MUSA – WP4 Intermediate Reporting – 18/01/2021

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MUSA has received funding from the Euratom research and training programme 2014-2018 under grant agreement No 847441.

GENERAL INFORMATION

- **Organization: Pisa University**
- **Contact person(s)/author(s): Sandro Paci, Michela Angelucci**
- **Severe accident code and version: MELCOR 2.2 v. 18019**
- **Uncertainty Tool and version: Dakota 6.13.0**
- **Computing environment (hardware):**
  - Operative systems: Windows 10 Pro 64
  - RAM: 32 GB
  - CPU characteristics: Intel® Core™ i7-10750H

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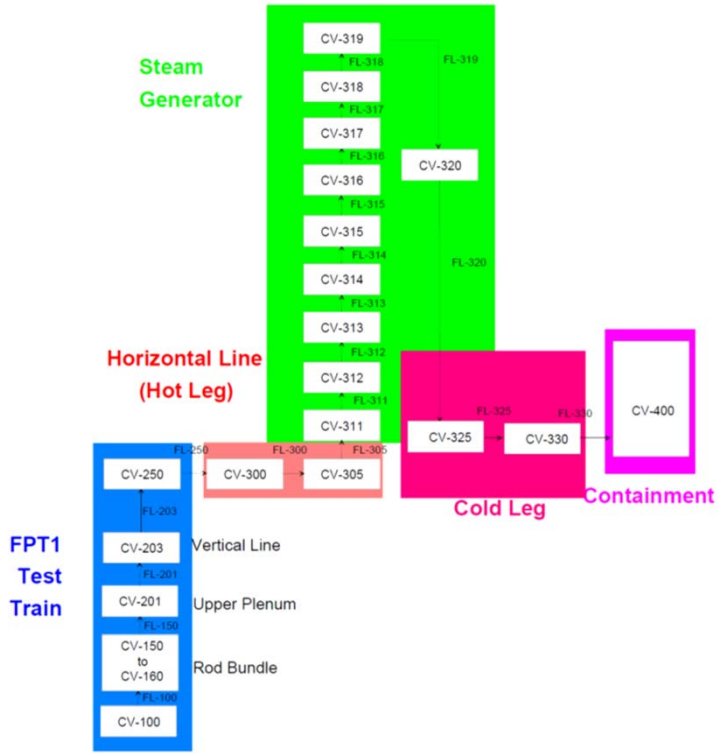
DESCRIPTION OF THE NODALIZATION AND MAIN HYPOTHESIS

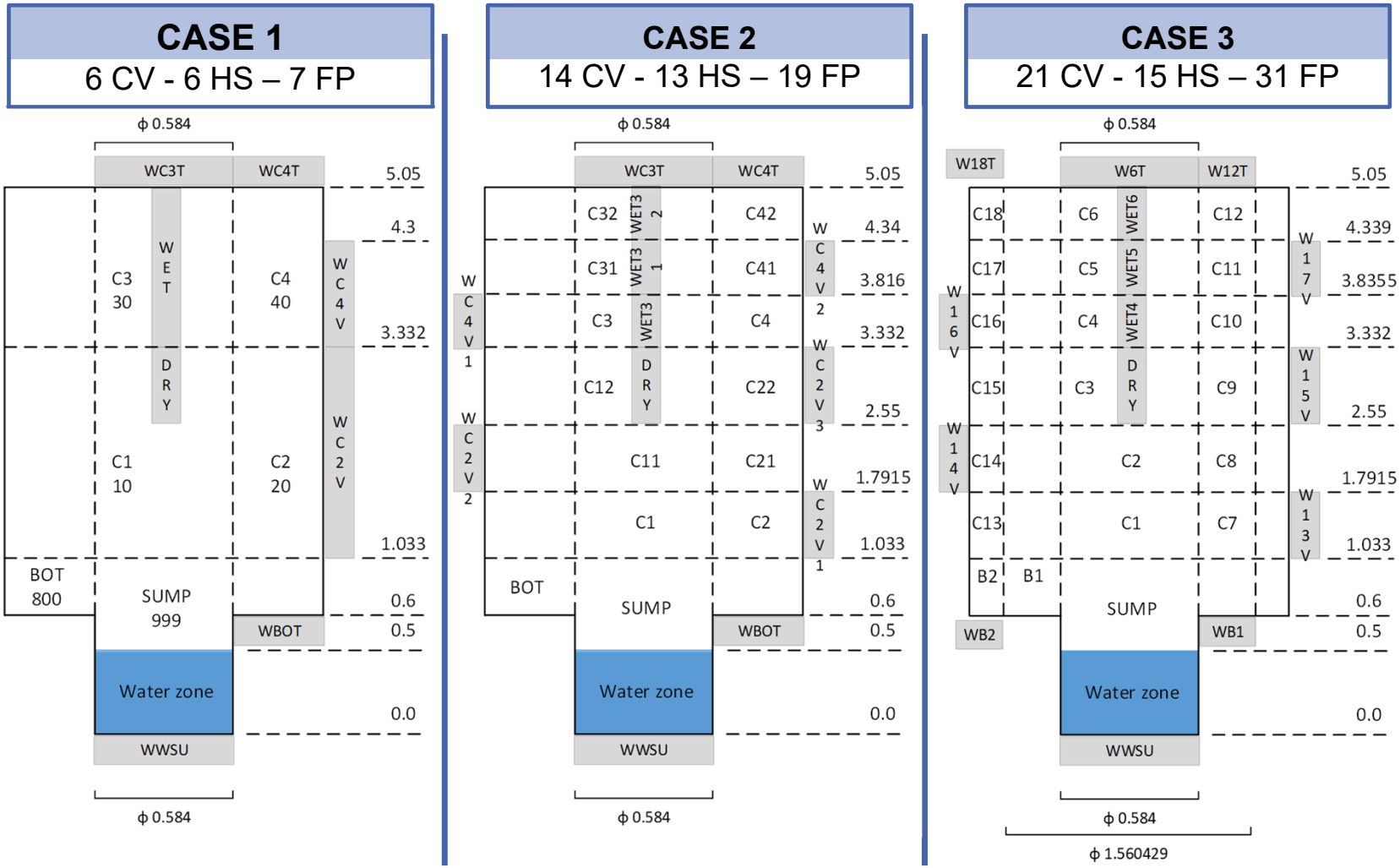
- SNL Nodalization
- Hypothesis and approximations: it is too coarse…
- A check is in progress on SNL input deck vs. FPT1 data

