



*Supplement of*

## **Transdisciplinary research on repository safety: challenges and opportunities**

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TRANSDISCIPLINARY RESEARCH ON THE MANAGEMENT  
OF HIGH-LEVEL RADIOACTIVE WASTE IN GERMANY

# Transdisciplinary research on Repository Safety: challenges and Opportunities

Session 3c — Herausforderungen und Lösungen bei der Transdisziplinarität in der  
Endlagerforschung

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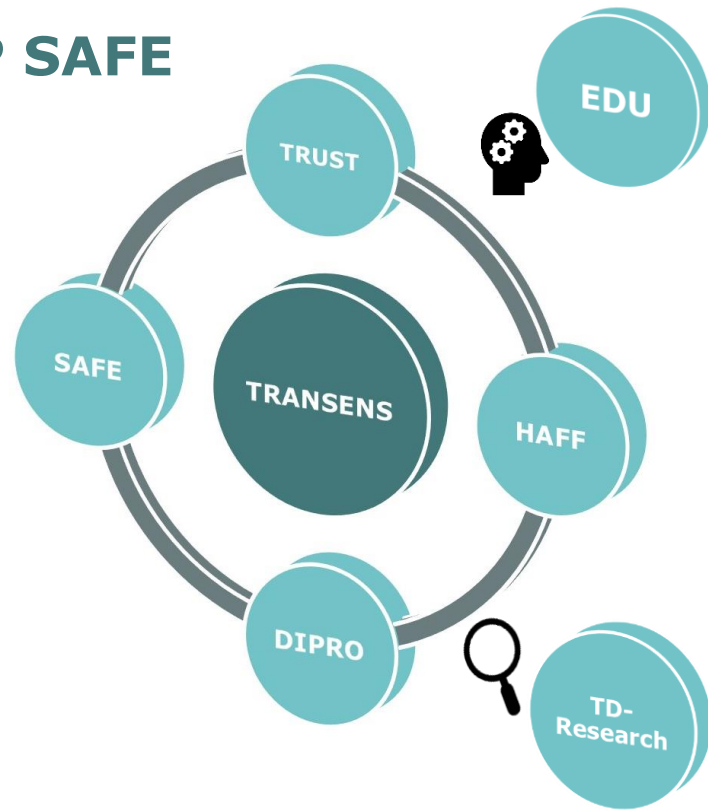
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## Introduction on TRANSENS and TAP SAFE

- Project TRANSENS
  - from 11/2019 to 10/2024
  - first TD research project under the aspect of nuclear waste disposal in Germany
  - disciplines from engineering, natural science to social science and humanities
  - linking science and society
- Four working packages, EDU & TD research
  - HAFF, SAFE, DIPRO, TRUST



