AUDIT REPORT

HUMAN FACTORS ENGINEERING

DETAILED CONTROL ROOM DESIGN REVIEW

IN-PROGRESS AUDIT

MILLSTONE NUCLEAR POWER STATION, UNIT NO. 3

NORTHEAST NUCLEAR ENERGY COMPANY

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TABLE OF CONTENTS

1. BACKGROUND

Licensees and applicants for operating licenses shall conduct a Detailed Control Room Design Review (DCRDR). The objective is to "improve the ability of nuclear power plant control room operators to prevent accidents or cope with accidents if they occur by improving the information provided to them" (NUREG-0660, Item I.D.). The need to conduct a DCRDR was confirmed in NUREG-0737 and Supplement 1 to NUREG-0737. DCRDR requirements in Supplement 1 to NUREG-0737 replaced those in the earlier documents. Supplement 1 to NUREG-0737 requires each applicant or licensee to conduct their DCRDR on a schedule negotiated with the Nuclear Regulatory Commission (NRC).

NUREG-0700 describes four phases of the DCRDR and provides applicants and licensees with guidelines for its conduct. The phases are:

1. Planning
2. Review
3. Assessment and Implementation
4. Reporting

Criteria for evaluating each phase are contained in NUREG-0801.

A Program Plan is to be submitted to the NRC by licensees/applicants within two months of the start of the DCRDR. Consistent with the requirements of Supplement 1 to NUREG-0737, the Program Plan shall describe how the following elements of the DCRDR will be accomplished:

1. Establishment of a qualified multidisciplinary review team.
2. Function and task analyses to identify control room operator tasks and information and control requirements during emergency operations.
3. A comparison of display and control requirements with a control room inventory.
4. A control room survey to identify deviations from accepted human factors principles.
5. Assessment of human engineering discrepancies (HEDs) to determine which HEDs are significant and should be corrected.
6. Selection of design improvements.
7. Verification that selected design improvements will provide the necessary correction.
8. Verification that improvements will not introduce new HEDs.
9. Coordination of control room improvements with changes from other programs such as SPDS, operator training, Reg. Guide 1.97 instrumentation, and upgraded emergency operating procedures.

A summary report is to be submitted to the NRC by licensees/applicants at the end of the DCRDR. As a minimum it shall:

1. Outline proposed control room changes.
2. Outline proposed schedules for implementation.
3. Provide summary justification for HEDs with safety significance to be left uncorrected or partially corrected.

The NRC will evaluate the organization, process, and results of the DCRDR. This effort will include the review of required documentation (Program Plan and Summary Report) and may also include the review of additional documentation, briefings, discussions, and on-site audits. In-progress audits may be conducted after submission of the Program Plan but prior to submission of the Summary Report. Pre-implementation audits may be conducted after submission of the Summary Report. The NRC review will be in accordance with the requirements of Supplement 1 to NUREG-0737. Additional guidance for the evaluation is provided by NUREG-0700 and NUREG-0801. Results of the NRC evaluation of a DCRDR will be documented in a Safety Evaluation Report (SER) or SER Supplement.

Significant HEDs should be corrected. Improvements which can be accomplished with an enhancement program may be done promptly. Other control room upgrades may begin following publication of the SER (or SER Supplement), resolution of any open issues, and NRC approval of a schedule for upgrade.

To the extent practical, without delaying completion of the DCRDR, NNECO should address any control room modifications and additions (such as controls and displays for inadequate core cooling and reactor system vents) made or planned as a result of other post-TMI actions. The lessons learned from operating reactor events such as the Salem ATWS events should also be integrated. Implications of the Salem ATWS events are discussed in NUREG-1000 and required actions are described in Section 1.2, Post Trip Review - Data and Information Capability, of the enclosure to Generic Letter 83-28.

