



Obtaining the Radiation Protection Supervisor Registration in Brazil from the Postgraduate Educational Course (PGEC) in Radiation Protection and the Safety of Radiation Sources

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Abstract. The Postgraduate Educational Course (PGEC) in Radiation Protection and the Safety of Radiation Sources, is offered since 2011, in Brazil, by the Institute of Radiation Protection and Dosimetry (IRD), in partnership with the International Atomic Energy Agency (IAEA). With workload of 472 hours/class, was designed to meet the needs of professionals with higher education to work in the field in portuguese-speaking countries. Despite the high qualification of the course and the graduate having the title of Specialist in Brazil, this title is still not recognized as a professional qualification by the National Nuclear Energy Commission (CNEN). In this sense, this work aims to demonstrate the process of obtaining the registration of individuals to act as a Radiation Protection Supervisor (RPS) in Research and Development laboratories (R&D) and low-risk radioactive facilities by a former student from PGEC's Brazil, based on the CNEN NN 6.01 and NN 7.01 Standards. The relevance of this work is to train professionals in radiation protection, not only to occupy the space in companies focused on this area, as collaborators, but also to become multipliers. It's understood that the PGEC's Brazil is of great importance important for R&D institutions that use radioactive material, given the lack of qualified professionals.

1. Introduction

The Postgraduate Educational Course (PGEC) in Radiation Protection and the Safety of Radiation Sources Postgraduate Course, is offered since 2011, in Brazil, by the Institute of Radiation Protection and Dosimetry (IRD), in partnership with the International Atomic Energy Agency (IAEA) [1].

Free of charge, was designed to meet the needs of professionals with a higher education level equivalent to a university degree in physics, chemistry, health and earth sciences or engineering and who have been selected to work in the field of radiation protection and source safety radioactive substances in portuguese-speaking countries [1].

Despite the high qualification of the course and the graduate having the title of Specialist, this title is still not recognized as a professional qualification by the National Nuclear Energy Commission (CNEN) [2]. In this sense, this work aims to demonstrate the process of obtaining the Radiation Protection Supervisor (RPS) Registration to work in Research and Development (R&D) laboratories and low-risk radioactive facilities from the title of Specialist in Radiation Protection and Safety from Radioactive Sources by a former student, based on the CNEN NN 6.01 and NN 7.01 Standards.

2. Materials and Methods

This paper is a case study [3] of the Registration as RPS by a former student from the PGEC's Brazil. This work is based on the CNEN NN 6.01 Standard, whose objective is to regulate the process of registering professionals with higher education qualified for the preparation, use and handling of radioactive sources, in radioactive installations, in industry, agriculture, teaching and in research [4], and on the CNEN NN 7.01 Standard [5], which aims to establish the necessary requirements to certify the qualification of RPS.

3. Results and Discussion

Below is shown information about the PGEC's Brazil, aspects of CNEN 6.01 and 7.01 Standards that based the student's request, as well as the applied to CNEN to obtain the title of RPS by the former student.

3.1. The PGEC's Brazil

The PGEC's Brazil provides the basic tools necessary for those who are going to become an instructor in the respective area (training multipliers). Divided into modules, it encompasses the theoretical part and practical training, using demonstrations, laboratory exercises, case studies, technical visits, simulation exercises and workshops. Some theoretical topics and exercises use the course's virtual classroom [1].

The PGEC's Brazil has a workload of 472 hours and duration of 22 weeks, and is divided into 17 modules, with theoretical parts and practical training (such as demonstrations, laboratory exercises, case studies, technical visits, simulation exercises and workshops) [1].

The course syllabus takes into account the requirements of the "International Basic Safety Standards for Protection Against Ionizing Radiation and for the Safety of Radiation Sources (BSS)", "IAEA Safety Series No. "Safety Guides" [1].

The scope of the course essentially deals with the technical and administrative aspects necessary for regulatory and operational controls in radiological protection and the safe use of radioactive sources in all their applications [1].

