International Seminar
Nuclear Decommissioning and Low-Level Radioactive Waste Management
Italy and the International Experience
Rome, 5-6 March 2013

**JRC experiences in Decommissioning and Waste Management at its Ispra site & other sites in the EU**

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Overview

1) Background information
2) Progresses achieved and current status
3) Concluding remarks
JRC experiences in Decommissioning and Waste Management at its Ispra site & other sites in the EU

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2) Progresses achieved and current status
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JRC current Structure: 7 Institutes in 5 Member States

- **IET** - Petten The Netherlands
  *Institute for Energy and Transport*

- **IRMM** - Geel Belgium
  *Institute for Reference Materials and Measurements*

- **ITU** - Karlsruhe Germany
  *Institute for Transuranium Elements*

- **IPSC** - Ispra Italy
  *Institute for the Protection and Security of the Citizen*

- **IHCP** - Ispra Italy
  *Institute for Health and Consumer Protection*

- **IES** - Ispra Italy
  *Institute for Environment and Sustainability*

- **IPTS** - Seville Spain
  *Institute for Prospective Technological Studies*

Staff: # 3000
Annual budget: 320 M€ + 50 M€ competitive
The **Euratom Treaty** (1957) empowered the European Atomic Energy Community (Euratom) to contribute to the establishment and growth of nuclear power related industries.

The R&D tasks were to be carried out by a “**Joint Research Centre**” within the European Commission (Art. 8 of the Treaty).

In the early 1960’s, **site agreements** were signed between the Community and four Member States: Belgium (Geel), Germany (Karlsruhe), Italy (Ispra) and the Netherlands (Petten).

**Nuclear regulations of the host country apply.**

Some of these sites had already **nuclear installations**, to which new facilities were added to enable the scientific activities.
Evolution of the JRC D&WM programme

Since the 1980’s, the JRC’s mission evolved and the need for nuclear R&D installations progressively reduced, particularly at the Ispra Site.

>> Many installations are now shutdown and in a state of safe conservation.

Since 1999, a JRC decommissioning programme has been set up.

The programme covers, for the 4 JRC nuclear sites, the historical liabilities as well as the future liabilities.

The D&WM activities are managed by the JRC sites. The JRC D&WM Steering Committee ensures overall coordination of the programme. Additionally, an international panel of Independent Experts provides advice on request.

The programme is periodically reviewed and updated. Every 4 years the status is presented in a Communication to the European Council and Parliament.
Historical and Future Liabilities at the JRC sites

JRC-Karlsruhe (Germany)
Facilities for research on safety and safeguards for the nuclear fuel cycle (hot cells and glove boxes)

JRC-Geel (Belgium)
Large accelerators for neutron physics
Laboratories for isotopic measurements and production of reference materials

JRC-Petten (the Netherlands)
High Flux Reactor and annexed laboratories
Historical and Future liabilities at JRC-Ispra (Italy)

The historical liabilities at Ispra include:
- Experimental reactors
- Hot cells and radiochemical facilities
- Waste handling and storage facilities

A few nuclear operations are still ongoing:
- Cyclotron
- Nuclear Safeguards activities

Given the scale of the nuclear operations in the past, the JRC-Ispra decommissioning programme is the largest within the JRC
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Main progresses at the Karlsruhe, Geel and Petten sites

JRC-Karlsruhe (Germany)
- Dismantling of old glove boxes and equipment
- Evacuation of historical waste and materials

JRC-Geel (Belgium)
- Decommissioning accelerator and laboratory building
- Evacuation of historical waste and materials
- Elaboration site decommissioning plan

JRC-Petten (the Netherlands)
- Evacuation of spent fuel and HLW
- Elaboration site decommissioning plan
Highlights of progresses at JRC-Ispra (1/4)

Realisation of **waste management facilities**

**Waste management facilities put in operation**
- Tank Farm Facility for storage of sludge
- Liquid Effluents Treatment Facility
- Abrasive Blasting Unit
- Materials Clearance Facility (MCF)
- Waste Characterisation Facility (WCF)
- X-Ray Digital Radiography System

