Monitoring the effectiveness of the training program in radiation protection, safety, security and environment at the Belgian Nuclear Research Centre SCK•CEN

N Kesteloot, M Coeck & L Van Puyvelde
Belgian Nuclear Research Centre SCK•CEN, Belgium
1952: cradle of nuclear research, applications and energy development in Belgium

> 60 years later: international player in the field of nuclear R&D

~700 staff, >50% with academic degree + ~ 70 PhD students

Mission:

- 3 major scientific research areas:
  - Nuclear materials sciences
  - Advanced nuclear systems
  - Environment, health and safety

- Services towards industry, healthcare, government

- Education and training
Knowledge transfer = key to SCK•CEN
More visibility since 2012: SCK•CEN Academy

Because of:

- More than 60 years of experience in nuclear research and technology
- Most recent knowledge and development
- Innovative projects
- Availability of large and unique nuclear installations

SCK•CEN is, next to renowned research centre, ideally suited to be an education and training (E&T) centre (complementary to universities)

- **SCK•CEN Academy**: coordinates all E&T activities at SCK•CEN
SCK•CEN Academy
4 pillars

- Guidance young researchers
  - Thesis (PhD, Master, Bachelor level), post-docs, internships, visits
  - Outreach activities for high schools

- Organization of courses and events
  - Contribution to academic learning in collaboration with universities
  - Customized training for professionals

- Policy support on E&T matters and international collaborations
  - EC Framework programs, Horizon2020, expert groups of IAEA, OECD, ...

- Caring for critical-intellectual capacities for society
  - Scientific/technical + context!

ETRAP2017-A0088
Friday June 2 - 10:00

ETRAP2017-A0086
Wednesday May 31 - 16:05

ETRAP2017-A0009
Thursday June 1 - 11:30
SCK•CEN Academy
Pillar 2 - Organization of courses and events

- **Academic courses: collaborations with universities**
  - BNEN (Belgian Nuclear higher Engineering Network)
  - Radiation Protection Expert
  - Others

- **Customized training courses/open courses/project courses**
  - Any topic SCK•CEN performs research on
    - Radiation protection
Continuous Professional Development for SCK•CEN employees

- Centrally organized by “SCK•CEN Learning Centre”
  - Development and implementation of policy on CPD actions
  - Management and practical organization of training activities

- **Aim**: maintain and increase competences in order to optimize output and wellbeing on the work floor

- **Systematic Approach to Training** applied
  - Analysis of training needs
  - Design of training programmes
  - Development of training material
  - Evaluation of training
Training activities in four categories

- Safety, security, environment, health, quality
- Scientific and technical competences
- Personal and management competences
- Your professional environment
Personal supervision plan for all new employees

- Common training program
- Job-specific training
  - e.g. glove box training

Common training program in radiation protection, safety, security and environment

- Close cooperation with Internal Service for Prevention and Protection at Work
- For all employees, PhD students and all >6 months @ SCK•CEN
  - Mixed target public (level, language)
  - Content differs based on activities
    - Professionally exposed personnel (access to controlled areas)
    - Professionally not exposed personnel
- Initial + refresher
Overview

Start of employment at SCK•CEN

$T_0$

On-the-job training for professionally exposed personnel

$T_0 + 1$ week

Introduction session

$T_0 + 2$ months

Training courses in radiation protection, safety, security and environment

$T_0 + 6$ months

Safety briefing with topical animations
Safety briefing with topical animations

- **Before** entering the technical domain
- E-learning modules + brochure
- Obligatory test with multiple-choice questions
- Access to technical domain after successful evaluation (> 70%)
  - Repeated annually by every member of staff + external workers
- Content adapted to work being carried out
Training program for new employees

OJT & introduction session

- Initial on-the-job training session for professionally exposed personnel
  - In the first work week
  - Guided tour in controlled area by Radiation Protection Officer
  - Focus = principles of good conduct in controlled area

- Introduction session for new employees
  - 2 hour information session
  - In the first months of employment
  - Topics
    - General information and professional environment at SCK•CEN
    - Safety management at SCK•CEN
Training program for new employees

Training courses

- Training courses in radiation protection, safety, security and environment
  - Within 6 months after start of employment
  - Offered in Dutch, French and English

- Follow-up of attendance in collaboration with Human Resources and Internal Service for Prevention and Protection at Work

<table>
<thead>
<tr>
<th>Target audience</th>
<th>Radiation protection</th>
<th>Safety, security and environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professionally exposed personnel (controlled area)</td>
<td>8h</td>
<td>4,5h</td>
</tr>
<tr>
<td>Professionally not exposed personnel</td>
<td>3h</td>
<td>4,5h</td>
</tr>
</tbody>
</table>
Training course in radiation protection

Approach

Topics

- Ionizing radiation: characteristics and applications
- Introduction detection and dosimetry
- Biological effects of ionizing radiation
- Legislation, safety and safety culture at SCK•CEN
- Radiation protection in practice
Kirkpatrick training evaluation model
- Level 1: reaction
- Level 2: learning
- Level 3: behavior
- Level 4: results

Online feedback form (level 1, 2 and 3)
- Immediately after training course
- Evaluation of content, course material, trainer and organization

Pre-post test (level 2)
- Assess the learning of the participants
- Test with 12 multiple choice questions
Future developments

- Conversion to **blended learning** pathway
  - Instruction videos, interactive animations and quizzes
  - Coupled to a face-to-face interaction session

- Embed training in **competence management** process

- Continue to collect data on **effectiveness** of training activities
  - Level 2: pre-post test
  - Level 3: impact survey

- Monitor **effect of conversion to blended learning**
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Belgian Nuclear Research Centre

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