

# Radiation Protection Issues in the Decommissioning of Nuclear Facilities: Lessons Learned from the ISOE WGDECOM

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on behalf of WGDECOM

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# Background and objectives of ISOE WGDECOM

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Decommissioning of NPPs is a subject of growing importance for the nuclear industry and meets some economical, technical and organizational challenges.



WGDECOM was created in 2014.



Objective: improve sharing of operational RP data and experience collected through benchmarking visits to NPPs or other facilities under decommissioning or in preparation of decommissioning.



Topics of interest:

Areas of RP most relevant for management of occupational exposure, good RP practices in decommissioning,  
Collection of operational data,  
Creation of a network of RP experts in decommissioning activities.

# WGDECOM current membership (2024)

25 experts from 12 countries

Chair : Kris Bauer - Watts Bar (TVA) - USA

Vice-Chair : Laure-Anne BELTRAMI – CEPN (ETC) - France

	<b>Belgium</b>	ENGIE Electrabel	<b>Japan</b>	TEPCO	
	<b>Brazil</b>	Angra NPP	<b>Korea</b>	KHNP	
	<b>Canada</b>	OPG	<b>Netherlands</b>	ANVS	
	<b>China</b>	Nuclear and Radiation Safety Center	<b>Russia</b>	Rosenergoatom VNIIAES	
	<b>France</b>	ASN CEPN (ETC) EDF	<b>Spain</b>	CSN	
	<b>Germany</b>	GRS	<b>Sweden</b>	Ringhals NPP Vattenfall	
	<b>Italy</b>	SOGIN	<b>USA</b>	University of Illinois (NATC) Watts Bar TVA Kewaunee NRC	

## PoW for previous period 2020-2023. Key activities.

- Conduct Technical visits to decommissioning sites
- Maintain networking of WGDECOM experts and exchange information
- Explore possibility to create decommissioning exposure DB
- Develop new service – Technical Support Missions
- Cooperate with Research Reactors in decommissioning
- Collect radiological Operating Experience
- Cooperate with international bodies
- Organize topical sessions



# Technical visits and cooperation with research institutions

- No visits in 2020 and 2021 due to Covid-19 pandemic.
- Prior to each exchange visit, a generic template with questions to be answered by the site visited are provided to the site.
- Visit reports are produced after visits and available on ISOE website.

Technical visit template

Questions	Answer
<ol style="list-style-type: none"><li>1. Decommissioning schedule and strategy,<ol style="list-style-type: none"><li>a. Priorities / Reasoning leading to the strategy and the time table</li><li>b. Twin block</li><li>c. Organisation</li><li>d. Starting point of dismantling, state of the blocks</li><li>e. Dismantling techniques in connection with waste management (i.e. steam generator)</li><li>f. Events and contamination history</li><li>g. Large components, cutting or disposal as large components</li><li>h. Time schedule, number of staff connected to dismantling work (own staff / contractors), responsibility / staff qualification in connection with fuel on site</li><li>i. Cost estimation / funding / delays in the time table</li><li>j. Final state of the site planned (clearance?), criteria for license termination</li><li>k. Consideration of earth quake and tsunami issues</li></ol></li></ol>	

# Technical benchmarking visits onsite

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- USA - April 2016: Zion (decommissioning completed) and Kewaunee (safe storage – Dormancy period until 2069)
- Sweden - October 2016: Barsebäck (pre-decommissioning phase : defueled characterization)
- Spain - April 2017: Jose Cabrera (decommissioning completed)
- Switzerland - November 2017: Mühleberg (preparation to decommissioning)
- France - October 2018: Bugey 1 (decommissioning in progress)
- USA - May 2019: San Onofre (preparation to decommissioning)
- Germany - October 2022: JEN mbH decommissioning site at Jülich (decommissioning in progress: AVR and FRJ-2).
- Belgium - October 2023: Doel 3 (decommissioning in progress) and Belgian Nuclear Research Centre (SCK·CEN)

## Topics addressed during benchmarking visits

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Regulatory context and strategy of decommissioning

Collective doses analyses for high doses works

Management of risk of internal exposure

Radioactive waste management

Integrated risk management

# Technical visits and cooperation with research institutions

- October 2023: 8th visit to Belgium
- Technical visit to the Doel 3 decommissioning Nuclear Power Plant:
  - Visit of the reactor building, reactor pool, steam generators, primary pumps and safety injection tank.
  - Visit of the room where the Automated Mobile Decontamination Appliance (AMDA) was installed, the synoptic command cabinet for the CSD resin tanks, the turbine hall;
  - Visit of the construction site of a new building for storage of contaminated operational materials.

