

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

APR1400 Design Certification

Korea Electric Power Corporation / Korea Hydro & Nuclear Power Co., LTD

Docket No. 52-046

RAI No.: 385-8465

SRP Section: 06.02.01.04 - Mass and Energy Release Analysis for Postulated Secondary System Pipe Ruptures

Application Section: 6.2.1.4 - Mass and Energy Release Analysis for Postulated Secondary System Pipe Rupture Inside Containment

Date of RAI Issue: 02/01/2016

Question No. 06.02.01.04-7

The SGN-III computer code is used for the secondary system pipe break analysis. However, the DCD or TeR do not comment on the acceptability of the SGN-III code for this application, which needs to be established. The applicant should document whether the SGN-III computer codes has been validated against pertinent experimental data. The applicant is also suggested to update the title of the KHNP Technical Report APR1400-Z-A-NR-14007-P/NP, i.e., "LOCA Mass and Energy Release Methodology," as it also covers the mass and energy release methodology for both LOCA and secondary pipe ruptures, e.g., MSLBs.

Response

The KHNP Technical Report APR1400-Z-A-NR-14007-P/NP, "LOCA Mass and Energy Release Methodology", will be updated to cover the mass and energy release methodology for both LOCA and MSLB.

The SGN-III computer codes validated against pertinent experimental data are documented in CESSAR, Appendix 6B.

An important factor in the MSLB analysis is the initial rate of level swell following the break and whether or not the swell is sufficient for the two-phase level to reach the steam generator nozzles. Once the level reaches the nozzles, the two-phase blowdown is so rapid that the increasing specific volume of the steam due to depressurization is sufficient to keep the two-phase level at the nozzle for most of the transient.

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The initial conditions and comparison results for the each experiment are described as follows:



