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ASEA BROWN BOVERI

April 30, 1992
ALWR-92-203
IC-92-092

Mr. Dennis M. Crutchfield
Acting Associate Director for Advanced Reactors
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

MS: 11H21

Subject: Review of Human Factors for System 80+ and DCRDR Audit

Dear Mr. Crutchfield:

In the meeting held April 9, 1992, between representatives of ABB-CE and NRC staff, ABB-CE indicated its desire that specific design features of the Nuplex 80+ control room design be reviewed. It is ABB-CE's desire to close out the staff's review of these aspects of the design, rather than to leave them open for Design Acceptance Criteria (DAC)-type resolution. To accomplish the review of the actual Nuplex 80+ design, NRC staff suggested a Detailed Control Room Design Review (DCRDR) type audit. ABB-CE would like to proceed with this audit to have documented the review of the design. It is ABB-CE's understanding from the April 24, 1992 meeting, that the DCRDR-type audit will be performed after the Human Factors Branch DSER input date (May 23, 1992).

The purpose of this letter is to define those parts of the Nuplex 80+ design for which ABB-CE is requesting the staff complete their review. For the remaining portions of the design, ABB-CE is currently working with the staff to establish an appropriate DAC approach. As a starting point for defining an ITAAC/DAC approach appropriate for the remaining portions of the Nuplex 80+ design, ABB-CE is reviewing the draft ABWR human factors-related ITAAC/DAC document. Comments on this draft will be provided in a separate letter by May 8, 1992.

The following section defines the design features of Nuplex 80+ for which the staff is requested to complete their review. A reference to sections of the docketed documentation which best describe these features is attached. This is a guide only and is not intended to preclude the staff from requiring and using other docketed material to complete their review. Table 1 provides a list of all material in addition to CESSAR-DC that has been docketed.

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1. Main Control Room (MCR) Configuration

   The MCR configuration includes:

   - The MCR panel and console footprint (CESSAR-DC Section 18.6.5)
   - Design basis for the configuration (CESSAR-DC Section 18.6.3)
   - Panel profiles for the Master Control Console (MCC) and Auxiliary Console and Safety Console (ACSC) (CESSAR-DC Section 18.6.5)
   - Location and functional design of the control room supervisor console (CESSAR-DC Sections 18.6.5 and 18.7.4.14)
   - Location of the big board Integrated Process Status Overview (IPSO) and control room offices (CESSAR-DC Section 18.6.5)

2. Integrated Process Status Overview (IPSO)

   The IPSO includes:

   - The design basis for the overview display (NPX80-IC-SD790-02 Section 4.1.1; CESSAR Section 18.7.1.2.1)
   - The resulting critical function based design approach and implementation, including the critical function matrix, success path status indications,digital or trend indication of key parameters, alarm presentation (CESSAR-DC Section 18.7.1; NPX80-IC-SD791-01 Section 5)
   - Continuous display of critical safety function status per Safety Parameter Display System (SPDS) requirements (CESSAR-DC Section 18.7.1.8.2; NPX80-IC-SD791-01 Section 5.4; NPX80-IC-SD790-02 Section 4.1.1)
   - Man-Machine Interface (MMI) display methods, including display/alarm coding, symbols, sizes, etc. (CESSAR-DC Section 18.7.1.2; NPX80-IC-SD791-01 Sections 4, 5, 8.1 and 8.2)

3. Nuplex 80+ MMI Features

   Standard Nuplex MMI features include:

   - Discrete Indication and Alarm System (DIAS) alarm tile display (CESSAR-DC 18.7.1.5.2; NPX80-IC-SD791-01 Sections 8.1, 8.2 and 8.4)
   - DIAS dedicated parameter display (NPX80-IC-SD791-01 Sections 4, 7.1 and 7.2)
   - DIAS multiple parameter display (NPX80-IC-SD791-01 Sections 4, 7.1 and 7.3)

- Data Processing System (DPS) CRT displays and display hierarchy (CESSAR-DC Section 18.7.1.3; NPX80-IC-SD791-01 Section 6)
- Component Control System (CCS) process controller display (CESSAR-DC Section 18.7.1.7; NPX80-IC-SD791-01 Section 10)
- CCS component controls (CESSAR-DC Section 18.7.1.6; NPX80-IC-SD791-01 Section 9)
- Combination of spatially dedicated alarms and discrete indications with selectable CRT pages and discrete indicators for monitoring (NPX80-IC-791-01 Sections 3.1, 5, 6, 7 and 8; CESSAR-DC Section 18.7.1.1-16.7.1.5)
- Combination of spatially dedicated and selectable devices for control (NPX80-IC-791-01 Sections 3.1, 9 and 10; CESSAR-DC Sections 18.7.1.6 and 18.7.1.7)

Review for each of these interfaces should include the format and attributes of the feature as defined in CESSAR-DC and the docketed design documentation (primarily NPX80-IC-SD791-01). This includes information presentation attributes, navigation methods, control access and manipulation, and information processing methods. The embodiment of these features has been exemplified as part of Reactor Coolant System (RCS) panel design (item 4 below). Upon completion of the staff's review, ABB-CE will utilize these standard Nuplex 80+ MMI features for all remaining System 80+ panels. The review of these panels is expected to be equivalent to that defined for the RCS panel below.

4. RCS Panel Design

- Availability of information and controls as required by the function and task analysis (NPX-IC-TE-790-01, Section 2, App. A & B)
- RCS layout for information and controls, including display pages for CRTs and discrete indicators (CESSAR-DC Section 18.7.3)

It is expected that the review be based on the design documented in CESSAR-DC and other docketed design documents. The dynamic prototype is available to aid in visualizing the documented design. It is expected that this audit will not be a DCRDR of the Nuplex 80+ prototype, since the prototype is an engineering tool that does not reflect all aspects of the documented design.

Sincerely,

for R. A. Matzie
Vice President
Nuclear Systems Development

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Attachment to ALWR-92-203
IC-92-092

TABLE 1 - DOCKETED DOCUMENTS

Document Number	Proprietary	Title	Submittal Status
NPX80-IC-DP-79^-02	No	Nuplex 80+ Function and Task Analysis Report	A
NPX80-IC SD-791-01	Yes	Nuplex 80+ Control Complex Information Systems Description	P
NPX80-IC-TE-790-01	No	Nuplex 80+ Verification Analysis Report	A
Draft	N/A	[ALWR] HF Standards and Guidelines and Bases (Sample Pages)	P
NPX80-IC-SD790-02	Yes	Nuplex 80+ Critical Functions Monitoring System Description	P

A = All
P = Partial

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