Education and Training in Nuclear Decommissioning

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The European Commission Joint Research Centre (JRC)

**Staff:** #3000

**Annual budget:**
- 395 M€
- +55 M€ competitive
- +30 M€ decommissioning
Since the 1980’s, the JRC’s evolving mission has progressively reduced the need for nuclear R&D installations, particularly at the Ispra Site, so that many are now shutdown and in a state of safe conservation.

In 1999, JRC started formally its Decommissioning and Waste Management (D&WM) programme, covering all its historical and future nuclear liabilities.
Accumulated Experience on D&WM at JRC

- Since the start of the Decommissioning and Waste Management programme, JRC staff acquired a large experience in operational D&WM issues.
- JRC's Decommissioning and Waste Management programme is:
  - relatively small (e.g. in comparison with NPP decommissioning)
  - but covers a variety of issues to be tackled ("exotic" installations & waste types)

The European Parliament, during its debates on the future Euratom research programme, requested that:

“JRC builds upon its experience with the decommissioning of JRC nuclear facilities and further reinforces its research to support safe decommissioning in Europe.”
Situation nuclear power reactors in the EU

Power reactors in EU: 220
Operating reactors: 135
Situation nuclear decommissioning in the EU

- Demonstration of decommissioning at an industrial scale, as a 'last but feasible step' of the nuclear life-cycle, is essential for the credibility of the nuclear energy option.
- Decommissioning market is in expansion, in particular in Europe.
- Currently, an industrial experience exist, however... further attention is necessary for:
  - Development of the most suitable techniques, with respect to safety, efficiency and waste limitation.
  - Standardisation and harmonisation.
  - Offering and promoting dedicated education and training opportunities.
  - Sharing knowledge and experiences.
Offering and promoting dedicated Education and Training (E&T) opportunities

JRC organised jointly with the University of Birmingham in April 2015 a seminar on Education and Training in Nuclear Decommissioning, in an attempt to answer to the questions:

- What are the E&T needs?
- What are the opportunities, what does already exist?
- How can we attract young talent?

- Outcome of the seminar is published in a joint report with orientations on the way forward to support Education and Training in Nuclear Decommissioning in the EU.
Competence development in nuclear decommissioning
What are the needs?

- Large need of competences, not only technical but also financial, juridical, social, ...

Main identified 'Pinch Point' areas for nuclear decommissioning
- Programme and Project Managers
- Engineers specialised in Decontamination & Dismantling Techniques and in Waste Management
- Safety Case/ Licensing Specialists
- Radiological Protection Advisors
- Radiation Metrologists and Radiochemists
- Skilled technicians and operators for dedicated equipment
Competence development in nuclear decommissioning

What are the needs?

*Essential to be taken into consideration are:*

- the adequate management of the cultural change, which is created by the transition from operation to decommissioning;
- the long term planning of the essential competences;
- the retaining of knowledge, independently of the possible turnover of staff;
- the importance of collaboration between the players involved;
- the need to facilitate mobility (both cross-border and cross-sector).

*The EU industry and organizations would be also helped by a more in-depth assessment of the future of the nuclear decommissioning activities and of their impact on the job market.*
What are the education and training opportunities?

*Examples of EDUCATION in decommissioning:*

- **PhD/Professorships** in decommissioning (e.g. 'Professorship on Decommissioning of Conventional and Nuclear Facilities' at KIT, D)
- **2/3 y postgraduate Masters courses** on decommissioning (e.g. 'MSc in nuclear decommissioning and waste management' UoB, UK, or 'ITDD Master – ingénierie, traçabilité et développement durable', France)
- **Dedicated modules** in decommissioning integrated in a more general master course
- **Bachelor degrees** with specialisation of about 1 y in decommissioning (e.g. Universities of Caen and Nîmes, France)
What are the education and training opportunities?

*Examples of vocational TRAINING in decommissioning:*

- JRC 'Summer School on Nuclear Decommissioning and Waste Management' (1 week, on the JRC-Ispra site, I)
- ‘Technology and Management of the Decommissioning of Nuclear Facilities’ course at the AREVA Nuclear Professional School (1 week by the Karlsruhe Institute of Technology (KIT), D)
- Belgian Nuclear Research Centre courses on 'Decommissioning of Nuclear Installations' (1 week open courses and customized courses at the SCK•CEN site, Mol, B)
- 'European Decommissioning Academy' organised by the Slovak University of Technology (3 weeks of courses, on-site training and technical tours in Austria, Switzerland and Italy);
- CEA/INSTN international course on 'Dismantling Experience of Nuclear Facilities' (1 week, including a tour of dismantling sites)
- IAEA ad hoc training programmes and possibilities for e-learning
What are the education and training opportunities?

With expansion of E&T opportunities attention should be paid for:

- harmonisation of the education and training outcomes,
- cooperation between universities and training institutes
- further enhancing the collaboration with all participants involved in decommissioning (industry, safety authorities and associated technical support organisations, waste management and decommissioning agencies, research centres).
How can we stimulate interest and future talent?

The JOB...

👍 'Breaking down' is not a very attractive occupation for me, I would prefer building something new!

👎 Why do I need to take care of the negative 'nuclear heritage' left by the others?

👎 At the end.. there is 'nothing'. What will then happen with my job?
Decommissioning is in reality much more than clearing, cleaning and demolishing; decommissioning projects are usually complex and present an appealing technological challenge, requiring creative solutions.

Decommissioning is an emerging activity involving on the average young people; related jobs offer many possibilities for career development.

Decommissioning offers also tremendous opportunities for people who have developed expertise in reliable technologies or experience in managing projects and who are interested in mobility.

A job in decommissioning is, in general, secure; young engineers and scientists graduating after studies dedicated to decommissioning are almost certain to find a job.

Actually, decommissioning provides a service to society and can be considered as a ‘noble cause’: decommissioning is aiming to restore a safe environment and demonstrates that closing the nuclear energy cycle is feasible.

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How can we stimulate interest and future talent?

Promotion could start by clarifying the existing education, training and career opportunities in Europe.

Advertising the challenge and excitement linked to decommissioning could be stimulated and integrated within existing campaigns for the promotion of education and training.

And more generally, promotion of decommissioning could be helped by improving the public understanding on its finality and as such presenting the activity in a more objective way.
'Pooling' of Decommissioning Training Initiatives

ELINDER Project

Rationale:

For vocational training in nuclear decommissioning the ‘summer school’ concept of training over one to three weeks offers an attractive opportunity for employers who want to enhance the professionalism of their staff, with a focus on practical experience.
'Pooling' of Decommissioning Training Initiatives

ELINDER Project

Approach:

- Training split in complementing modules, at different locations
- 'Induction module', 'Generic modules' and 'Specific modules'

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<td><strong>Induction to nuclear</strong></td>
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<td>nuclear industrial applications, nuclear safety and radiation protection</td>
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<td><strong>Generic course on decommissioning</strong></td>
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<td>- decommissioning: experiences, status of the play</td>
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**Interest in participation:**

- INSTN, France
- KIT, Germany
- EWN, Germany
- STUBA, Slovakia
- University of Birmingham, UK
- SCK•CEN, Belgium
- IAEA
- JRC, EC
Thank you for your attention