

52-003



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

November 21, 1995

Mr. Nicholas J. Liparulo
Nuclear Safety and Regulatory Activities
Westinghouse Electric Corporation
P.O. Box 355
Pittsburgh, Pennsylvania 15230

SUBJECT: COMMENTS ON THE AP600 DRAFT TRAINING PROGRAM

Dear Mr. Liparulo:

The Nuclear Regulatory Commission (NRC) staff has recently completed review of a Westinghouse draft standard safety analysis report (SSAR) revision to the AP600 operator training program. The proposed changes were provided by Westinghouse letter NTD-NRC-95-4498 dated June 30, 1995, and concern the operator training program description in the human factors chapter of the SSAR (Section 18.9.9). Previously, the SSAR had defined how the operator training program attributes for the AP600 would be developed in relation to human factors engineering design principles (Element 9 of the Human Factors Engineering Program Review Model (HFEPRM)). In the draft safety evaluation report (DSER), the NRC staff considered the training program development to be within the scope of the design certification and reviewed the SSAR description at an implementation plan level.

Subsequent to the DSER issuance, the staff and Westinghouse have agreed that the operator training program is the COL applicant's responsibility. Consequently, the need for Westinghouse to specifically address each open item in DSER Section 18.10.3 is beyond design certification and no longer necessary. The open items can be considered resolved (except as noted below) contingent on Westinghouse revising the SSAR to separately specify each criterion of HFEPRM Element 9 as a COL action item.

In review of the revised SSAR material, the staff has identified two new items related to training which must be resolved by Westinghouse prior to issuance of a FSER. One item involves the concept of emphasizing cognitive skills in lieu of procedure compliance in operator training curriculum. The staff needs to better understand how this shift in training philosophy will be conveyed to the COL applicant who have traditionally placed an emphasis on procedure compliance. The other item involves the training of operators for the validation of the control room design man-machine interface system (M-MIS). The staff needs to have a better understanding of how Westinghouse will select and train the control room operations staff who will be used to validate the control room design. These operators should be representative of a typical COL holder's licensed crew. Specifically, how will the validation crew be independent of the design and yet qualified for testing the M-MIS.

240082

RF03
11

9511270372 951121
PDR ADOCK 05200003
A PDR

NRC FILE CENTER COPY

November 21, 1995

Mr. Nicholas J. Liparulo

- 2 -

Detailed discussions on Section 18.10.3 DSER open items resolution and the two new items are provided in the enclosure to this letter. If you have any questions regarding this matter, you can contact me at (301) 415-1141.

Sincerely,

Original signed by
William C. Huffman, Project Manager
Standardization Project Directorate
Division of Reactor Program Management
Office of Nuclear Reactor Regulation

Docket No. 52-003

Enclosure: AP600 DSER Open
Item Resolution
Element 9 -
Training

cc w/enclosure:
See next page

DISTRIBUTION:

| | | |
|-------------------|---------------------|------------------|
| Docket File | PDST R/F | DCrutchfield |
| PUBLIC | BGrimes | TQuay |
| RArchitzel | TKenyon | WHuffman |
| DJackson | JMoore, 0-15 B18 | WDean, EDO |
| MSiemien, OGC | ACRS (11) | BBoger, 0-10 H5 |
| CThomas, 0-10 D24 | JBongarra, 0-10 D24 | EJordan, T-4 D18 |

DOCUMENT NAME: A: ELEMENT9.LTR SEE PREVIOUS CONCURRENCE*

To receive a copy of this document, indicate in the box: "C" = Copy without attachment/enclosure "E" = Copy with attachment/enclosure "N" = No copy

| | | | |
|--------|--------------|------------|--------------|
| OFFICE | PM:PDST:DRPM | HHFB:DRCH | SC:PDST:DRPM |
| NAME | WHuffman:sg* | JBongarra* | RArchitzel |
| DATE | 11/9/95 | 11/13/95 | 11/21/95 |

Mr. Nicholas J. Liparulo

- 2 -

Detailed discussions on Section 18.10.3 DSER open items resolution and the two new items are provided in the enclosure to this letter. If you have any questions regarding this matter, you can contact me at (301) 415-1141.