2 DISCUSSION

The Northeast Nuclear Energy Company (NNECo), a wholly owned subsidiary of Northeast Utilities (NU), submitted its Millstone Nuclear Power Station, Unit 3, Control Room Design Review Implementation Plan,[1] to the Nuclear Regulatory Commission on November 10, 1983, as its DCRDR Program Plan for Millstone Nuclear Power Station, Unit 3. The submittal was reviewed with reference to the requirements of Supplement 1 to NUREG-0737 and the guidance in NUREGs 0700 and 0801. NRC staff comments on the Millstone Unit DCRDR program plan were issued March 26, 1984.[2] A Summary Report detailing the results of the DCRDR program is scheduled for submittal on November 1, 1984. Millstone Unit 3 is now under construction and NNECo plans to be prepared for fuel loading in the Fall of 1985.

Based on the NRC review of the Millstone Unit 3 Program Plan, the staff concluded that NNECo plans to conduct a control room design review that generally meets the intent of NUREG-0737 Supplement 1. The NRC staff was concerned, however, that the methodology used to conduct the required task analysis would not result in the appropriate identification of operator information and control needs. The staff, therefore, requested an in-progress audit of Millstone Unit 3 DCRDR process to encompass all elements of the control room review with particular emphasis on the Task Analysis.

An NRC human factors engineering in-progress audit of the Millstone Unit 3 DCRDR was performed, August 7-10, 1984, at the plant site in Waterford, Connecticut, and at a full-scale mock-up of the control room, located in Mystic, Connecticut, at a facility owned by The Interlock Group. The audit was carried out by a team of NRC personnel from the Human Factors Engineering Branch (HFEB) of the Division of Human Factors Safety and consultants from Lawrence Livermore National Laboratory, Livermore, California. This combined team is referred to in this audit report as the NRC audit team.

2.1 AUDIT TEAM ACTIVITIES

The Millstone Unit 3 DCRDR in-progress audit by the NRC audit team consisted of an entrance briefing by NUSCo personnel and Millstone Unit 3 DCRDR review team members, discussions with review team members, reviews of DCRDR documentation, brief reviews of the Millstone Unit 3 control room and mock-up, and an exit briefing. The audit emphasized the methodology used by the DCRDR review team to conduct the task analysis.

The review team members provided documentation and facilities to support the NRC in-progress audit both before and during the audit, as follows:

- Documents submitted before the audit
  - Millstone Nuclear Power Station, Unit No. 3 Control Room Design Review Implementation Plan, November 10, 1983[1]
- Documents made available during the audit
  - Westinghouse Owners' Group Emergency Response Guidelines[3]
  - Westinghouse Emergency Operating Procedures[4]
  - Millstone Unit 3 Emergency Operating Procedures, to date

- Millstone Unit 3 Control Room Inventory
- Working papers for the Millstone Unit 3 Control Room Survey
- Working papers for the Millstone Unit 3 Task Analysis
- Working papers for the Millstone Unit 3 Assessment of HEDs
- Completed questionnaires from operating experience review

- Facilities available at the audit site
  - The Millstone Unit 3 control room, with main control board and auxiliary panels still under construction, and the remote shut-down panels, located 2 levels below the control room.
  - A full-scale mock-up of the Millstone Unit 3 main control board and auxiliary panels.

NNECo operating, engineering, and human factors personnel and their human factors consultants, The Interlock Group, provided assistance to the NRC audit team during the audit by supplying supplemental DCRDR documentation, discussing the Millstone Unit 3 DCRDR process and activities, and answering audit team questions.

The Millstone Unit 3 DCRDR in-progress audit findings are summarized in Sections 2.2 through 2.5.

2.2 DCRDR PLANNING

2.2.1 Review Team Selection

Supplement 1 to NUREG-0737 requires the establishment of a qualified multidisciplinary review team. Guidelines in team selection are found in NUREG-0700 and NUREG-0801.

The Millstone Unit 3 DCRDR multidisciplinary review team consists of a core review team supplemented by a discipline support group that provides specific expertise as required.

The core team currently consists of:

- 3 operations and engineering personnel
- 2 human factors specialists
- 1 training specialist

The review team is under the management of the Northeast Utilities Service Company (NUSCo) CRDR Project Manager and the NUSCo CRDR Project Engineer. The CRDR Project Engineer coordinates all aspects of the review team activities and reports directly to the CRDR Project Manager.

