



Westinghouse Electric Corporation
Nuclear Projects Division

AP600

Program Operating Procedure

Subject:

DESIGN REVIEWS

Approved:

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Nuclear Projects Division

Effective Date:

AUTHOR/COGNIZANT FUNCTION

Contact Manager, AP600 Quality Assurance, on questions concerning this procedure.

PURPOSE

THIS

The procedure describes the method for preparing, conducting, and documenting formal Design Reviews (DR) performed for the purpose of Design Verification. This procedure may also be used as a guide for non-verification Design Reviews.

SCOPE

This procedure applies to all Design Reviews conducted for the AP600 project.

DEFINITIONS

See Procedure ESBU 4.12

General

Design Reviews for the AP600 project shall be performed in accordance with procedure ESBU 4.12 of the ESBU Quality Policy/Procedure Manual with the following modifications:

1. In addition to the responsibilities established in ESBU 4.12, the Cognizant Design Manager is responsible for:
 - a. obtaining an AP600 document number for the design review report, and
 - b. ensuring that design review action items are entered into the AP600 open item tracking system.
2. The Cognizant Design Manager, rather than the Design Review Chairman, is also responsible for following design review action items and ensuring that they are completed.
3. The general design review checklist per ESBU 4.12 is provided for guidance. Alternate checklists may be used as deemed appropriate by the Design Review Chairman. In any case, in addition to the responsibilities established in ESBU 4.12, the Design review Chairman is responsible for determining the applicability of the Human Factors Checklist per Appendix A of this procedure and incorporating it into the review as applicable.

4. Intermediate and Final Design Reviews shall include a review of the Preliminary and Intermediate Design Reviews (respectively) to assure closure of outstanding actions.

5. The Design Review report format is given in Appendix B of this procedure.

REFERENCES

A. ESBU Quality Policy/Procedures Manual

FORMS/EXHIBITS

AP600 Document Cover Sheet, Form 58202, Exhibit 10

APPENDICES

A. Human Factors Engineering Checklist

B. Design Review Report Format

APPENDIX AHUMAN FACTORS CHECKLIST

A. Product/User Identification:

1. Are the objectives of the product-user system appropriately defined?
2. Are the functions required to achieve the product-user system objectives appropriately defined?
3. Are the functions shared between the user and the product allocated in a way that most effectively utilizes the capabilities of each (automation or manual or combination)?
4. Are the users' tasks appropriately defined for anticipated modes of operation?
5. Has an operating experience review been conducted to identify human factors issues encountered in previous designs so that they can be avoided in the development of the current system, or in the case of positive features, to ensure their retention?

B. Information Requirements for the Human-System Interface:

1. Are the user's information requirements clearly defined for each of the tasks defined above?
2. Do the displays, reference materials, and navigation links appear to satisfy these information requirements by providing the required amount of data with the necessary accuracy and response time?
3. Are data presented in a concise, directly usable form? If not, can the user interpret the provided data quickly and accurately enough to complete the identified tasks successfully?
4. Have the data provided to the user been limited to that which is necessary to satisfy the identified information requirements?

C. Data Presentation and Controls for the Human-System Interface (HSI):

1. Do control and display hardware and organization appear to match operational requirements as defined by utility requirements?
2. Are numeric data presented in units which the user expects and understands? Does the range of numeric displays encompass minimum and maximum operational values?

APPENDIX A (Continued)

3. Are the schemes for labeling and coding controls, displays, and data legible, meaningful, and consistent? Does the HSI design follow a set of HSI design guidelines ⁵ so that there is consistency across displays and controls?⁷
4. Does the HSI resource include features to minimize errors and facilitate users in detecting, and recovering from, potential errors they may make?
5. Are display mechanisms fault-tolerant? For example, are there provisions for loss of color in a CRT display, are there provisions for loss of an indicator light, etc.?
6. Do the displays include data quality coding to clearly indicate ^{vv} when sensors have failed or values are out-of-range?

D. Work Station (Operation and Control Center System; MCR, TSC, RSR, Local):

1. Do the physical dimensions of the HSI resource take into account reach, strength, and sensory limitations throughout the range of anticipated users?
2. Does the layout of the HSI resource provide an optimal arrangement for interactions between users and between the user and the equipment?
3. Do the illumination, sound, temperature, and ventilation levels permit the user to perform required tasks satisfactorily?
4. Are these provisions for the user's safety and comfort?

E. Maintenance and Repair :

1. Have the maintenance requirements of the HSI resource ^{been} evaluated and documented?
2. Do maintenance and repair tasks for the HSI resource place reasonable technical and physical demands on service personnel?

F. Design Verification:

1. Is the HSI resource evaluated through walk-through studies, simulation studies, or some analysis to verify that the product-user system objectives (see 5.5.1.5 above) and functions have been achieved? A.4

APPENDIX BDESIGN REVIEW REPORT FORMAT

COVER PAGE

AP600 Document Cover Sheet, Form 58202

AP600 DOCUMENT NUMBER

A document number should be assigned to the Design review report in accordance with GW GMP 005, "Document Numbering Procedure."

SECTION

TITLE

1

Introduction

Give data and place of design review; identify design review Chairperson, members, and secretary.

2

Scope

Define scope of the design review (e.g., "Scope was to evaluate the design impacts involved in changing from Design "A" to Design "B").

3.

Summary

State the number of action items and provide an overview of the action item concerns.

4.

Conclusion

State DR committee's conclusion(s) based on material presented in the DR meeting(s)

5.

Attachments

- a. List of all presenters and observers in attendance at the Design Review meeting(s)
- b. Design Review Information Sheet(s)
- c. Design Review agenda which identifies the items presented in the Design Review meeting(s)
- d. Action Item Chits issued
- e. List and copy of the Design Review presentations