Sincerely,

William C. Huffman, Project Manager
Standardization Project Directorate
Division of Reactor Program Management
Office of Nuclear Reactor Regulation

Docket No. 52-003

Enclosure: AP600 DSER Open
Item Resolution
Element 6 -
Training

cc w/enclosure:
See next page

DISTRIBUTION:

Docket File
PUBLIC
RArchitzel
DJackson
MSiemien, OGC
CThomas, 0-10 D24

PDST R/F
BGrimes
TKenyon
JMoore, 0-15 B18
ACRS (11)
JBongarra, 0-10 D24

DCrutchfield
TQuay
WHuffman
WDean, EDO
BBoger, 0-10 H5
EJordan, T-4 D18

DOCUMENT NAME: A: ELEMENT9.LTR

To receive a copy of this document, indicate in the box: "C" = Copy without attachment/enclosure "E" = Copy with attachment/enclosure "N" = No copy

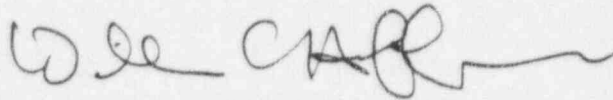
| | | | | |
|--------|---------------------|-----------|---------------------------------------|--------------|
| OFFICE | PM:PDST:DRPM | HHFB:DRCH | <input checked="" type="checkbox"/> E | SC:PDST:DRPM |
| NAME | WHuffman: <i>eg</i> | JBongarra | | RArchitzel |
| DATE | 11/9/95 | 11/13/95 | | 11/ /95 |

Mr. Nicholas J. Liparulo

- 2 -

Detailed discussions on Section 18.10.3 DSER open items resolution and the two new items are provided in the enclosure to this letter. If you have any questions regarding this matter, you can contact me at (301) 415-1141.

Sincerely,

A handwritten signature in black ink, appearing to read "W. C. Huffman", with a long horizontal flourish extending to the right.

William C. Huffman, Project Manager
Standardization Project Directorate
Division of Reactor Program Management
Office of Nuclear Reactor Regulation

Docket No. 52-003

Enclosure: AP600 DSER Open
Item Resolution
Element 9 -
Training

cc w/enclosure:
See next page

Mr. Nicholas J. Liparulo
Westinghouse Electric Corporation

Docket No. 52-003
AP600

cc: Mr. B. A. McIntyre
Advanced Plant Safety & Licensing
Westinghouse Electric Corporation
Energy Systems Business Unit
P.O. Box 355
Pittsburgh, PA 15230

Mr. Ronald Simard, Director
Advanced Reactor Programs
Nuclear Energy Institute
1776 Eye Street, N.W.
Suite 300
Washington, DC 20006-3706

Mr. John C. Butler
Advanced Plant Safety & Licensing
Westinghouse Electric Corporation
Energy Systems Business Unit
Box 355
Pittsburgh, PA 15230

STS, Inc.
Attn: Lynn Connor
Suite 610
3 Metro Center
Bethesda, MD 20814

Mr. M. D. Beaumont
Nuclear and Advanced Technology Division
Westinghouse Electric Corporation
One Montrose Metro
11921 Rockville Pike
Suite 350
Rockville, MD 20852

Mr. James E. Quinn, Projects Manager
LMR and SBWR Programs
GE Nuclear Energy
175 Curtner Avenue, M/C 165
San Jose, CA 95125

Mr. Sterling Franks
U.S. Department of Energy
NE-42
Washington, DC 20585

Mr. John E. Leatherman, Manager
SBWR Design Certification
GE Nuclear Energy, M/C 781
San Jose, CA 95125

Mr. S. M. Modro
Nuclear Systems Analysis Technologies
Lockheed Idaho Technologies Company
Post Office Box 1625
Idaho Falls, ID 83415

Barton Z. Cowan, Esq.
Eckert Seamans Cherin & Mellott
600 Grant Street 42nd Floor
Pittsburgh, PA 15219

Mr. Frank A. Ross
U.S. Department of Energy, NE-42
Office of LWR Safety and Technology
19901 Germantown Road
Germantown, MD 20874

Mr. Ed Rodwell, Manager
PWR Design Certification
Electric Power Research Institute
3412 Hillview Avenue
Palo Alto, CA 94303

Mr. Charles Thompson, Nuclear Engineer
AP600 Certification
U.S. Department of Energy
NE-451
Washington, DC 20585

**AP600 DSER Open Item Resolution
Element 9 - Training**

At the time the DSER review was prepared, training program development was within the scope of design certification and the staff reviewed Westinghouse's training at an implementation plan level. Subsequent to the publication of the DSER, Westinghouse has decided that training is a COL responsibility and has identified training as a Combined License Information Item in SSAR Section 13.2.1.

While it is acceptable for training program development to become a COL responsibility, two issues were raised by the staff in discussions with Westinghouse.

First, the staff raised concerns about the potential differences between the concept of the operator that is driving the design of the AP600 M-MIS and the concept of the operator that may be reflected in a COL training program. Thus the staff requested information on how Westinghouse was to communicate the "concept of operations" design basis to the COL so that the COL training program could appropriately reflect the approach. For discussion purposes, this issue will be referred to as the "Concept of the Operator" and should be tracked under related open item #2061.

Second, the staff raised concerns about the conduct of M-MIS validation. Specifically, in the absence of a training program, how could suitable validation test participants be available to adequately validate the design. For discussion purposes, this issue will be referred to as the "Training of Operations Personnel for Validation" and should be tracked under related open item #2062.

