DETAILED CONTROL ROOM DESIGN REVIEW
SUMMARY REPORT
FOR THE
VERMONT YANKEE NUCLEAR POWER PLANT

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Yankee Atomic Electric Company
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DCRDR SUMMARY REPORT

EXECUTIVE SUMMARY

Vermont Yankee Nuclear Power Corporation, in conjunction with the Yankee Atomic Electric Company Nuclear Services Division, has completed a Detailed Control Room Design Review (DCRDR) in accordance with the requirements of NUREG-0737, Supplement 1, and recognition of the guidance of NUREG-0700, 0801 and others. Vermont Yankee is an operating plant which predates these documents and which has continuously improved the Control Room man/machine interface throughout a decade of operation. Subsequent to the issuance of Supplement 1, additional improvements have been designed and implemented in accordance with the requirements of that document.

The DCRDR consisted of several major efforts, a static survey, a review of operating events, an operator interview and a comparison of the Control Room inventory with the information and control needs for emergency operation. Some of the review was done in 1982 by a team of utility employees under the supervision of the BWR Owners Group. That work has been brought up-to-date by the current team and supplemented when necessary.

In the case of the comparison of information and control needs, a complete new effort was performed to comply with the requirement.

The items defined under 5.1 and 5.2.a and b of Supplement 1 are completed and have resulted in 54 Human Engineering Discrepancies (HEDs). Many were discovered by more than one DCRDR activity and most fell into the category of a better way to implement an activity which was currently being done in a satisfactory manner. A small number were found by addressing the new needs of the symptom-oriented emergency operating procedures (EOPs). No HEDs were found to be so critical as to demand immediate implementation. This is not surprising, considering the many Control Room improvements already implemented as a result of owner inspired changes and other regulatory requirements.

Details of the process and the resulting HEDs are provided in this document.

Vermont Yankee Detailed Control Room Design Review

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LIST OF DOCUMENTS USED OR PRODUCED

A.1 Instructions for Deriving I&C Needs

A.2 Emergency Operating Procedures, Revision 0

A.3 I&C Needs Worksheets

B.1 Instructions for comparison of I&C Needs with Control Room Inventory

B.2 Completed I&C Comparison Worksheets

C.1 BWR Owners Group Survey Methods Handbook

C.2 BWR Owners Group Supplement Worksheets

C.3.a Completed BWR Owners Group Checksheets

C.3.b Completed BWR Owners Group Supplement Checksheets

C.3.c Completed Operator Questionnaires and Summary

C.3.d Summary Comments on Review of Historical Documents

D.1 BWR Owners Group Summary of Findings 1982

D.2 Wyle Findings 1980

D.3 List of Findings Sorted by HED

D.4 List of Findings Sorted by Record Key

D.5 List of HEDs with Recommendations

D.6 List of HEDs with Final Resolutions

D.7 Classification Method of HEDs

D.8 HED Numbering System

E.1 Program Plan

F.1 Summary Report

A copy of these documents will be retained in the plant records.

NOTE: Document identification number is related to requirement of NUREG-0737, Supplement 1, as shown:

A - 5.1.b.(ii)	Determine I&C Needs
B - 5.1.b.(iii)	Compare Needs to Inventory
C - 5.1.b.(iv)	Perform a Survey
D - 5.1.c and d	Assess Discrepancies, Select Improvement, Verify Correction and Coordinate
E - 5.2.a	Submit Program Plan
F - 5.2.b	Submit Summary Report

Vermont Yankee Detailed Control Room Design Review

I. INTRODUCTION

Vermont Yankee Nuclear Power Corporation has completed a Detailed Control Room Design Review (DCRDR) in response to the requirements of NUREG-0737, Supplement 1, received with Generic Letter 82-33. The details of the proposed procedures, techniques and methods of documentation were submitted in a Program Plan in June 1984.

Improvements to the instrumentation and controls of the Vermont Yankee Control Room have been implemented throughout the entire plant lifetime in response to operator suggestions and regulatory requirements. Following the incident at Three Mile Island, an abundance of regulatory requirements caused a number of additional changes to be implemented. A DCRDR, which considered all the previous changes, was performed in the post-TMI era. The results of that DCRDR and any changes from the methods and techniques described in the Program Plan have been included in this report. A team of NRC staff members and their consultants conducted an in-progress audit during April 1 through 4, 1985. Many of the verbal comments provided at the exit interview have also been addressed in this document.

This document should be used in conjunction with the Program Plan. Section headings in this Summary Report are followed by numbers in parenthesis, which refer to the section of the Program Plan where the activity is discussed. The Summary Report then cites the NUREG-0737, Supplement 1, requirement and addresses those parts of the activity which may not have been performed precisely as described in the Program Plan.

Figure 2, Schedule of DCRDR Activities, Page 8 of the Program Plan, illustrates the many activities comprising the DCRDR which occurred over a number of years. The sequence remains correct, though some calendar dates may have been changed. All activities have been performed in accordance with the schedule submitted by Vermont Yankee and which became the subject of a confirmatory order issued on June 12, 1984.

A revised Control Room layout drawing, Figure 1 is enclosed. The computer-based Data Management System assigned an arbitrary number of 60 to the CAD system panels and 61 and 62 to the alternate shutdown panels located in the Reactor Building.

