



REGULATORY BODY STAFFING ESTIMATION

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Background and Goal of the present work

The regulatory body (RB) acts as an essential barrier to guarantee the safety of adiation sources. It is an important component among all the institutions involved in a strategy of defense in depth (INSAG 27).

Most of the accidents occurred were result of inadequate safety culture and human issues, either due to lack of education and training or incomplete staff that generate stress and lack of attention. People make mistakes; it is unrealistic to believe that they can be completely avoided. Nevertheless, errors can be reduced and measures adopted in order to prevent that unadverted events develop into accidents. **The availability of sufficient staff in the RB, contributes to reinforce the defense in depth.** Additionally, it is important that the RB embodies and displays a safety culture that guarantees the necessary impact of its regulatory mission. This will serve as an example to the licensee organizations among which it promotes a solid safety culture.

The methodology was developed in the framework of the IAEA Technical Cooperation project **RLA9086: Strengthening Radiation Safety Infrastructure.**

Developing

This work provides an **unpublished methodology** that guides governments and regulatory bodies in estimating the staff needed in the RB to fulfill its roles and responsibilities and therefore allowing to accomplish with requirement 18, Staffing and competence of the regulatory body, GSR Part 1 (Rev. 1). The methodology is based on the number of facilities and activities to be regulated, and takes into account the maturity of the regulatory control in each country. Its application is recommended whenever the number of facilities and activities changes or the functions and responsibilities of the RB are modified, or because there have been substantial changes in the staff of the RB without the application of a proper staff renewal policy.

Requirement 18 of GSR Part 1 (Rev. 1), Staffing and competence of the regulatory body, "The regulatory body shall employ a sufficient number of qualified and competent staff, commensurate with the nature and the number of facilities and activities to be regulated, to perform its functions and to discharge its responsibilities".

The methodology takes into account the IAEA standards and in particular:

- Safety Standards Series No. GSR Part 1 (Rev. 1) "Governmental, Legal and Regulatory Framework for Safety",
- General Safety Guide No. GSG 12 "Organization, Management and Staffing of the Regulatory Body for Safety",
- General Safety Guide No. GSG 13 "Functions and Processes of the Regulatory Body for Safety".

IAEA Safety Standards for protecting people and the environment	IAEA Safety Standards for protecting people and the environment	IAEA Safety Standards for protecting people and the environment
Governmental, Legal and Regulatory Framework for Safety	Organization, Management and Staffing of the Regulatory Body for Safety	Functions and Processes of the Regulatory Body for Safety
General Safety Requirements No. GSR Part 1 (Rev. 1)	General Safety Guide No. GSG-12	General Safety Guide No. GSG-13

includes all the functions of the RB, including the **basic** and **support** functions, in particular the following basic functions are included:

- Development of regulations and guides
- Notification and authorization
- Review and assessment of facilities and activities
- Inspection of facilities and activities
- Enforcement
- Establishment of a coercive policy
- Emergency preparedness and response
- Communication and consultation with interested parties

and the supporting functions:

- Legal support
- Liaison with other governmental organizations
- Regulatory body management system
- Advisory committees
- International cooperation and assistance
- Exchange of operational experience and regulatory experience
- Research and development
- Safety related records

The methodology is based on estimating the staff needed to perform the regulatory functions assigned to the RB by **estimating the number of man-days per year needed to perform the regulatory functions** assigned to the RB, which will depend on the education and training of the staff. Once the number of man-days per year needed to accomplish all functions is estimated, it is divided by the **number of working days per year**, which depends on each country, thus obtaining the number of people needed in the RB.

$$N_{OR} = \frac{DH_{FR}}{D_L}$$

The number of man-days per year required to perform the regulatory functions (DH_{FR}) is estimated from **two components**: (1) The number of man-days per year required to fulfill the basic and support functions of the RB **that depend on the inventory of existing radiation sources in the country** (DH_{FD}) and; (2) the number of man-days per year required to fulfill **the rest of the functions** (DH_{OF}). All regulatory functions should be subject to a graded approach so that, while the descriptions of these functions are generic, the degree of application will differ according to the types of facility or activity, the degree of compliance of the users and the available resources of the RB.

$$DH_{FR} = DH_{FD} + DH_{OF}$$

That is why for the application of the methodology it is required to have a national registry of radiation sources and for this reason the guide provides a group of recommendations for those countries that do not have this registry.

