52-003

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

May 2, 1996

APPLICANT: Westinghouse Electric Corporation

FACILITY: AP600

SUBJECT: SUMMARY OF AP600 DESIGN REVIEW MEETING REGARDING THE PASSIVE CONTAINMENT COOLING SYSTEM (PCS) AND WGOTHIC COMPUTER CODE

On April 22 and 23, 1996, representatives of the U.S. Nuclear Regulatory Commission (NRC), Scientech, Inc. (NRC consultant), and Westinghouse Electric Corporation (Westinghouse) met in Rockville, Maryland, to discuss the WGOTHIC computer code and PCS design review status. Attachment 1 is a list of participants.

Mass and energy transfer, changes to Westinghouse's approach for analyzing containment mixing and stratification, and scaling were discussed. Westinghouse is going to use only a lumped-parameter model to analyze all phases of the design basis accidents, rather than use both a distributed-parameter and lumped-parameter model. The use of the SATAN-VI and LOFTRAN computer codes for mass and energy calculations was discussed. Documentation on the version of LOFTRAN used by Westinghouse needs to be updated. Westinghouse indicated that LOFTRAN-AP was used and that the documentation would be changed. For scaling, a new pressure-rate-of-change calculation was recently completed and shared with the staff. It was agreed upon that Westinghouse could send in portions of the scaling work as it was completed to expedite the review. This information, in final form, will be included in the Applications Report. Issues identified that would rely on the scaled test were mixing and stratification, mass transfer, PCS natural air circulation, film stability, and heat transfer. Attachment 2 is the presentation materials provided by Westinghouse. Westinghouse informed the staff that none of this information was proprietary.

Westinghouse requested staff response to their characterization of the status of the PCS and WGOTHIC computer code validation review as it would be presented by Westinghouse to the Advisory Committee on Reactor Safeguards (ACRS) on May 9 and 10, 1996. These draft slides contained proprietary information and were used for discussion purposes only. The slides were collected at the conclusion of the meeting. Changes to the slides were mutually agreed upon to reflect the proper characterization of the issues and the status of the review.

The following are issues that will be addressed in future meetings and submittals:

1. Westinghouse needs to demonstrate that the seven nodes chosen by Westinghouse in the WGOTHIC computer code adequately models the AP600 design. Westinghouse indicated that this information would be included in the Applications Report, which is scheduled to be submitted on June 28, 1996.

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2. Westinghouse needs to demonstrate the sensitivity of the mixing above and below the operating deck. Westinghouse indicated that this information would be included in the Applications Report, which is scheduled to be submitted on June 28, 1996.

3. Westinghouse needs to justify the use of forced convection for mass transfer in the dome area.

original signed by:

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Office of Nuclear Reactor Regulation

Docket No. 52-003

Attachments: As stated

cc w/attachments:
See next page

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WESTINGHOUSE/NRC MEETING

PASSIVE CONTAINMENT COOLING SYSTEM

APRIL 22 AND 23, 1996

MEETING PARTICIPANTS

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LOTHAR WOLF	NRC CONSULTANT
JOHN BUTLER	WESTINGHOUSE
JIM GRESHAM	WESTINGHOUSE
DAN SPENCER	WESTINGHOUSE
JOEL WOODCOCK	WESTINGHOUSE

Attachment 1

WESTINGHOUSE PRESENTATION MATERIALS

FOR THE APRIL 22 AND 23, 1996, MEETING BETWEEN

WESTINGHOUSE AND THE NRC ON

PASSIVE CONTAINMENT COOLING SYSTEM

Attachment 2

PCS DBA transient evaluation simplifications

- Temporal partitioning

- Spatial partitioning
  - Heat sink distribution among compartments
  - Circulation potential

