PIANOFORTE
EUROPEAN PARTNERSHIP FOR RADIATION PROTECTION RESEARCH
RRADEW

Resilience to Radiological Events in Wartime

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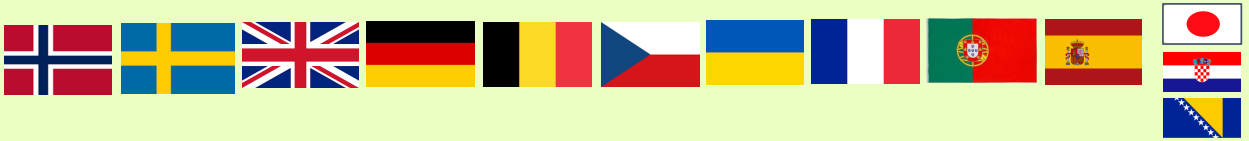
Rome, NERIS workshop, 11 November 2024

P. Croüail

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This partnership has received funding from the European Union's "EURATOM" research and innovation program under the 101061037 grant agreement

14 PARTNERS – 10 COUNTRIES



NMBU	NORWAY – University of Life Sciences
LU	SWEDEN – Lund University
UKHSA	UNITED KINGDOM – Health Security Agency
KIT	GERMANY – Karlsruhe Institute of Technology
SCK-CEN, UA	BELGIUM – Nuclear Research Center + University of Antwerpen
USB	CZECHIA – University of South Bohemia
ISPNPP, NRCRM	UKRAINE – Institute for Safety problems of NPPs + Research Center of Radiation Medicine
CEPN IRSN, ENSOSP	FRANCE – Nuclear Protection Evaluation Center, Institute for Radiation and Nuclear Safety, Firefighter Officer Academy
APA	PORTUGAL – Environment Agency
CIEMAT	SPAIN – Research Center for Energy, Environment and Technology

Many radiological events during past wars, armed conflicts, terrorist attacks and rebellions …–2021

1973 Argentina
Atucha NPP occupied by an armed group
1980 Iraq -"operation Babylon"
Al-Tuwaitha nuclear site attacked by Israel
1981 Iraq – "operation Opera"
Osirak nuclear research facility destroyed by Israel
1982 South Africa Koeberg
NPP occupied by an armed group
1984-1987 Iran Bushehr
NPP bombed several times by Iraq
1991 Israel Dimona
nuclear center attacked by Iraq
2001 (9/11) USA
NRC: "NPPs were targets considered by Al Qaida"
2007 Syria "operation Orchard" Deir-es-Zor
(future) nuclear reactor bombed by Israel
2021 Iran Natanz and Karaj
NPP and enrichment facilities attacked by Israel

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Escalation of threats over the last 3 years

2022

- 02 – **Invasion by Russia**n troops of the **Chornobyl** exclusion zone and capture of nuclear facilities, surveillance garrison held hostage
- 03 & 06 - **Kharkiv** neutron source facility targeted and damaged by rockets
- 03-10 - **Zaporizhzhia** NPP and fuel storage hit by missiles, civilian evacuation convoys and residential buildings attacked, NPP occupied by Russian troops, NPP staff held hostage…

2023

- 06 - Destruction of the N. **Kakhovka** dam and reservoirs used for water supply and cooling of nuclear installations
- IAEA dissuasive [?] presence at Zaporizhzhia, Rivne, Chornobyl, and South Ukraine

2024

- *04 - (All Zaporizhzhia units in cold shutdown status)*
- 04 – Iran warns Israel against attacking nuclear sites…
- 07 – UA drone attack of the RU Kapustin-Yar **Astrakhan** nuclear missile test site
- 08 - **Zaporizhzhia** cooling water tower fired (act of terror?)
- 08 - RU **Kursk** NPP is « extremely exposed to attacks » (IAEA)
- 09 - Putin threatens to use nuclear weapons in Ukraine
- 10 - Israel vs. Iran (official: 'targeting nuclear sites is an option')

Nuclear accident threat, myths and realities

Nuclear installations and sites have often been designated or were actual targets during past wars or armed conflicts, and they will be even more so in the future (esp. in Ukraine).

Although the radiological consequences could reach areas far from the front line, risks about are often overstated by media incl. social media.