GP-R-212105

Control Room Layout

ALTERNATE
SHUTDOWN
PANELS 61-62

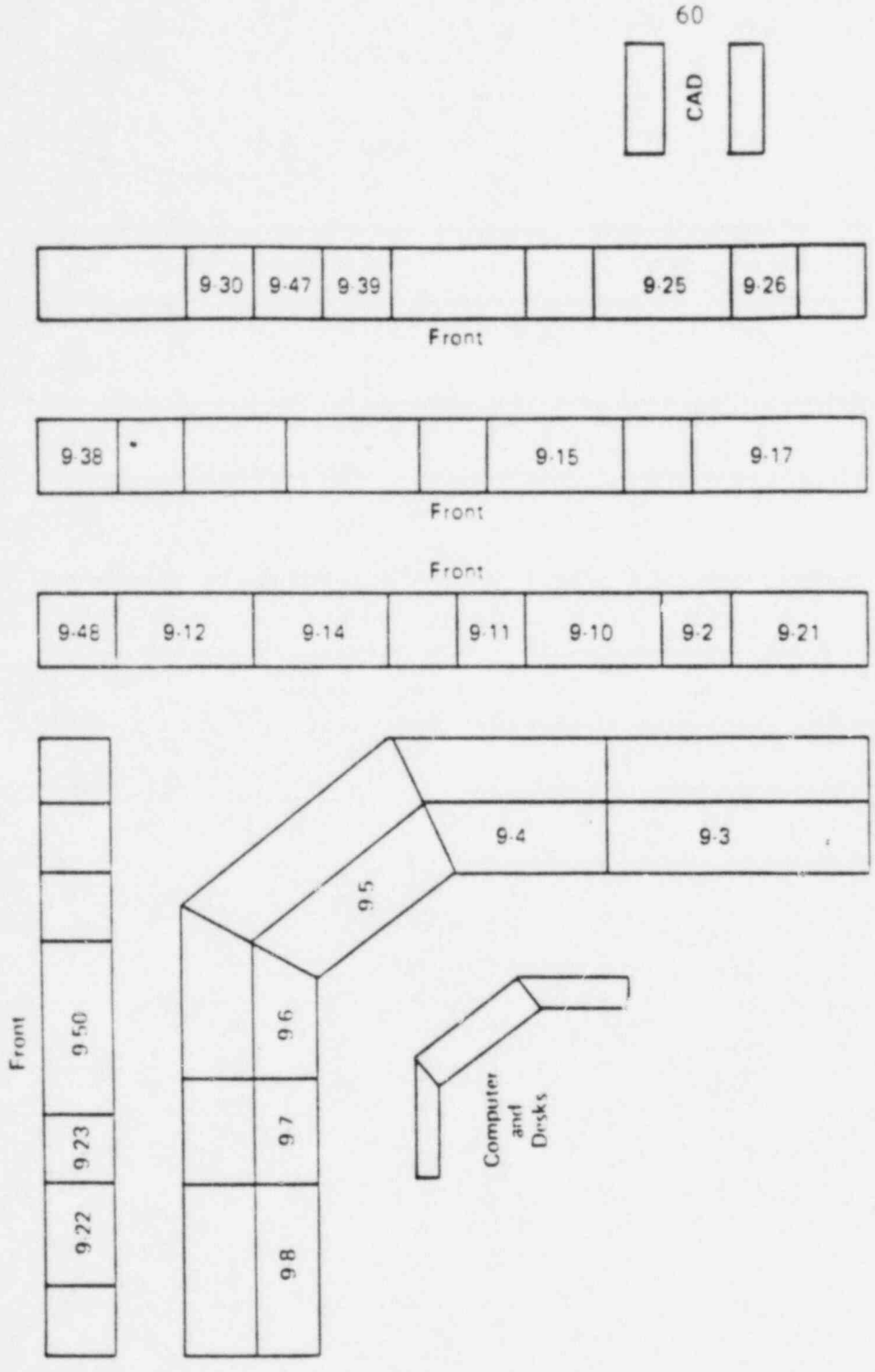

Figure 1. Vermont Yankee Control Room Arrangement

II. MULTIDISCIPLINED TEAM (Section 2)

NUREG-0737, Supplement 1, Section 5.1.b.(i), required the establishment of a multidisciplined team to conduct the DCRDR. Section 2 of the Program Plan describes the structure of a Management Team to direct the effort and Review Team to do the survey, evaluate the findings and provide recommendations to correct any discrepancies. The Program Plan also references "Other Disciplines." Additional assistance from the human factors consultant, General Physics Corporation, was provided to determine the information and control needs for emergency operation. Attachment A to this report provides the resume of Mr. R. Stamm who performed this task and the comparison with the Control room inventory. In addition, a resume of one of the Review Team that had not been submitted previously with the Program Plan, Mr. R. L. Branch is also included.

III. DERIVATION OF I&C NEEDS (Section 4.4)

Section 5.1.b(ii) of NUREG-0737, Supplement 1, states, "The review shall consist of the use of function and task analysis (that had been used as the basis for developing emergency operating procedures, Technical Guidelines and plant specific emergency operating procedures) to identify control room operator tasks and information and control requirements during emergency operations. This analysis has multiple purposes and should also serve as the basis for developing training and staffing needs and verifying SPDS parameters."

VYNPC addressed this requirement in a somewhat different manner than described in the Program Plan. A detailed description is given below. Additional detail relative to the Emergency Procedure Guidelines (EPGs), the plant-specific guidelines, and the Emergency Operating Procedures (EOPs) is included, in Attachment B.

1. Function Analysis

VYNPC was an original member of the BWR TMI owners group and was involved in and supported, both the Emergency Procedure Guidelines Committee, and the Control Room Improvements Committee. As a result of this involvement, it followed naturally that the VY EOPs would be based, as directly as possible, on the BWROG-EPGs.

The EPGs were carefully evaluated by the VY operating staff. References to equipment not provided for the VY reactor plant were removed and the alternate equipment substituted. Certain part names were changed to reflect plant preference, e.g, torus for suppression chamber.

It was decided to base the EOPs on Revision 3 of the EPGs. Two of the EPG concerns, radioactivity control and secondary containment control, were not included. These two required considerable

analytical work which was not available at this time, and it was decided not to defer implementation of the EOPs until these analyses were available. The analyses are currently in progress.

Attachment B describes NRC acceptance of the EPGs as "a functional analysis that identifies, on a high level, generic information and control needs. However, these EPGs do not explicitly identify the plant-specific information and control needs which are necessary for preparing emergency operating procedures and determining the adequacy of existing instrumentation and controls."

Using the generic EPGs, plant-specific calculations were performed to determine the values applicable to the VY plant. With these values available, the VY EOPs were then written directly from the generic EPGs. This work was performed by General Physics Corporation personnel under contract to VYNPC. Once the EOPs were completed, a step-by-step comparison with the generic EPGs was performed. Wherever an action was indicated in the EPGs, the corresponding VY EOP step was identified. Wherever any differences appeared, the deviations were noted and justification provided. An independent review to verify the work performed by both VYNPC and General Physics Corporation was performed by TTI Engineering of Norwood, Massachusetts. The scope of the TTI review was to:

a. Verify that the EOPs are technically correct in that they accurately reflect the plant-specific technical guidelines and other EOP sources documents.

b. Verify that the EOPs are written correctly in that they accurately reflect the plant-specific writers guide.

c. Insure that any deviations generated in the conversion of the BWROG Generic Technical Guidelines to Plant-Specific Technical Guidelines are noted and proper justification for the deviation is supplied.

d. Verify all calculations performed in the generation of Plant-Specific Technical Guides.

This review was done in three (3) phases; Phase 1 was the confirmation of references, Phase 2 was the verification of calculations and Phase 3 was the verification of procedure/ appendix steps.

Phase 1 was performed by Henry Sadler at the Vermont Yankee plant. Phase 2 was performed by Henry Sadler and Myron Kaczmarsky at TTI Headquarters. Phase 3 was performed by Gilbert A. Johnson and John J. Burbank at the Vermont Yankee plant.

This constitutes an analysis of the functions defined in the generic EPGs as modified to suit the VY plant-specific needs and to be addressed in the EOPs.

2. Task Analysis

A systematic task analysis process was used to identify information and control requirements. Initially, a copy of the EOPs, Revision 0, was provided to the VY human factors consultant, General Physics Corporation, with instructions to derive a list of I&C needs and requirements needed to implement the EOPs. The tasks and subtasks implicit in the high level EOP steps were considered and analyzed.

The procedural steps were expanded to describe them in terms of tasks required and subdivisions of those tasks. A rather extensive work sheet was prepared which identified the EOP step number, the task/subtasks required to perform the step, and the instruments and controls needed to perform the tasks. The requirements in terms of characteristics were stated in a separate column. The requirements were those determined from the procedure step and included instrument range, scale divisions and engineering units, as well as control requirements.

To guarantee minimum influence of this I&C needs and requirements list derivation from the existing Control Room inventory, the work was performed by General Physics personnel with no knowledge of the Control Room or the existing inventory list. General Physics was provided with a set of EOPs and a set of instructions to derive the I&C list from the EOPs. General Physics personnel used their own experience and knowledge of BWR reactor plants to determine the tasks and subtasks and resulting equipment needs. Where requested, system description, critical operating values, and operating procedures were provided to aid in implementing this task. Documentation of the process used is currently being prepared by our consultant, General Physics Corporation.

Figure 2 shows a typical page of the EOPs used to derive the I&C needs, while Figure 3 shows the I&C needs list derived from that page of EOPs. Attachment C is the instructions to derive the I&C needs from the EOPS.

REACTOR SCRAM

OPERATIONAL EMERGENCY PROCEDURE

A. Entry Condition

Any Scram Condition.