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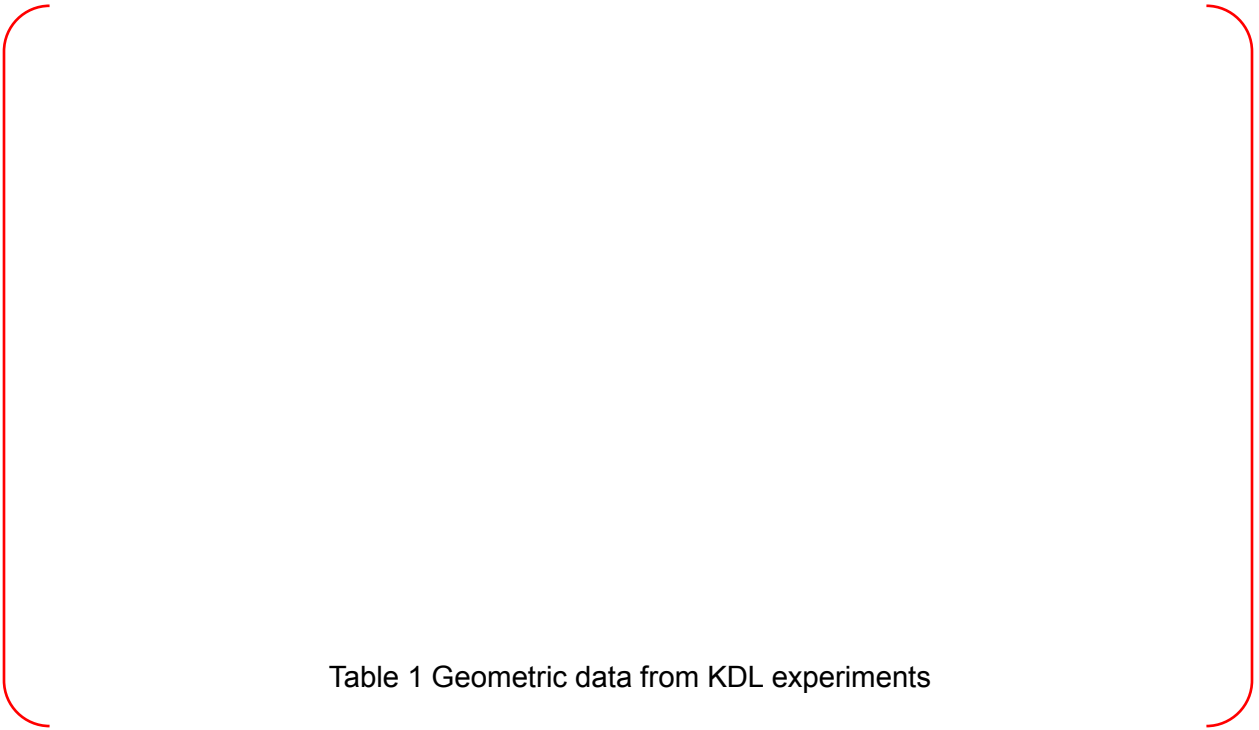
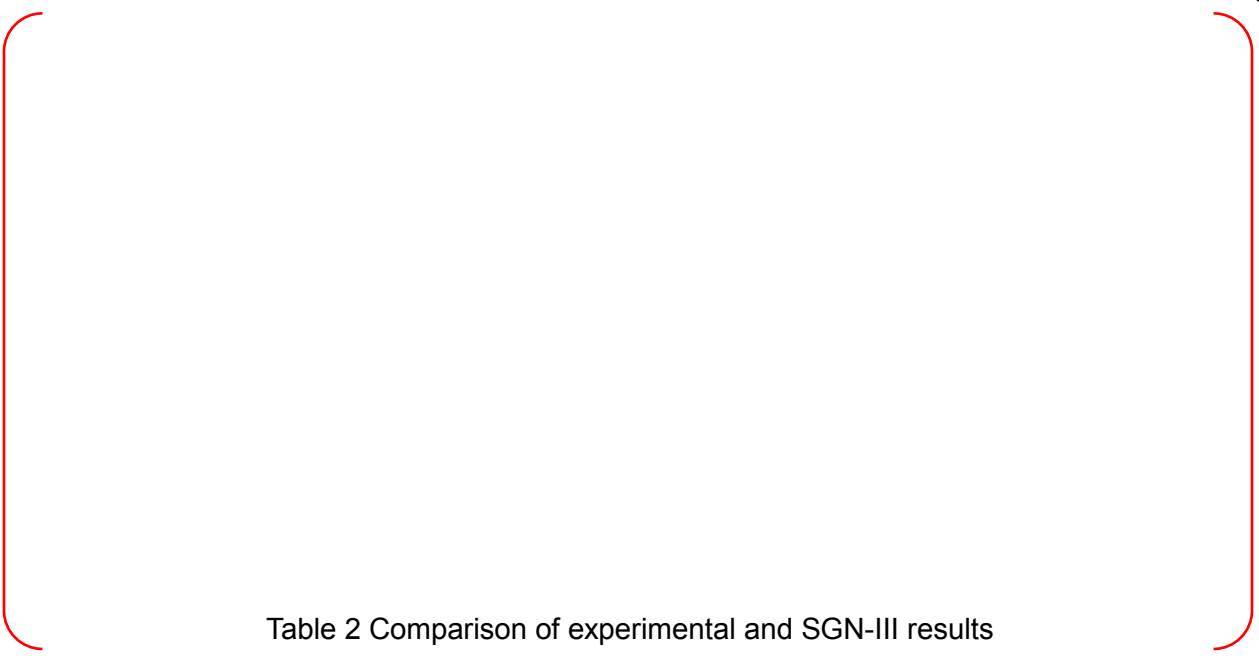
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Table 1 Geometric data from KDL experiments

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Table 2 Comparison of experimental and SGN-III results

