FORO

Foro Iberoamericano de Organismos Reguladores Radiológicos y Nucleares

Final Results of Project CReAN of the Iberoamerican FORO

Sixth Meeting of the Steering Committee on Competence of Human Resources for the Regulatory Bodies

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About FORO (1)

Who are we?	an association of **Nuclear and Radiological regulators** created in 1997 with the aim of promoting **Radiation Protection, Nuclear Safety and Security** at the highest level in the region.
Our Vision	being a fruitful environment for strengthening **safety** through the **exchange** of information and practices, as well as through **technical and scientific projects** in matters of mutual interest.
Our Language	Spanish

About FORO (2)

Our Mission

- Promotion of **Safety**,
- **Exchange** of information and knowledge,
- Sharing of knowledge and development of **projects of common interest**,
- **Harmonization** of the regulatory practices, and
- **Cooperation** with national, regional and international organizations and associations with **similar objectives**.

FORO Members

ARGENTINA	Autoridad Regulatoria Nuclear
BRAZIL	Comissão Nacional de Energia Nuclear
CHILE	Comisión Chilena de Energía Nuclear
COLOMBIA	Ministerio de Minas y Energía
CUBA	Centro Nacional de Seguridad Nuclear
SPAIN	Consejo de Seguridad Nuclear
MEXICO	Comisión Nacional de Seguridad Nuclear y Salvaguardias
PERU	Instituto Peruano de Energía Nuclear
URUGUAY	Autoridad Reguladora Nacional en Radioprotección

CReAN Project

- *The FORO project CReAN (Competence of Regulators in the Nuclear Area) began in 2012 with the overall objective of improving systems, programs and practices on training and competence development of regulators of nuclear reactors.*
- *The project met eight FORO experts representing Argentina (who led the project with two experts), Brazil, Cuba, Chile, Spain, Mexico and Uruguay and it had Mrs. María Moracho as IAEA Scientific Secretary.*
- *CReAN was developed in two years and included five workshops and an intensive networking . The fifth and final meeting took place in Madrid, Spain between 5 and 9 May 2014.*

CReAN Products

The Project has produced two major documents:

- *A Technical Report documenting all work performed in the project and giving back up to the second document, which is expected to have regional and international dissemination*.
- *A Guide for Building and Development Competence of Regulators of Nuclear Reactors. The Guide presents the strategies and specific elements of a programme to strengthen regulatory competence, and it is designed to maximize the use of resources of the Ibero American region.*

CReAN Guide framework

- *The Guide has as theoretical framework the IAEA Safety Report 79 "Managing Regulatory Body Competence", and it is seen as a document that helps to extend and complement some of the main processes of competence management focused to regulators of nuclear reactors.*

- *As the project was developed at the same time that the SR 79 and the latest version of the SARCoN Guide were produced, CReAN could contribute to the review of these documents and that contribution was recognized by the IAEA in the prologue of SR 79.*

Contributions of the CREaN Guide

As a starting point:

- *A model of questionnaire to evaluate the infrastructure and national mechanisms for competence management of regulators of nuclear reactors.*
- *A diagnosis of the regional situation, implemented through a SWOT analysis.*

As a main content:

- *The delineation of a strategic plan for building competence of regulators of nuclear reactors that includes concrete developments and good practices for helping the implementation of that plan.*

Main findings of the SWOT analysis
Strengthens

- ***S1.*** *FORO countries share the same language, with the exception of Brazil.*
- ***S2.*** *In four countries of the FORO there are more than 40 years experience in the regulation of nuclear power reactors and two more countries have experience in the regulation of research reactors.*
- ***S3.*** *There are in the region nuclear reactors in all stages of life.*
- ***S4.*** *In the majority of FORO countries there is a large range of basic academic training in the nuclear field and in the countries with nuclear experience there are considerable training options in applied technologies in that field.*
- ***S5.*** *There are in the region two Regional Training Centres sponsored by IAEA for applied training. One of both in Spanish language , with over 30 years experience and more than 1000 postgraduates and the other in Portuguese language created in 2011.*

Main findings of the SWOT analysis
Weaknesses

- ***W1.*** *There is a significant degree of informality and volunteerism in the training process of nuclear regulators within regulatory agencies, particularly with regard to OJT and continuing education.*
- ***W2.*** *The processes of competence building are not fully incorporated into the management system of the regulator.*

CReAN as an Opportunity

- *To confront that panorama the CReAN team considered very opportune to concentrate efforts in developing practical tools and disseminate examples of best practices that could facilitate the implementation of **formal** national programmes to strengthen competence of regulators of nuclear reactors*.

