

August 6, 1985

Docket No. 50-309

Mr. J. B. Randazza
Executive Vice President
Maine Yankee Atomic Power Company
83 Edison Drive
Augusta, Maine 04336

Dear Mr. Randazza:

SUBJECT: MINUTES OF MEETING BETWEEN NRC AND MAINE YANKEE ATOMIC POWER
COMPANY ON THE MAINE YANKEE DETAILED CONTROL ROOM DESIGN REVIEW

A meeting to address NRC concerns regarding Maine Yankee Atomic Power Company's (MYAPCo) Detailed Control Room Design (DRCRD) Summary Report was held at NRC on July 9, 1985. These concerns were described in our draft SER dated June 4, 1985. During the meeting, MYAPCo addressed most of our concerns, more fully illustrated their methods and procedures for conducting the DCRDR, and provided sample results in several areas. Several action items remain for the licensee; these are associated with Human Engineering Deficiency (HED) assessment, resolution and implementation schedules. MYAPCo has agreed to provide this information and, therefore, a formal Supplement to the DCRDR Summary Report should not be necessary.

The enclosed minutes of this meeting are for your use and formal concurrence. If you require any further information, please contact P. Sears at 301 492-7458.

Sincerely,

/S/

Edward J. Butcher, Acting Chief
Operating Reactors Branch No. 3
Division of Licensing

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As stated

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Mr. J. B. Randazza
Maine Yankee Atomic Power Company

Maine Yankee Atomic Power Station

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Meeting Between NRC and Maine Yankee Atomic Power Company on the
Maine Yankee Atomic Power Plant
Detailed Control Room Design Review
Bethesda, Maryland
July 9, 1985

The following are the minutes for a meeting held on July 9, 1985 between the NRC and Maine Yankee Atomic Power Company (MYAPCo). Also in attendance were NRC contractor staff from Science Applications International Corporation (SAIC). Specific attendees and organizations which they represented are shown in Attachment 1.

The meeting was held to provide MYAPCo the opportunity to address and clarify issues which had surfaced as a result of the NRC review of the licensee's Detailed Control Room Design Review (DCRDR) Summary Report submitted by the licensee for the Maine Yankee Atomic Power Plant. More specifically, issues were raised concerning a number of DCRDR requirements including:

- o establishment of a multidisciplinary team,
- o system function and task analysis,
- o Human Engineering Deficiency (HED)
- o selection of design improvements,
- o verification of improvement, and
- o coordination.

Furthermore, safety-significant HEDs to be left uncorrected or only partially corrected needed to be documented, and proposed design improvements and schedules for implementation of the improvements needed to be provided by the licensee to permit the NRC to complete its evaluation of the licensee's DCRDR.

The specific issues of concern were documented and transmitted to the licensee prior to the meeting. A copy of this transmittal is shown in Attachment 2. MYAPCo's agenda for the meeting was to address questions and discuss these issues. Highlights of the discussion are provided below. Copies of all handouts presented by the licensee during its discussion are included in Attachment 3.

Establishment of a Multidisciplinary Team

Based on information presented in the licensee's DCRDR Summary Report, it appeared that MYAPCo had organized a DCRDP team composed of qualified personnel. However, the adequacy of the team and DCRDR task accomplishment could not be fully evaluated until the licensee provided information relevant to the level of effort expended by specific team members on certain tasks. Of particular concern was the level of participation of a human factors specialist on selected tasks.

At the meeting, the licensee elaborated on the team qualifications and staffing of DCRDR tasks. Human factors training in areas such as human capability, task analysis, and workload was provided to Steering Committee members and most working group members by John Senders, a Human Factors Consultant to Maine Yankee. This training was accomplished to facilitate accomplishment of the DCRDR and to provide Maine Yankee with some in-house awareness of human factors principles.

Following the NRC's In-Progress Audit conducted at the plant on February 13-17, 1984, Maine Yankee personnel decided to redo the following three DCRDR activities: (1) document review, (2) system function and task analysis, and (3) the assessment of HEDs. A fulltime human factors engineer was hired to work on these tasks and serve as a member of the Steering Committee while John Senders continued to provide consulting services to the licensee. The human factors engineer will become a fulltime employee at Maine Yankee in September 1985, which will further enhance the human factors capability of the licensee's staff.

The licensee detailed the assignments of DCRDR team members for these three tasks. Both the document review and assessment activities were headed by the human factors engineer. Operations personnel and the chairman of the Steering Committee also participated in the assessment task, the results of which were presented to the Steering Committee for approval. The task analysis, on the other hand, was accomplished by Yankee Atomic, a company with expertise in safety analysis and nuclear systems engineering, with Maine Yankee human factors personnel providing an overview function through completion of the task.

As a result of information provided at the meeting, the NRC finds that Maine Yankee established a qualified multidisciplinary team and allocated personnel with relevant areas of expertise to complete DCRDR tasks. Furthermore, the training of in-house personnel in human factors principles and the hiring of a fulltime human factors engineer demonstrate the commitment of Maine Yankee to the integration of human factors into plant operations.