**Planned new waste management utilities**
- Interim Storage Facility (ISF, *construction started*)
- Grouting Facility
- Final Waste Package (5 m³)
- Sludge solidification facility
Management of historical wastes and nuclear materials

**Realisations 2009-2012**

- Removal of 15 tons of Na/NaK from the site
- Removal of 1700 radiological sources from the site
- Removal of nuclear materials to the US and F
- Safe storage area for irradiated nuclear materials
- Start sorting and characterisation of historical wastes in former waste stores

**Main planned actions**

- Removal of residual nuclear materials
- Supercompaction of technological waste drums
- Removal and treatment of 6000 buried bituminised drums
- Removal of historical waste embedded in concrete pits and waste conditioned in concrete blocks
- Treatment of ILLW
Highlights of progresses at JRC-Ispra (3/4)

Decommissioning projects

Realisations

• Decommissioning and free release radiochemistry building (RCHL) in 2010
  (first facility to be fully decommissioned)

Planned Decommissioning projects

• FARO (fuel melting experimental facility)
• LCSR (hot cells facility)
• STRRL (former liquid treatment station)
• ESSOR reactor and appended facilities
• Cyclotron
• Waste management area and facilities
Settlement Agreement signed on 27.11.2009 with Italian Minister of Economic Development

- regularises the historical (mixed Italian/EC) liabilities on the site, by transferring the responsibility for the Ispra-1 reactor decommissioning to the Italian Government and taking over all other liabilities on the site
- formalises the transfer of JRC waste to the future Italian national repository by end of 2028 at latest
- mitigates the risk of later waste reconditioning which could result of changes in the waste acceptance criteria as set by the Italian authorities

→ the Agreement should reduce significantly the risks on the D&WM programme

→ the Agreement is not yet executed by the Italian Government, contacts are on-going
# Overview National Framework for Waste Management

<table>
<thead>
<tr>
<th>JRC Site</th>
<th>Waste Treatment &amp; Conditioning</th>
<th>Waste Interim Storage</th>
<th>Waste Disposal</th>
<th>Waste Ownership</th>
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<tbody>
<tr>
<td>Karlsruhe (Germany)</td>
<td>HDB</td>
<td>HDB</td>
<td>repository under construction</td>
<td>JRC</td>
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<tr>
<td>Geel (Belgium)</td>
<td>Belgoprocess</td>
<td>Belgoprocess</td>
<td>sitting done, repository under design</td>
<td>ONDRAF/NIRAS</td>
</tr>
<tr>
<td>Petten (the Netherlands)</td>
<td>COVRA</td>
<td>COVRA</td>
<td>no sitting, no detailed design</td>
<td>COVRA</td>
</tr>
<tr>
<td>Ispra (Italy)</td>
<td>JRC</td>
<td>JRC</td>
<td>preliminary design</td>
<td>JRC (until 2028)</td>
</tr>
</tbody>
</table>

- National Policies
- National Framework
- Competent Regulatory Authority
- Responsibilities License Holders
- Expertise and skills
- Financial resources
- Transparency
- National programmes
- Notification and Reporting
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Conclusions (1/3)

**Progresses** have been made since 1999, in particular with regard to:

- the evacuation of nuclear materials, radiological sources and the clean-up and removal of other historical waste
- the realisation and commissioning of facilities on the Ispra site to manage the future decommissioning waste in an appropriate way
- the effective decommissioning of facilities at the Geel site and the Ispra site
- the elaboration of decommissioning plans.
Conclusions (2/3)

Uncertainties remain, mainly related to:

- The execution of the Settlement Agreement by the Italian Government
- The volumes and associated costs of the decommissioning waste, including the tariffs for the later evacuation to the disposal site
- The requirements for the acceptance of some waste
- The streamlining of the preparation, authorisation and execution of the decommissioning projects.
Conclusions (3/3)

With respect to the Italian National framework, collaboration between operators on issues of common interest is essential, in order to:

- Maximise synergies
- Use the best available expertise
- Come to global solutions at National level.
Thank you for your attention!