The audit team learned of two changes to the DCRDR review team since the submittal of the Millstone Unit 3 CRDR program plan to the NRC: 1) a new training specialist has replaced the person named in the program plan, and 2) a nuclear engineer formerly with discipline support has been moved to the core team. The NRC audit team concluded that the assignment of a training specialist and a nuclear engineer to the core team is a valuable addition to the core team. These changes should improve the quality of the review team and should be documented in the CRDR summary report.

The discipline support group offers expertise in licensing; PRA/Safety analysis; electrical, mechanical and instrumentation engineering; human factors; training; and operations. The summary report should also identify discipline support used by the review team; e.g., the EOPs generated by the Westinghouse Owners' Group and the NUSCo personnel currently writing the plant-specific EOPs.

The audit team is satisfied that the applicant has assessed the role of human factors specialists in the DCRDR and has assigned a critical role to human factors specialists in all phases of the DCRDR.

Based on their review of the Millstone Unit 3 DCRDR review team qualifications, the NRC audit team concluded that the review team will satisfy the requirement of Supplement 1 to NUREG-0737 and has established a qualified multidisciplinary review team to conduct a DCRDR.

2.2.2 Management Responsibility

NUREG-0700 guidelines state that support of the applicant's management is needed to ensure that the DCRDR team has the information, equipment, and necessary expertise needed to conduct a control room design review.

It was evident to the NRC audit team during the in-progress audit that management fully supports the DCRDR process as intended by the guidance in NUREG-0700. The audit team was told that, thus far, management has approved and agreed to implement all requests for change submitted by the review team to correct HEDs discovered during the DCRDR. Some examples of management support observed by the NRC audit team were:

- Hiring of The Interlock Group as human factors consultants to participate as members of the Millstone Unit 3 DCRDR review team and to help complete the DCRDR process.
- Constructing a full-scale color photomosaic mock-up of the control room panels.
- Assignment of senior personnel from key areas, such as training, operations, and procedures writing, to the core review team.

2.3 DETAILED CONTROL ROOM DESIGN REVIEW

2.3.1 Review of Operating Experience

The NUREG-0700 guidelines recommend that a review of operating experience be performed that includes the examination of available operating experience documents and a survey of control room operating personnel.

The review team has completed part of its operating experience review. The historical documentation has been reviewed and HEDs generated from LERs have been written up and incorporated into the set of HEDs to be assessed. An operating personnel questionnaire has been completed and the results summarized. The review team has stated that it has delayed the operating personnel follow-up interviews until later so that inexperienced operators will have had more time to become familiar with control room operation. In this way, the follow-up interview will be a more valuable source of information and assessment of HEDs generated by the completed questionnaires.

The audit team noted a deviation from the program plan. A "post experience review" has been added to Section 4.1, "Operating Experience Review." Post experience review provides feedback on control room design problems discovered during construction and start-up phases. HEDs generated from this review, primarily from start-up testing, have been written up and incorporated into the overall set of HEDs to be assessed.

2.3.2 Systems Function and Task Analysis

Supplement 1 to NUREG-0737 requires the applicant to perform systems function and task analyses to identify control room operator tasks and information and control requirements during emergency operations. Furthermore, Supplement 1 to NUREG-0737 recommends the use of function and task analyses that had been used as the basis for developing emergency operating procedures, technical guidelines, and plant-specific emergency operating procedures to define these requirements.

The following steps for a top-down systems function and task analysis are identified in the NUREG-0700 guidelines.

1. Identification of Systems and Subsystems
2. Identification of Operating Events for Analysis
3. Function Identification
4. Operator Task Identification and Analysis

Operator information and control needs and their associated characteristics must be determined independently from existing control room design, and not be influenced by existing control room equipment and instrumentation.

The Millstone Unit 3 DCRDR team has made some recent modifications and improvements to the task analysis methodology that was not described in its program plan submittal.

The Millstone Unit 3 DCRDR review team is using the Westinghouse Owner's Group (WOG) generic Emergency Response Guidelines (ERGs) to develop their

plant-specific emergency operating procedures (EOPs). The ERGs were the topic of a meeting on March 29, 1984, between the NRC and the WOG[5].