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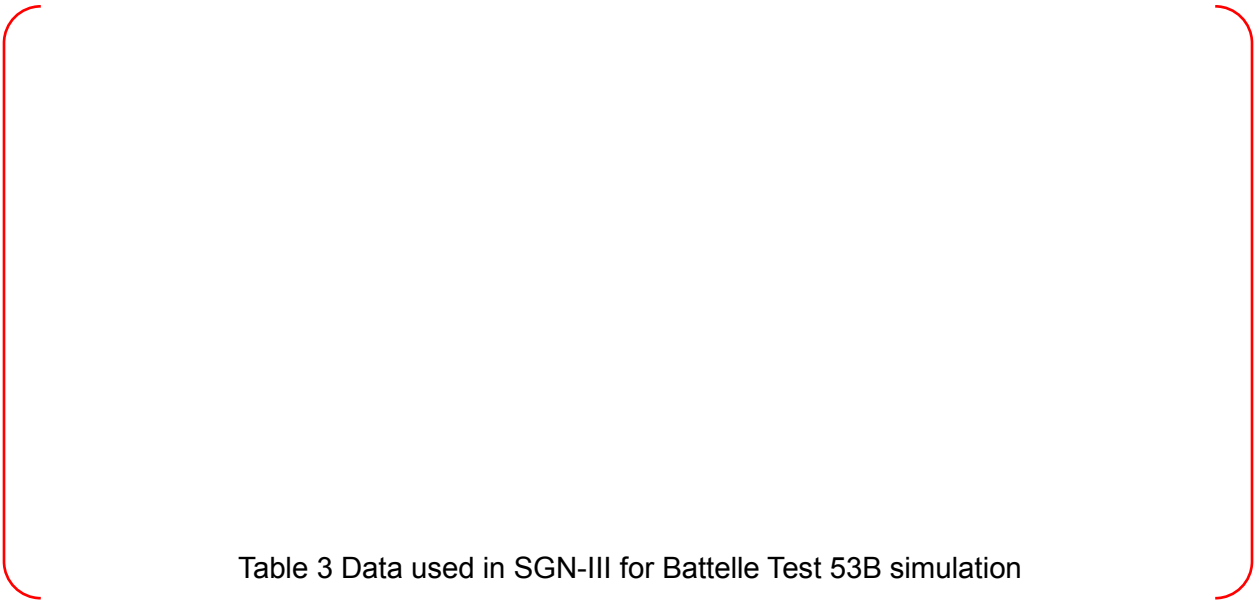


Table 3 Data used in SGN-III for Battelle Test 53B simulation

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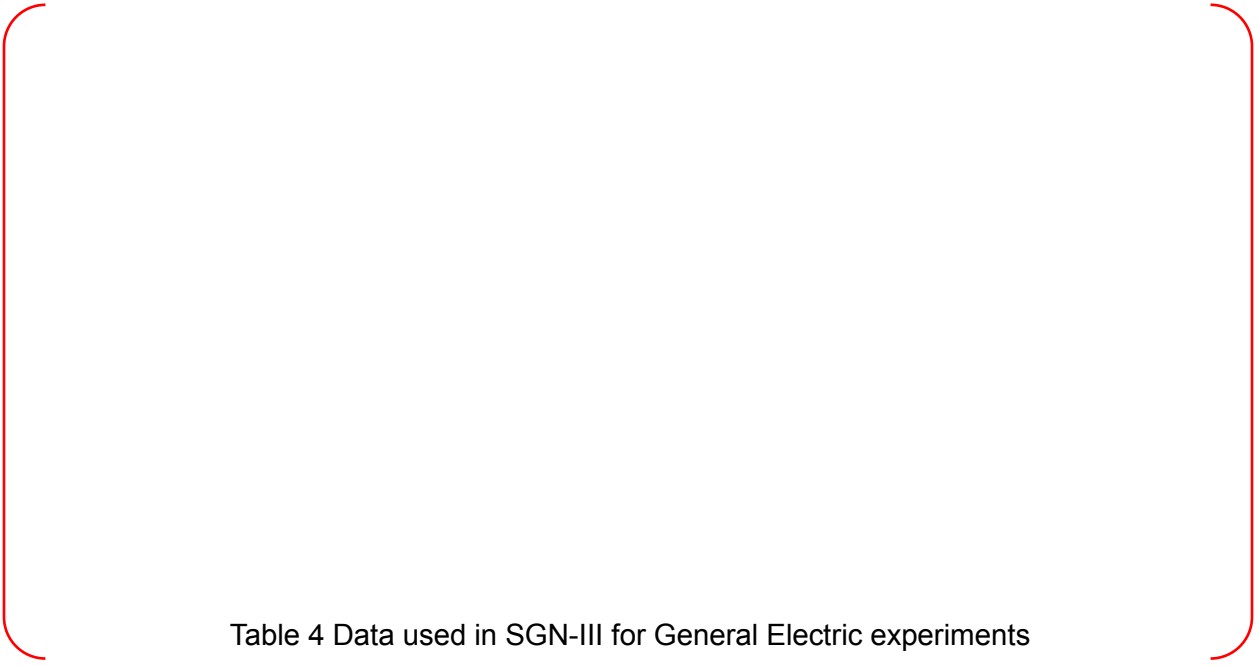