To address the staff concerns previously identified and to address Element 9 DSER open items, Westinghouse submitted a draft revision to SSAR Section 18.9.9, The AP600 Training Program, dated June 30, 1995. The following is an overview of the status of the results of the review for all Element 9 open items:

New Open Items (OITS #)

Current Status

| | | |
|------|---|----------|
| 2061 | Concept of the Operator | Action W |
| 2062 | Training of Operations Personnel for Validation | Action W |

Open Item (OITS #, DSER #)

Current Status (NRC/W)

| | | |
|------|--|---------------------|
| 1373 | 18.10.3-1: Training Mission | Resolved/(Action W) |
| 1374 | 18.10.3-2: Training Requirements | Resolved/(Action W) |
| 1375 | 18.10.3-3: Training SAT Approach | Resolved/(Action W) |
| 1376 | 18.10.3-4: Training Organizational Roles | Resolved/(Action W) |
| 1377 | 18.10.3-5: Training Personnel Qualifications | Resolved/(Action W) |

Enclosure

Open Item (OITS #, DSER # Continued)

Current Status (NRC/W)

| | | |
|------|---|---------------------|
| 1378 | 18.10.3-6: Training Scope | Resolved/(Action W) |
| 1379 | 18.10.3-7: Training HFE Integration | Resolved/(Action W) |
| 1380 | 18.10.3-8: Training Learning Objectives | Resolved/(Action W) |
| 1381 | 18.10.3-9: Training Presentation | Resolved/(Action W) |
| 1382 | 18.10.3-10: Training Resources | Resolved/(Action W) |
| 1383 | 18.10.3-11: Training Evaluation | Resolved/(Action W) |
| 1384 | 18.10.3-12: Training Verification | Resolved/(Action W) |
| 1650 | 18.10.3-13: Training Effectiveness | Resolved/(Action W) |
| 1385 | 18.10.3-14: Training Program Update | Resolved/(Action W) |
| 1386 | 18.10.3-15: Training Source Materials | Resolved/(Action W) |

Concept of the Operator (OITS #2061)

Issue: Westinghouse has identified a concept of the operator which is summarized in SSAR Section 18.9.9.3 (June 30, 1995). The operator is described "as an autonomous decision maker that supervises the performance of plant systems" (p. 18-9-83). In addition, the SSAR indicates that "To a large extent, current training programs treat operators as users of procedures, and independent decision making is not really expected. The *new orientation to operations* (emphasis added) requires that the training program stress decision-making and cognitive skills" (p. 18-9-83). Further, Section 18.9.9.1 identified several aspects of AP600 operation that are different from that with which most operators are currently familiar, including the operation of passive safety systems, the AP600 interface design, and the approach to presentation of plant state which considers functional and physical views of the plant's state.

Since Westinghouse's new orientation is probably not completely familiar to utility training departments, potential differences may exist between the concept of the operator that is driving the design of the AP600 M-MIS and the concept of the operator that may be reflected in a COL training program. Thus the staff requested information on how Westinghouse will communicate the "concept of operations" design basis to the COL so that the COL training program could appropriately reflect the approach.

Proposed Resolution: In general, very little information of this issue was provided in the SSAR revision. Westinghouse has partially addressed this issue in the revised SSAR Section 18.9.9.4, Training Insights Report. Section 18.9.9.3 discusses general principles for how operator training can be enhanced to address cognitive skills. The report would communicate insights from the V&V activity on training to the COL, but does not address the broader issue as described above. Based on the top-level description of the report, it is difficult to evaluate whether or not the insights contained in this report will be sufficiently detailed so as to provide adequate guidance to the

COL on the development of their training programs for the AP600 personnel. Also, it is not clear that the type of training provided to validation participants will provide an adequate basis upon which to draw insights to an actual training program (see discussion of the Training of Operations Personnel for Validation item below).

Thus, the information provided in the revised SSAR Section 18.9.9 does not fully address the staff's concerns. Westinghouse should provide an explanation of how Westinghouse will communicate the "concept of operations" design basis to the COL so that the COL training program will appropriately reflect Westinghouse's new orientation to operations.

STATUS OF OPEN ITEM: Action W

Training of Operations Personnel for Validation (OITS #2062)

Issue: Validation of the integrated system requires the measurement of performance of the integrated system under a range of operating conditions in order to evaluate whether the performance meets acceptable criteria. An essential component of the integrated system is the personnel who are qualified to operate the system. A concern is that if training is a COL activity, what provisions will be made to ensure that validation is conducted with qualified personnel who will be representative of COL licensed personnel who will eventually operate the plant.

Proposed Resolution: Westinghouse has addressed this issue in Revision 4 of the SSAR Sections 18.9.9.1, Introduction, 18.9.9.2, General Approach to Training HFE Operations Personnel, and 18.9.9.3, Recommended Training Practices.

