

# Education and training of leading professionals in radiological protection in The Netherlands

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## Abstract

The training and education in Radiological Protection in The Netherlands is split up in levels. The highest level is an advanced course for those who are (or are predestined to be) leading professionals in the field of radiation protection. This course is given every 4/5 years by experts in the fields and covers a wide variety of subjects. The present course is given in five blocks of one week. Moreover there is training on the job and lab work with advanced equipment. The layout of the course and the longstanding experience will be discussed.

## 1. Introduction

In The Netherlands legislation by the "Nuclear Energy Law" (Kernenergiewet, KEW) orders that practices involving ionizing radiation, are supervised by a qualified radiation expert. The recognition of these experts for different types of practises has been arranged by Ministerial Arrangements underlying this legislation. For the different expertises there are five levels defined, ranging from level 5 (supervision to low risk practices) up to level 1 (academic international acknowledged expertise). At the moment Training for level 1 is not provided for so that the highest educational to receive is that of level 2. For this course the only approved institution is the combination of Boerhaave/IRS and Reactor Institute Delft-NCSV.

The course will be given once every four to five year, depending on the number of application and for each course the program committee arranges a new program to guarantee the scientific and social actuality to date. For this the committee introduces national and international experts to act as teacher. This year we started the 9<sup>th</sup> edition of the course and we educated during the past three decades more than 100 professionals. The content of the course builds up on the skills educated in the preceding level 3 course, so that a level 3 diploma is required to follow the course.

The program offers both a 'helicopter view' of the profession "radiation protection" as well as selected subjects with great profoundness.

## 2. The profile of a level-2-expert

The profile of the level-2-expert might be described as follows:

He/she:

- masters the foundation of the profession;
- keeps notice of the developments in the profession;
- is able to evaluate articles of the profession from scientific literature to their relevance and uses this knowledge in practise;
- is recognized as serious interlocutor with (usually high educated) experts of different disciplines and the authorities;
- is capable to judge the (economic) interest of his company or his institution against the radiation protection obligations;
- is able to act as radiation expert in different types of radiological problematic nature;
- is able to found and lead a radiation protection unit;
- operates as independent expert in a complex organisation.

### 3. The profile of the course

The level 2 course is a practical radiation protection course at the level of academic work. All the questions related to the radiation protection field are deeply addressed in this course. This will include the tangent planes between organisation, radiation protection, functioning as level 2 expert, position within the organisation, internal communication and public relation.

The course is split in five thematic educational blocks of a week, with hearing and working lectures, where an active participation of the student is obligated and secured by several thematic debate sessions during the evenings. The themes and subjects of the blocks are summarized in table 1. In advance of such a week literature is distributed, which should be studied before the session starts. Each block is finished with a written examination. The student has to present an oral presentation in front of the course committee, which will be judged both in aspects of contents and didactics. In a practical training period of a week offered by the Reactor Institute Delft-NCSV, different detection principles and practices will be learned. The experiments are to be explained in a report that will be judged too.

During about a week the student has to attend a practise in the form of a stage at an institute, where he has to solve a specific, to the field of radiation protection, problem has to solve. The report of this stage is also judged and counts for the final weighting.

In all thematic blocks there is also an excursion to, for this course, relevant institutions or corporations.

Block number	Themes	Subjects
1	Radiation Physics Dosimetry  Radiation detection  Radiation shielding	Basic concepts, Interaction Methods, Concepts, Units, Aviation/Space dosimetry, Microdosimetry, Radiotherapy, Neutrons. Basic concepts, Low-activity, Background Basic concepts, Accelerators, Extended sources
2	ICRP-systematic Internal contamination  Radon	ICRP 60, 63,64,66 and new Skin, Respiratory track, Ingestion track, Laboratory, Bio assay, Natural Epidemics, Units, Policy, Detection
3	Radio biologics Radiation risks Medical aspects Pregnancy and radiation	Basic concepts, Stochastics, Cellular By organ Therapeutics Prenatal, Practices
4	Exposure Society aspects Non-ionizing radiation	Workers, Population, Patient Risk perception, Cases UV, Lasers
5	Legislation Policy Execution Organisation Implementation	Dutch law, International laws Developments Licences, Types Different Councils QA

Table 1. Themes and subjects of the program blocks.

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