Some innovative contributions of the CREaN Guide

- *A global list of competences based on the model of the 4 quadrants of the IAEA and the SARCoN tool, translated to Spanish, modified (including, for example, new competences in emergency response preparedness and examination of operation staff, new definition of the level of development for each competence, and deployment of each competence in the K/S/A components) and adjusted to the needs of regulators of nuclear reactors in the region.*
- *A proposal for the composition and sizing of the regulatory staff ("core regulatory staff") for licensing and control of a nuclear power reactor with the vision of a reasonable technical self-sufficiency of the RB.*
- *Development of competence profiles for a representative set of posts of the "core regulatory staff".*
- *A set of best practices in the different steps of personnel recruitment, professional career development and mechanisms for competences accreditation.*

Core Regulatory Staff

- *The CReAN Project has defined a set of essential regulatory positions involved in every stage of the licensing and control process of a nuclear reactor's life.*

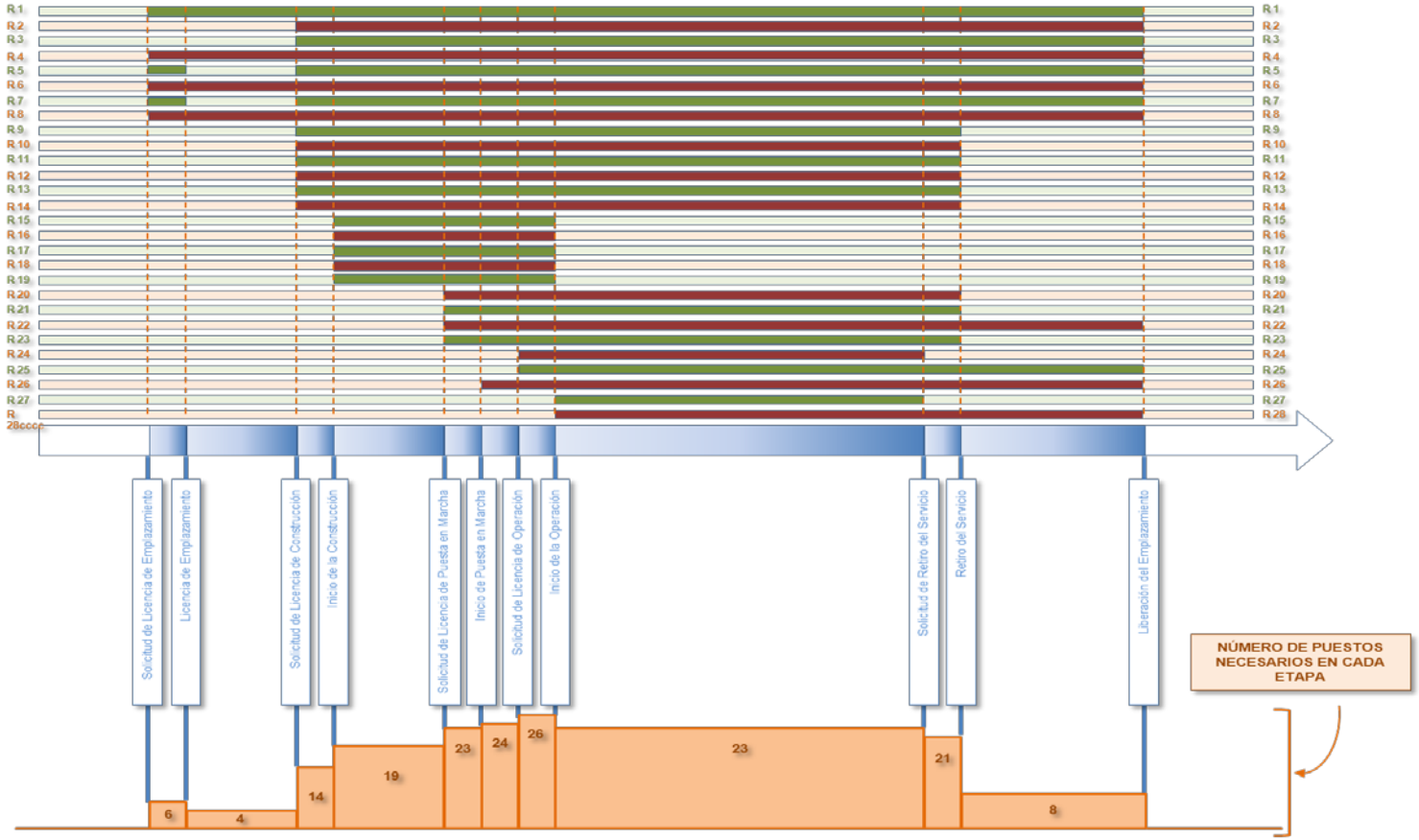
- *In total, 28 nuclear regulatory positions for the different stages of the licensing and control process have been identified. For each of these positions, the Project has developed its objective and main tasks.*