## What do we want to achieve in TAP SAFE?

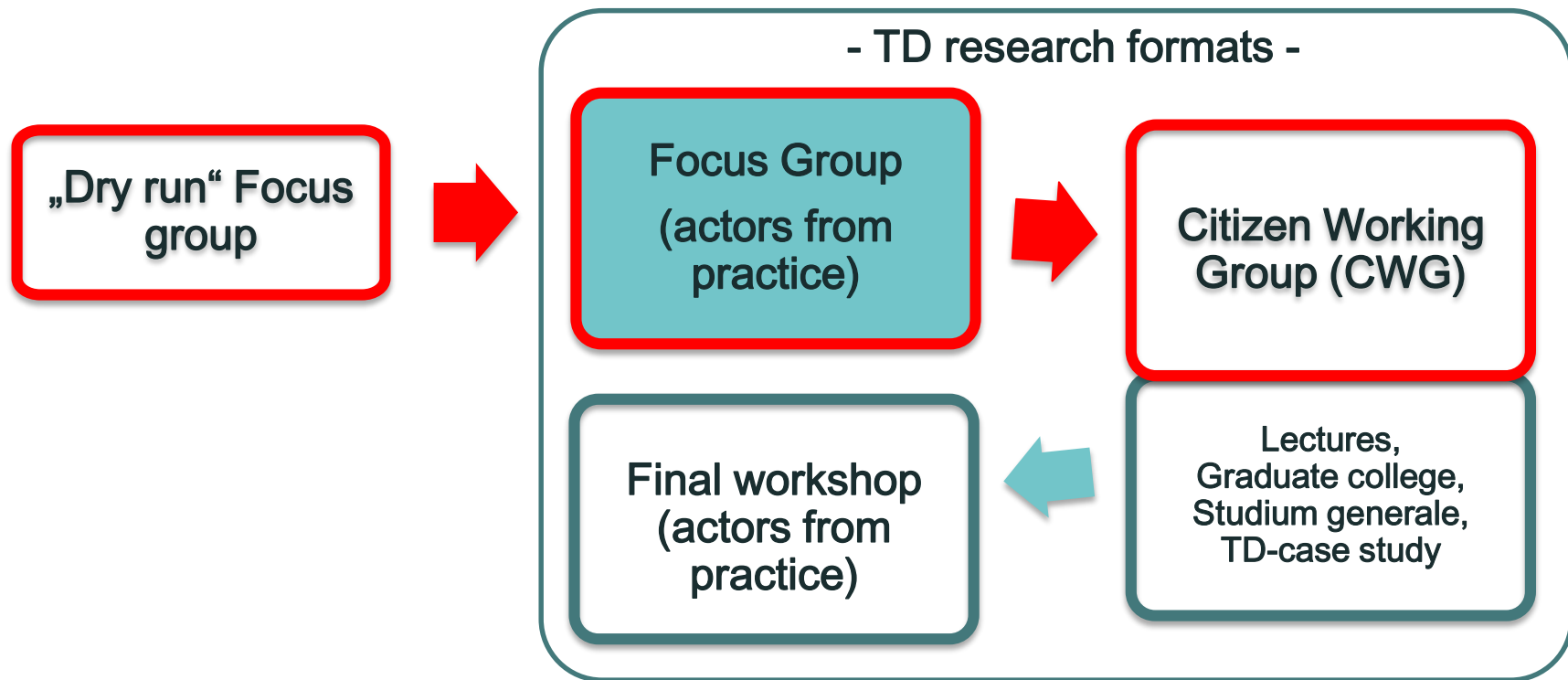
- Safety Case (SC): Established tool and basis for decision-making in repository programs (based on a variety of safety assessments).
- But also: Criticism of approaches, procedures and standards, which can become relevant in the German site selection process (Standortauswahlverfahren).

### Is an **optimization** of the SC possible/necessary?

- If so: Scope? Design?
- Focus of stakeholders and interested people?
- Is the very complex SC suitable for TD research?

## What is a Safety Case?

- *Safety Case (IAEA) = "The Safety Case is the **collection of scientific, technical, administrative and managerial arguments and evidence in support of the safety** of a disposal facility [...]" IAEA (2012)*
- Primarily documentation, but also methodology
- Demonstrates compliance with the legally specified protection objectives and safety requirements (in Germany: *Ordinance on Safety Requirements for the Disposal of High-Level Radioactive Waste*)
- A Safety Case can have many names e.g.:
  - USA: total system performance analysis
  - Germany/Switzerland: Sicherheitsnachweis, Sicherheitsuntersuchung, Sicherheitsbericht
  - France: Dossier de sûreté



## Issues discussed

- What are your personal experiences in relation to the SC?
- What can the SC prove? What can the SC definitely not do?
- What bothers you about the SC?
  
- What level of safety should be aimed at?
- Separation of the group into breakout rooms:
  - How can ritualized procedures be changed?
  - How can a discourse on safety be co-created?