SSAR Section 18.9.9 indicated that development and execution of the training program for the human factors engineering V&V test subjects is designated as beyond the scope of design certification. However, Section 18.9.9.1 states that "This section describes a process for the design and implementation of a training program that is directed toward the operations personnel who participate as subjects in the Human Factors Engineering V&V in the AP600 simulator." These two statements appear contradictory and require clarification.

SSAR Section 18.9.9.2 describes a general approach to training validation participants that is not based on SAT but rather uses a "performance-based evaluation" approach. This approach needs to be described in greater detail. Particularly confusing is the discussion in the second paragraph of this section. The approach seems to indicate that validation scenarios will be identified. Then two similar scenarios will be created: one for training and one for evaluation of skill mastery. When identified scenario-specific criteria are achieved, the validation scenarios are performed. If this interpretation is correct, then it would appear that the training is specifically geared to scenario-specific performance of validation tests and not to develop participants that are autonomous decision makers that supervise the performance of plant systems. Participants trained using this approach would not seem to be representative of actual plant personnel and may not behave in a similar manner. A cornerstone of the Westinghouse approach is to design an interface that supports the personnel in dealing with unplanned and unanticipated events. The concept of operations reflects this approach. However, the proposed approach to training of validation participants seems completely contrary to this philosophy. Participants are trained on specific events which are then used for validation (with minor differences in scenarios).

SSAR Section 18.9.9.3 discusses general principles for how operator training can be enhanced to address cognitive skills. The focus of the section is not entirely clear. The principles provided are selected examples from NUREG/CR-6126, "Cognitive skill training for nuclear power plant operational decision making." While the principles described are excellent, they are discussed at a very high level so that the practices themselves are described;

discussed at a very high level so that the practices themselves are described; however, no insights are offered as to how these practices should be explicitly incorporated within the training program for the AP600.

More information on this issue is needed to resolve the staff's concerns.

STATUS OF OPEN ITEM: Action W

Open Item 18.10.3-1: Training Mission

Criterion: The training program should be developed in accordance with 10 CFR 50.120, 10 CFR Part 55, and other relevant requirements to ensure that personnel have the qualifications commensurate with the performance requirements of their jobs. Training should address:

- the full range of positions of operational personnel including licensed and non-licensed personnel whose actions may affect plant safety
- the full range of plant functions and systems including those that may be different from those in predecessor plants (e.g., passive systems and functions)
- the full range of relevant HSI components (e.g., MCR, remote shut-down, panel, local control stations) including characteristics that may be different from those in predecessor plants (e.g., display space navigation, and operation of "soft" controls)
- the full range of plant conditions

DSER Evaluation: SSAR Section 18.9.9.2 discusses the mission and scope of the AP600 Training Program. This section lists the 10 plant positions for which training programs will be developed and maintains that these positions are those which directly affect safe plant operation. SSAR Section 18.9.9.3 indicates that the bulk of the discussion related to training program development will be focused on the control room operators and senior control room operators, with similar processes being used for the other positions.

Based on a review of this material, several issues need clarification. It is not clear how the 10 plant positions indicated were derived as those which directly affect safe plant operations. The 10 positions listed are the 10 currently used by INPO in their training program accreditation process [see INPO 85-002 (Revision 01), The Accreditation of Training in the Nuclear Power Industry (Procedures and Criteria)]. However, there is no discussion of the analysis conducted to ensure that these same 10 positions are the positions which directly affect safe plant operations in the AP600 plant.

Additionally, criterion 1 calls for training to address the full range of plant functions and systems; the full range of relevant HSI components; and the full range of plant conditions. The material reviewed does not specifically address any of these areas as they relate to training. While the process described for the development of training programs should result in a training program which addresses these areas, the relevant documentation does not specifically describe how this will occur. Discussion of AP600 features which differ from currently operating nuclear power plants in the U.S. primarily relates to a different philosophy that will be implemented in the training of AP600 operators (e.g., cognitive problem-solving abilities, Section 18.9.9.4) and changes in the main control area computerized interface

(Section 18.9.9.4). Little discussion relates to training for the remote shutdown panel and other local control stations, or to training in the area of passive systems and functions.

In summary, questions still remain regarding the areas that training will address. Specifically, only the positions that training will be developed for are defined, and no rationale is given for why those positions were chosen (have they been determined to be the only positions which directly affect safe plant operations?). The other areas which training should address, as listed in this criterion, are not discussed in any detail the AP600 SSAR documentation related to training program development.

Proposed Resolution: Westinghouse has identified training program development as a Combined License Information Item (as clarified in the June 30, 1995, draft of SSAR Section 18.9.9 and SSAR Section 13.2.1). Thus satisfying this criterion is beyond design certification and becomes a COL responsibility. Based upon this information, this DSER issue is considered resolved.

