Joint Research Centre
the European Commission's in-house science service

Serving society
Stimulating innovation
Supporting legislation

Infrastructure development at the JRC Karlsruhe

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Karlsruhe Germany
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The mission of ITU is to provide the scientific foundation for the protection of the European citizen against risks associated with the handling and storage of highly radioactive material.

1. April 1963: Official Groundbreaking

Juli 1958: EURATOM declares interest to operate “well equipped Institute” in KARLSRUHE

1964: first laboratories start operation
JRC-ITU infrastructure until 2009
WING M
- Fully self-sustaining building
- High activity labs, fissile materials storage
- Site Physical Protection Hub

Wing M PRIORITY (upon request of supervising authority)
Concept of Wing M – Roadmap End 2016 start construction
No extension of JRC-Karlsruhe labs (stable operational costs)
Future of hot cells facility: reduce inventory (operation wing B), investigation of long term alternatives: transfer to wing M
Workprogram defined with Member States and stakeholders
Transfer of Pu to USA

(US Dept. of Energy, Global Threat Reduction Initiative)

Joint Venture ITU + WAK GmbH

- conditioning and packing
- SK1 Transport in 2016

UK MOX (BNFL) fuel return to owner through Studsvik to Sellafield

- 2 Transports in 2014
- complex encapsulation (qualification BAM, TÜV)

AREVA various fuels return to reaktor of origin in Germany and Switzerland

- ca. 36 fuel pins within 2-3 years
Wing M objectives
Wing M laboratories and activities

Total surface 2500 m²

- Laboratory for Preparation of Advanced Fuels
- Laboratory for Partitioning & Transmutation
- Power Laser Apparatus for Reactor Irradiated Samples (POLARIS)
- Preparation and Characterisation Laboratory
- Laboratory for Mechanical Properties
- Laboratory for Alpha-Emitters Medical Applications
- Laboratory for Kinetics and Thermodynamics
- Laboratory for Electron Microscopy
- High-Temperature and Surface Analysis
Decommissioning of Wing F G and B
JRC-ITU infrastructure
2020-2035
JRC-ITU infrastructure 2020-2035

today

2020

2025

2035
JRC-Ka infrastructure plan 2014/2035

JRC-ITU KA Infrastructure Plan 2035

- 2014: Wing M construction
- 2016: Renovation Wing
- 2018: License to operate Wing M
- 2020: Transfer AFG to M
- 2022: Non irradi. Waste Charact. to Wing A
- 2024: Wing A full operation
- 2035: Wing B decommissioning

Wing B Return of material to owners
F G Decommissioning
Wing B condition of ITU materials
Decommissioning waste streams

ITU waste streams

Waste compliant with KONRAD criteria
= waste with negligible heat generation

Waste non-compliant with KONRAD criteria

<table>
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<tr>
<th>Other non-compliant waste</th>
<th>Unirradiated nuclear material</th>
<th>Spent fuel</th>
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<2014

Waste contractor (at Karlsruhe)
(No licence for nuclear material)

Conditioning compliant to KONRAD criteria & Interim Storage for negligible heat generating waste
(ITU: 1650 m³ by 2013)

2023

KONRAD repository (opening expected 2023)

Interim-storage for heat-generating waste (without nuclear material)
(6 m³ by 2013)

2050

- 4.500 m³ reserved for ITU (by 2060)
- 16.7 Mio Euro to be paid by ITU (2014-2020)

2060

Repository for heat generating waste (open not before 2050)
- Search for suitable sites on-going
- To be established by 2050

Dry interim storage at ITU

Separation of fission products at ITU

External facilities

Re-patriation to the US

Conditioning & interim-storage off-site

Nuclear Material

Fission products

separated fission products
“open” nuclear laboratory
for
students
industry
R&D partners
network partners

Nuclear Material:
Sealed Sources for NDA
Uranium standards from
depleted to 93% enrichment,
Plutonium standards:
oxides, metal, alloys,
Radiation sources

“INS3L”

Nuclear security:
Active detection
R&D for active methods for
Safeguards and secuirty

spent fuel
tomograph
Exp. Simul.

Training areas
Testing &
Standardization

integrating 4 locations currently in DWM area in 1 laboratory
JRC-Geel nuclear infrastructure

50 years old buildings

Not adapted anymore to present safety & security standards

FEASIBILITY STUDY for grouping of laboratories: 2 options

Radionuclide metrology

Mass spectrometry Sample preparation

Van de Graaff

GELINA

2007 – 2014
Modernised infrastructure
Open access facilities
E&T facilities