The prerequisite for the course is that the participants have a higher education level (undergraduation or technologist) in the areas of Engineering, Physics, Chemistry, Biology, Health Area, Radiology or related areas [1]. The Course program is divided into the following Modules/Disciplines, with their respective workloads [1]:

- a) General Review of Mathematics – 12 hours;
- b) General Review: Fundamentals – 40 hours;
- c) Quantities and measures – 32 hours;
- d) Biological effects of ionizing radiation – 24 hours;
- e) Principles of Radiological Protection and Regulatory Control – 48 hours;
- f) Evaluation of internal and external exposures – 48 hours;
- g) Protection against occupational exposure – 64 hours;
- h) Medical exhibitions in radiodiagnosis, radiotherapy and nuclear medicine – 48 hours;
- i) Public exposure to radiation due to the practices – 40 hours;
- j) Intervention in chronic and emergency situations due to exposure – 20 hours;
- k) Workshop: Advances in the area of Radiation Protection – 8 hours;
- l) Safe Transport of Nuclear Material – 20 hours;
- m) Lectures on the Final Course Completion Work research topics – 4 hours;
- n) Technical Visits – 6 hours;
- o) Training teachers – 28 hours;
- p) Final Course Completion Work Orientation – 20 hours;
- q) Presentation of the Final Course Completion Work – 10 hours.



Thus, the PGEC's Brazil aims to provide the necessary tools for those who will become instructors in the respective area. The course project is structured to provide theoretical and practical training on the multidisciplinary bases, whether scientific and/or technical, of the recommendations and international standards on radiation protection and their implementation [1].

3.2. Standard CNEN NN 6.01 – requirements for the registration of individuals for the preparation, use and handling of radioactive sources

This Standard applies to natural persons people applying for registration for the preparation, use and handling of radioactive sources in radioactive installations, industry, agriculture, teaching and research [4].

According to NN 6.01, the higher-level professional must be previously registered to work, in general, in the following areas [4]:

- a) Medical applications for the use, preparation and handling of unsealed radioactive sources;
- b) Medical applications for the use and handling of sealed radioactive sources;
- c) Industrial applications;
- d) Applications in teaching and research;
- e) Applications in Agriculture;
- f) Medical-veterinary applications; and
- g) Services.

The item "d" (Applications in teaching and research) falls within the scope of this work, and can work in the areas of [4]:

- 1) nuclear physics;
- 2) nuclear chemistry;
- 3) biology;
- 4) hydrology, including tracers;
- 5) oceanography;
- 6) ecology;
- 7) dentistry;
- 8) pharmacology;
- 9) physical education;
- 10) nutrition;
- 11) radiopharmacy; and
- 12) radiobiology.

The candidate for the registration of an individual, which qualifies him for the preparation, use or handling of radioactive sources, must submit the following to CNEN [4]:

a) professional registration with the corresponding boards, in the biomedical, scientific or technological areas, as applicable; in the absence of a class council, a diploma recognized by the Ministry of Education;

b) application for registration with the CNEN, according to the CNEN model; and

c) successful completion of a Radiation Protection Course for the Preparation, Use and Handling of Radioactive Sources, with a minimum load of forty (40) hours, in an Institution accredited by MEC.

The registration will be provided for the area of activity established therein and will be valid for 5 (five) years, being revalidated for an equal period of time, provided that the professional proves to have carried out activities in his/her area of activity during, at least, the half of the validity period of your registration [4].

3.3. Standard CNEN NN 7.01 – certification of qualification of radiological protection

According to CNEN 7.01 Standard, which aims to establish the necessary requirements for SPR qualification certification, professionals qualified to work in Research Laboratories are also qualified to work as SPR [5].



This is because in low-risk installations, as in the case of this work, the SPR can be a professional registered with the CNEN in accordance with the CNEN NN 6.01 Standard. Thus, they are also qualified to act as SPR in the following low-risk installations [5]:

I - group 4 installations. In this case, radioactive installations that handle, store or use unsealed source with total activity up to 30 times the exemption level;

II - installations of subgroups 3A and 7A that use analytical techniques. In this case, 3A - Installations using sealed sources with activity lower than or equal to 1/10 (one tenth) of the reference value D ; 7A - Equipment that generates ionizing radiation that produces a beam with energy less than or equal to 0.10 MeV;

III - group 5 research laboratories that exclusively use reference sources for measuring or calibrating equipment. In this case, radioactive facilities that handle, store or use unsealed source with total activity between 30 times and 20,000 times the exemption level; and

IV - facilities of group 2A. In this case, installations that use sealed sources in large self-shielded equipment, which do not allow access to the sources or the irradiation chamber, and in which there is no displacement of the sources in routine operation.

Therefore, according to CNEN 7.01 Standard, the SPR can also work in research laboratories (item III). The registration will be provided for the area of activity established therein and will be valid for 5 (five) years, being revalidated for an equal period of time, provided that the professional proves to have carried out activities in his/her area of activity during, at least, the half of the validity period of your registration [5].

With this certification, the professional will have a record valid for 05 years in low-risk installations, classified according to CNEN NN 6.02 Standard. With the Specialist diploma in hand, the graduate student was helped to enter the registration process. With this certification, the professional will have a Registration valid for 05 years in low-risk facilities [4, 5].