- *This set of posts, referred to as "core regulatory staff," features the positions of senior regulators that should be involved at every stage of the licensing process, regardless of the required number of regulators in each position, which depends on the size and organization of each regulatory body.*

Core Regulatory Staff

CODE	POSTS	STAGES				
		S	C	Co	O	DCo
R1	Nuclear power plant licensing coordinator	■	■	■	■	■
R2	Senior thermo-hydraulic evaluation specialist,		■	■	■	
R3	Senior neutronic assessments specialist		■	■	■	■
R4	Senior natural and man-induced events analysis Specialist	■	■	■	■	
R5	Senior nuclear safety specialist	■	■	■	■	
R6	Senior radiation protection specialist	■	■	■	■	■
R7	Senior physical protection specialist	■	■	■	■	■
R8	Licensee's quality management system assessor / auditor	■	■	■	■	■
R9	Civil and mechanical structures safety evaluator / inspector		■	■	■	
R10	Mechanical systems safety evaluator / inspector		■	■	■	
R11	Electrical systems safety evaluator / inspector		■	■	■	
R12	Reactor instrumentation and control safety evaluator / inspector		■	■	■	
R13	Safety systems evaluator / inspector		■	■	■	
R14	Internal fires and flooding evaluator / inspector		■	■	■	
R15	Engineering inspections and evaluations on-site coordinator		■	■		
R16	Construction, assembly and preliminary testing of mechanical systems inspector		■	■		
R17	Electrical systems construction, assembly and preliminary testing inspector		■	■		
R18	Construction, assembly and preliminary testing of instrumentation and control systems inspector		■	■		
R19	Main contractor's quality management system Inspector		■	■		
R20	Senior Probabilistic Safety Analysis Specialist		■	■	■	
R21	Senior human factors engineering specialist			■	■	
R22	Senior organizational aspects and safety culture specialist			■	■	■
R23	Senior severe accidents analysis specialist			■	■	
R24	Senior operators' education and training in radiation and nuclear safety specialist			■	■	
R25	Senior emergency plan evaluation specialist			■	■	■
R26	Resident inspector			■	■	■
R27	Senior operating experience specialist				■	
R28	Senior radioactive waste management specialist				■	■