Table 4 Data used in SGN-III for General Electric experiments

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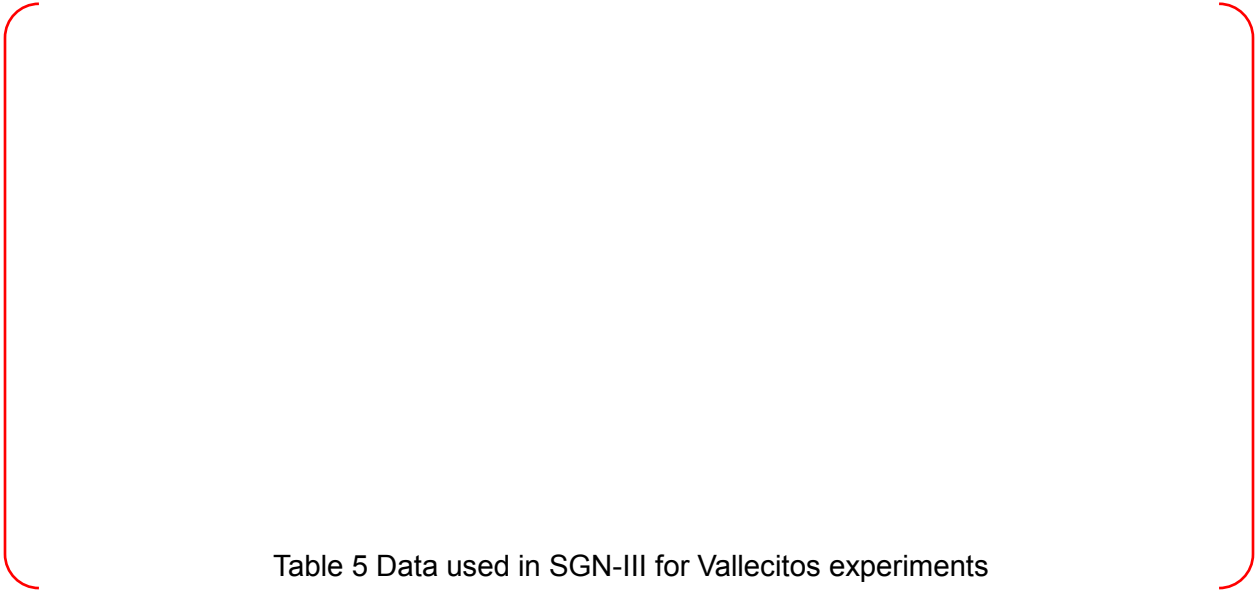