    Simplified flow network based on domonant heat sink content

    Dead-ended compartments

AP600 PCS DBA - LOCA Temporal Partitioning

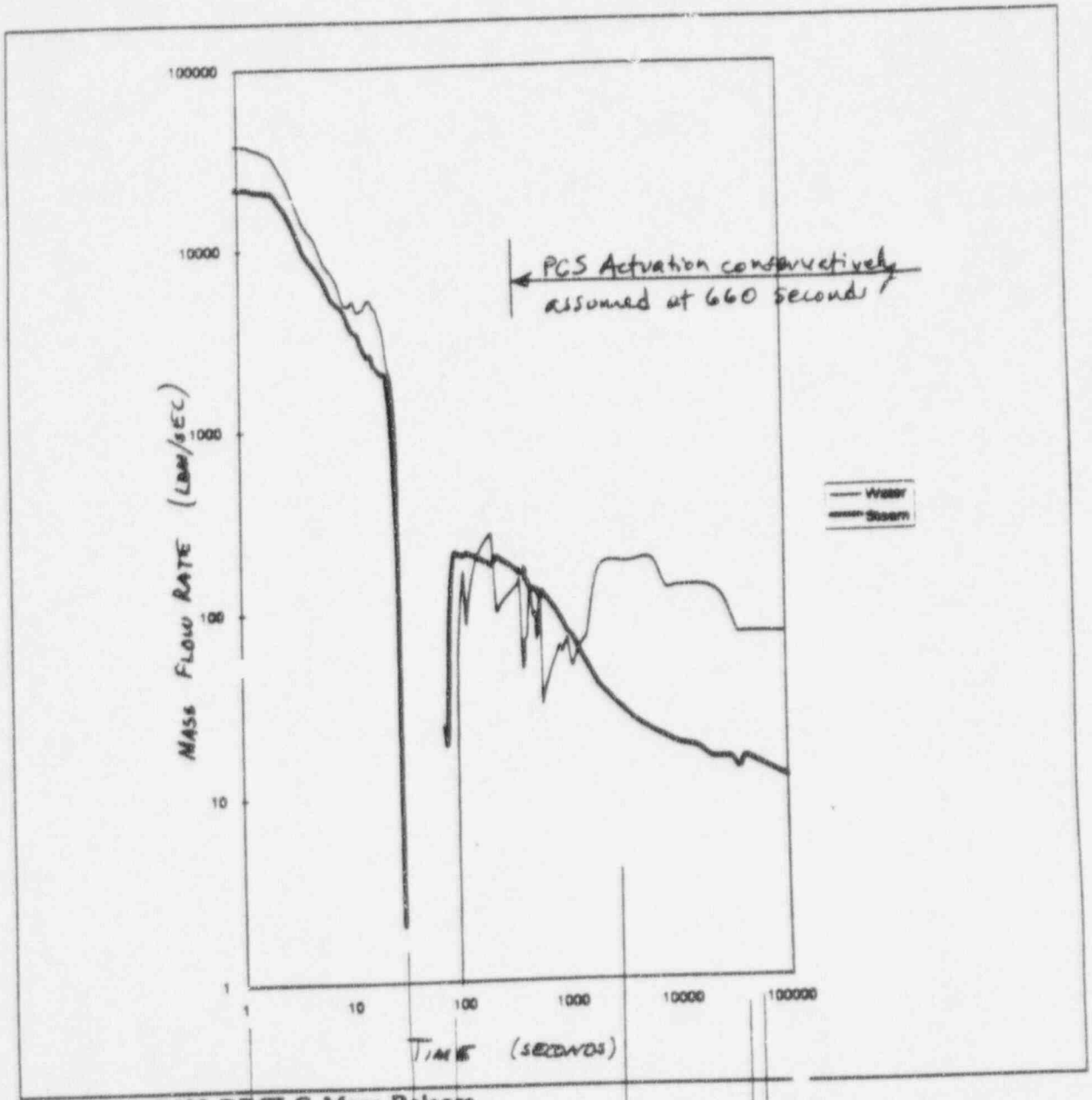


Figure 3 AP600 DECLG Mass Release

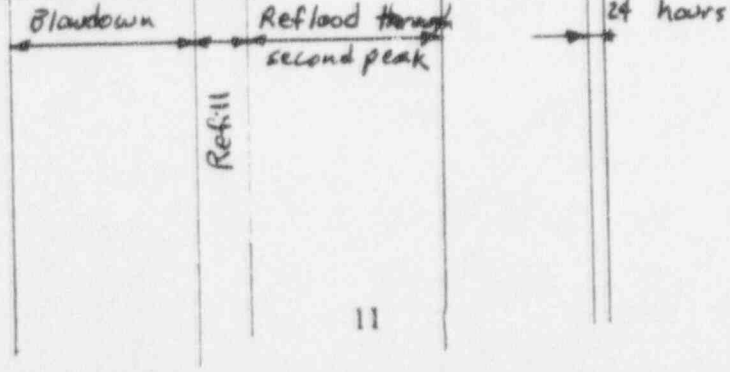
LB LOCA (4 loop Plant)