Evolution of the Core Regulatory Staff along the NPP´s life



EVOLUCIÓN DEL PLANTEL BÁSICO A LO LARGO DE LA VIDA DE LA CENTRAL NUCLEAR

Description of one post

NUCLEAR POWER PLANT LICENSING COORDINATOR	
OBJETIVE: Planning, organizing, conducting and supervising regulatory activities of authorization, evaluation, inspection and enforcement of the NPP. Acting as the Regulatory Body interlocutor to the Operating Organization.	
TASKS	**DESCRIPTION**
T1	Elaborate proposals for regulatory actions relating to the authorization, evaluation, inspection and enforcement of the nuclear plant, based on the technical reports of the specialists
T2	Ensure continuous monitoring of compliance of regulatory standards and requirements imposed on the nuclear power plant.
T3	Approve and supervise the Inspection Plan to the nuclear power plant, participating in inspections as it deems appropriate.
T4	Participate in the implementation of new areas, processes or inspection methods
T5	Participate in the definition of regulatory processes and in the development of procedures for the authorization of complex tasks in the nuclear power plant.
T6	Coordinate communication between the nuclear power plant and different units of the RB, and manage information and documentation delivery by the Operating Organization.
T7	Maintain a fluid interaction with NPP counterpart to promote the exchange of technical information. Coordinate and manage the relevant technical meetings between the regulator and the operator of the nuclear plant.
T8	Keeping updated the management system with regard to the regulatory activities at nuclear plant and to propose possible improvements
T9	Maintaining a consistent and fluid communication with the Resident Inspection of the nuclear power plant, about the activities and incidents in the plant and inform the Resident Inspection on regulatory actions that directly affect them.
T10	Keep permanently informed senior management of the RB on the processes in place, raising emerging needs.
T11	Coordinate with specific areas of the RB participation in resolving specific situations that may arise, such as legal issues, public communication, reporting arising from international commitments, etc.
T12	Participate at the headquarters, in the organization of the emergency response of the RB, as the "most knowledgeable" of the NPP.
T13	Participate in the elaboration of technical standards, as an expert in NPP regulatory processes.
T14	Train senior regulatory staff on coordination aspects of licensing process. Manage their own continuing education.
T15	Interact with external technical advisors providing assistance in the process of licensing and control of the nuclear power plant
T16	Participate in teams assessing licensing of operating personnel of the NPP.