Appendix B

B. Operator Actions

☐	1.	Verify the scram.	Power level decreasing All rods inserted
☐	2.	IF the scram did not occur THEN manually initiate a scram	Manual scram pushbuttons RPS test switches A1, A2, B1, B2 (CRP 9-15 and 9-17) Requires AP 3125 Classification
☐	3.	IF power remains above 5% THEN Exit this procedure Enter OE3101 at Step B.1.	APRM Downscale Reactivity Control OE Procedure
☐	4.	Place the mode switch to SHUTDOWN or REFUEL when steam flow has decreased to less than .64 Mlbm/hr per steam line.	PCIS Group I Isolation at: 850 psig MSL pressure in RUN 40% MSL flow and not in RUN
☐	5.	IF MSIV Isolation has occurred AND the main condenser is available THEN re-open MSIV's.	CAUTION 27 - DO NOT OPEN MSIV's IF A VALID HIGH RADIATION OR LINE BREAK CONDITION HAS CAUSED THE ISOLATION

FIGURE 2

Procedure No OE-3100 Rev 0
Reactor Scram

VERMONT YANKEE
I&C NEEDS WORKSHEET

Procedure Step Number	Task	I&C Needs	I&C Requirements
A.	This step defines the entry condition to initiate the use of this procedure. The E.C. is any parameter value which should cause the Rx to scram. These are identified in Appendix A to OE-3100.	1. IRM flux indication	1. Range: 100/125 to 125/125 of scale Divisions: 5
		2. IRM status indication	2. Operable or inoperable
		3. APRM flux indication	3. Range: 0 to 120% full power Divisions: 5%
		4. APRM status indication	4. Operable or inoperable
		5. Mode switch position	5. RUN or NOT RUN
		6. SRM flux indication	6. Range: 1E4 to 5E5 counts per second Divisions: Logarithmic
		7. SRM shorting link status	7. Removed or installed
		8. Reactor pressure indication	8. Range: 900 to 1200 psig Divisions: 10
		9. Reactor water level indication	9. Range: 90 to 160 inches Divisions: 5
		10. Turbine stop valve position indication	10. Range: 80 to 100% full open Divisions: 5
		11. Turbine first stage pressure indication	11. Range: 130 to 250 psig Divisions: 5
		12. Turbine control valve position indication	12. Open or closed
		13. MSIV position indication	13. Range: 80 to 100% full open Divisions: 5
		14. Scram discharge volume level indication	14. Range: 14 to 28 gallons Divisions: 2
		15. Primary containment pressure indication	15. Range: 1.5 to 3.5 psig Divisions: 0.1
		16. Main steam line radiation indication	16. Range: background to 4 times background at rated power Divisions: Logarithmic
		17. Manual scram control capability and indication	17. See Standard A
		18. Mode switch position	18. SHUTDOWN position indicated
		19. Scram air header pressure indication	19. Range: 40 to 80 psig Divisions: 5

FIGURE 3

(3)

IV. COMPARISON WITH CONTROL ROOM INVENTORY (Sections 4.5 and 4.6)

NUREG-0737, Supplement 1, Section 5.1.b, stated "shall consist of . . . (iii) A comparison of the display and control requirements with a Control Room inventory to identify missing displays and controls."

Implementation of this item was described in Sections 4.5, Verification of Task Performing Capabilities, and 4.6, Validation of Control Room Functions, of the Program Plan. In some instances, the tasks described in these sections of the Program Plan were performed in another section. For example, Purpose No. 1 "whether the functions allocated to the Control Room operating crew can be accomplished effectively within the structure of the Vermont Yankee specific EOPs", was performed within the function analysis using the following walk-through technique:

1. A team was assembled consisting of a licensed plant operator and a human factors consultant. The operator used a copy of the appropriate EOP. The human factors engineer used the list of I&C needs and checksheet described in the previous section. The Control Room inventory was assumed to be the Control Room itself.

2. The operator read the procedure step aloud, thus identifying the appropriate item on the worksheet to the human factors engineer. They discussed the items needed to perform the test and verified that the list of I&C needs was complete.

3. The operator then pointed to the component he would use to perform the step and stated aloud the characteristics of the component. These were compared to the needs and requirements of the I&C needs worksheet.

4. If the instrument or control named on the needs list did not exist, the checker entered "No" in the column headed "I&C Available" and entered a comment to that effect in the column headed "Comments."

5. If such an instrument existed, a "Yes" was entered and the number of the panel where it was located.

6. If such an instrument existed, but did not meet the stated requirements, the checkers entered a "Yes" and panel number under "I&C Available," and entered "No" under "Requirements Met," and a comment describing the differences.

7. If the instrument was identified as being qualified to the requirements of Regulatory Guide 1.97. 1.97 was entered under "Requirements Met."

8. A "No" in either column required a written comment, and all comments were entered into the Data Management System.

9. Information and control needs on the I&C needs list, which were not in the Control Room but were performed locally, were identified by a similar comment.

10. All instrument locations were identified. If, in the opinion of the survey team, the instrument was located so that feedback might be difficult to determine at the control location, a suitable comment was entered. However, it should be recognized that the walk-throughs were not performed in real time or by a complete crew of Control Room Operators. Time available or crew needed to perform procedural steps was not examined at this point, nor were they defined in the EOPs.

Prior to this I&C comparison, the EOPs were evaluated by actual walk-throughs at the most representative simulator available, the BWR simulator at Morris, Illinois. The evaluation was performed by licensed station operators, members of the training staff and assisted by General

Physics Corporation. A second round of simulator exercises is currently being scheduled for all licensed station operators. These walk-throughs represent the most dynamic time relevant evaluation of the EOPs possible at this time.

In addition, the Vermont Yankee plant-specific simulator is expected to be operational in the fall of 1985. As soon as practical thereafter, the VY EOPs will be further dynamically exercised in real time and with each complete Control Room crew as part of their routine training programs.

As with all the previous reviews, any findings from these training programs will be evaluated by the review and management teams. Procedure and hardware corrections will be made where necessary.

V. STATIC SURVEY

1. Operating Experience Review (Section 4.1)

Section 4.1 of the Program Plan describes the planned method of performing an operational experience review. It consists of two major parts: the document review and the operator interview.

Document Review (Section 4.1.2.1)

The document review was conducted as stated in the Program Plan. Historical events, documented in Plant Scram Reports and Licensing Event Reports (LERs) were reviewed, and those caused by human factors were evaluated and entered into the Data Management System.

The events documented during 1980 and 1981 were reviewed by the team working under the direction of the BWR owners group when they conducted the Control Room survey in January 1982. No human factors discrepancies were found.

Those documents describing events which occurred between January 1982 and January 1985 were investigated by the current Review Team. Of the several events occurring in that period, eight comments were generated and entered as findings into the Data Management System to be evaluated by the Review Team.

Operator Interviews (Section 4.1.2.2)

The Program Plan states that a representative sample of operators were interviewed in 1982. The methodology and findings are described in the report of the BWR owners group survey team. Ten findings were described in the report.

All operators who were assigned to the Control Room since January 1982 were interviewed on the current phase of the program. The original BWR methodology and questionnaire was used. Forty findings were entered into the Data Management System as a result.

2. Control Room Survey (Section 4.2)

The Program Plan describes the development and methodology of the BWROG survey in Section 4.2 and Appendix A. The results of this survey are retained in the plant documents and summarized in the report provided to Vermont Yankee in March of 1982.

In addition, in conformance with NRC Generic Letter 83-18, the current Review Team surveyed the Control room using the review supplement checksheets provided to VY by the BWROG. The alternate shutdown panels, located in the Reactor Building, were surveyed by the Review Team using both the original checksheets and the supplemental checksheets.

To bring the survey up to date thereby addressing any new discrepancies, the list of Engineering Design Change Requests (EDCRs) and Plant Alteration Requests (PARs), implemented between January 1982 and February 1984, was carefully reviewed for any that would result in control board changes. These control board changes were evaluated for human factors discrepancies. None were found. In addition, an environmental survey of the Control room addressing heat, light, humidity and noise was redone. The findings resulting from both the original and subsequent surveys were entered into the Data Management System.

