NUCLEAR ENERGY BUSINESS GROUP • GENERAL ELECTRIC COMPANY
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# GENERAL ELECTRIC

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## ERRATA And ADDENDA SHEET

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*NOTE: Correct all copies of the applicable publication as specified below.*

| ITEM | REFERENCES (SECTION, PAGE PARAGRAPH, LINE) | INSTRUCTIONS (CORRECTIONS AND ADDITIONS) |
|---|---|---|
| 01 | Page v/vi | Replace with new page v/vi. |
| 02 | Page 3-1/3-2 | Replace with new page 3-1/3-2. |
| 03 | Page 4-3 | Replace with new page 4-3. |
| 04 | Pages 4-9 & 4-10 | Replace with new pages 4-9 and 4-10. |
| 05 | Page 4-11 | Add new page 4-11. |
| | | NOTE: Brackets in right-hand margin indicate areas of revision. |

## LIST OF TABLES

# 3. INPUT TO ANALYSIS

A list of the significant plant input parameters to the LOCA analysis is presented in Table 1.

Table 1

SIGNIFICANT INPUT PARAMETERS TO THE LOSS-OF-COOLANT ACCIDENT ANALYSIS

Plant Parameters:

| | |
|---|---|
| Core Thermal Power | 3440 MWt, which corresponds to 105% of rated steam flow |
| Vessel Steam Output | $14.05 \times 10^6$ lbm/h, which corresponds to 105% of rated steam flow |
| Vessel Steam Dome Pressure | 1055 psia |
| Recirculation Line Break Area for Large Breaks - Discharge | 1.9 $ft^2$ (DBA)   1.3 $ft^2$ (66% DBA) |
| - Suction | 4.2 $ft^2$ |
| Number of Drilled Bundles | 716 |

Fuel Parameters:

| Fuel Type | Fuel Bundle Geometry | Peak Technical Specification Linear Heat Generation Rate (kW/ft) | Design Axial Peaking Factor | Initial Minimum Critical Power Ratio* |
|---|---|---|---|---|
| A. IC Type 1 & 3 | 7 x 7 | 18.5 | 1.5 | 1.2 |
| B. IC Type 2 | 7 x 7 | 18.5 | 1.5 | 1.2 |
| C. 8DB274L | 8 x 8 | 13.4 | 1.4 | 1.2 |
| D. 8DB274H | 8 x 8 | 13.4 | 1.4 | 1.2 |
| E. 8DRB284L | 8 x 8 | 13.4 | 1.4 | 1.2 |
| F. P8DRB284L | 8 x 8 | 13.4 | 1.4 | 1.2 |
| G. P8DRB265H | 8 x 8 | 13.4 | 1.4 | 1.2 |

]

*To account for the 2% uncertainty in the bundle power required by Appendix K, the SCAT calculation is performed with an MCPR of 1.18 (i.e., 1.2 divided by 1.02) for a bundle with an initial MCPR of 1.20.

## 4.5 RESULTS OF THE CHASTE ANALYSIS

This code is used, with suitable inputs from the other codes, to calculate the fuel cladding heatup rate, peak cladding temperature, peak local cladding oxidation, and core-wide metal-water reaction for large breaks. The detailed fuel model in CHASTE considers transient gap conductance, clad swelling and rupture, and metal-water reaction. The empirical core spray heat transfer and channel wetting correlations are built into CHASTE, which solves the transient heat transfer equations for the entire LOCA transient at a single axial plane in a single fuel assembly. Iterative applications of CHASTE determine the maximum permissible planar power where required to satisfy the requirements 10CFR50.46 acceptance criteria.

The CHASTE results presented are:

- Peak Cladding Temperature versus time
- Peak Cladding Temperature versus Break Area
- Peak Cladding Temperature and Peak Local Oxidation versus Planar Average Exposure for the most limiting break size
- Maximum Average Planar Heat Generation Rate (MAPLHGR) versus Planar Average Exposure for the most limiting break size

A summary of the analytical results is given in Table 2. Table 3 lists the figures provided for this analysis. The MAPLHGR values for each fuel type in the BF-2 core are presented in Tables 4A through 4F. ]

## 4.6 METHODS

In the following sections, it will be useful to refer to the methods used to analyze DBA, large breaks, and small breaks. For jet-pump reactors, these are defined as follows:

a. DBA Methods. LAMB/SCAT/SAFE/DBA-REFLOOD/CHASTE. Break size: DBA.

b. Large Break Methods (LBM). LAMB/SCAT/SAFE/non-DBA REFLOOD/CHASTE. Break sizes: $1.0\ ft^2 \leq A < DBA$.

c. Small Break Methods (SBM). SAFE/non-DBA REFLOOD. Heat transfer coefficients: nucleate boiling prior to core uncovery, 25 Btu/hr-$ft^2$-°F after recovery, core spray when appropriate. Peak cladding temperature and peak local oxidation are calculated in non-DBA-REFLOOD. Break sizes $A \leq 1.0\ ft^2$.