This criterion will be satisfied when a COL information item is provided identifying commitments which are consistent with this criterion.

STATUS OF OPEN ITEM: Resolved (Action W)

Open Item 18.10.3-2: Training Requirements

Criterion: Training program development should address applicable requirements of NUREG-0800 Section 13.2, "Training," 10 CFR 50.120, 10 CFR Part 55, and other applicable regulations.

DSER Evaluation: NUREG-0800 Section 13.2, 10 CFR 50.120, 10 CFR Part 55, and other applicable regulations are not discussed in the SSAR AP600 Training Program Development documentation. The material provided does not appear detailed enough to allow such a review to be conducted.

Proposed Resolution: Westinghouse has identified training program development as a Combined License Information Item (as clarified in the June 30, 1995, draft of SSAR Section 18.9.9 and SSAR Section 13.2.1). Thus satisfying this criterion is beyond design certification and becomes a COL responsibility. Based upon this information, this DSER issue is considered resolved.

This criterion will be satisfied when a COL information item is provided identifying commitments which are consistent with this criterion.

STATUS OF OPEN ITEM: Resolved (Action W)

Open Item 18.10.3-3: Training SAT Approach

Criterion: A systems approach to training as defined in 10 CFR 55.4 should be used. The training development implementation plan should be consistent with the following five elements:

- systematic analysis of jobs to be performed
- learning objectives derived from the analysis that describe desired performance after training
- training design and implementation based on the learning objectives
- DSER Evaluation of trainee mastery of the objectives during training
- DSER Evaluation and revision of the training based on the performance of trained personnel in the job setting

DSER Evaluation: The Plant Training Program Design Process is graphically displayed in Figure 18.9.9-1 of the AP600 SSAR, and described in Sections 18.9.9.3 through 18.9.9.4. The process described appears to be a variant of the Systematic Approach to Training (SAT) process currently used in the development of training programs in the nuclear industry (i.e., the steps discussed in the AP600 SSAR do not directly correspond to the five SAT steps). While the first four SAT steps appear to be incorporated in the process described, the fifth step, DSER Evaluation and revision of the training based on the performance of trained personnel in the job setting, is not discussed at all in the available documentation. In addition, the fourth step, DSER Evaluation of trainee mastery of the objectives during training is addressed under Section 18.9.9.4.2.3 with the brief statement that "a periodic DSER Evaluation of trainees provides a means for identifying weaknesses and prescribing remediation."

Section 18.9.9.4.1 discusses the use of cognitive task analysis to supplement the information obtained using a traditional SAT approach. A reference is given for cognitive task analysis, but it is not described in any detail in the documentation provided, thus it is not clear how the use of this approach will enhance the SAT process.

In summary, while the staff finds the applicant's general approach to SAT acceptable, questions remain regarding some of the details of the methodology.

Proposed Resolution: Westinghouse has identified training program development as a Combined License Information Item (as clarified in the June 30, 1995, draft of SSAR Section 18.9.9 and SSAR Section 13.2.1). Thus satisfying this criterion is beyond design certification and becomes a COL responsibility. Based upon this information, this DSER issue is considered resolved.

This criterion will be satisfied when a COL information item is provided identifying commitments which are consistent with this criterion.

STATUS OF OPEN ITEM: Resolved (Action W)

Open Item 18.10.3-4: Training Organizational Roles

Criterion: The roles of all organizations, especially the COL applicant and vendors, should be specifically defined for the development of training requirements, development of training information sources, development of training materials, and implementation of the training program. For example, the role of the vendor may range from merely providing input materials (e.g., emergency procedure guidelines) to conducting portions of specific training programs.

DSEER Evaluation: Section 13.2 of the AP600 SSAR states that training is COL applicant specific and is outside the AP600 design certification scope. No other reference is given in the documentation to allow a determination to be made of what the role of all organizations will be in the development of training requirements, development of training information sources, development of training materials, and implementation of training programs.

In summary, the material contained in the AP600 SSAR does not contain the level of detail to allow a determination to be made of what the role of all organizations will be in the development and implementation of the training programs.

Proposed Resolution: Westinghouse has identified training program development as a Combined License Information Item (as clarified in the June 30, 1995, draft of SSAR Section 18.9.9 and SSAR Section 13.2.1). Thus satisfying this criterion is beyond design certification and becomes a COL responsibility. Based upon this information, this DSEER issue is considered resolved.

This criterion will be satisfied when a COL information item is provided identifying commitments which are consistent with this criterion.

STATUS OF OPEN ITEM: Resolved (Action W)

Open Item 18.10.3-5: Training Personnel Qualifications

Criterion: The qualifications of organizations and personnel involved in the development and conduct of training should be defined.