The following conclusions about use of the WOG ERGs were developed by the NRC as a result of that meeting:

1. "... it appears that Revision 1 of the ERGs and background documents do provide an adequate basis for generically identifying information and control needs."
2. "Each licensee and applicant, on a plant-specific basis, must describe the process for using the generic guidelines and background documentation to identify the characteristics of needed instrumentation and controls. For the information of this type that is not available from the ERGs and background documentation, licensees and applicants must describe the process to be used to generate this information (e.g., from transient and accident analyses) to derive instrumentation and control characteristics. This process can be described in either the Procedures Generation Package (PGP) or DCRDR Program Plan with appropriate cross referencing."
3. "For potentially safety significant plant-specific deviations from the ERG instrumentation and controls, each licensee and applicant must provide in the PGP a list of the deviations and their justification. These should be submitted in the plant-specific technical guideline portion of the PGP, along with other technical deviations."
4. "For each instrument and control used to implement the emergency operating procedures, there should be an auditable record of how the

needed characteristics of the instruments and controls were determined. These needed characteristics should be derived from the information and control needs identified in the background documentation of Revision 1 of the ERGs or from plant-specific information."

5. "It appears that the Basic version of the ERG and background documentation provide an adequate basis for generically deriving information and control needs. However, because of the differences in the organization of the material in the background documents between Basic and Revision 1, it is apparent that it would be easier to extract the needed information from the Revision 1 background documents."

The Millstone Unit 3 DCRDR team has used plant specific EOPs based on Rev. 1 of the WOG ERGs to generate "Task Sequence Charts" which develop operator tasks for emergency operations. A NNECo procedures writing committee is preparing four additional plant-specific EOPs for the following cases.

1. fuel handling accident
2. remote shutdown
3. remote cooldown
4. loss of shutdown cooling

From the operator tasks developed in the Task Sequence Charts, "Task Data Forms" (TDF) are generated. The TDFs have each task broken out into steps, with corresponding information and control requirements based on ERG background data developed for each step. HEDs are generated by comparing information and control requirements developed in the TDFs with the instruments and controls available in the Millstone Unit 3 control room inventory. This comparison process is presently incomplete since Millstone

Unit 3 EOPs are not fully developed. The WOG has been requested by NU to provide full information on plant specific parameter characteristics. NU will develop the four plant-specific EOPs, from which TDFs will be prepared in late 1984.

The NRC audit team reviewed the task analysis documentation and the methodology as described. The audit team learned that the Millstone Unit 3 DCRDR team expects the plant-specific data on parameter characteristics from WOG in October, 1984. The audit team has determined that the information (parameter) characteristics should include specific information such as parameter type, dynamic range, setpoints, resolution/accuracy, speed of response, units, and the need for actions such as trending and alarming. Control characteristics should include specific information such as type (discrete or continuous), rate, gain, response requirements, transfer functions, locking functions, and information feedback associated with control use. NNECo expects to have the final four plant-specific EOPs completed in late 1984, which will allow completion of the task analysis effort.

The NRC audit team concludes that the Millstone Unit 3 DCRDR summary report should completely document the task analysis methodology and that, if performed as described during the in-progress audit, the systems function and task analysis will satisfy the requirements of Supplement 1 to NUREG-0737.

2.3.3 Control Room Inventory

Supplement 1 to NUREG-0737 requires the applicant to make a control room inventory and to compare the operator display and control requirements and the associated characteristics determined from the task analyses with the control

room inventory to determine missing or discrepant controls and displays which will be documented as HEDs.

The audit team has determined that the Millstone Unit 3 review team has generated a control room inventory and has begun to perform the comparison of the inventory controls and instruments with the information and control requirements identified as a result of the task analysis. The comparison is being done on Task Data Forms which are part of the task analysis, as described in the previous section. Further comparison needs to be carried out when additional information is received from Westinghouse regarding the specific parameter characteristics.

The audit team has concluded that the use of the control room inventory process described during the in-progress audit will satisfy the requirements of Supplement 1 to NUREG-0737.

2.3.4 Control Room Survey

Supplement 1 to NUREG-0737 requires that a control room survey be conducted to identify deviations from accepted human factors principles. NUREG-0700 provides guidelines and criteria for conducting a control room survey.

