

June 6, 2011

MEMORANDUM TO: John McKirgan, Chief
Containment & Ventilation Branch
Division of Safety Systems & Risk Assessment
Office of New Reactors

Robert L. Dennig, Chief
Containment & Ventilation Branch
Division of Safety Systems
Office of Nuclear Reactor Regulation

FROM: Richard Y. Lee, Chief */RA/*
Fuel & Source Term Branch
Division of Systems Analysis
Office of Nuclear Regulatory Research

SUBJECT: MELCOR APPLICATION OF SELECTED DESIGN-BASIS
ACCIDENTS ANALYSES

Enclosed are two RES/FSTB Reports: 2011-01; entitled, "Application of the MELCOR Code to Design Basis BWR Containment Analysis" and 2011-02; entitled, "Application of the MELCOR Code to Design Basis Subcompartment Analysis." In order to assess the adequacy of containment thermal-hydraulic modeling incorporated in the MELCOR code to audit industry's safety analysis calculations for standard boiling water reactors (BWR) and subcompartment pressure and temperature transient analysis, targeted plant calculations were performed. These reports document MELCOR code [version 1.8.6] demonstration calculations performed for selected postulated design basis accident (DBA) analyses inside containment and which are systematically compared to CONTAIN code results.

The BWR Mark I, II, and III containment configurations were analyzed in order to predict design basis peak pressure and temperature conditions inside the drywell and wetwell regions. And the key result for subcompartment analysis is the calculated pressure differential between adjacent subcompartments during a variety of postulated high-energy line breaks. The MELCOR code demonstration calculations performed were compared to CONTAIN code calculations. These code-to-code comparisons reveal an "equivalency" between the calculated results, and therefore, MELCOR can be used for these types of design basis analyses. Moreover it was shown that the MELCOR code was more suited and superior to CONTAIN in the long-term DBA BWR demonstration plant case in which a simplified RPV control volume was modeled. So the modeling efficiency and performance for this type of analysis provided an added benefit when using MELCOR.

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Draft versions of these reports were previously distributed to your cognizant staff for review, and any comments received were addressed. These reports are placed in ADAMS and will be accessible to the public.

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I would appreciate it if you would see that this short -- approximately 5 minutes -- survey is completed by the responsible manager or supervisor, giving your Office's views of the delivered RES product, within the next 10 working days.

Considering previous DBA analyses related to MELCOR applications and assessments completed over the past several years, it is our view that MELCOR has practically "replaced" the CONTAIN code when there is a need to perform containment analysis audit calculations. There are a few on-going activities that need to be completed, e.g., code assessment of the HDR experiments; code assessment of an ice condenser plant design and incorporate code modifications that facilitate containment analysis studies. However, these issues are somewhat minor in nature and we do not expect any adverse results. Furthermore, it is our intention in the next several years to conduct several MELCOR training sessions in the area of design basis containment analysis.

And as usual we will be available to facilitate your staff in running MELCOR and provide technical support as needed. Please contact Allen Notafrancesco (301 251-7560) for any further discussion on this matter.

Enclosures:
As stated

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