Sketch of the nodalization



CV nodalizations for the Phébus FPT tests

Three nodalisations have been developed for the containment.



DESCRIPTION OF THE REFERENCE CASE APPLICATION

- Very short description of the reference case. The focus of the description is to show
  - Progress of the activity – SNL input deck control
  - Eventual issues,
  - Challenges,
  - etc

- FOM to be selected (UNIPI will be focalized on CV behaviour)

Table : List of FOM selected by the Partner for the WP4 FPT1 exercise

e.g.	PARAMETER
1	Release of iodine from top of the bundle [% of i.i.]
2	Release of Caesium from top of the bundle [% of i.i.]
3	Caesium retention in the circuit [% of Cs released from the core]
4	Aerosol amount in the containment's atmosphere [g]
5	Total gaseous iodine amount in the containment's atmosphere [g]
6	Total iodine aerosols amount in the containment's atmosphere [g]
7	Total deposited/adsorbed iodine amount in the containment [g]

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CALCULATION ENVIRONMENT ARCHITECTURE

- **Brief description of the coupling between the uncertainty tool and the severe accident code**

  SNAP

Figure: Sketch of the severe accident code and uncertainty tool calculation scheme

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DESCRIPTION OF THE INPUT UNCERTAINTY PARAMETERS AND OF THE UNCERTAINTY METHODOLOGY THAT WILL BE USED

- Please underline the input uncertain parameters that you selected from the WP2 database.
- Please characterize in the following table only those parameters that you are going to use and are not part of the WP2 database

Table: Partner input uncertainty parameters different from those given in WP2 database

		Reference values	Range of Variation (e.g. ±20%, ±50%, etc.)	PDF Type (e.g. uniform, normal, etc.)	Note
1	parameter				

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DESCRIPTION OF THE INPUT UNCERTAINTY PARAMETERS AND OF THE UNCERTAINTY METHODOLOGY THAT WILL BE USED

Table : Partners uncertainty methodology brief description in a tabular form

	Partner Choice
Uncertainty Methodology used	e.g. probabilistic method to propagate input uncertainty, etc.
Methods used to define the required number of samples	e.g. Wilks, etc.
Sampling methods	e.g. Latin Hypercube, etc.
Probability and confidence level selected	e.g. 95%, 95%
Statistical analyses of the FOMs	e.g. min value, max value, mean, median standard deviation, cumulative distribution function -CDF-, probability density function -PDF-, etc.
Sensitivity analyses used to characterize the relation between the input uncertainty parameters and the FOM	e.g. Pearson, Spearman, etc.

ONLY A FEW INFORMATION,
MAIN REFERENCE IS THE WP3

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REMARKS

- Status of the activity: UNIPI has participated to ISP-46 and Phebus Interpretation circles but the activities were focalized on CV behavior (th and aerosol behaviour) using a fine CV nodalization. Now there are delay in the complete analysis as reported in the following
- Delay if any: delay with the re-issue of the MELCOR license (resolved in December 2020), stop in the activities for sanitary emergency
- Challenges: to be able to perform the calculation phase activities on time…
- Additional remarks: none

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