Table 4C

MAPLHGR VERSUS AVERAGE PLANAR EXPOSURE

Plant: BF-2 Fuel Type: 8DB274L

| Average Planar Exposure (Mwd/t) | MAPLHGR (kW/ft) | PCT (°F) | Oxidation Fraction |
|---|---|---|---|
| 200 | 11.2 | 1652 | 0.003 |
| 1,000 | 11.3 | 1645 | 0.003 |
| 5,000 | 11.9 | 1648 | 0.003 |
| 10,000 | 12.1 | 1626 | 0.002 |
| 15,000 | 12.2 | 1642 | 0.003 |
| 20,000 | 12.1 | 1642 | 0.003 |
| 25,000 | 11.6 | 1603 | 0.002 |
| 30,000 | 10.9 | 1537 | 0.002 |
| 35,000 | 9.9 | 1447 | 0.001 |
| 40,000 | 9.3 | 1389 | 0.001 |

Table 4D

MAPLHGR VERSUS AVERAGE PLANAR EXPOSURE

Plant: BF-2 Fuel Type: 8DB274H

| Average Planar Exposure (Mwd/t) | MAPLHGR (kW/ft) | PCT (°F) | Oxidation Fraction |
|---|---|---|---|
| 200 | 11.1 | 1646 | 0.003 |
| 1,000 | 11.2 | 1635 | 0.003 |
| 5,000 | 11.8 | 1640 | 0.003 |
| 10,000 | 12.1 | 1630 | 0.002 |
| 15,000 | 12.2 | 1647 | 0.003 |
| 20,000 | 12.0 | 1648 | 0.003 |
| 25,000 | 11.5 | 1608 | 0.002 |
| 30,000 | 10.9 | 1547 | 0.002 |
| 35,000 | 10.0 | 1457 | 0.001 |
| 40,000 | 9.3 | 1401 | 0.001 |

Table 4E

MAPLHGR VERSUS AVERAGE PLANAR EXPOSURE

Fuel Types: 8DRB284L and P8DRB284L

| Average Planar Exposure (MWd/t) | MAPLHGR (kW/ft) | PCT (°F) | Oxidation Fraction |
|---|---|---|---|
| 200 | 11.2 | 1685 | 0.004 |
| 1,000 | 11.3 | 1667 | 0.003 |
| 5,000 | 11.8 | 1671 | 0.003 |
| 10,000 | 12.0 | 1647 | 0.003 |
| 15,000 | 12.0 | 1669 | 0.003 |
| 20,000 | 11.8 | 1672 | 0.003 |
| 25,000 | 11.2 | 1633 | 0.003 |
| 30,000 | 10.8 | 1596 | 0.002 |
| 35,000 | 10.0 | 1527 | 0.002 |
| 40,000 | 9.4 | 1464 | 0.001 |

Table 4F

MAPLHGR VERSUS AVERAGE PLANAR EXPOSURE

Fuel Type: P8DRB265L

| Average Planar Exposure (Mwd/t) | MAPLHGR (kW/ft) | PCT (°F) | Oxidation Fraction |
|---|---|---|---|
| 200 | 11.5 | 1674 | 0.003 |
| 1,000 | 11.6 | 1672 | 0.003 |
| 5,000 | 11.9 | 1638 | 0.003 |
| 10,000 | 12.1 | 1623 | 0.003 |
| 15,000 | 12.1 | 1633 | 0.003 |
| 20,000 | 12.0 | 1638 | 0.003 |
| 25,000 | 11.6 | 1607 | 0.002 |
| 30,000 | 11.2 | 1561 | 0.002 |
| 35,000 | 10.9 | 1523 | 0.002 |
| 40,000 | 10.5 | 1480 | 0.001 |
| 45,000 | 10.0 | 1438 | 0.001 |