokolova, E.	Rostechnadzor, Russian Federation
Wells, P.	International Atomic Energy Agency
Zimmermann, M.R.	International Atomic Energy Agency

Technical Meetings

Vienna, Austria: 2–4 December 2009, 30 November–02 December 2010, 28 November–02 December 2011, 4–7 December 2012, 29–31 October 2013.

Consultancy Meetings

Vienna, Austria: 16–20 March 2009, 23–24 February 2010, 8–9 July 2010, 15–19 August 2011, 31 October–04 November 2011, 27–28 March 2012, 29–30 August 2012, 11–12 February 2013, 25–26 April 2013, 10–12 December 2013.

ORDERING LOCALLY

In the following countries, IAEA priced publications may be purchased from the sources listed below or from major local booksellers.

Orders for unpriced publications should be made directly to the IAEA. The contact details are given at the end of this list.

AUSTRALIA
DA Information Services
648 Whitehorse Road, Mitcham, VIC 3132, AUSTRALIA
Telephone: +61 3 9210 7777 • Fax: +61 3 9210 7788
Email: books@dadirect.com.au • Web site: http://www.dadirect.com.au

BELGIUM
Jean de Lannoy
Avenue du Roi 202, 1190 Brussels, BELGIUM
Telephone: +32 2 5384 308 • Fax: +32 2 5380 841
Email: jean.de.lannoy@euronet.be • Web site: http://www.jean-de-lannoy.be

CANADA
Renouf Publishing Co. Ltd.
5369 Canotek Road, Ottawa, ON K1J 9J3, CANADA
Telephone: +1 613 745 2665 • Fax: +1 643 745 7660
Email: order@renoufbooks.com • Web site: http://www.renoufbooks.com

Bernan Associates
4501 Forbes Blvd., Suite 200, Lanham, MD 20706-4391, USA
Telephone: +1 800 865 3457 • Fax: +1 800 865 3450
Email: orders@bernan.com • Web site: http://www.bernan.com

CZECH REPUBLIC
Suweco CZ, spol. S.r.o.
Klecakova 347, 180 21 Prague 9, CZECH REPUBLIC
Telephone: +420 242 459 202 • Fax: +420 242 459 203
Email: nakup@suweco.cz • Web site: http://www.suweco.cz

FINLAND
Akateeminen Kirjakauppa
PO Box 128 (Keskuskatu 1), 00101 Helsinki, FINLAND
Telephone: +358 9 121 41 • Fax: +358 9 121 4450
Email: akatilaus@akateeminen.com • Web site: http://www.akateeminen.com

FRANCE
Form-Edit
5 rue Janssen, PO Box 25, 75921 Paris CEDEX, FRANCE
Telephone: +33 1 42 01 49 49 • Fax: +33 1 42 01 90 90
Email: fabien.boucard@formedit.fr • Web site: http://www.formedit.fr

Lavoisier SAS
14 rue de Provigny, 94236 Cachan CEDEX, FRANCE
Telephone: +33 1 47 40 67 00 • Fax: +33 1 47 40 67 02
Email: livres@lavoisier.fr • Web site: http://www.lavoisier.fr

L'Appel du livre
99 rue de Charonne, 75011 Paris, FRANCE
Telephone: +33 1 43 07 50 80 • Fax: +33 1 43 07 50 80
Email: livres@appeldulivre.fr • Web site: http://www.appeldulivre.fr

GERMANY
Goethe Buchhandlung Teubig GmbH
Schweitzer Fachinformationen
Willstätterstrasse 15, 40549 Düsseldorf, GERMANY
Telephone: +49 (0) 211 49 8740 • Fax: +49 (0) 211 49 87428
Email: s.dehaan@schweitzer-online.de • Web site: http://www.goethebuch.de

HUNGARY
Librotade Ltd., Book Import
PF 126, 1656 Budapest, HUNGARY
Telephone: +36 1 257 7777 • Fax: +36 1 257 7472
Email: books@librotade.hu • Web site: http://www.librotade.hu