Table 5 Data used in SGN-III for Vallecitos experiments

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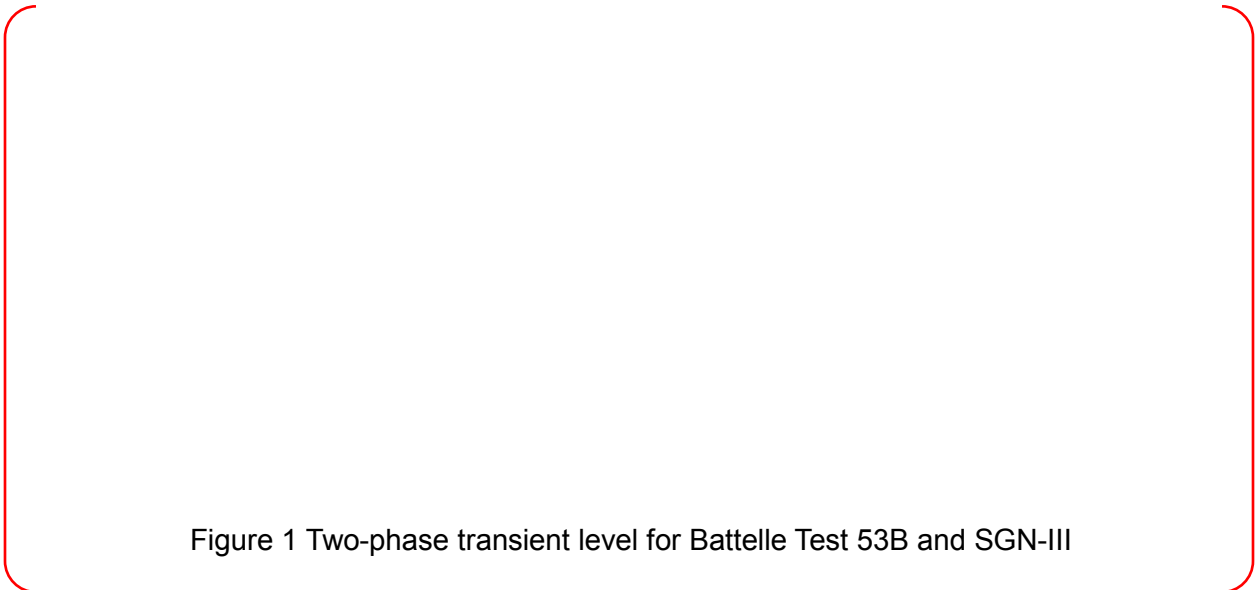