3.4. The Professional Certification Process

With regard to the PGEC's Brazil, it provides the basic tools necessary for those who will become an instructor in radiation protection, training qualified specialists to act as multipliers of knowledge in the area.

In other words, the course offers all the necessary requirements for proving a radioprotection course, with a minimum load of forty (40) hours, as required by the CNEN NN 6.01 Standard [4].

In this sense, the former student requested the SPR request to work in R&D laboratories, based on his diploma (figure 1). Then, the former student filed with the CNEN the Application for Registration (figure 2) and the specific request for the area of R&D at CNEN (figure 3). After analysis by CNEN, the request was approved (figure 4).

Figure 1. The diploma of the PGEC's Brazil.



Source: The author

Figure 2. Application for Registration at CENEN.

CENEN Comissão Nacional de Energia Nuclear

MINISTÉRIO DA CIÊNCIA, TECNOLOGIA, INOVAÇÕES E COMUNICAÇÕES

BRASIL GOVERNO FEDERAL

REQUERIMENTO DE REGISTRO DE PESSOA FÍSICA PARA O PREPARO, USO E MANUSEIO DE FONTES RADIOATIVAS

2020RPF10143 ENCAMINHADO A CENEN EM 04/04/2020

IDENTIFICAÇÃO DO SOLICITANTE			
Nome		CPF	Registro Profissional
GUSTAVO OLIVEIRA DA CONCEIÇÃO		052.338.407-66	CRTRRJ
Naturalidade	Nacionalidade	Estado Civil	Sexo
RJ	BRASIL	CASADO (A)	MASCULINO
Endereço		Número	Nascimento
AVENIDA AUGUSTO FERREIRA RAMOS		S/N	26/04/1974
Complemento		Bairro	
LOTE 21 QUADRA 43		ITAIPU	
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APLICAÇÃO			
Área de Atuação			
APLICAÇÕES NO ENSINO E NA PESQUISA			
- DIAGNÓSTICO E TERAPIA COM RADIOFÁRMACOS			

Solicito inscrição no registro de pessoas físicas habilitadas ao preparo, uso ou manuseio de fontes radioativas na área de atuação indicada.

Source: The author

Figure 3. Request for the area of R&D at CNEN.

SOLICITAÇÃO

Rio de Janeiro, 05 de abril de 2020

AO CGMI/CORAD/CNEN


REGISTRO DE PESSOAS FÍSICAS PARA O PREPARO, USO E MANUSEIO DE FONTES RADIOATIVAS

AC SRA MARCIA

SOLICITAÇÃO DE ALTERAÇÃO DE ÁREA DE ATUAÇÃO
CORRETO ENSINO E PESQUISA - FÍSICA NUCLEAR


Solicito que seja alterada a minha área de atuação em meu cadastro visto que ao preencher a opção FÍSICA NUCLEAR – na área de ENSINO E PESQUISA- ao enviar o formulário , quando imprimi o SCRA finalizado, observei que o mesmo havia estava com a opção DIAGNÓSTICO E TERAPIA COM RADIOFÁRMACOS, ou seja o sistema alterou minha opção.

Atenciosamente


 GUSTAVO OLIVEIRA DA CONCEIÇÃO
 TECNÓLOGO EM RADIOLOGIA- 07288t CRTR/RJ

Source: The author

Figure 4. Approval by CNEN.



gouv.br Ministério da Ciência, Tecnologia e Inovação

Comissão Nacional de Energia Nuclear

Profissionais de nível superior habilitados para o preparo, uso e manuseio de fontes radioativas

Aplicação no Ensino e na Pesquisa - Posição em 10/04/2020

Nome	UNEP	Ordem de inscrição	Inscrição	Habilitação
GUSTAVO OLIVEIRA DA CONCEIÇÃO	AP-1718	24/01/2017	08/04/2020	08/04/2025

Source: The author



4. Conclusion

The relevance of this work is to train professionals in radioprotection, not only to occupy the space in the Teaching and Research laboratories, as collaborators, but also to become multipliers.

In addition, this work envisages a specific area of action for PGEC graduates, in order to be professionally qualified by CNEN.

This is because, in view of the scarcity of professional training courses focused on radiation protection, such professionals are unable to register with the CNEN, so it is necessary to understand the needs in the area of radiation protection that the market is signaling.

It is thus understood that the PGEC's Brazil is of great importance for R&D institutions that use radioactive material, given the lack of qualified professionals.

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