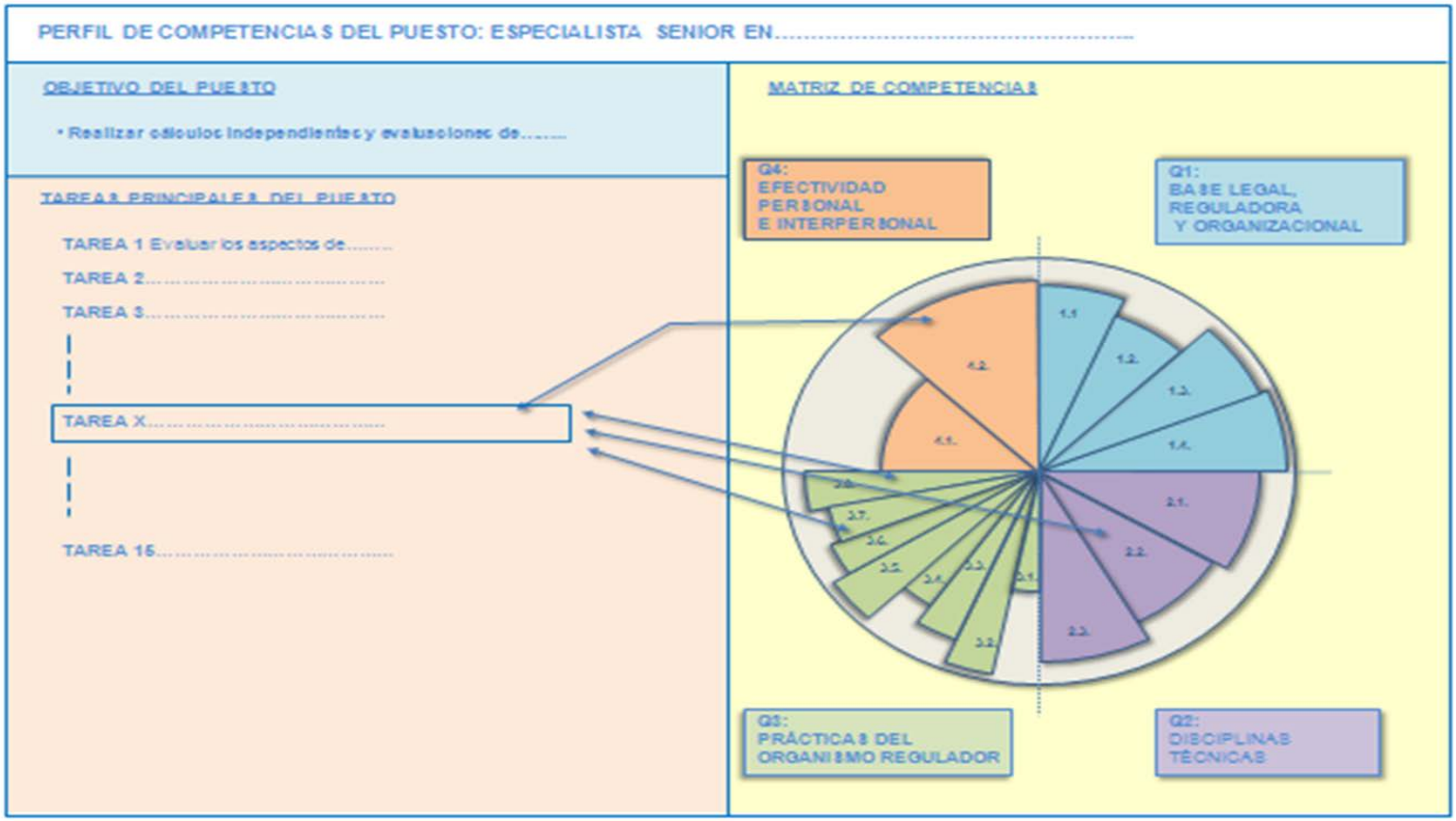
Competence profile of each post

- *Each core regulatory position must be staffed with personnel with specific competence profiles. The profiles have been developed by linking the list of tasks with the global list of competences and by selecting the specific competences for each task and the level of development of each competence in terms of low (supervised), medium (autonomous) or high (supervisor or expert) to get the wanted profile. The latter element is what we denominate* ***competence matrix*** *or* ***competence chart (****when we represent it graphically)*

