The European Commission’s science and knowledge service

MetroDecom Workshop

JRC Decommissioning and Waste Management Programme

JRC Ispra – 11th October 2016
Overview

1) Background information
2) Highlights on the Programme Strategy
3) Progresses achieved and current status
4) Concluding remarks
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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 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**:
- Nuclear Safeguards activities

*Given the scale of the nuclear operations in the past, the JRC-Ispra decommissioning programme is the **largest** within the JRC*
JRC Decommissioning and Waste Management activities at the Ispra site

1) Background information

2) **Highlights on the Programme Strategy**

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4) Concluding remarks
1 - Nuclear Materials management

FINAL OBJECTIVE: ownership transfer to third parties or ultimately transfer to the Italian National repository

INTERMEDIATE OBJECTIVE: transfer out of Essor Nuclear Island

APPROACH:
Non irradiated nuclear material
• sale or transfer of recyclable materials to third parties or reprocessing
• non-recyclable materials: packing, temporary storage and later transfer to Italian repository (when available), after downgrading to waste

Irradiated Nuclear material
• fuel retrieval and treatment if needed; packing and transfer in "Transit Safe Area"
• Option 1: conditioning of all fuel in "dual purpose" dry storage casks; transfer of casks to temporary storage and later transfer to Italian repository (when available)
• Option 2: fuel reprocessing
2 - Nuclear Facilities Safe Conservation and Decommissioning

**GENERAL OBJECTIVE:**

Final release of buildings and areas free of any radiological constraint (by 2030 according to COM 2013; building demolition is the reference option; building re-use only if needed and confirmed by Safety Authority)

**GENERAL APPROACH:**

- Short term: preliminary dismantling activities (under existing licenses)
- Medium term: "pre-decommissioning" works, (under ad hoc authorisations)
- Long term: decommissioning works under "progetti particolareggiati" and "piani operativi" (once decommissioning license is granted)
3 Waste Management (1/2)

**General Objective:** characterise, treat, condition and immobilise the radioactive waste into qualified containers authorised by Safety Authority and agreed on the National repository operator; store containers on-site until transfer to Italian final repository

**Low Level Solid Waste**

**Approach**

- priority on recycling or clearance when possible;
- non-clearable waste sorting, pre-treatment and characterisation on site (in Area 40 and at D&D work-yards);
- waste treatment (mainly off-site) by super-compaction; metal melting; incineration
- waste immobilisation by grouting on-site in Final Waste Package ("IP2");
- interim storage on site in ISF
3 Waste Management (2/2)

**Approach**
- retrieval and on-site characterisation;
- On/off-site volume reduction;
- On/off site residual waste immobilisation or re-packaging;
- interim storage on site
- Disposal off-site (Italian Repository)

**ILW**
- Roman Pits
- Concrete Blocks
- Bitumen Drums
- Disused sources

**Low and Intermediate Level Liquid Waste**

**Approach**
- blending ILLW with the Low Level Liquid Waste and treatment of resulting waste as Low Level Liquid Waste (to be confirmed by S.A.)
Interim Storage and final waste disposal

**Interim Storage facility (ISF) of JRC Ispra radioactive waste**

- Designed, built and commissioned between 2007 and 2013 to host all VLLW and LLW JRC Ispra conditioned radioactive waste only, for a period up to 30 years
- Storage capacity largely exceeding (25%) the estimated inventory of JRC Ispra historical and decommissioning waste

**Final disposal of JRC Ispra radioactive waste**

- The ultimate destination of the JRC Ispra radioactive waste will be the Italian National Repository according to Waste Directive 2011/70 (transposed into Law Decree 45/2014) and settlement agreement between Euratom and Italian Government of 27/11/2009
- Process of Italian national repository siting started in 2014 and is currently on hold
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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 Characterization Facility (WCF)
- X-Ray Digital Radiography System
- Interim Storage Facility
- Final Waste Package (5 m3)

Planned new waste management utilities

- Grouting Facility
- Sludge solidification facility/service
Management of historical wastes and nuclear materials

Realisations 2009-2014

- 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)*
- FARO (fuel melting experimental facility)

Planned Decommissioning projects

- LCSR (hot cells facility)
- STRRL (former liquid treatment station)
- ESSOR reactor and appended facilities
- Cyclotron
- Waste management area and facilities
Management of nuclear material

Non irradiated nuclear material
- Almost 95% of nuclear material shipped off site for recycling in the past years;

Irradiated Nuclear material
- Completion of the Transit Safe Area (TSA) in ESSOR to collect all the irradiated nuclear material present on site; completion of cold and "combined tests" for nuclear material transfer from open air dry wells to Transit Safe Area in ESSOR
- Launch of the call for tender for nuclear material retrieval from ESSOR pool and ADECO hot cells, dual purpose dry casks design and manufacturing.
- Reprocessing feasibility: contract under negotiation with Areva
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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 some facilities
- the elaboration of decommissioning plans.
Uncertainties remain, mainly related to:

- 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.
- The execution of the Settlement Agreement with the Italian Government
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.
Thanks for your attention!