The objective of the control room survey is to identify, for assessment and possible correction, characteristics of displays, controls, equipment, panel layout, annunciators and alarms, control room layout, and control room ambient conditions that do not conform to good human engineering practices.

The Millstone Unit 3 DCRDR team has used the Interlock Group to perform a systematic survey of the control room using NUREG-0700, Section 6, "Guidelines

Criteria." The criteria will be converted to Millstone 3 plant-specific checklists.

Three categories of checklists represent three levels of design detail: component, set, and panel. Noncompliance with a checklist item will result in an annotation on the survey checklist and a corresponding HED form being completed for each of the noncompliant items. The checklist form will also carry the HED number for cross referencing. A thorough team review, both before and at the conclusion of the survey, is planned to ensure the completeness of the content of the checklist categories. The applicant's control room survey documentation appears to recognize the need for audit traceability during the DCRDR.

The NRC audit team reviewed the checklists and other survey documentation during the in-progress audit. The NRC audit team performed a small scale survey of the mock-up and concludes that, in general, the survey is being carried out satisfactorily. However, one particular example of an HED that could be overlooked by the Millstone Unit 3 DCRDR survey was found by the audit team. Throughout the control boards, the color code green ≡ closed; red ≡ open was used except on the electrical panel (voltage regulator components 90CS-3EXSN05 and 70CS-3EXSN05) where red ≡ "good" or "raise" and green ≡ "bad" or "lower." The HED assessment process would determine if this discrepancy required corrective action.

The Millstone Unit 3 DCRDR has planned three surveys to cover classes of items across all control boards: meters, annunciators, and labels. These surveys will cover human factors considerations relevant to a class, including control room convention. The audit team notes that these surveys should be

fully documented in the applicant's supplementary reports as the adoption of new control room conventions would impact directly upon the DCRDR program and operational safety.

The audit team concludes that the Millstone Unit 3 DCRDR survey, as conducted so far and if performed as described in the remaining areas, will satisfy the requirements of Supplement 1 to NUREG-0737.

The applicant plans to hold in abeyance the environment, communications, and computer surveys; primarily for construction schedule reasons. These surveys will be documented in supplementary reports.

2.4 ASSESSMENT AND IMPLEMENTATION

2.4.1 Assessment of HEDs

Supplement 1 to NUREG-0737 requires that HEDs be assessed to determine which HEDs are significant and should be corrected. NUREG-0700 and NUREG-0801 contain guidelines for the assessment process.

The applicant has proposed an approach for evaluating HEDs on their potential to adversely affect emergency operations. Four prioritization categories are being utilized by the applicant.

Priority

1 Safety significant HEDs which have the potential to impact the management of emergency operations.

2 HEDs which are related to operational/reliability issues.

3 HEDs of minor consequence to operations.

4 HEDs which are not emergency in nature and which have no history of causing operational problems.

The Millstone Unit 3 DCRDR team has established a two-phase plan for HED assessment: 1) an initial screening of all HEDs to get corrective action started as soon as possible, and 2) final assessment of HEDs, for which the DCRDR team cannot decide on relatively simple solutions. The DCRDR team has proposed a method of weighing diversity of opinion for these cases and reaching a consensus among the review team members on the HED assessment.

The audit team emphasizes that it is important for the DCRDR team to prioritize all HEDs, even those screened for early resolution, so that the NRC can evaluate the disposition of all HEDs. The Millstone Unit 3 DCRDR team is requested to go back and prioritize all HEDs including those which have already been resolved by "no change."

The audit team believes that the assessment process as described will satisfy the requirements of Supplement 1 to NUREG-0737, although the assessment process being used by the Millstone Unit 3 DCRDR deviates significantly from the process described in the program plan. The current assessment methodology should be completely documented in the summary report.

2.4.2 Selection of Design Improvements

Supplement 1 to NUREG-0737 requires the selection of control room design improvements that will correct significant HEDs. It also states that improvements that can be accomplished with an enhancement program should be done promptly.

The applicant has identified three categories of design improvements: enhancements, class improvements, and individual discrepancy corrections.

The audit team has concluded that the Millstone Unit 3 DCRDR team has the appropriate composition and interactive process to assure that technical expertise and not cost or ease of implementation will be the motivating force behind the selection of design improvements.

