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PSI

eurad

European Joint Programme on Radioactive Waste Management

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EURAD WP8/Subtask 2.1: Status and plans

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EURAD WP SFC – Task 2 status reporting meeting, via remote connection, 4 February 2021

Zertifiziertes Managementsystem STARS ISO 9001

Summary

- Subtask 2.1: short recall (what and which participants)
- Current short status for each participants
- Plans/Conclusions

EUropean Joint Programme on RADioactive Waste Management

EURAD

5-year implementation phase 1 – EURAD-1

This project receives funding from the Euratom research and training programme under grant agreement No 847593.

Subtask 2.1: short recall

- Subtask 2.1: Theoretical study of SNF source terms
- Subtask leader: PSI
- Subtask contributors: CIEMAT, JSI, NAGRA, PSI, SCK.CEN, VTT, KIT, JRC-Geel, ENRESA
- Main responsible persons:
  - CIEMAT: Francisco Alvarez
  - JSI: Marjan Kromar
  - NAGRA: Ahmed Shama
  - PSI: Dimitri Rochman
  - SCK.CEN: Luca Fiorito
  - VTT: Silja Häkkinen
  - KIT: Ron Dagan
  - JRC-Geel: Peter Schillebeeckx
  - ENRESA: Ana Muñoz

Subtask 2.1: short recall

- Activities:

1. Select representative assemblies
2. Calculated quantities: isotopic concentrations, decay heat, gamma/neutron emissions
3. Cooling time: up to 1e5 years
4. Perform calculations (nominal and uncertainties/sensitivities/biases)
5. Identify relevant parameters
6. Summary of results
7. Workshop

Subtask 2.1: short recall

- Codes to be used and selected cases (as of today):

Institute	Code	Samples (planned)
PSI	CASMO, CASMO/SIMULATE/SNF	GU1, GU3, BM1, SKB-50, GE, HEDL, ENRESA
JSI	SERPENT2 ALEPH2 SCALE (TRITON/NEWT) POLARIS DRAGON	SKB-50 (JRC), S1.PWR, S2.PWR, NPP Krško fuel, SF95-5 REGAL (SCK)
SCK.CEN		
JRC Geel		
KIT	MCNP/CINDER, Nucleonica	SF95-5
NAGRA	SCALE POLARIS	SF95-5, BM1 Gundremmingen-7 (B23) ENRESA-BWR SKB-50, GE, HEDL
VTT	SERPENT2	Gundremmingen-7 (B23)
CIEMAT	EVOLCODE, MCNP/CINDER	S1.PWR, SF95-5
ENRESA	Define a BWR case (8 PIE) + POLARIS	

Subtask 2.1: short recall

- Time frame:
- Activities delayed in 2020 and 2021 (+ 6 months or + 1 year) due to COVID and late request for new decay heat values to SKB

	Month 3 (Aug. 2019)	Month 7 (Dec. 2019)	Month 11 (April 2020)	Month 15 (Aug. 2020)	Month ?? (2020-2021)	Month ?? (2021-2022)
Task Definition	PSI					
Simplified calculations		All				
Advanced calculations			All			
Sensitivity				All		
Uncertainties					All	
Report/workshop						PSI

Current status: PSI

- From February 2020:

- Three samples to be studied (GU1, GU3, BM1)
- GU1: done, paper to be submitted soon (internal signatures)
- GU3: paper under preparation, final stage
- BM1: all calculations done
- ENRESA samples: calculations being performed
- Decay heat: some calculations done

Current status: JSI/SCK.CEN/JRC Geel

- From December 2020:

- S1.PWR
  - Sensitivity and uncertainty
- Takahama
  - C/E biases, sensitivity and uncertainty
- REGAL
  - C/E biases, sensitivity and uncertainty
- SKB-50
  - C/E biases, sensitivity and uncertainty

Current status: KIT

- From December 2020:

- SF95-5:
  - Started with MCNP/CINDER and Nucleonica
  - Calculations with MURE and KAPROS
  - Code comparison between high fidelity (Monte Carlo) and simplified deterministic approach.
  - Study of isotopic composition in the fuel and in the cladding (*e.g*. impurities)
  - Contribute to the question “how much simulation efforts are meaningful ?”

  - basic information for the burn up calculation
  - second phase to understand the origin of discrepancies
  - Cross section uncertainty calculation

Current status: NAGRA

- From February 2021

- BM1, SF95-5 and Gundremmingen-7
  - Performed with SCALE/Polaris, isotopic vectors (PIE)
- SKB-50
  - Ringhals-2 and -3 under study

- Paper on decay heat uncertainties submitted (almost accepted)
- Paper on decay heat nominal values to be resubmitted
- Current study on PIE C/E (nominal and uncertainties)

Current status: VTT

- From December 2020:

- Gundremmingen-7 with SERPENT2
  - Simplified and advanced (3D) calculations done
  - Sensitivity calculations done
  - Uncertainties to be done

Current status: CIEMAT

- From November 2020

- SF95-5
  - Paper started
  - Study with EVOLCODE and MCNP/CINDER
  - Sensitivity, uncertainty calculations started

Current status: ENRESA

- From November 2020

- ENRESEA delivered the BWR assembly specifications on June 2020
- Providing an updated report in November 2020
- Performing studies with POLARIS

Plans/conclusions

- All participants have started their calculations and publications
- We follow a delayed schedule (+ 6 months or + 1 year)
- Collection of all results: 2021
- Expected draft report: 2022
- Joint publication: 2022
- Workshop: place and date to be defined in 2022

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