In all of the above effort, the result was a numerical value between 0 and 12. For every question on the checksheet with a value of 4 or greater, a comment was generated and entered as a finding into the Data Management System.

Vermont Yankee Detailed Control Room Design Review

This section of the DCRDR produced the largest number of findings.

In 1980, a preliminary evaluation of the Vermont Yankee Control Room was performed by Wyle Laboratories Scientific Service and Systems Group using MIL STD 1472B as a reference. The results of this survey are documented in a letter report available at Vermont Yankee. All of the findings in this report are duplicated in the later BWROG survey. No direct findings from this report were entered into the Data Management System.

VI. ASSESSMENT OF DISCREPANCIES (Section 5)

Section 5 of the Program Plan describes a method of assessing and categorizing HEDs. Additional detail is provided below as well as any changes made in the assessment process. Previous sections of this report and the Program Plan have described the methods and techniques of extracting potential human factors discrepancies from the several activities which comprise the DCRDR. The use of a Data Management System to group and track these discrepancies is described in the following section. The Data Management System functions to guarantee that: 1) all comments from all activities are included, 2) all findings are evaluated by the entire Review Team, 3) a historical documentation of all entries is maintained, and 4) an auditable tracking system of comment to finding to HED is maintained.

The method of categorizing HEDs originally described in the Program Plan turned out to be unwieldy and required a preconceived scenario of events. In its place was provided the following, simpler method of categorization:

Class A - HEDs that are considered to be more significant than Class B or C. These HEDs comprise findings which generally relate to EOPs or Station Technical Specifications.

Class B - HEDs which have the potential to cause human error or equipment misoperation and which are of lessor significance have been assigned to Class B.

Class C - These HEDs are considered to have the least significance of all three classifications. They involve findings which present some degree of operator inconvenience such as clumsy controls and awkward feedback arrangement.

Data Management System (Section 3.5)

Section 3.5 of the Program Plan briefly described a typical Data Management system. The system actually utilized by Vermont Yankee had considerably greater capability. It consisted of two computer files which could be manipulated in various ways to obtain the maximum correlation and tracking.

Findings File

All questions in the static survey answered with a numerical value of 4 or greater required a comment which was entered as a finding. All comments from the IC& comparison were entered into the findings file. Comments from the operator interview and questionnaire, deemed significant by the Review Team, were entered as findings. Certain historical events resulted in comments by the Review Team which were entered as findings.

Each of the approximately 800 entries from the activities described above were entered into the findings file and given a unique descriptive number composed of four separate units:

1. A sequential entry number, identified as record key number, defines the order in which the finding was entered and also keeps a total.

2. A letter describing the section of the DCRDR from which the finding was derived. "S" represents static survey; "O" represents operator interview; "H" represents review of historical events; and "T" represents task analysis or, more properly, I&C comparison since no findings are derived directly from the task analysis.

3. A two-digit number representing the panel on which the findings was discovered.

4. A four-digit alphanumeric definition of the checksheet question which generated the finding.

A brief description of the problem identified appears under the heading "Description." "Resolution" describes the assignment of the finding, either to an HED, defined by a four-digit number, or to discard. A space for appropriate comments has been provided. If a finding is assigned to discard, a comment is entered justifying the discard. All findings remain listed in the file for documentation and tracking.

This file can be sorted to print out the findings listed by section, panel, question number and HED number. The last is the most useful, but sorting by panel enables a review of the various findings affecting a single panel.

To avoid procedural corrections, similar findings reported for different panels and similar kinds of problems were found and sorted. As a result in many cases, several findings were combined into a single HED. In other instances, a single finding constituted an HED. A total of 54 HEDs were identified and inserted in the HED file in the following manner:

1. A sequential number labeled RCD identified the sequence of entry and, therefore, a total.

2. An HED number of four digits identified the general component or functional area of the discrepancy, e.g., recorders, environment, etc.

3. A brief description of the discrepancy. When the HED is comprised of several discrepancies, the description is broader and less specific than a description in the findings file. An HED comprised of a single finding may simply repeat the description of the

finding. However, evaluation of the original finding by the Review Team may bring out additional concerns in which case the HED could be more detailed than, or address additional aspects of, the finding.

4. Status of the HED. A "Resolved" entry indicates that Vermont Yankee has addressed the concern, reached a decision concerning the recommendation, approved a modification and established implementation date. In the event that no change will be made, justification is entered in the last column.

Recommendation/Resolution

This column contains a classification document and a resolution. The Review Team submitted a recommendation to the Management Team. Once the Management Team addressed and resolved the HED, the entry in this column became a "resolution" and was assigned an implementation date. The draft version containing the recommendations was reviewed by the NRC audit team in April 1985, and a copy will be retained in the VY document file. The final issue containing the resolution is submitted with this Summary Report and will be maintained in the Vermont Yankee files.

VII. PROPOSED MODIFICATIONS (Section 5.2)

1. Verify and Validate

A detailed description of the method of determining suitable corrective measures to address discrepancies is provided in the Program Plan. This method was followed by the Review Team in determining suitable modifications which would cure the problem and not create another problem. Mock-ups of the proposed changes may be used by the design engineers who implement the recommendations, e.g., to verify demarcation methods.

2. Coordinate

A NUREG-0737 coordinator has been assigned by VYNPC to manage and address all of the various requirements of NUREG-0737, Supplement 1. This coordinator is a member of VYNPC middle management, knowledgable in all aspects of nuclear power plant operation and is cognizant of regulatory practice.

VIII. LIST OF HEDs

HUMAN ENGINEERING DISCREPANCIES
PRIORITY LISTING

In the following pages, the HEDs are listed in the order and priority of implementation. Each HED is listed by its number, followed by a brief title, its classification and its priority. The classification (A, B, or C) has been described in the Summary Report.

The DCRDR Management Team acted on each Review Team recommendation and assigned an implementation schedule generally consistent with these classifications. HEDs which involved relatively simple resolution such as procurement of portable equipment, improved training or standardized procedures were assigned the earliest implementation schedule. Conversely, HEDs which involved only cosmetic changes were assigned to Schedule B to permit other more significant HEDs to be assigned a higher priority.

Since the outage plan for the 1985 Refueling Outage has already been completed, all the priority A HEDs have been scheduled to be completed not later than the startup following the second subsequent refueling outage. Priority B and C HEDs have been respectively assigned to the following third and fourth regularly scheduled refueling outage.

Those HEDs listed as "No Chg." will not be implemented.

HED LIST

The HEDs found during the DCRDR are listed in the pages following the Priority List. This listing is sequential and includes a description of the HED, a resolution, and an implementation schedule expressed as a priority. A justification is provided for those HEDs which will not be implemented.