The audit team believes that NNECo's plan to select design improvements is adequate to meet the intent of NUREG-0700 guidelines and the requirements of Supplement 1 of NUREG-0737. The Millstone Unit 3 summary report should completely document the methodology and results of design improvement selection, with a full description of the problems and justification for the final resolution of all HEDs with safety significance to be left uncorrected or only partially corrected.

2.4.3 Verification of Design Improvements

Supplement 1 to NUREG-0737 requires verification that selected design improvements will provide the necessary corrections of HEDs.

The audit team understands that the Millstone Unit 3 DCRDR has planned to 1) verify all HED corrective actions on the control board drawings and on the control room mock-up to evaluate the impact of the proposed improvements and 2) to verify by walk-throughs and talk-throughs on the mock-up that selected design improvements will provide the necessary corrections of HEDs.

Separate walk-throughs and talk-throughs in the control room will be conducted especially for HEDs that are generated by the environmental and communications surveys.

The audit team concluded that the Millstone Unit 3 DCRDR will verify that selected design improvement will provide the necessary corrections of HEDs, as required by Supplement 1 to NUREG-0737. The Millstone Unit 3 summary report should document the verification process.

2.4.4 Verification No New HEDs Created

Supplement 1 to NUREG-0737 requires verification that control room design improvements will not introduce new HEDs into the control room.

NNECo plans to verify that HED corrective actions will correct discrepancies without creating unacceptable side effects as part of its ongoing verification process and final validation of Millstone Unit 3 control room design changes.

The audit team understands that NNECo may not have full verification and validation of the control room before fuel loading, but that the mock-up will be used extensively for that purpose.

The audit team concludes that when the Millstone Unit 3 verification program and final validation are completed as described and reported fully as recommended, ...is will satisfy the requirement of Supplement 1 to NUREG-0737 that control room design changes do not introduce new HEDs.

2.4.5 Coordination of Control Room Improvements with Other Programs

Supplement 1 to NUREG-0737 requires that control room improvements be coordinated with changes from other programs; e.g., safety parameter display system (SPDS), operator training, Regulatory Guide 1.97 (R.G. 1.97), and emergency operating procedures (EOPs).

The Millstone Unit 3 DCRDR team has taken steps to assure that control room improvements are coordinated with changes from other programs by assuring:

- SPDS design is being done with guidance from a human factors specialist from the core review team.
- The DCRDR team includes a trainer as a core member.
- Regulatory Guide 1.97 instrumentation has been used on the control boards.
- The DCRDR team includes as a core member an operations engineer who is also a member of the committee reviewing and writing EOPs for Millstone Unit 3.

The audit team concludes that the Millstone Unit 3 DCRDR team effort to meet the design improvement coordination requirements of Supplement 1 to NUREG-0737 will be successful if implemented as described during the in-progress audit.

2.5 REPORTING

NNECo submitted its program plan for the Millstone Unit 3 DCRDR to the NRC on November 10, 1983. The NRC staff reviewed the program plan and believes that NNECo has planned an appropriate approach to the Millstone Unit 3 DCRDR. The NRC staff comments on the Millstone Unit 3 program plan were transmitted to NNECo via the Division of Licensing on March 26, 1984.

The audit team has recommended that NNECo's summary report, which is necessary to satisfy the reporting requirements of Supplement 1 to NUREG-0737, include documentation of all changes to the program plan, especially those regarding the task analysis methodology.

The audit team was informed that NNECo intends to submit supplemental reports, after the summary report, which will include the following items:

1. Environmental and communications surveys
2. Validation methodology
3. Task analysis of plant-specific EOPs
4. Task analysis of instrument parameter characteristics to be received from Westinghouse
5. Assessment and design improvements of outstanding HEDs.

3. CONCLUSIONS

The Millstone Unit 3 DCRDR is still in progress. The NRC staff reviewed the Millstone Unit 3 program plan and conducted an in-progress audit of the DCRDR on August 7-10, 1984.