The functions that directly depend on the source inventory are:

- Notification and authorization (NA)
- Review and assessment of facilities and activities (EE)
- Inspection of facilities and activities (II)
- Enforcement (CO)
- Safety related records (RR)

$$DH_{FD} = \sum_{i=1}^{Np} (DH_{NA_i} + DH_{EE_i} + DH_{II_i} + DH_{CO_i} + DH_{RR_i})$$

Where: Np is the number of facilities and activities in the country and $DH_{NA_i} + DH_{EE_i} + DH_{II_i} + DH_{CO_i} + DH_{RR_i}$ are the number of man-days per year related to direct functions: notification and authorization, review and assessment, inspection, enforcement, and records, respectively.

Rest of the functions that do not directly depend on the source inventory:

- Development of regulations and guides (RG),
- Communication and consultation with interested parties (CP)
- Legal support (SL)
- Liaison with other governmental organizations(OA)
- Emergency preparedness and response (EM)
- Regulatory body management system (SG)
- Advisory committees (AE)
- International cooperation and assistance (OI)
- Exchange of operational experience and regulatory experience (EO)
- Research and development (ID)

$$DH_{OF} = DH_{RG} + DH_{CP} + DH_{SL} + DH_{OA} + DH_{EM} + DH_{SG} + DH_{AE} + DH_{OI} + DH_{EO} + DH_{ID}$$

The methodology was developed within the framework of the Technical Cooperation project RLA9086 "Evaluation of the implementation of the strategy for the strengthening of the Regulatory Body in Latin America and the Caribbean" uses a **simple, hypothetical inventory of facilities and activities, with the objective of facilitating your understanding** and provides the formulas on how to estimate each of the components mentioned above.

The guide also provides a **real practical example** of the application of the methodology, which made it possible to assess the hiring needs of new RB staff, taking into account the new responsibilities assigned. The example estimated the number of people needed to control all sources of ionizing radiation excluding medical radiodiagnosis and assuming control of radiodiagnostic facilities and image-guided intervention procedures, in order to assess the impact on human resources in taking on this new role.

In addition to the guide that develops the methodology, a computer tool developed in Excel, **StaffOR**, was developed that facilitates its implementation.

ESTIMACIÓN DEL NÚMERO DE PERSONAS NECESARIAS PARA REALIZAR EL CONTROL REGULADOR A INSTALACIONES RADIACTIVAS.				
País	Jornada Laboral diaria (h)	Número de Días Laborables a la semana	Número Máximo de Días de libre Laborables al año	Número de Días Laborable al año (D _L)
Panamá	8	5	42	212
DÍAS-HOMBRE AL AÑO		NÚMERO DE PERSONAS NECESARIAS		
FUNCIÓNES DIRECTAS	1514	7,1	AUTORIZACIÓN	790
RESTO DE LAS FUNCIÓNES	302	1,4	INSPECCIÓN	790
TOTAL	1817	8,6	REGISTRACIÓN	240
			Seguimiento Jurídico	81
NÚMERO DE PERSONAS NECESARIAS PARA REALIZAR EL CONTROL REGULADOR (N _{OR})				9
CORRECCIÓN POR CAPACITACIÓN				10

Conclusions

The guide will provide guidance to governments and regulatory bodies on how to determine the sufficient number of qualified and competent persons based on the number of facilities and activities to be regulated, to carry out their duties and responsibilities, and taking into account the maturity of the regulatory control in each country.

The computer tool developed in Excel facilitates the implementation of the guide.