HED	Description	Class	Priority
0101	EOP Recorders (Torus Press./Level) having Glare and Parallax Problems	A	A
0203	Demarcation and Hierarchical Labeling	A	A
0401	Warning Labels	A	A
05B0	Test Feature for Indicating Lights	A	A
05E0	Reversed Control Movement	A	A
05E2	Pointers Obscure Graduations, Failure Mode Not Evident	A	A
0600	Annunciator Design Problems	A	A
0601	Annunciator Silence Controls	A	A
0602	Annunciator Problems	A	A
0603	Alarm Response Procedure Tabs	C	A
0700	Temporary Labels (Dymo Tape)	A	A
0800	Glare Caused by Rear Lighting	C	A
0900	CRP 9-5 Lay Down Space	C	A
0901	Glare Caused by Rear Lighting (CRP 9-7)	C	A
0902	Emergency Lighting	A	A
0907	AOG Lay Down Space	C	A
1000	Interchanging of Lenses	C	A
1001	Standardized Operating Procedures	A	A
1200	Dedicated Gaitronics	A	A
1403	Openings in Control Panels	C	A
1405	EOP Instruments	C	A
1407	EOP Instruments	A	A
1408	Torus Level Reference	C	A
1409	Operator's Desk Lighting	C	A

HED	Description	Class	Priority
0102	Keylock Switches Outside Anthropometric Limits	C	B
0200	Indicators Not Correlated with Controls	C	B
0201	AOG Panel Problems	B	B
0204	MG Set Speed/Demand Meters	B	B
0206	Service Water Pump Switches	C	B
02A0	Mimic Inconsistencies	C	B
0300	Color Standard (Mimics, Switches, Labels, Demarcation, Lights)	B	B
0400	Label Standard (Switch, Escutcheon Plates and Labels)	B	B
05A0	Recorder Problems (Scales Unclear, Incorrect Units, Subdivisions)	C	B
05A1	Recorder Problems (Pens Inadequately Identified, Not Color Coded)	C	B
05C0	Switch Labels and Color Code	A	B
05D0	Meters, Recorders Not Marked for Normal, Abnormal, Alarm Ranges	C	B
05E1	Poor Visual Contrast Between Scale and Pointer, Graduations	C	B
05E4	Relabel Flux Tilt Monitor	C	B
1300	Training Issues (AOG, RHR, Duties, Requal.)	B	B
1402	EPR/MPR Controls	C	B
1406	Hogger Controls	C	B

HED	Description	Class	Priority
0102	Keylock Switch Problems	C	C
0200	Feedback and Controls	C	C
05E3	HPCI/RCIC Tachometers	C	C
0903	Control Room Noise	C	C
0904	Control Room HVAC	C	C

HED	Description	Class	Priority
0100	Emergency Controls Outside Anthropometric Limits	C	No Chg.
0202	RHR Meters and Controls Not Grouped Together	A	No Chg.
0205	RBCCW Switch Handles (Cut Off)	C	No Chg.
0905	Control Room Crowd Controls	C	No Chg.
0906	Annunciator Sound Level	A	No Chg.
1301	Equipment Status Board	A	No Chg.
1401	Off-Gas Isolation Valve Controls	C	No Chg.
1404	Drawing Revisions	C	No Chg.

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED0100

DESCRIPTION OF DISCREPANCY: The findings that comprise this HED describe components which are located outside the recommended anthropometric limits. Many of these are outside the limits because of the guard rail on the MCB. These are components which do not require precise readings or frequent rapid manipulation.

RESOLUTION: Class C - Controls and displays that comprise this HED are not required to be operated and/or monitored precisely during emergency operation. No action will be taken.

STATUS: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED0101

DESCRIPTION OF DISCREPANCY: Torus pressure and level recorders are located higher than recommended on Panel 9-25. This creates a parallax and glare problem.

RESOLUTION: Class A - Those indications which are required by the Emergency Operating Procedures will be relocated within anthropometric limits. Those that are not required by EOPs will not be changed.

Schedule A

STATUS: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED0102

DESCRIPTION OF DISCREPANCY: Keylock switches on the back panels are located about 94 inches from the floor which is well outside the recommended anthropometric limits.

RESOLUTION: Class C - The labeling on all switches will be corrected by moving it below the switch so it can be better seen.

Those switches that are required by the Emergency Operating Procedures will be relocated within anthropometric limits. Those that are not required by the EOPs will not be changed.

Schedule B (labels)

Schedule C (all else)

STATUS: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED0200

DESCRIPTION OF DISCREPANCY: The findings that comprise this HED describe areas in the Control Room where indicators are not aligned to facilitate comparative readings and where control and feedback are not easily correlated.

RESOLUTION: Class C - Hierarchical labeling and demarcation methods will be applied consistent with the guidelines of NUREG-0700.

Components which cannot otherwise be resolved will be relocated.

Schedule B

STATUS: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED0201

DESCRIPTION OF DISCREPANCY:

The AOG panel 1) has components which are not grouped in a logical manner, 2) mimic needs improvement, 3) should be demarcated to improve feedback, and 4) is located on the back of the MCB outside primary operating area.

RESOLUTION:

Class B - Changes made with respect to color, labeling, acronyms, and abbreviations will be made in accordance with standards developed in response to other HEDs and implemented to the extent practical on this panel.

The components controlled by this panel are not emergency equipment requiring rapid operator response. The only emergency functions, isolation or train switchover occur automatically.

In general, the operation of this panel is assigned to the Shift Supervisor or an extra operator. To ensure a consistent approach when operating the system, enhanced operator training in the use of the startup procedure will be provided.

Schedule B (labels, color, acronyms)

STATUS:

Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED0202

DESCRIPTION OF DISCREPANCY: On Panel 9-3, the torus level indicators are separated from the RHR pump controls by six feet. Thus, the operator cannot read the meters while stationed at the controls.

RESOLUTION: Class A - Torus wide-range level and pressure indications are correctly located for the application of containment venting.

When using the procedure referenced in this HED, there is no need to simultaneously open the valve and monitor the indications. No immediate operator action is required which would require constant monitoring of the indicator.

No action will be taken.

STATUS: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED0203

DESCRIPTION OF DISCREPANCY: The findings that comprise this HED describe areas of the MCB where demarcation is needed to combine control groups and displays.

RESOLUTION: Class A - Hierarchical labeling and demarcation methods will be applied consistent with the guidelines of NUREG-0700.

Schedule A

STATUS: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED0204

DESCRIPTION OF DISCREPANCY: The MG set speed/demand meters are 1) too small to read the required accuracy, 2) poorly located and have glare problems.

RESOLUTION: Class B - These indicators will be replaced with ones that enable the operator to read the required accuracy.

Schedule B

STATUS: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED0205

DESCRIPTION OF DISCREPANCY: The switch handles for the Reactor Building cooling water have been cut off to provide room for the annunciator push buttons.

RESOLUTION: Class C - There is no safety significance to these switch handles. No change is required by the finding. However, the location and function of all annunciator centers will be addressed in HED0601.

STATUS: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED0206

DESCRIPTION OF DISCREPANCY: The service water pump switches are not arranged in a logical manner. From left to right, the switches are arranged A, C, B, D.

RESOLUTION: Class C - The switch arrangement correctly reflects the physical location of the pumps. Hierarchical labeling and demarcation will be added to further aid the operator.

Schedule B

STATUS: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED02A0

DESCRIPTION OF DISCREPANCY: The findings that comprise this HED describe how the mimic on the MCB 1) is missing start and end points, 2) missing name plates, 3) standard symbols not used, and 4) does not have adequate contrast with MCB.

RESOLUTION: Class C - The findings for this HED will be corrected.

Schedule B

STATUS: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED0300

DESCRIPTION OF DISCREPANCY: The items that comprise this HED describe how color is used inconsistently on panels in the Control Room and on the alternate shutdown system panels. The BWR-OG survey, the Wyle survey and the NSD survey have all mentioned this.

RESOLUTION: Class B - A color standard will be implemented consistent with the guidelines of NUREG-0700 as a basis.

Schedule B

Status: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED0400

DESCRIPTION OF DISCREPANCY: The findings that comprise this HED describe how labels are used inconsistently. Some examples are 1) the same size labels and letters are not used for similar devices, 2) nomenclature, acronyms and abbreviations are inconsistent and 3) not all components identified.

RESOLUTION: Class B - A labeling standard will be implemented consistent with the guidelines of NUREG-0700.

Schedule B

STATUS: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED0401

DESCRIPTION OF DISCREPANCY:

The findings that comprise this HED describes areas where warning labels are not used to 1) identify operating limits or 2) identify alarm or action points.

RESOLUTION:

Class A - All temporary warning labels will be replaced with permanent warning labels.

Appropriate station operating procedures will be reviewed to identify the need for warning labels. Any necessary labels will be implemented consistent with the guidelines of NUREG-0700.

