CONTAINMENT MODELING STRATEGY AND RESULTS

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INTRODUCTION

- Objectives of the presentation
  - Exchange experience and information about model development and assessment efforts
    - Key messages from model development and open questions
    - Focus on modeling activities, some sample results
  - Future interests

Insights on modeling strategy

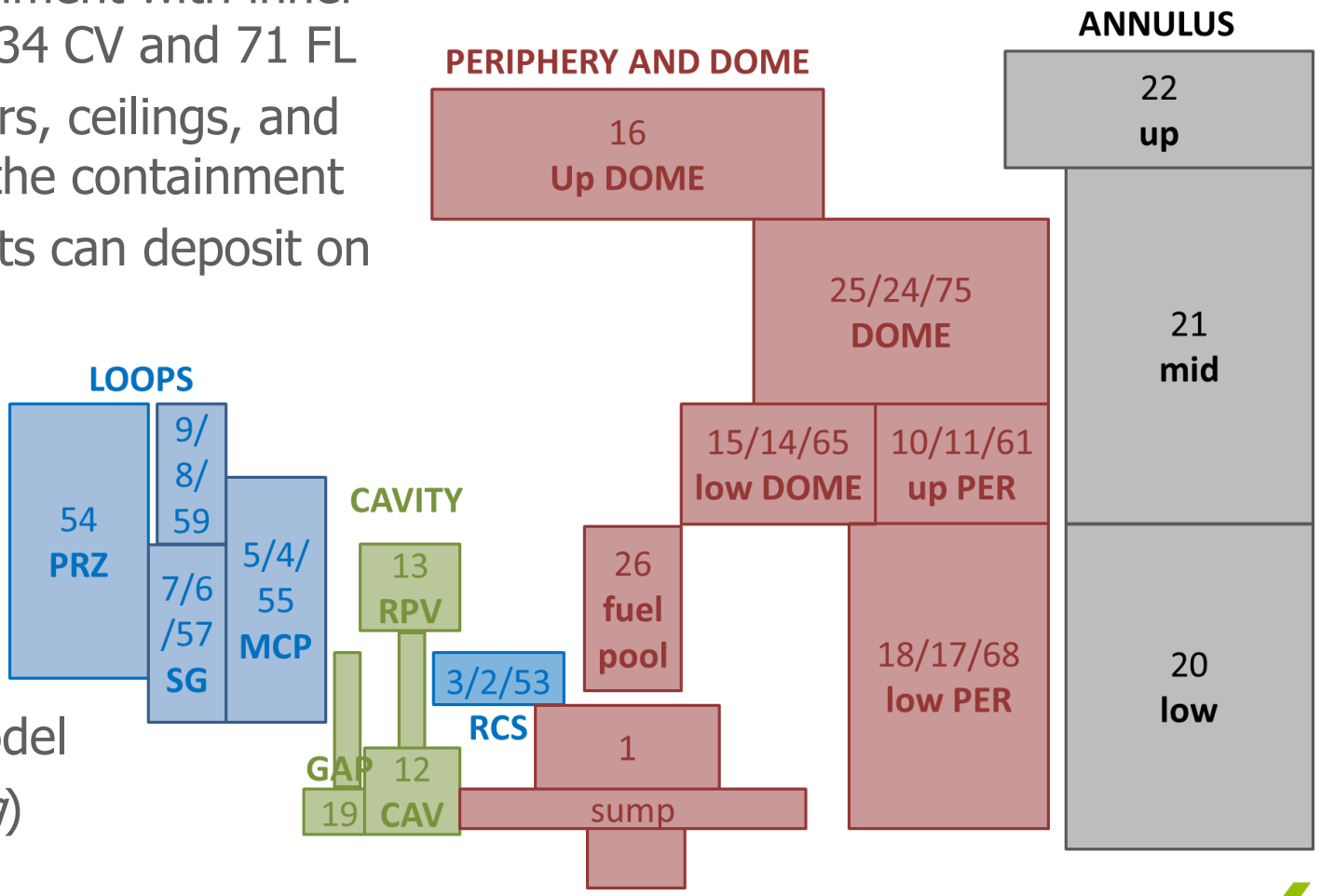
CONTAINMENT MODELING

MAIN ASSUMPTIONS

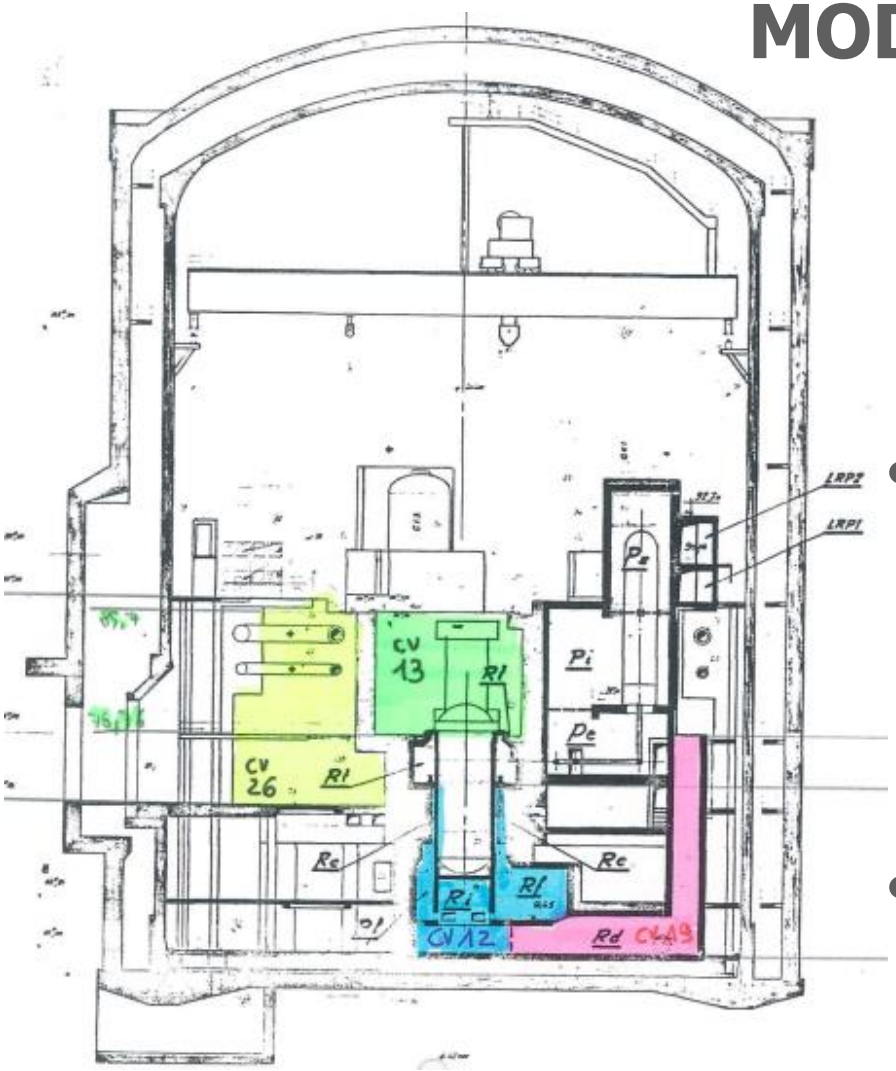
- Development directly for MELCOR 2.x, no conversion needed
- **Finding documentation suitable for model development is challenging**
  - Effort to interpret and convert the technical plant data into the code input data
  - Calculations necessary to convert the technical plant data to the necessary format for the input deck
- Identification of volumes, flow paths and heat structures from detailed plant measurements
  - Identification and grouping of the volumes, openings and surfaces
  - Floor-by-floor strategy
  - Verification of global values (e.g. volumes, surfaces)