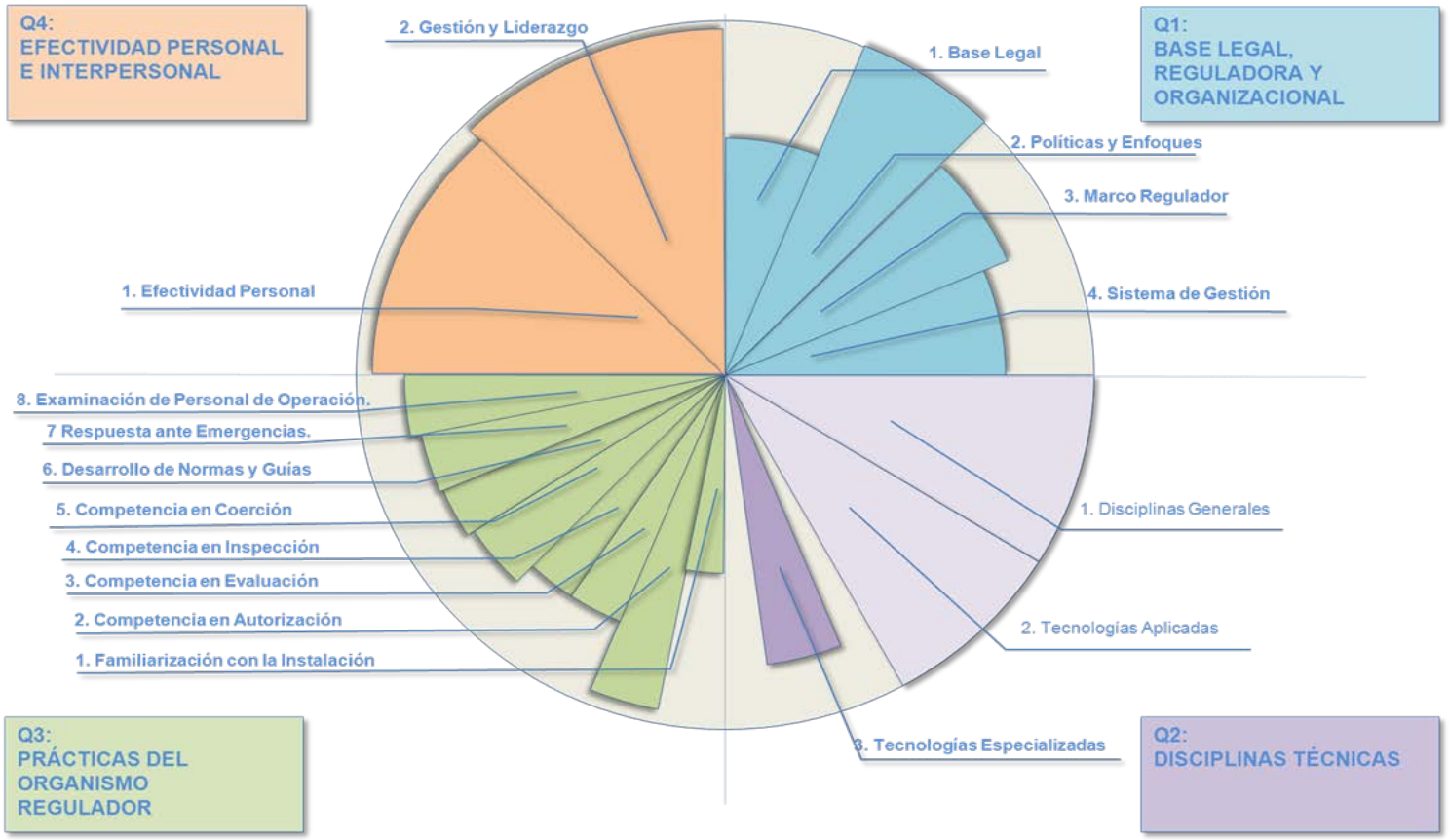
- *The competence profile, as described, is fundamental to the development of the strategic training plan for regulators of nuclear reactors, because the profile defines the requirements for knowledge, skills and attitudes and their levels of development, for the effectiveness and efficiency in job performance.*

- *One of the main problems we found in the development of competence profiles is the lot of assumptions and the subjectivity involved in defining each profile.*