Schedule A

STATUS:

Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED05A0

DESCRIPTION OF DISCREPANCY:

The findings that comprise this HED describe recorders that have 1) more than nine intermediate markings between major divisions, 2) pointers that obscure the scale, 3) printed numbers which are not clear, 4) other similar problems, 5) incorrect engineering units.

RESOLUTION:

Class C - Incorrect engineering units will be corrected.

The balance of the discrepancies will be corrected as the recorders are replaced during normal use.

Schedule B

STATUS:

Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED05A1

DESCRIPTION OF DISCREPANCY: The findings that comprise this HED describe how recorder 1) pens are not labeled and 2) pen color is not used consistently.

RESOLUTION: Class C - The pens will be labeled and colors will be implemented in accordance with the color standard consistent with the guidelines of NUREG-0700.

Schedule B

STATUS: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED05B0

DESCRIPTION OF DISCREPANCY: A lamp test feature is not provided to determine if indicating lights have failed.

RESOLUTION: Class A - A lamp test feature will be provided for all status lights whose condition would not be detected during normal operation or which are not backed up by another indication.

Schedule A

STATUS: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED05C0

DESCRIPTION OF DISCREPANCY:

The findings that comprise this HED describe how switches are 1) not color coded, 2) not clearly marked, 3) have handles which obscure legend plates, 4) labeled open-close, instead of start-stop or auto/open instead of open/close, 5) no tactile difference between pump and valve switches.

RESOLUTION:

Class A - Discrepancies one through four will be implemented with the color and label standards. Color and label differences preclude the need for tactile differentiation between pump and valve switches.

Schedule B

STATUS:

Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED05D0

DESCRIPTION OF DISCREPANCY: Indicating devices are not marked to show normal, abnormal or alarm setpoints.

RESOLUTION: Class C - Appropriate station operating procedures will be reviewed to identify the need for the marking of normal or abnormal ranges and alarm setpoints, and necessary changes will be made.

Schedule B

STATUS: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED05EC

DESCRIPTION OF DISCREPANCY: On some adjacent valve controllers, the control movement to increase is reversed.

RESOLUTION: Class A - Controllers will be changed to increase from left to right.

Schedule A

STATUS: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED05E1

DESCRIPTION OF DISCREPANCY: The visual contrast between scale and pointer is poor and there are more than nine intermediate scale markings on the instruments covered by these findings.

RESOLUTION: Class C - These findings will be corrected.

Schedule B

STATUS: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED05E2

DESCRIPTION OF DISCREPANCY: The findings that comprise this HED describe how 1) pointers obscure graduations, 2) instrument failure mode is not evident, 3) scales are in odd multiples, and 4) process units are not identified.

RESOLUTION: Class A - Those pointers which obscure the scale will be changed. The odd numbered scales will be replaced and the process units will be identified.

Schedule A

STATUS: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED05E3

DESCRIPTION OF DISCREPANCY: HPCI and RCIC turbine tachs have zero at top of vertical scale.

RESOLUTION: Class C - These indicators will be changed.

Schedule C

STATUS: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED05E4

DESCRIPTION OF DISCREPANCY: The off-gas radiation monitor is a multiple range meter with a confusing selector switch. Also it is located below the recommended limit on Panel 9-10. This meter should be on Panel 9-2 with its associated recorder.

RESOLUTION: Class C - The label will be clarified.

This is a special function monitor with limited usefulness. It is used only for troubleshooting when there is failed fuel. The operation is done slowly, and it is not tied to any other plant operation. Panel 9-10 is the correct place for it, and its location will not interfere with the operation of the testing.

Schedule B

STATUS: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED0600

DESCRIPTION OF DISCREPANCY: Numerous annunciator findings comprise this HED. Examples are that the annunciator system 1) is not consistent in the use of acronyms and abbreviations, 2) is not prioritized, 3) has no first out alarms, 4) has high use of common windows which block second alarm, and 5) windows are inconsistent in type and size.

RESOLUTION: Class A - Lettering on the windows and the use of abbreviations and acronyms will be changed consistent with the label standards of NUREG-0700. An engineering study will be performed to address the existing annunciator system. Appropriate changes will be implemented.

Schedule A

STATUS: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED0601

DESCRIPTION OF DISCREPANCY: The annunciator response controls 1) cover a large area making it possible to acknowledge and reset distant alarms, 2) a separate silence push button is not provided.

RESOLUTION: Class A - HED 0601 will be done as a part of HED0600.

Schedule A

STATUS: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED0602

DESCRIPTION OF DISCREPANCY: The findings that comprise this HED List alarms that should be provided based on operating events and I&C comparison.

RESOLUTION: Class A - This will be done as a part of HED 0600.

Schedule A

STATUS: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED0603

DESCRIPTION OF DISCREPANCY: The alphanumeric identification system for annunciator window identification is cumbersome to use in response procedures.

RESOLUTION: Class C - The word "cumbersome" refers to the use of the alarm response procedure. Alarms that require the use of this procedure are not safety-related and do not require instant operator response; therefore, the only corrective action necessary is to tab the alarm response procedure to accommodate operator convenience.

Schedule A

STATUS: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED0700

DESCRIPTION OF DISCREPANCY: The findings that comprise this HED describe how the use of temporary labels is 1) not controlled, 2) not periodically reviewed, 3) not accurate, and 4) not consistent.

RESOLUTION: Class A - Existing Procedure DP-0162 will be revised to establish requirements for the use of temporary labels.

Schedule A

STATUS: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED0800

DESCRIPTION OF DISCREPANCY: The findings that comprise this HED describe areas of the Control Room where glare and parallax affect indicating devices. Most of the glare is caused by the row of lights behind the control board.

RESOLUTION: Class C - A shield or reflector will be provided.

Schedule A

STATUS: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED0900

DESCRIPTION OF DISCREPANCY: When stationed at Panel 9-5 the operator is required to maintain a log. No writing space with knee and toe room is provided.

RESOLUTION: Class C - A table will be provided.

Schedule A

STATUS: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED0901

DESCRIPTION OF DISCREPANCY: The lights behind Panel 9-7 shine direct light in the operator's eyes when he is in the normal operating position.

RESOLUTION: Class C - A shield or reflector will be provided.

Schedule A

STATUS: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED0902

DESCRIPTION OF DISCREPANCY: The emergency lighting varies from 6.5 to 9-foot candles below the recommended minimum.

RESOLUTION: Class A - Control Room emergency lighting will be corrected.

Schedule A

STATUS: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED0903

DESCRIPTION OF DISCREPANCY: The background noise level in the area of the back panels is 85 dB due to the 60-cycle hum from the relays. The operators have complained about the 60-cycle hum.

RESOLUTION: Class C - A consultant is currently evaluating alternate solutions to this problem. Appropriate corrective action will be implemented.

Schedule C

STATUS: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED0904

DESCRIPTION OF DISCREPANCY: The operators have complained about drafts in the Control Room at night and on weekends. The problem comes from the ventilation system which blows across the primary operating area from one side of the Control Room.

RESOLUTION: Class C - The ventilation system will be modified to correct the draft problem.

Schedule C

STATUS: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED0905

DESCRIPTION OF DISCREPANCY: The Control Room tends to become a gathering place during operational transients.

RESOLUTION: Class C - AP-0150 provides the Shift Supervisor with the necessary authority to control the number of people in the Control Room. No change will be made.

STATUS: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED0906

DESCRIPTION OF DISCREPANCY: The Annunciator System is 7 dB above the average background noise. NUREG-0700 recommends 10 dB. The annunciator can be easily heard.

RESOLUTION: Class C - The Annunciator System can be easily heard above background. No change will be made.