War exacerbates vulnerability of populations

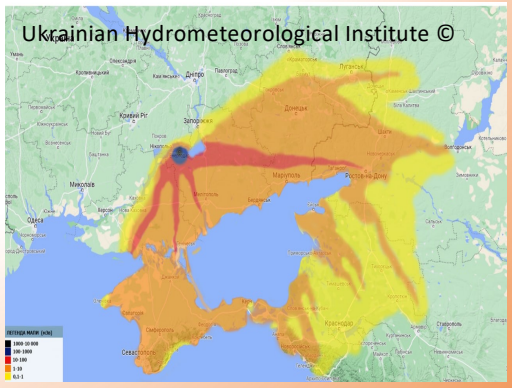
Attack vs a nuclear site is a very effective threat .
Not only by the use of heavy weapons, but also through sabotage (power cuts, cyberattacks, arsons, etc.), staff hostage taking, as well as spreading disinformation and rumours about the potential radiological consequences

When we know that this can (will?) happen, are we really outside the scope of the Civil Nuclear Liability Protocol?

NPPs in Ukraine



Possible contamination map after an accident at Zaporizhzhia NPP



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The EPR & R systems have been designed for peacetime contexts (i.e. essential infrastructures still in place, workers and institutions well organised and population living around in cohesion)



- Not necessarily adapted to an armed conflict or a war context!

What are the specific challenges do we need to prepare for?

- ITB distribution and efficiency?
- Sheltering and evacuation criteria and procedures?
- Essential infrastructures needed (stakeholders to be prepared)
- Impact modelling and monitoring capabilities (citizen monitoring)
- Feasibility of recovery countermeasures (e.g. recovery of lost/damaged radioactive sources)
- Obstacles to the return of distanced/evacuated/escaped populations (post-war welfare issues)
- Mental health issues (war trauma + fear of radioactivity)
- Specific information & communication strategies

What drives Resilience?

- Indentification of stakeholders' roles during preparedness and response
- Adaptation of decision-aiding tools (incl. indicators of resilience)
- Sizing training needs (for first and second responders)

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OBJECTIVES AND WPs

What are the resilience factors in the face of radiological events in a war situation?

How can resilience be improved?

WP0

COORDINATION, WEBSITE, DMP, CDP, PROJECT STAKEHOLDER GROUP

WP1

WAR SCENARIOS LEADING TO RADIOLOGICAL CONSEQUENCES

WP2

CHARACTERISATION (DIMENSIONS, ATTRIBUTES & INDICATORS), ANALYSIS AND ASSESMENT OF RESILIENCE (INCL. ANALYTICAL PLATFORM)

WP3

CASE STUDIES ON RESILIENCE IN PAST SITUATIONS (FIRST LINE RESPONDERS, AUTHORITIES, NGOs, LOCAL COMMUNITIES) : UKRAINE, CZECHIA, BALKANS, JAPAN

WP4

STRATEGIES FOR BUILDING RESILIENCE

(SCENARIO EXERCISES, TRAINING COURSE DESIGN, RECOMMENDATIONS)

WP5

ETHICAL CHALLENGES

(Workshop in Budweis - Report)

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Advisors and other stakeholders to consult on our work



RRADEW STAKEHOLDER GROUP **TO BE CONSTITUTED**
(ONTL ORGANISTIONS, NTL AUTHORITIES, MILITARY FORCES, FIREFIGHTERS AND OTHER RESPONDERS, etc.)

PIANOFORTE PROJECTS
PREDICT (NUCLEAR DETONATION), CITISTRA (CITIZEN MONITORING)

PIANOFORTE SAB AND PF STAKEHOLDERS

PROJECTS SELECTED IN HORIZON DISASTER RESILENT SOCIETY CLUSTER #3 (ON SAFETY AND SECURITY)

CBRN DEFENSE
RESILIENCE & COUNTERACT PROJECTS (ANTIDOTE RADIOPROTECTORS FOR FIRST RESPONDERS)

INTL ORGANISATIONS (IAEA, ICRP, WH0, NEA-CRPPH, HERCA, etc.)

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On behalf of all the RRADEW team

Thank you for your attention

and looking forward to the presentation of the results



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