DSEER Evaluation: Section 18.9.9.4 describes the process by which development of AP600 MCR operator subject matter experts will occur. Specifically, currently licensed PWR training instructors will be used as MCR operators during the conduct of validation tests on the EOPs and the human engineering of the MCR. This experience, in combination with formal instruction by design engineers on the plant systems, cognitive problem-solving methods, and the man-machine interface systems, will prepare the instructors to become designers of the MCR operator training program.

Section 18.9.9.4.2.4 discusses the formation of review teams consisting of instructors familiar with the training program technical content as well as instructional technologists for the review of material developed prior to the development of lesson designs. Other review points include similar types of individuals as well as utility owners group representatives (Section 18.9.9.4.4).

No discussion is devoted to defining the qualifications of organizations and personnel involved in the conduct of training.

Proposed Resolution: Westinghouse has identified training program development as a Combined License Information Item (as clarified in the June 30, 1995, draft of SSAR Section 18.9.9 and SSAR Section 13.2.1). Thus satisfying this criterion is beyond design certification and becomes a COL responsibility. Based upon this information, this DSER issue is considered resolved.

This criterion will be satisfied when a COL information item is provided identifying commitments which are consistent with this criterion.

STATUS OF OPEN ITEM: Resolved (Action W)

Open Item 18.10.3-6: Training Scope

Criterion: The overall scope of training should be defined including the following:

- categories of personnel (e.g., senior reactor operator) to be trained
- specific plant conditions (normal, upset, and emergency)
- specific operational activities (e.g., operations, maintenance, testing and surveillance)
- HSI components (e.g., MCR, emergency operations facility, remote shutdown panel, local control stations)

The scope of training should include the training of personnel participating in verification and validation of the plant design (Element 10).

DSER Evaluation: See previous discussion on Criterion 1. Additionally, Criterion 6 also requires that the AP600 SSAR discuss the scope of training of personnel participating in the verification and validation of the plant design. Section 18.9.9.4 states that currently licensed PWR training instructors will receive formal instruction by design engineers on the plant systems, cognitive problem-solving methods, and the man-machine interface systems prior to their participation in validation tests on the EOPs and on the human engineering of the MCR. How this training will be structured and developed is not described.

Proposed Resolution: Westinghouse has identified training program development as a Combined License Information Item (as clarified in the June 30, 1995, draft of SSAR Section 18.9.9 and SSAR Section 13.2.1). Thus satisfying this criterion is beyond design certification and becomes a COL responsibility. Based upon this information, this DSER issue is considered resolved.

This criterion will be satisfied when a COL information item is provided identifying commitments which are consistent with this criterion.

STATUS OF OPEN ITEM: Resolved (Action W)

Open Item 18.10.3-7: Training HFE Integration

Criterion: Learning objectives should be derived from the analysis that describes desired performance after training. This analysis should include but not be limited to training issues identified in the following HFE PRM elements:

- Operating Experience Review - Previous training deficiencies and operational problems that may be corrected through additional and enhanced training. Positive characteristics of previous training programs
- Function Analysis and Allocation - Functions identified as new or modified
- Task Analysis - Tasks identified during task analysis as posing unusual demands including critical tasks identified by PRA/HRA, new or different tasks, and tasks requiring a high degree of coordination, high workload, or special skills
- Human Reliability Assessment - Requirements for coordination of individual roles to reduce the likelihood and/or consequences of human error associated with critical human actions and the use of advanced technology
- HSI Design - Design features whose purpose or operation may be different from the past experience or expectations of personnel
- Plant Procedures - Tasks that have been identified during procedure development as being problematic (e.g., procedure steps that have undergone extensive revision as a result of plant safety concerns)
- Verification and Validation (V&V) - Training concerns identified during V&V, including HSI usability concerns identified during validation or suitability verification and operator performance concerns (e.g., misdiagnoses of plant event) identified during validation trials.

DSER Evaluation: This criterion lists seven elements from which training issues should be identified. The issues should then be used to derive learning objectives. The development of learning objectives is generally discussed, by Westinghouse, in SSAR Section 18.9.9.4.1, paragraph 12 and 13 (they are termed instructional objectives in the SSAR). These two paragraphs define what learning objectives are and the hierarchical manner in which they are developed. These two paragraphs, however, do not address any of the seven elements associated with this criterion.

Proposed Resolution: Westinghouse has identified training program development as a Combined License Information Item (as clarified in the June 30, 1995, draft of SSAR Section 18.9.9 and SSAR Section 13.2.1). Thus satisfying this criterion is beyond design certification and becomes a COL responsibility. Based upon this information, this DSER issue is considered resolved.

This criterion will be satisfied when a COL information item is provided identifying commitments which are consistent with this criterion.

STATUS OF OPEN ITEM: Resolved (Action W)

Open Item 18.10.3-8: Training Learning Objectives

Criterion: Learning objectives should also be derived from knowledge and skill requirements derived from the final safety analysis report, system description manuals and operating procedures, facility license and license amendments, licensee event reports, and other documents identified by the staff as being important to training.