STATUS: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED0907

DESCRIPTION OF DISCREPANCY: There is no procedure lay down space at the AOG panel. The procedure lay down space at all panels is marginal.

RESOLUTION: Class C - A cart will be provided.

Schedule A

STATUS: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED1000

DESCRIPTION OF DISCREPANCY: There is no provision to prevent the interchanging of indicating light lenses.

RESOLUTION: Class C - Training will address this concern.

Schedule A

STATUS: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED1001

DESCRIPTION OF DISCREPANCY: The findings that comprise this HED describe how operating procedures 1) are not standardized, 2) do not reference panel locations, and 3) allow for inconsistencies between procedures.

RESOLUTION: Class A - Guidance has been developed which specifies a standard format and style for all procedures. All operators will be instructed that as inconsistencies are discovered in procedures, they should be brought to the Department Head's attention. Changes will then be made.

Schedule A

STATUS: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED1200

DESCRIPTION OF DISCREPANCY: The findings that comprise this HED describe how in-plant communication is not available to Control Room operators on a priority basis.

RESOLUTION: Class A - A specific Gaitronics channel will be reserved for Control Room use. Labels will be provided for each station.

Schedule A

STATUS: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED1300

DESCRIPTION OF DISCREPANCY: The findings that comprise this HED describe how training should 1) be plant-specific, 2) does not adequately cover the AOG System, and 3) does not include computer.

RESOLUTION: Class B - These findings have been forwarded to the Training Department for their corrective action.

Schedule B

STATUS: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED1301

DESCRIPTION OF DISCREPANCY: It has been recommended that a plant equipment status board be provided.

RESOLUTION: Class A - Several continuous means of maintaining plant equipment status already exist. They include: Shift Turnover Log Sheets, Control Room Logs and Equipment Status Logs. These logs have recently been upgraded and the addition of another means of maintaining equipment status would be completely unnecessary. No change will be made.

STATUS: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED1401

DESCRIPTION OF DISCREPANCY: The off-gas isolation valve controls and indication are located on Panel 9-2 near the monitoring displays. This valve controls the output of the AOG System to the vent stack.

RESOLUTION: Class C - The most important function of this valve is to close on indication of a release. The stack monitoring indication is near Panel 9-2. Therefore, the correct location for the isolation valve control and indication is on Panel 9-2, near the stack monitor. No change will be made.

STATUS: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED1402

DESCRIPTION OF DISCREPANCY: The findings which comprise this HED describe situations where the control response is not clearly related to the action.

RESOLUTION: Class C - These instances will be corrected as in HED 0401.

Schedule B

STATUS: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED1403

DESCRIPTION OF DISCREPANCY: The findings which comprise this HED discuss areas where openings have been left on the control board.

RESOLUTION: Class C - Unused openings on the control board will be closed.

Schedule A

STATUS: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED1404

DESCRIPTION OF DISCREPANCY: The operator interviews expressed concern over the time required to change drawings in response to design changes.

RESOLUTION: Class C - Action has been taken to reduce the time for drawing changes. No further change will be made.

STATUS: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED1405

DESCRIPTION OF DISCREPANCY:

The findings which comprise this HED describe instances where: 1) the instruments needed to perform the EOPs are not provided, and 2) additional indication would greatly aid the operator.

RESOLUTION:

Class A - Each individual finding will be evaluated and the appropriate corrective action will be taken. This corrective action will include:

1. Provision of appropriate indication, control or labels; or
2. Change of procedure to clarify action required; or
3. Justification where no corrective action is judged to be necessary.

Schedule A

STATUS:

Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED1406

DESCRIPTION OF DISCREPANCY: These findings describe where instruments should be relocated to aid operator action.

RESOLUTION: Class C - These findings will be corrected.

Schedule B

STATUS: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED1407

DESCRIPTION OF DISCREPANCY: The findings comprising this HED describe situations where the information required by the EOPs is not provided in the same units.

RESOLUTION: Class A - This HED will be addressed in the same manner as HED 1405.

Schedule A

STATUS: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED1408

DESCRIPTION OF DISCREPANCY: Torus level digital indicators on Panel 9-25 have different zero reference for adjacent meters.

RESOLUTION: Class C - This finding will be corrected.

Schedule A

STATUS: Resolved

* HUMAN ENGINEERING DISCREPANCY RECORD *

NUCLEAR STATION -- VERMONT YANKEE

HED1409

DESCRIPTION OF DISCREPANCY: The lighting at the operator desk is below the minimum 50-foot candles recommended in NUREG-0700.

RESOLUTION: Class C - This finding will be corrected.

Schedule A

STATUS: Resolved

IX. ATTACHMENTS

A. Resumes

B. NRC Memo, Weiss to Moore, "Task Analysis"

C. Instruction

VERMONT YANKEE DETAILED CONTROL ROOM DESIGN REVIEW

Attachment A Resumes

RICHARD I. STAMM
Senior Engineer

EDUCATION

M.S., Nuclear Engineering, Ohio State University

B.S., Chemistry, State University of New York College at Potsdam

LICENSES AND CERTIFICATIONS

Senior Reactor Operator, Boiling Water Reactor/6

EXPERIENCE
1982 - Present

General Physics Corporation

Mr. Stamm provides technical assistance to power utilities in areas of operator and plant system procedure development and preparation; reactor physics and operations; surveillance procedure development; systems descriptions preparation and review; and inservice inspection program reviews. Representative projects include:

- Detailed Control Room Design Review/Emergency Procedure Verification and Validation, Gulf States Utilities, River Bend Nuclear Station, Unit 1
  Developed and implemented scenarios for DCRDR Task Analysis of BWR Owners Group Emergency Procedure Guidelines and Emergency Procedure Verification and Validation; independently derived Information and Control Requirements for DCRDR; evaluated Emergency Procedures, identified procedure discrepancies and provided recommendations for resolution.

- Detailed Control Room Design Review/Emergency Procedure Validation, Vermont Yankee Nuclear Station
  Developed and implemented scenarios for validation of Vermont Yankee Emergency Procedures; utilized scenarios and operator walkthroughs to evaluate Emergency Procedures, identify procedure discrepancies and provide recommendations for resolution; independently derived Information and Control Requirements for DCRDR and performed control room inventory analysis.

- Detailed Control Room Design Review, Omaha Public Power District, Fort Calhoun Nuclear Station
  Currently performing DCRDR Task Analysis of Combustion Engineering Owners Group Emergency Procedure Guidelines; independently deriving Information and Control Requirements for comparison with actual control room inventory.

- Southern California Edison's San Onofre Nuclear Generating Station, Unit 2
  Performed Configuration Management Analysis to review and evaluate all design changes and proposed facility changes to SONGS Unit 2 to determine the impact on simulator software, hardware, and training.

- Inservice Inspection Program Review, Baltimore Gas and Electric Company, Calvert Cliffs Units 1 and 2
  Performed complete boundary classification review of Class 1, 2, and 3 pressure retaining systems based on the requirements of 10CFR and Regulatory Guide 1.26; P&IDs, plant Classification Manual and NRC transmittals were reviewed for conformance and completeness in preparation for the second 10-year inspection cycle.

1981 - 1982 **General Electric Company, Startup Test Operations Unit**
Mr. Stamm was a nuclear startup engineer, certified SRO on BWR/6, and worked at the Grand Gulf Nuclear Station. His responsibilities included revising plant systems descriptions; reviewing operating procedures; developing and instructing reactor physics and applied engineering courses, and instructing operators in BWR systems and operations.