System Function and Task Analysis

As described in their Summary Report, Maine Yankee's system function and task analysis was accomplished by (1) conducting walkthrough/talk-throughs of EOPs which resulted in the validation of control room functions and verification of task performance capabilities, and (2) table top discussions between multidisciplinary team members to identify information and control needs and their associated characteristics which should exist in the control room. However, the licensee failed to document how the analyses were actually conducted. It appeared that the basis of the analyses conducted was the set of symptomatic emergency operating procedures developed by Maine Yankee in response to the requirement of Supplement 1 to NUREG-0737. The licensee, however, discussed neither the basis for nor the development of its EOPs. As a result, the information regarding the licensee's system function and task analysis was not sufficient to evaluate whether it satisfied the intent of this requirement of NUREG-0737, Supplement 1.

At the meeting, the licensee described in considerable detail both its EOP development and task analysis activities conducted prior to and after the NRC audit of the Maine Yankee DCRDR. Prior to the audit, Maine Yankee participated in the Combustion Engineering Owner's Group (CEOG) generic emergency operating procedure upgrade effort, although the plant more closely resembles a Westinghouse unit. Because much of the Combustion Engineering (CE) material was not applicable to Maine Yankee, an interdisciplinary group composed of Maine Yankee and Yankee Atomic personnel tried to develop their own technical guidelines and EOPs for Maine Yankee. These EOPs, which were not based on a formal task analysis, were implemented at Maine Yankee in the spring of 1983. During the EOP developmental process, however, Supplement 1 to NUREG-0737 was issued. To satisfy this new

initiative, a task analysis of the upgraded EOPs was accomplished primarily using a walkthrough/talkthrough approach directed by John Senders. The EOPs were broken down into fundamental levels and walked through on a mockup. Some 200 HEDs were identified using this process.

These activities were reviewed by the NRC at the In-Progress Audit and a number of problems with both the scope of the effort and its dependence on the existing control room were identified. The NRC staff also questioned the newly developed EOPs. As a result, Maine Yankee decided to conduct a second task analysis. The second task analysis was performed by Yankee Atomic personnel who provided expertise in the areas of nuclear systems engineering and transient analysis. To avoid biasing the personnel of Yankee Atomic, this effort was conducted at their own facilities rather than at Maine Yankee. In addition, Yankee Atomic was instructed by the licensee to approach this effort as though a new control room were to be designed.

The Maine Yankee Station is a combination of both Combustion Engineering and Westinghouse technologies. In light of the fact that Maine Yankee is primarily configured as a Westinghouse plant rather than a CE plant, the licensee decided to use the Westinghouse Owners Group Emergency Response Guidelines (WOG ERGs), Rev. 1, as a basis for the second task analysis. After sorting the plant systems by vendors, the relevant Westinghouse ERGs were applied. A list of differences between the CE and Westinghouse guidelines was developed and used to guide the second task analysis. The top-down task analysis consisted of a table-top analysis of the WOG ERGs that led to the identification of information and control needs and their associated characteristics. This data was recorded on the forms shown in Attachment 3. Twenty-five HEDs were identified as a result of this second effort. Additionally, the licensee is now working on a second upgrading of their EOPs that are based on this task analysis.

From the meeting at the NRC, the staff finds that Maine Yankee's task analysis efforts were more comprehensive than originally documented in the Summary Report. Using the relevant WOG ERGs, the licensee completed a top-down task analysis that was independent of the control room and identified information and control requirements and their associated characteristics. In addition, by conducting the earlier walkthroughs, the licensee also conducted a control room function verification and validation. The 200 plus

HEDs identified as a result of the walkthroughs were reverified during the second task analysis. Considering the processes and results of the task analyses performed for Maine Yankee Station, the NRC staff finds that the licensee has provided the information needed to permit closing out this item.

Assessment of HEDs

A review of the licensee's Summary Report surfaced a number of concerns relative to the assessment of HEDs. Although it appeared that the licensee had implemented a systematic and quantitative procedure to determine the safety-significance of HEDs, the methodology was not described in sufficient detail to enable an informed evaluation of the procedure. More specifically, it was not clear how the cutoff score had been derived. Sources of data were ambiguous as were the assessment criteria. None of the HEDs nor their priorities were listed or described in their Summary Report.

As described by the licensee at the meeting, the assessment criteria had been revamped as a result of comments received during the NRC In-Progress Audit. This was accomplished by the human factors engineer, human factors consultant and Steering Committee chairman. Safety significance was the primary criterion. Cost considerations were eliminated from the assessment process.