DSER Evaluation: This criterion specifies that learning objectives should be derived from knowledge and skill requirements contained in the final safety analysis report, system description manuals and operating procedures, facility license and license amendments, licensee event reports, and other relevant documents. As discussed under Criterion 7, the development of learning objectives is discussed in Section 18.9.9.4.1, paragraph 12 and 13 of the AP600 SSAR. These paragraphs define what a learning objective is and the hierarchical manner in which learning objectives are developed. These paragraphs do not address the use of any of the documents described in this criterion in the derivation of learning objectives.

Additional information is needed in order to determine whether the training programs developed for the AP600 will fully meet this criterion.

Proposed Resolution: Westinghouse has identified training program development as a Combined License Information Item (as clarified in the June 30, 1995, draft of SSAR Section 18.9.9 and SSAR Section 13.2.1). Thus satisfying this criterion is beyond design certification and becomes a COL responsibility. Based upon this information, this DSER issue is considered resolved.

This criterion will be satisfied when a COL information item is provided identifying commitments which are consistent with this criterion.

STATUS OF OPEN ITEM: Resolved (Action W)

Open Item 18.10.3-9: Training Presentation

Criterion: The design of the training program should be defined to specify how learning objectives will be conveyed to the trainee. The use of lecture, simulator, and on-the-job training to convey particular categories of learning objectives should be defined. Specific plant conditions and scenarios to be used in training programs should be defined. Training implementation considerations such as the temporal order and schedule of training segments should be defined. The training program specifications should include justifications based on HFE principles of training, training practices, and other criteria.

DSER Evaluation: This criterion specifies that the training program design should specify how learning objectives will be conveyed to the trainee. For example, how different methods of training deliverance (e.g., simulator, lecture) will be used to convey different categories of learning objectives, how different plant conditions/scenarios will be defined for use in training programs, training implementation considerations such as temporal ordering, and justifications of training program specifications based on HFE principles of training, training practices, and other criteria.

Of the items listed in the criterion, only the training implementation considerations appear to be specifically addressed in the AP600 SSAR. These items are addressed under SSAR Section 18.9.9.4.2.1 which discusses the definition and sequencing of instructional units. Using the principles discussed the curriculum should move from simple to complex and component skills and knowledge should be integrated in a job context.

While the use of different training delivery methods are discussed, they are not discussed in the context of conveyance of different learning objective categories. Additionally, the issue of the definition of different plant conditions/scenarios for use in training programs is not discussed.

Proposed Resolution: Westinghouse has identified training program development as a Combined License Information Item (as clarified in the June 30, 1995, draft of SSAR Section 18.9.9 and SSAR Section 13.2.1). Thus satisfying this criterion is beyond design certification and becomes a COL responsibility. Based upon this information, this DSER issue is considered resolved.

This criterion will be satisfied when a COL information item is provided identifying commitments which are consistent with this criterion.

STATUS OF OPEN ITEM: Resolved (Action W)

Open Item 18.10.3-10: Training Resources

Criterion: Facilities and resources such as plant-referenced simulator and part-task training simulators required to satisfy training design requirements, should be defined.

DSER Evaluation: Section 18.9.9.4.3 of the AP600 SSAR states that during the development of instructional devices and materials, a determination will be made of the instructional staff size, necessary computer equipment, the number and size of classrooms, the use of state of the art tools/equipment, and the development of instructional materials. No discussion is provided for the method that will be used to make this determination.

In summary, the AP600 SSAR discusses the need to define the various facilities and resources for training design requirements, but does not discuss how this will be accomplished.

Proposed Resolution: Westinghouse has identified training program development as a Combined License Information Item (as clarified in the June 30, 1995, draft of SSAR Section 18.9.9 and SSAR Section 13.2.1). Thus satisfying this criterion is beyond design certification and becomes a COL responsibility. Based upon this information, this DSER issue is considered resolved.

This criterion will be satisfied when a COL information item is provided identifying commitments which are consistent with this criterion.

STATUS OF OPEN ITEM: Resolved (Action W)

Open Item 18.10.3-11: Training Evaluation

Criterion: Methods for evaluating trainee mastery of training objectives should be defined, including written and oral tests and walk through and simulator exercises. DSER Evaluation criteria for training objectives should be defined for individual training modules. Methods for assessing overall proficiency should be defined and coordinated with regulations, where applicable.

DSER Evaluation: This criterion states that methods for the DSER Evaluation of trainee mastery of training objectives should be defined (including the definition of DSER Evaluation criteria and DSER Evaluation of overall proficiency). Section 18.9.9.4.2.3 of the AP600 SSAR presents a very brief discussion of this point stating that "a periodic DSER Evaluation of trainees provides a means for identifying weaknesses and prescribing remediation." The development of DSER Evaluation criteria is discussed in Section 18.9.9.4.1 and indicates this will be accomplished after the knowledge, skills, and abilities are assigned to the tasks and subtasks, the performance measures will be derived for each task.