Figure 1 Two-phase transient level for Battelle Test 53B and SGN-III

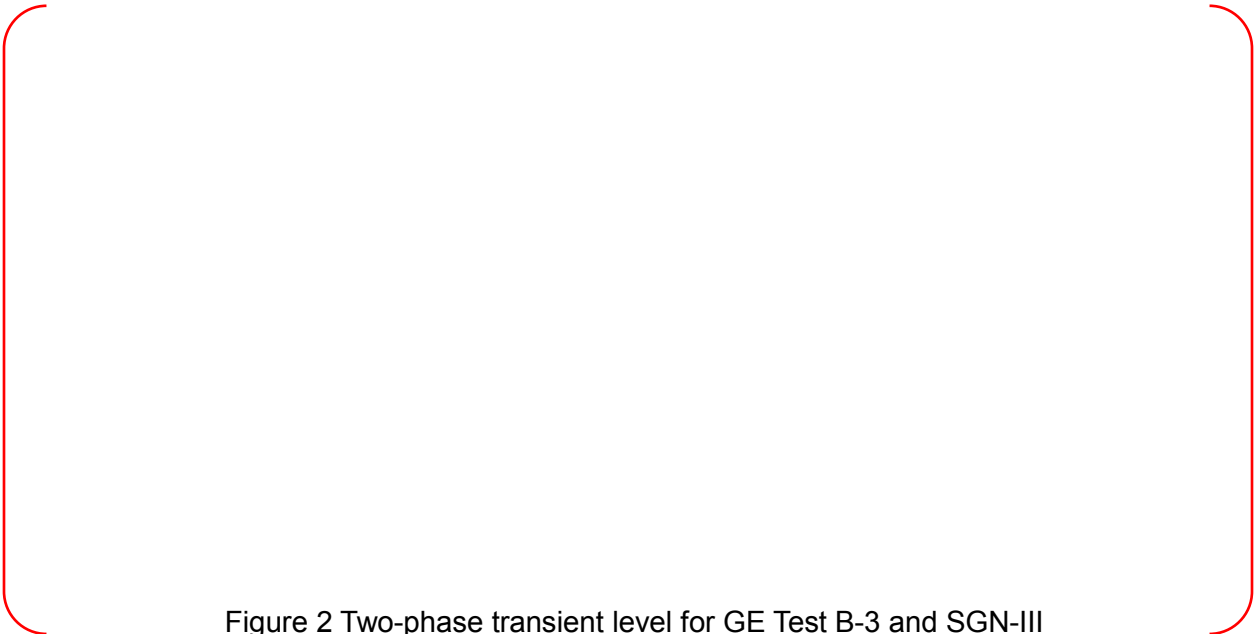


Figure 2 Two-phase transient level for GE Test B-3 and SGN-III

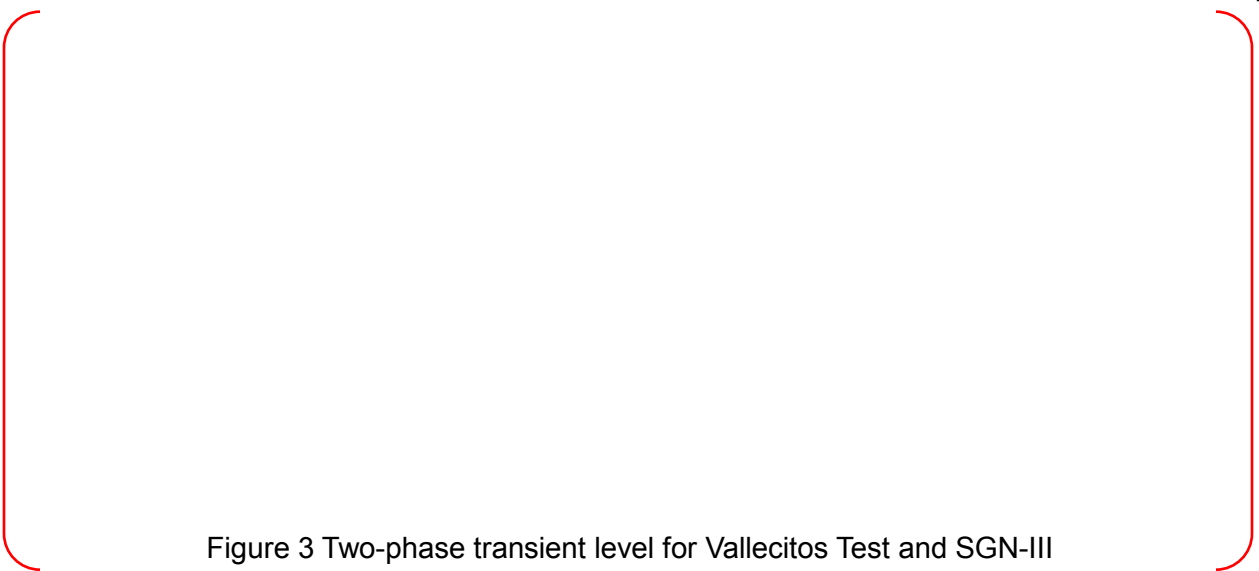


Figure 3 Two-phase transient level for Vallecitos Test and SGN-III

Impact on DCD

There is no impact on the DCD.

Impact on PRA

There is no impact on the PRA.

Impact on Technical Specifications

There is no impact on the Technical Specifications.

Impact on Technical/Topical/Environmental Reports

KHNP Technical Report APR1400-Z-A-NR-14007-P/NP, "LOCA Mass and Energy Release Methodology", will be updated to cover the mass and energy release methodology for both LOCA and MSLB.