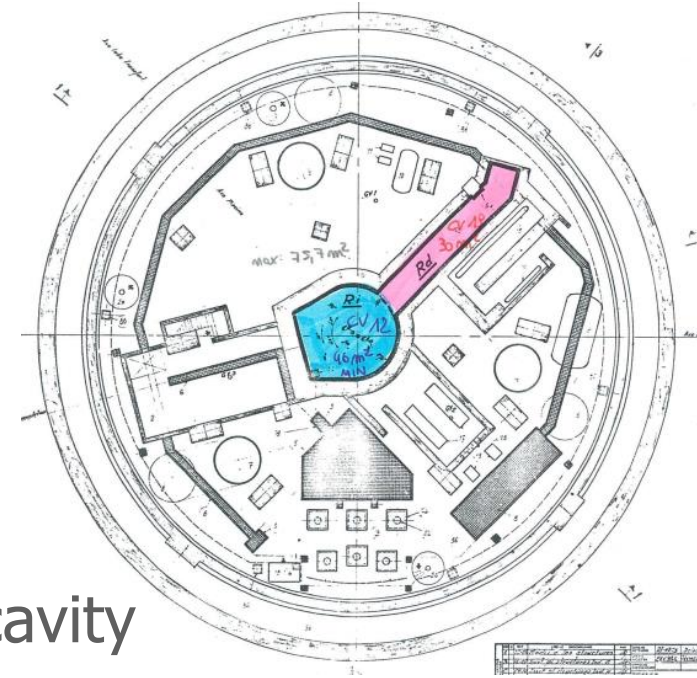
MODELING

- Double containment with inner metallic liner: 34 CV and 71 FL
- HS: walls, floors, ceilings, and equipment in the containment
- Fission products can deposit on any structure
- Gravitational settling only on horizontal structures
- CFVS, DF
- Spray, film model
- PARs (*ongoing*)



MODELING



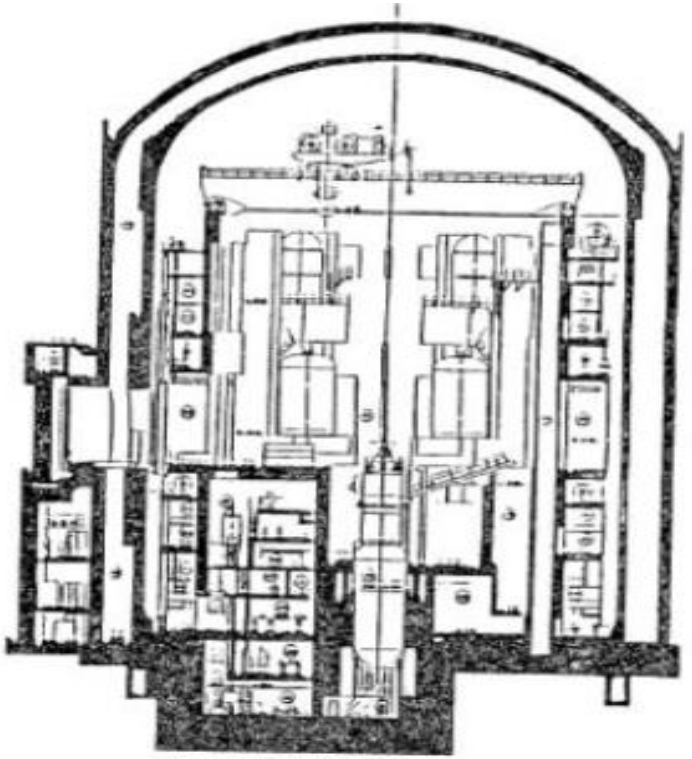


- Reactor cavity
  - LCS concrete
  - Melt spreading in dry cavity, late cavity flooding, after RPV failure
  - Spreading area: cylindrical part with access gallery, isolated from the sump
- Ongoing plants modifications: direct cavity injection and alternative spray

Simpler 1CV containment, for specific model development

Upcoming MODELING

- Reactor cavity
  - SIL concrete
  - Early cavity flooding, before RPV failure
  - Cavity: cylindrical part with small access gallery
- Reactor cavity is lower than containment floor and sump



- Connection between lower containment and cavity
- Deep water pool can be created by gravity-driven early flooding

FEEDBACK ON MODELING

- Containment modeling
  - Conversion of plant data in code input data
  - Selection of nodalization scheme
  - Validation: need to run the whole accident progression
  - PARs modeling ongoing, thanks to support by code developers
- Modeling strategy
  - Nodalization depends on the purpose of the analysis
  - **What is the most suitable level of detail? For which purpose?** Useful to share info about it

Code developers: effort in providing examples during users' workshops and modeling guide is highly appreciated!

Containment modeling strategy and results

CONCLUSIVE REMARKS

CONCLUSIVE REMARKS & FUTURE PLANS

- Exchange experience and information about model development and assessment efforts
- Ongoing activities
  - LOCA and SBO scenarios analyses, in support of the evaluation of the Belgian NPPs safety assessments (WENRA RL2014 and new EC Nuclear Safety Directive 2014/87/EURATOM)
- Possible future activities
  - Participation to MUSA with MELCOR code and MELCOR uncertainty engine
  - Participation to R2CA with MELCOR and MACCS codes
  - Interest in using MELCOR for OECD/NEA ROSAU analytical activities

QUESTIONS?

THANKS FOR YOUR ATTENTION!