1979 - 1981 **General Electric Company, Radiological Testing and Instrumentation Unit**
Mr. Stamm was an associate engineer assigned to the Vallecitos Nuclear Center. His activities included design of fuel rod scanner detector housing and shield, development of procedures for monitoring U-235 inventory in waste incinerator; analysis of radioisotope transport in radwaste volume reduction process, and performance of fuel and piping gamma scans and dose rate measurements at reactor sites.

1977 - 1979 **Ohio State University, Department of Nuclear Engineering**
Mr. Stamm was a graduate research associate. He participated in the development of gamma ray cameras for medical use; and in the design, fabrication and evaluation of germanium strip detectors.

(1/85)

June 1984

RICHARD L. BRANCH

Assistant Operations Supervisor - Vermont Yankee

Experience

Mr. Branch has amassed an impressive list of experience in power plants beginning in 1946 as a member of the US Navy. Eleven years in various marine engine rooms were followed by two years as Engineer on a diesel submarine. This, in turn, was followed by a year of training in the US Navy Nuclear Power Training Unit at West Milton, NY, and the Westinghouse Bettis Laboratories. Six years of on-board experience followed on the USS Robert E. Lee and the USS George Bancroft where he served as Engineering Watch Section Supervisor.

Following his retirement from the US Navy, with twenty years service, he was employed by General Dynamics, Electric Boat Division in Groton, Connecticut, as a Technical Aide.

He joined the Vermont Yankee Nuclear Power Corporation staff in 1968 as a Shift Supervisor. This was during the early phases of plant construction. During the ensuing two years he was loaned to the Millstone Point Company as a Shift Supervisor and assisted them during the construction and start-up periods.

At the completion of his Millstone assignment he returned to Vermont Yankee as a Shift Supervisor during the late construction period and participated in completion and start up of this plant. He continued as Shift Supervisor until 1976. Since then he has servced as Assistant Operations Supervisor and Operations Supervisor.

Licenses

Mr. Branch holds or has held the following licenses and ratings:

1. AEC Senior Operators License for Millstone 1
2. AEC Senior Operators License for Vermont Yankee (currently in force)
3. Senior Chief Engineer USN
4. Operating Engineer USN
5. Engineer USN

Education

Mr. Branch completed a High School Equivalency program while in the US Navy. He has completed a total of 12 US Navy training school, among which were included:

Machinist Mate School
Class A Engineman School (Diesel)
Class C Engineman School (Diesel)
Ground Control Approach School (Engineman)
Basic Nuclear Power School
Training Unit S3G
Nuclear Power Plant School (Bettis)

In civilian life he has completed:

BWR Reactor Operator Training Program (Morris, Ill.)
Program of Reactor Experiments (Argonne National Lab.)
In three different years ('77, '78, '79) he has requalified on the Browns Ferry Simulator and the GE BWR Simulator.

ATTACHMENT 2

MAY 14 1984

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MEMORANDUM FOR: Voss A. Moore, Chief
Human Factors Engineering Branch
Division of Human Factors Safety

FROM: S. H. Weiss, Section Leader
Section B, Human Factors Engineering Branch
Division of Human Factors Safety

SUBJECT: MEETING SUMMARY - TASK ANALYSIS REQUIREMENTS OF SUPPLEMENT 1 TO NUREG-0737 - MAY 4, 1984 MEETING WITH BWR OWNERS GROUP EMERGENCY PROCEDURE GUIDELINES AND CONTROL ROOM DESIGN REVIEW COMMITTEES

Staff representatives met with representatives of the BWROG Emergency Procedure Guidelines (EPG) and Control Room Design Review (CRDR) Committees and others on May 4, 1984 to discuss the task analysis requirements of Supplement 1 to NUREG-0737 (Generic Letter 82-33). The purposes of the meeting were 1) for the Owners Group to discuss how the EPG development effort and the CRDR program addressed operator information and control needs, and 2) for the staff to determine any additional analyses or documentation needed for review of applicant and licensee submittals on the Detailed Control Room Design Review and Emergency Procedure Generation Package.

Mr. Robert Stratman, EPG Committee Chair, made a brief presentation on the background of the BWROG EPG Program. His presentation included a description of the technical bases and scope of the EPGs. Mr. A. G. Higgs, CRDR Committee Chair, provided a discussion of the Owners Group CRDR Program and the BWROG approach to task analysis. A copy of the meeting agenda and transparencies used in the BWROG presentations are provided as Enclosure 1.

During a staff caucus to discuss the information provided by the BWROG, the following conclusions were drawn by the staff and, subsequently, presented to the meeting attendees:

1. Based on the presentations by Messrs. Stratman and Higgs and the ensuing discussion, it appears that Revision 3 of the EPG provides a functional analysis that identifies on a high level, generic information and control needs. However, these EPGs do not explicitly identify the plant-specific information and control needs, which are necessary for preparing emergency operating procedures and determining the adequacy of existing instrumentation and controls.

2. Because detailed plant-specific information and control needs cannot be extracted directly from the EPGs, plant-specific analysis is required.

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3. Each licensee and applicant must describe the process used to identify plant-specific parameters and other plant-specific information and control capability needs and must describe how the characteristics of needed instruments and controls will be determined. These processes may be described in either the Procedure Generation Packages or the DCRDR Program Plan with appropriate cross-referencing.

4. For each instrument and control used to implement the EOPs, there should be an auditable record that defines the necessary characteristics of the instrument or control and the bases for that determination. The necessary characteristics should be derived from analysis of the information and control needs identified in NRC approved EPGs and from analysis of plant-specific information.

Enclosure 2 is a list of attendees.

/S/

S. H. Weiss, Section Leader
Section B, Human Factors Engineering Branch
Division of Human Factors Safety

Enclosures:
As stated

cc w/enclosures:
A. Migas
R. Stratman
G. Burnette

VERMONT YANKEE DETAILED CONTROL ROOM DESIGN REVIEW

Instrument and Control Requirements for Emergency Operation

Instruction for Deriving I&C Requirements

GENERAL

The I&C requirements will be derived directly from the symptom oriented emergency operating procedures. At this time, revision 0 of the procedures are the latest available. Certain minor modifications and editorial changes may be made before final approval and implementation of the procedures, but the procedures are based on the BWR owners group Guidelines, as adjusted to be applicable to Vermont Yankee, and no substantial changes are expected. Using the five Operational Emergency Procedures (0E3100 through 3400), the I&C requirements will be derived as follows:

1. A check sheet will be devised with the procedure identified by number, revision, and title at the top left corner.
2. Starting with the entry condition for the procedure, the step number will be identified in the column "Procedure Step Number".
3. The task described by the entry condition, or step, will be entered under the column "Task". If the step is clear enough to determine the requirements directly, the step may be entered verbatim. If necessary, the step may be restated to describe the task in sufficient detail to enable the requirements to be determined.

4. Under the column "I&C Needs", enter the type of instruments and/or controls needed to perform the task listed in the previous column. For example, if the task states "Determine that the reactor water level is at least 14 inches above the top of the active fuel" one would expect to need a level indicator. Frequently, many items are needed to perform the step, so for clarity, each one should be given a sequential number.

5. In the column "I&C Requirement", enter for each item in the previous column, the specific requirements the instrument must meet to appropriately provide the information or control specified in the task. Using the same example, the requirement might read: Range: TAF to TAF plus 20, Units: inches, Scale Division: 1. Information to determine requirements may be obtained from the VY FSAR, system descriptions, analyses, equipment specifications, or general experience in boiling water or other nuclear power plants. DO NOT use the control room inventory list or develop this list from existing control room equipment. This is to be an independently derived list of needs without dependency on the instrumentation and controls currently installed.

   To clearly associate the requirements with the needs, the requirements should be numbered to correspond with the instruments listed under "Needs".

If a similar instrument need has already been identified in the procedure and the requirements are the same, it is acceptable to merely reference the previous step where the requirements were listed. Do not reference a step in another procedure.