Construction of competence profile of each post



Competence chart of one post



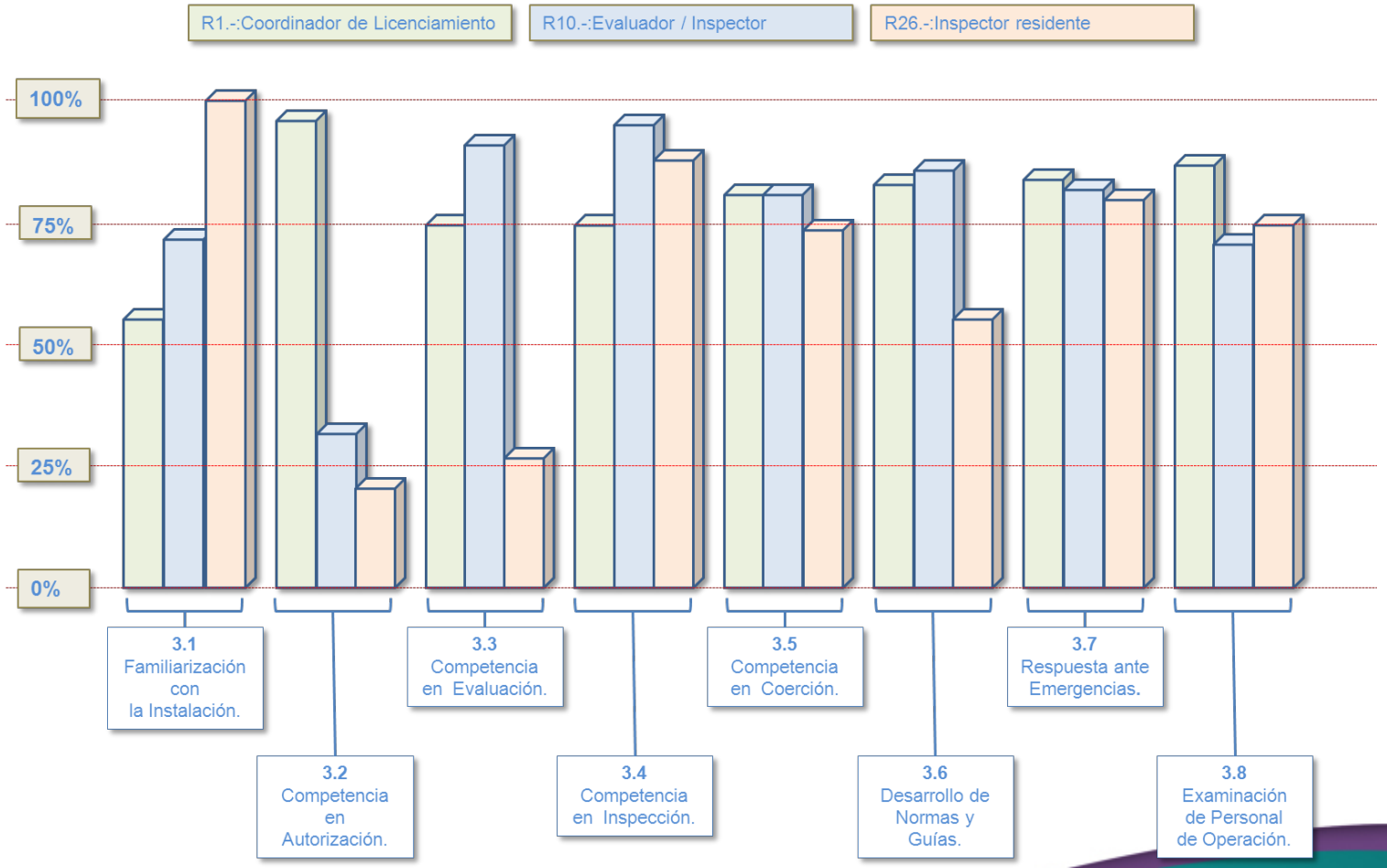
MATRIZ DE COMPETENCIAS

PUESTO R1: COORDINADOR DE LICENCIAMIENTO

Description of a competence chart

- *The competence chart for a given post is represented as a pie chart in which the main sectors symbolize the 4 quadrants of the IAEA model. The small sectors in each quadrant represent the principal competences of this quadrant, and the radius of each small sector is proportional to the average of the levels of development associated to the secondary competences linked to a principal competence, in each quadrant.*

Comparisson of competence levels of three representative posts regarding Q3



Some final reflections and remarks

- *In first place we (as a team) would like to recognize the window of opportunity the FORO has created to bring together experts of the region to exchange and share operative experience and to harmonize criteria that help in improving regulatory practices.*

- *Regarding the Project, I would like to stress that CReAN has addressed some issues on competence building of nuclear regulators, on which there is no much international literature. Particularly, Staffing Levels and aspects of the Professional Career.*
  - *These topics are normally addressed within organizations or through external consultancy, but the Project team understands that there is a significant set of common strategies that could help to MS in developing national programmes for building competence and strengthen technical self-sufficiency of the RB.*

Some final reflections and remarks

- *Lastly, we are happy to announce that CReAN contributions on staffing levels and competence profiles of regulators of nuclear reactors shall be included shortly in an IAEA TECDOC that is now under development.*
  - *Our work has been selected as an interesting and productive experience in using and improving the concepts and tools of SR 79 and SARCoN.*

We encourage you to review the CReAN products that will be presented in upcoming IAEA publications and published next year on the FORO website (in Spanish).

¡THANKS ON BEHALF OF THE CReAN TEAM AND THE FORO!