In both of the above referenced sections of the SSAR, the discussion is limited and does not adequately address the criterion.

Proposed Resolution: Westinghouse has identified training program development as a Combined License Information Item (as clarified in the June 30, 1995, draft of SSAR Section 18.9.9 and SSAR Section 13.2.1). Thus satisfying this criterion is beyond design certification and becomes a COL responsibility. Based upon this information, this DSER issue is considered resolved.

This criterion will be satisfied when a COL information item is provided identifying commitments which are consistent with this criterion.

STATUS OF OPEN ITEM: Resolved (Action W)

Open Item 18.10.3-12: Training Verification

Criterion: Methods should be defined for verifying the accuracy and completeness of training course materials.

DSER Evaluation: SSAR Section 18.9.9.4 states that techniques such as memory and sorting tasks and divided-attention tasks provide a check on whether the training program is appropriate for the skill being trained, but how this occurs is not explained.

Proposed Resolution: Westinghouse has identified training program development as a Combined License Information Item (as clarified in the June 30, 1995, draft of SSAR Section 18.9.9 and SSAR Section 13.2.1). Thus satisfying this criterion is beyond design certification and becomes a COL responsibility. Based upon this information, this DSER issue is considered resolved.

This criterion will be satisfied when a COL information item is provided identifying commitments which are consistent with this criterion.

STATUS OF OPEN ITEM: Resolved (Action W)

Open Item 18.10.3-13: Training Effectiveness

Criterion: Methods for evaluating the overall effectiveness of the training programs should be defined, including review of operator performance in tests and walk through and simulator exercises and on-the-job performance.

DSER Evaluation: It is not clear how the overall effectiveness of training programs will be evaluated based on the material provided in the AP600 SSAR. As mentioned previously, under the DSER Evaluation of Criterion 3, of the five steps of SAT, this is the step which appears to be most lacking based on review of the information presented.

Proposed Resolution: Westinghouse has identified training program development as a Combined License Information Item (as clarified in the June 30, 1995, draft of SSAR Section 18.9.9 and SSAR Section 13.2.1). Thus satisfying this criterion is beyond design certification and becomes a COL responsibility. Based upon this information, this DSER issue is considered resolved.

This criterion will be satisfied when a COL information item is provided identifying commitments which are consistent with this criterion.

STATUS OF OPEN ITEM: Resolved (Action W)

Open Item 18.10.3-14: Training Program Update

Criterion: Procedures for refining and updating the content and conduct of training should be established, including procedures for tracking training course modifications.

DSER Evaluation: SSAR Section 18.9.9.6 discusses the use of training program configuration management computer systems, which are an important element in tracking the effects of curriculum changes and for initiating changes due to plant or job description modifications in the AP600 plant. However, it is not clear how this system will be used for refining and updating the content and conduct of training.

Proposed Resolution: Westinghouse has identified training program development as a Combined License Information Item (as clarified in the June 30, 1995, draft of SSAR Section 18.9.9 and SSAR Section 13.2.1). Thus satisfying this criterion is beyond design certification and becomes a COL responsibility. Based upon this information, this DSER issue is considered resolved.

This criterion will be satisfied when a COL information item is provided identifying commitments which are consistent with this criterion.

STATUS OF OPEN ITEM: Resolved (Action W)

Open Item 18.10.3-15: Training Source Materials

Criterion: The applicant's effort should be developed using accepted industry standards, guidelines, and practices. A list of documents which may be used as guidance is provided in the HFE PRM.

DSER Evaluation: No references to PRM documents are identified in the SSAR AP600 training sections, particularly references for NRC documents or guidance documents.

Westinghouse must, taking into account the concerns identified by the staff in their DSER Evaluation of this criterion, describe how 10 CFR 50.120: "Training and Qualification of Nuclear Power Plant Personnel," Title 10,

"Energy;" 10 CFR Part 55, "Operators' Licenses," Title 10, "Energy;" and ANSI/ANS 3.1-1981, "Selection, Qualification, and Training of Personnel for Nuclear Power Plants" are used as input to training program development.

Proposed Resolution: Westinghouse has identified training program development as a Combined License Information Item (as clarified in the June 30, 1995, draft of SSAR Section 18.9.9 and SSAR Section 13.2.1). Thus satisfying this criterion is beyond design certification and becomes a COL responsibility. Based upon this information, this DSER issue is considered resolved.

This criterion will be satisfied when a COL information item is provided identifying commitments which are consistent with this criterion.

STATUS OF OPEN ITEM: Resolved (Action W)