The audit team determined that the Millstone Unit 3 DCRDR team has made changes in its program plan that need to be documented in the summary report. The deviations that require documentation include:

1. Changes in review team personnel
2. Changes in Section 4.1, "Operating Experience Review"
3. Revision of the methodology for task analysis
4. Revision of the methodology for HED assessment

Items deferred to after the summary report submittal that should be documented in supplementary reports are:

1. Environmental and communication surveys
2. Validation methodology
3. Task Analysis of plant specific EOPs
4. Task analysis of EOPs using parameter characterization information from WOG
5. Outstanding HED assessment: description of and corrective actions

Based on currently available information, the audit team concludes that NNECo has planned and is conducting a DCRDR for Millstone Unit 3 which, if carried out and documented as described during the in-progress audit, will satisfy the requirements of Supplement 1 to NUREG-0737.

4. REFERENCES

1. Millstone Nuclear Power Station, Unit No. 3 Control Room Design Review Implementation Plan, November 10, 1983.
2. NRC Memorandum to Thomas M. Novak, DOL, from William T. Russell, DHFS, Review of Millstone Nuclear Power Station Unit 3 Control Room Design Review Implementation Plan (Program Plan), March 26, 1984.
3. Westinghouse Owners' Group, Emergency Response Guidelines, Basic and Revision 1 versions.
4. Westinghouse Owner's Group, Emergency Operating Procedures.
5. NRC Memorandum to Dennis L. Ziemann, DHFS, from H. Brent Clayton, DHFS, Meeting Summary - Task Analysis Requirements of Supplement 1 to NUREG-0737, March 29, 1984 Meeting with Westinghouse Owners' Group (WOG) Procedures Subcommittee and Other Interested Persons, April 5, 1984.

ENCLOSURE 3

STAFF RESPONSE TO THE PROPOSAL FOR

PHASED IMPLEMENTATION OF THE MILLSTONE 3

SAFETY PARAMETER DISPLAY SYSTEM

DOCKET NO. 50-423

STAFF RESPONSE TO THE PROPOSAL FOR

PHASED IMPLEMENTATION OF THE MILLSTONE 3

SAFETY PARAMETER DISPLAY SYSTEM (SPDS)

In its letter of December 7, 1984 Northeast Utilities requested NRC staff concurrence with the concept of a two-phase implementation for the Millstone 3 SPDS. That letter described the SPDS features that would be operable by fuel load (Phase 1) and those that would be operable prior to start-up following the first refueling outage (Phase II). The staff concurs with the described two-phase implementation except for the following items:

1. Phase 1 must include implementation of electrical and electronic isolation suitable to prevent interference with equipment and sensors that are used in safety systems.

2. Phase 1 must include implementation of a parameter set that is acceptable to the staff. The inclusion of necessary parameters cannot be deferred beyond fuel load.

3. The staff is unsure of the meaning of the Phase II feature described as, "Plant variable information to aid critical safety function assessment and execution of emergency operating procedures..." Based on the teleconference between the staff and Northeast Utilities on December 7, 1984, the staff assumes that this phrase means "information that is helpful to the operator for non-SPDS functions, such as event diagnosis." On that basis the staff concurs that this feature may be deferred to first refueling. If the staff's assumption about the meaning of this phrase is incorrect, the applicant should provide further information to clarify the meaning.

The implementation of inadequate core cooling displays (time history plots) will not be addressed as a part of the SPDS review. However, the staff reviewers for Inadequate Core Cooling Instrumentation (Task Action Plan Item II.F.2) find the proposal for phased implementation of the inadequate core cooling (ICC) displays acceptable. The staff understands the proposal to be as follows:

Phase I (by fuel load) - ICC parameters' current values;

Phase II (by first refueling) - time history plots of ICC parameters.

The staff's concurrence with the concept of phased implementation is based on the assumption that the Phase I SPDS will be designed to satisfy the

provisions of Supplement 1 to NUREG-0737. Given the incomplete state of the Millstone 3 SPDS design and the staff's review of the design, this assumption may be somewhat tenuous. However, the staff plans to provide early feedback to the applicant by means of an on-site audit of the proposed design, to ensure that an acceptable design can be implemented by the fuel load.

ENCLOSURE 4

OBSERVATIONS MADE DURING ULTRASONIC INSPECTION

DEMONSTRATION AT MILLSTONE 3

DOCKET NO. 50-423