} FG1

} FG2

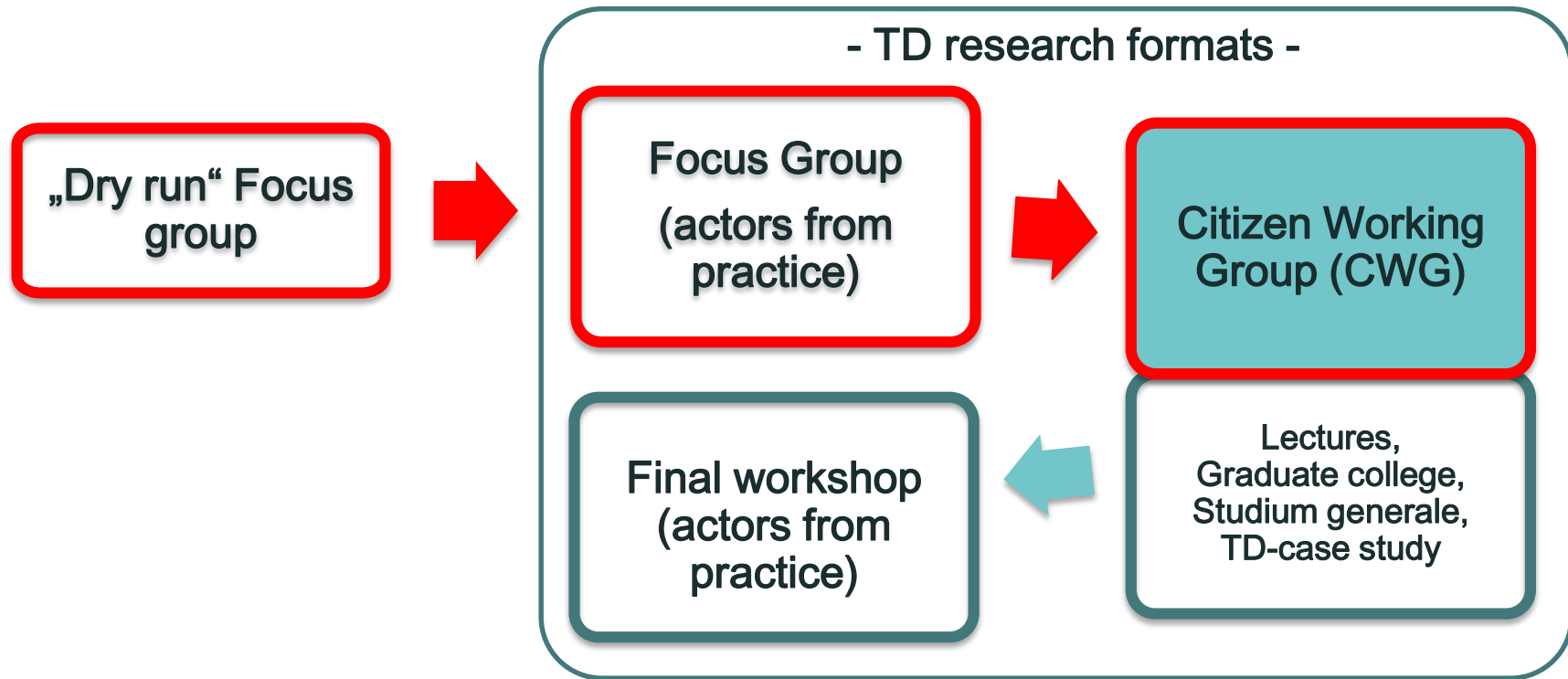
## Results (1/2)

- Ritualised procedure in the SC
  - E.g. FEP (Features, Events and Processes) lists or numerical simulations have "taken on a life of their own".
  - SC tools are no longer sufficiently questioned
- Communication problem due to inaccessibility
  - The giant amount of information and documentation poses a great difficulty
  - Documentation: Multi-level system (oriented towards communication goals / target groups) possibly promising
  - Comprehensible, central chain of argumentation
  - Separate document vs. "Thinking about communication at the same time"
  - Better use of electronic documentation systems, digital SC in the near future