The licensee described in detail the systematic method and mathematical formula used to assess identified HEDs. Assessment resulted in a prioritized list of HEDs based on safety significance. This list was presented to the Steering Committee which determined a cutoff point above which HEDs were considered safety-related. All HEDs below the cutoff were reevaluated. As a result of the reevaluation, many HEDs below the cutoff were elevated above the cutoff when other factors including the nature of the HED and plant availability were considered.

Based on information provided at the meeting, the NRC staff finds that the licensee developed an assessment methodology which meets the intent of Supplement 1 to NUREG-0737. For the staff to complete its evaluation, the licensee needs to submit the prioritized list of safety-related HEDs. The

fifty (50) HEDs which fell below the safety-related cutoff point should also be submitted for review.

Selection of Design Improvements and Verification that Improvements Will
Provide the Necessary Corrections Without Introducing New HEDs

From a review of the licensee's Summary Report, it appeared that the selection of design improvements and verification that improvements will provide the necessary corrections without introducing new HEDs were integral parts of the DCRDR performed at Maine Yankee. However, the licensee's submittal provided limited information describing the actual processes that were used to select improvements. There was no information provided on the processes that were used to examine various alternative solutions, their integrated effects on operator performance, and the arrival at a final solution. Verification of correction effectiveness was not addressed in the Summary Report.

As described by the licensee at the meeting, assessed HEDs were categorized into a number of groups by type of correction required. Actual corrections were determined by the human factors consultant, chairman of the Steering Committee, and an I & C engineer. These correction groupings were then further divided into (1) paint, label, tape fixes or (2) design changes. To correct paint, label, and tape type fixes, the human factors engineer drafted standards for resolution. These included a standard for enhancements (e.g., mimicking, color coding, and shading), labeling, and displays. An annunciator standard is being developed. All standards were submitted to the Steering Committee for review.

Proposed fixes were produced and applied to the mockup for review by the Steering Committee with operations representation included to assure that the corrections were effective and would not introduce new HEDs. Design changes required full I & C review and conceptual project authorization. Various checklists were used in-house to track the implementation of the corrections from design to completion.

Based on information provided by the licensee at the meeting, the NRC staff finds that Maine Yankee developed and implemented procedures for the selection of design improvements and verification of correction

effectiveness which meet the intent of NUREG-0737, Supplement 1. The licensee needs to submit a prioritized list of safety-related HEDs and their proposed corrections for review before a complete evaluation can be made by the staff.

Proposed Schedules for Implementing HED Corrections

The DCRDR Summary Report submitted by the licensee indicated that proposed HED corrections would be implemented during the 1985, 1987, and 1988 refueling outages. However, as the licensee failed to submit identified or prioritized HEDs, it was not possible to determine whether corrections were being implemented in a timely fashion.

As described by the licensee at the meeting, all 221 HEDs above the cutoff score will be fixed. One hundred and fifty (150) HEDs will be fixed during the 1985 refueling outage. The HEDs to be corrected, however, will not necessarily be the first 150 on the prioritized list of HEDs. Priority as well as issues such as ease of fix, control room location, and cost have been considered in the selection of those safety significant HEDs which should be corrected at the earliest refueling outage. Corrections for the remaining safety-significant HEDs will be designed later and implemented during the 1987 and 1988 refueling outages.

The NRC staff finds that to complete its evaluation of the scheduling process proposed by the licensee, Maine Yankee needs to submit a list of those HEDs to be corrected during the 1987 and 1988 refueling outages, along with a description of the proposed improvements.

Coordination

Based on a review of the licensee's Summary Report, it appeared that coordination was an integral part of the DCRDR conducted at Maine Yankee. However, whether the licensee had met the requirement of NUREG-0737, Supplement 1 was difficult to assess since no details regarding the mechanics and scheduling of coordination activities had been provided.

At the meeting, the licensee did provide examples to demonstrate the coordination of the DCRDR with other improvement programs including SPDS and Reg. Guide 1.97. The staff, therefore, finds that this requirement of NUREG-0737, Supplement 1, has been satisfied.

ACTION ITEMS

- o The licensee needs to submit the complete list of prioritized safety-related HEDs which fell above the cutoff score. The fifty HEDs below the cutoff score should also be provided. The HEDs should be described in sufficient detail to permit NRC review. Proposed schedules for implementation also should be provided.
- o Following a review of the above, the NRC will inform Maine Yankee of those proposed corrections they would like to review. These should be submitted by the licensee.
- o Pending reviews of the above, a determination of the need for a Pre-Implementation Audit will be made.

Attachment 1

MEETING MAINE YANKEE AND NRC
July 9, 1985

<u>Name</u>	<u>Organization</u>
P. Sears	NRC/DL
M. Fineberg	SAIC
R.M. Roland	SAIC
S.E. Nichols	MYAPCo
T.M. Gifford	MYAPCo
G.D. Whittier	MYAPCo
Ellen Levine	SAIC
George Lapinsky	NRC/HFEB
Joel Kramer	NRC/HFEB
Wm. H. Regan	NRC/HFEB
Dom Tondi	NRC/HFEB