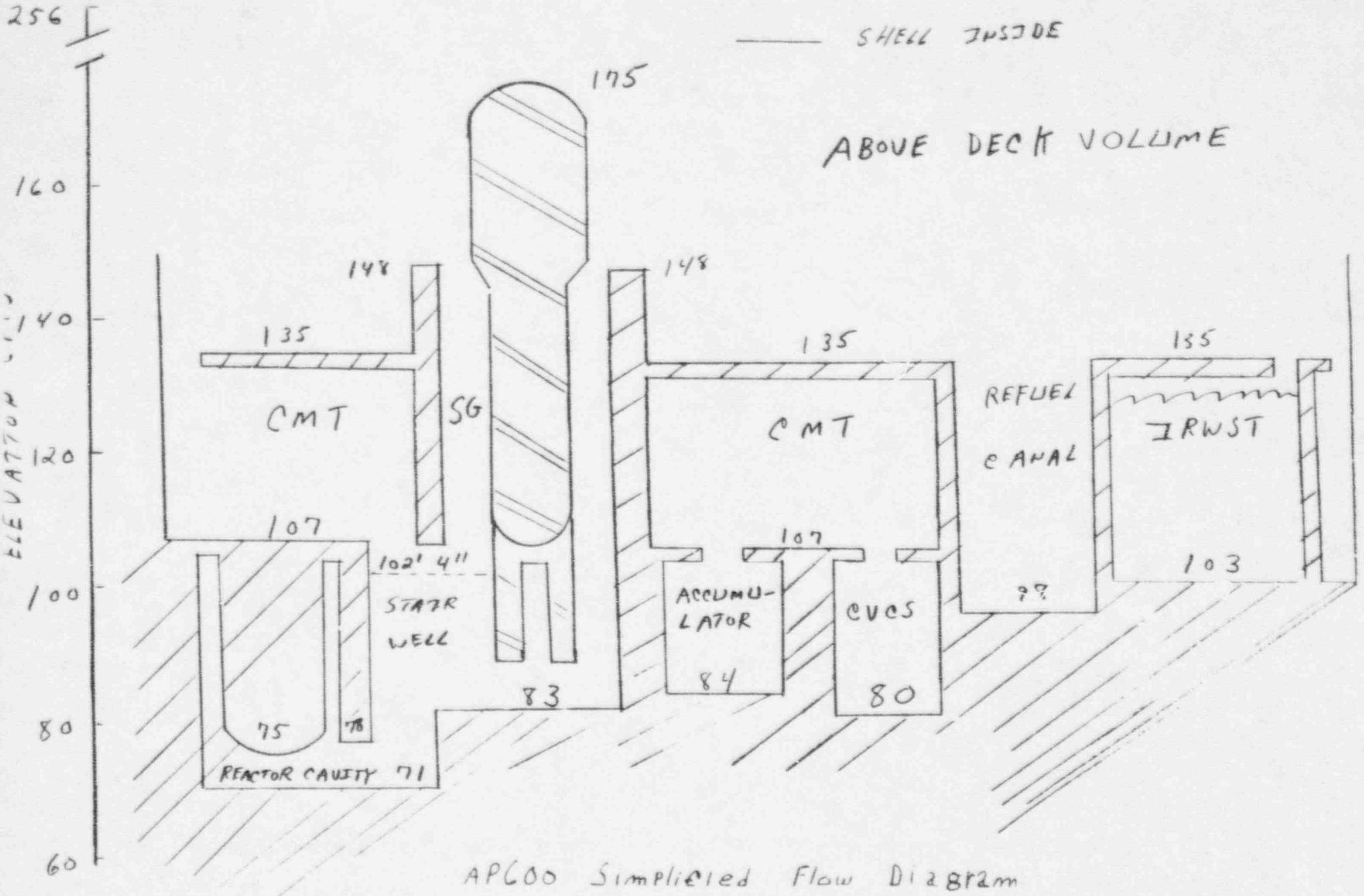
0-12 s. Blowdown (ends with accum injection)

12-33 s. Refill (ends when bottom of core is reached)

36 s. Primary P = Cont. P.

33-150 s. Reflood (ends when core is quenched)





AP600 Simplified Flow Diagram

Mixing and stratification

- Summary results

LOCA biases for peak pressure

- For SG break case, lumped parameter can simulate circulation effects

- For CMT break case, ~½ CMT room heat sinks eliminated to account for potential for stratification

- Dead-ended compartments eliminated for t > 30 seconds

- Floors are eliminated in compartmens

LOCA biases at 24 hours

- Lumped parameter predicts well mixed containment by 24 hours which is conservative for PCS heat removal

MSLB biased to maximize transient pressure

- Break is assumed in the Lumped Parameter node just above the operating deck to reduce steam access below deck

CMT Room Layout