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ASEA BROWN BOVERI

March 17, 1993
LD-93-049

Docket No. 52-002

Attn: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: System 80+™ Experience Review Process

Dear Sirs:

Enclosed with this letter is a summary of how design and operating experience were incorporated into the System 80+ design process. This summary will be printed in Table 1.2-1 of CESSAR-DC as shown in the attached markup.

If you have any questions, please call me or Mr. Stan Ritterbusch at (203) 285-5206.

Very truly yours,

COMBUSTION ENGINEERING, INC.

C. B. Brinkman

C. B. Brinkman
Acting Director
Nuclear Systems Licensing

CBB/ser
cc: J. Trotter (EPRI)
T. Wambach (NRC)
P. Lang (DOE)

250030

ABB Combustion Engineering Nuclear Power

Combustion Engineering, Inc.

1000 Prospect Hill Road
Post Office Box 500
Windsor, Connecticut 06095-0500

Telephone (203) 688-1911
Fax (203) 285-9512
Telex 99297 COMBEN WSOR

D032

See Insert

TABLE 1.2-1

(Sheet 1 of 6)

SYSTEM 80+ IMPROVEMENTS BASED ON OPERATING EXPERIENCE

This table summarizes ~~those~~ the major design improvements which have resulted from design and analysis experience as well as plant startup and operating experience. ~~This experience reflects both industry experience via the EPRI Utility Requirements Document and designer-specific experience.~~

A. Integrated Design Process

One organization, ~~Combustion Engineering, Inc.~~ ABB-CE, is responsible for the design of structures, systems, and components of a plant which are important to safety (where design features depend on site-specific characteristics, interface requirements are provided), thus facilitating an integrated design process. The major considerations in this integrated design approach are as follows:

1. The PRA is used to evaluate the design and to identify areas where significant improvement can be obtained. Although the end product of the PRA is a calculation of core damage frequency and offsite consequences, the PRA can also be used to gain design insights and identify improvements for handling more frequent transients and accidents (Appendix B). J

2. Maintainability of the plant is being addressed by using equipment that minimizes the need for maintenance, by assuring that equipment can be easily accessed, and by assuring that maintenance actions will be as simple as possible (so as to avoid unplanned reactor trips and plant downtime). These same considerations apply to periodic testing and inspection of equipment.

3. In almost all cases for System 80+, safety and non-safety functions have been separated. This will make the plant much simpler to operate and maintain.

4. Human factors (i.e., the man-machine interface) are considered throughout the plant and especially in the control room (Chapter 18).

TABLE 1.2-1 (Cont'd)

(Sheet 2 of 6)

SYSTEM 80+ IMPROVEMENTS BASED ON OPERATING EXPERIENCE

5. ALARA consideration affect the selection of materials and location of piping and equipment that carry radioactive coolant. For example, specifications for the reactor coolant system materials have been tightened to minimize transport of contamination. Improvements in the steam generator tubing material and access openings will greatly reduce radiation exposures for maintenance, testing, and inspection. The overall goal is to maintain personnel exposure to less than 100 man-rems per year for each reactor (Chapter 12).

6. Plant security (i.e., sabotage protection) and fire protection concerns have been directly addressed in determining layouts for plant safety systems (Section 13.6).

B. Increased RCS Design Margins and Improvements

1. Reactor: The core operating margin has been increased by reducing the normal operating hot leg temperature and revising core parameter monitoring methods. The ability to change operating power level (i.e., maneuver) using control rods only (without adjusting boron concentration in the coolant system) has been provided, simplifying reactivity control during plant load changes and reducing liquid waste processing requirements (Sections 4.3 and 4.4). J

2. Reactor Pressure Vessel: The reactor vessel is ring-forged with material specifications that result in a sixty year end-of-life RT_{NDT} well below the current NRC screening criteria. This results in a significant reduction in the number of welds (with resulting reduction in inservice inspection) and eliminates concern for pressurized thermal shock (Section 5.3).

3. Pressurizer: The pressurizer volume is increased to enhance transient response and reduce unnecessary challenges to safety systems (Section 5.4.10).

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The experience input to the System 80+ design process has been accrued through the organizations participating in the System 80+ design team. This includes architect engineering organizations (Stone & Webster Engineering Corporation and Duke Engineering & Services, Inc.) which have extensive experience in plant design and, in the case of Duke Engineering & Services, actual plant operating experience. Architect engineering experience is reflected mainly in the plant layout, building design, control room, and the many "balance of plant" systems supporting the Nuclear Steam Supply System. This experience was brought to the System 80+ design team by the engineers responsible for the design of specific structures and systems in currently operating plants and by actual plant operators who also participated in the design process. The ALWR Utility Requirements Document was also used in the design of System 80+ and the design and operating experience of participating utilities reflected therein has been incorporated through the adoption of design requirements.

Experience related to the operation of the Nuclear Steam Supply System was brought to the System 80+ design through the predecessor System 80 and earlier Nuclear Steam Supply System designs and through the years of experience of individual designers. This individual experience was developed through review of industry experience reflected in documents such as NRC Bulletins and Generic Letters (e.g., see Tables 1.8-2 and 1.8-3), Unresolved and Generic Safety Issues (see Appendix A of this safety analysis report), Institute for Nuclear Power Operations publications, and in the ABB-CE Corrective Actions Program. Their experience was also developed through participation on design teams for startup of plants with Nuclear Steam Supply Systems designed by ABB-CE.

Operating experience is reflected throughout the System 80+ design described in all chapters of this safety analysis report, including shutdown risk improvements, which are reported in the shutdown risk section of Chapter 19. The major improvements based on operating experience are summarized below.