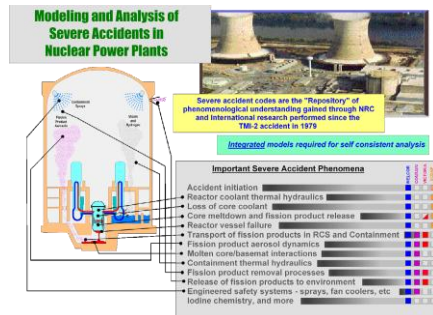


*Exceptional service in the national interest*



## MELCOR/Contain-LMR Integration

### *Preserving and Enhancing U.S. Sodium Fire Modeling Capabilities*

A sodium coolant accident analysis code is necessary to provide regulators with a means to perform confirmatory analyses for future sodium reactor submissions. MELCOR and CONTAIN, which are currently employed by the USNRC for LWR licensing, have been traditionally used for level 2 and level 3 probabilistic analyses as well as containment design basis accident analysis.

To meet future regulatory needs, new models will be added to the MELCOR code for simulation of Liquid Metal Reactor (LMR) designs. Existing models developed for separate effects codes will be integrated into the MELCOR architecture. This work will integrate into MELCOR, those CONTAIN code capabilities that feasibly fit within the code architecture.

Implementation of such models for sodium reactor simulation into an actively maintained, full-featured integrated severe accident code fills a significant gap in capability for providing the necessary analysis tools for regulatory licensing. Current work scope will focus on the following implementation goals:

**Phase 1:** Implement sodium Equations of State (EOS) as a working fluid for a MELCOR calculation from:

- The fusion safety database (FY13)
- The SIMMER-III Code (FY13)
- The SAS4a Code

**Phase 2:** Examine and test changes to the CONTAIN-LMR Implemented by JAEA, specifically:

- Aerosol Condensation
- Implementation of the capability for simultaneous sodium and water condensation modeling

**Phase 3:** Implementation and Validation of CONTAIN models (1)

- Sodium Spray Fires (including new test data)
- Sodium Pool Modeling
- Sodium Pool Fires

**Phase 4:** Implementation and Validation of CONTAIN models (2)

- Debris Bed/Concrete Cavity Interactions
- Sodium Pool Chemistry
- Atmospheric Chemistry