## Results (2/2)

- Assessment period and the term „Nachweis“ (German for “proof”)
  - “hubris”, “unrealistic”, discredits SC
  - Terms like “proof” or “evidence” are perhaps unfavorable. Safety cannot - in the literal sense - be proven → Terms like “safety report” might be better
- SC produced by experts; scrutinized by experts (review)
  - Opening necessary?!
  - Experts not involved in the process often difficult stakeholders  
→ how do you deal with this?
- Taking a closer look at whether the integration and coordination processes between the different SC modules need to be improved



## SAFE CWG meetings – overriding goals

- Substantial input on the content and communication of SAFE's work on the Safety Case in the sense of an 'extended peer review'. Supporting this:
  - Explorative investigation to what extent the concept of SC can be made understandable to a population group and which formats of exchange between scientists and population representatives are suitable for this purpose; learning effect on communication on the part of SAFE scientists.
  - Promoting the ability to ask constructive questions on specific and general aspects of the SC
  - CWG provides input for the optimization of the SC (communication and content)

## CWG cooperation schedule



## 1st SAFE CWG meeting – Goals

- Convey knowledge (factual knowledge/overview knowledge) and promote questioning skills
- Clarify goals and expectations, co-design with a view to reducing complexity
- Generate interest in the topic and identify subjects the CWG is particularly interested in
- Formation of the volunteer group for the "Intensive Workshop".
  - Getting insights for designing Intensive WS
  - What kind of preparation material is necessary?

## 1st SAFE CWG meeting – Results

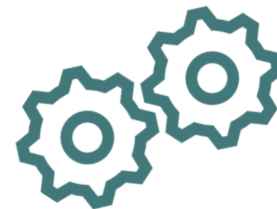
- Identification and development of three work themes:
  1. SC and container/canisters incl. material science, geotechnical barrier & scenarios
  2. **practical look at: FEP (Features, Events, and Processes) , scenarios, exemplary view**
  3. handling uncertainties, models, presentation of results



## 2nd SAFE CWG meeting (planned)

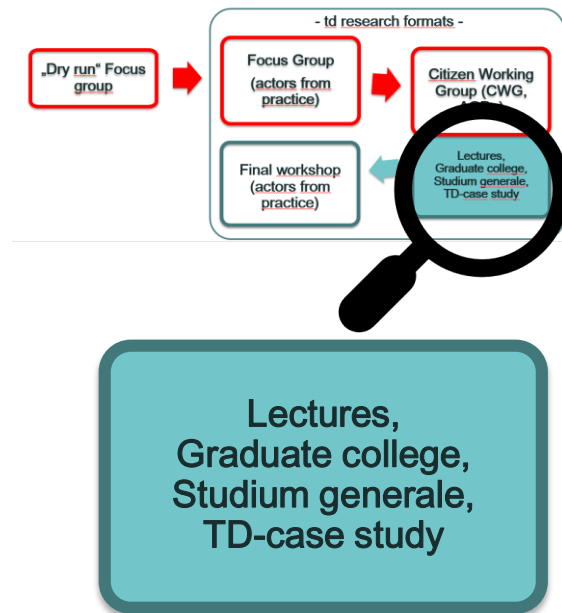
### ➤ Practical look at: FEP, scenarios, exemplary view

- Lead management: GRS
  - Workshop with practical examples and exercises, e.g. working with flipcharts
- Main topics:
  - View on a FEP database
  - Work with selected FEP, influence on initial barriers (scenarios).
  - What FEP can YOU think of?
- Review: What could be achieved?



## TD work following the CWG meetings

- Graduate Academy at TUC (mid-2022)
  - Was identified as necessary → adaption during the project
  - Utilisation of CWG and focus group results
  - Greater focus on technical issues
- Offers in the *Studium Generale* and *TD case study*
  - Ways to present simulation results
  - Further development of the ReSUS platform
- *Conclusion Workshop* with CWG and actors from practice





# Thank you for your kind attention!

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