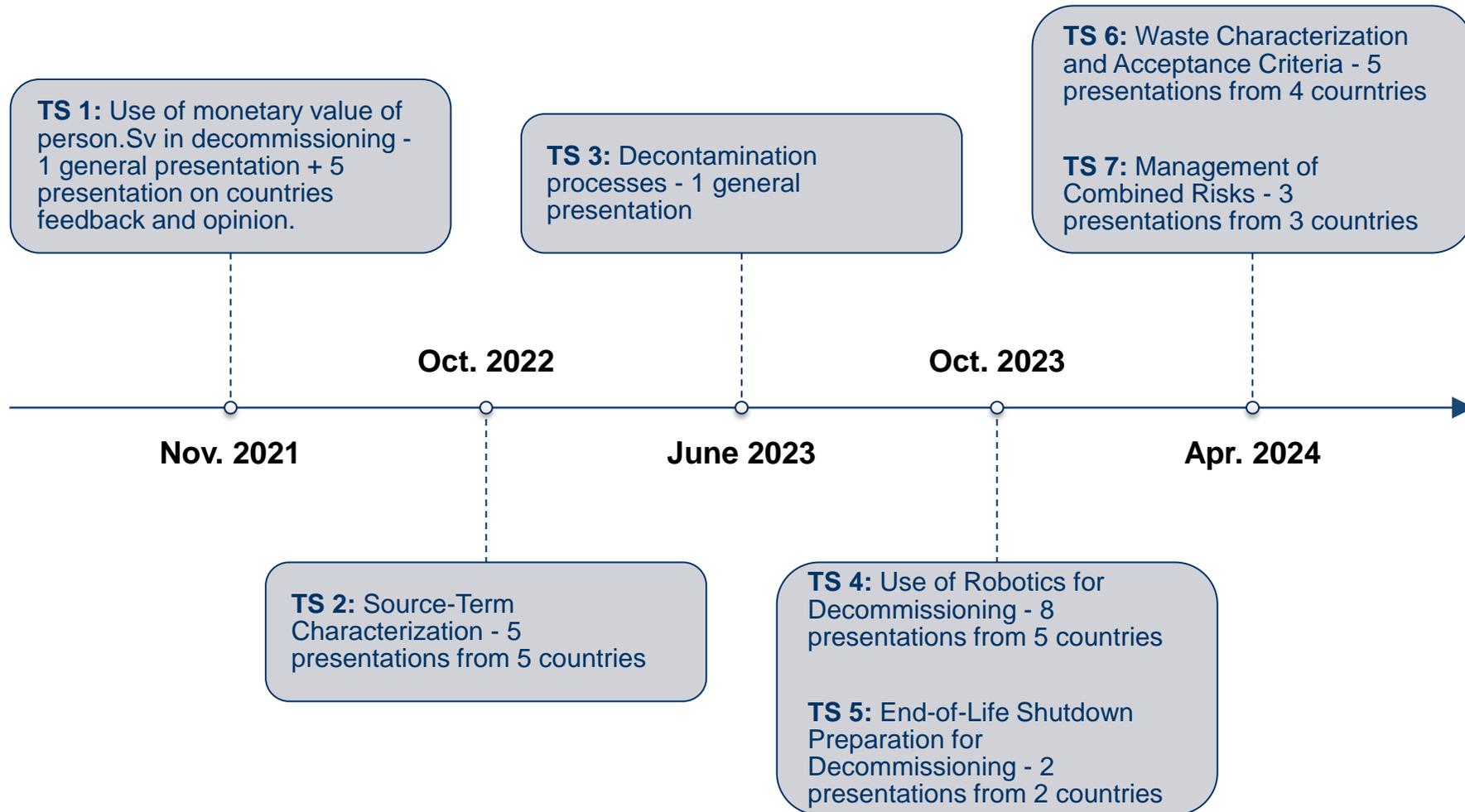




# Technical visits and cooperation with research institutions

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- Technical visit of the Belgian Nuclear Research Centre (SCK-CEN).
- BR3 research reactor:
  - Visit of BR3 controlled area
  - Visit of turbine hall (cutting workshop, total gamma clearance monitor,...)
  - Visit of auxiliary building
  - Visit of storage locations: storage building (surveyed/monitored area) for radioactive waste, Open air storage of cleared lead blocks.
- HADES underground research laboratory and Euridice exhibition room



# WGDECOM - Lessons learned



Lack of **Feedback** on tasks to be performed



Presence of **multiple pollutants** (asbestos, lead, chemicals,...)



Relevant to **share information with research reactors** and other nuclear installations (not only NPPs)



**Evolving environment** (radiological conditions, removal of components,...)



**Radionuclides** different from operation (increased risk of internal exposure, lack of feedback,...)



Start **characterization** as soon as possible



Establishment of a **dose database** but its use for comparison is not relevant because data is:

Not sufficiently available;  
Not comparable;  
Not unique / not unambiguous.

Continuation of previous ToR (2020-2023) with 2 new actions identified:

- Collect and share information obtained during the WGDECOM meetings, topical sessions and technical visits with all ISOE members;
- Exchange experience with nuclear facilities in decommissioning and not only NDDs

Update of PoW for 2024-2027 - Main topics

- Define questions of interest and answers associated
- Organize topical sessions
- Collect information and data and make them available to the ISOE participants
- Develop case studies to document solutions and distribute to the ISOE participants.
- Collect RP related events during decommissioning and analyse them.
- Exchange experience with nuclear facilities in decommissioning

Next meeting plan in October / November 2024 with a visit to a site in decommissioning or in preparation of decommissioning (Sweden, Switzerland, other?)

Increase membership and active participation

Increase sharing of information with all ISOE members

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Thank you for your attention!



*For more information:*  
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