

Docket No. 50-346

License No. NPF-3

Serial No. 1121

January 31, 1985



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Director of Nuclear Reactor Regulation  
Attention: Mr. John F. Stolz  
Operating Reactor Branch No. 4  
Division of Licensing  
United States Nuclear Regulatory Commission  
Washington, D. C. 20555

Dear Mr. Stolz:

On December 17, 1982, the Nuclear Regulatory Commission (NRC) issued Supplement 1 to NUREG 0737, "Requirements for Emergency Response Capability", (Generic Letter 82-33) (Log No. 1168).

On June 29, 1984 (Serial 1057), Toledo Edison submitted a summary report for the Detailed Control Room Design Review (DCRDR). Additionally, Toledo Edison committed to provide a proposed schedule for implementation in accordance with Commission Order dated February 21, 1984, as revised June 5, 1984 (Log No. 1527).

Section 7 of the DCRDR Summary Report described two different approaches to the dispositioning of Human Engineering Discrepancies (HED's); those for which short term corrective actions could be identified, and those which required additional consideration to assure an integrated approach to their resolution. Those HED's requiring additional consideration were further divided into a number of special studies described in the report.

In planning these additional studies, Toledo Edison has determined that not all of the studies need be conducted in parallel, i.e., they need not all be completed in the same time-frame to assure proper resolution of all HED's. We further determined that the most safety significant HED's were included in only half of the identified studies.

To help establish the schedule for the conduct of these studies, we decided to re-examine the most safety significant HED's to further prioritize them and thus determine which of the studies would provide the most significant benefits. The result of this effort is a clearer understanding of the safety significance of these HED's and a more definitive schedule for the conduct of these special studies.

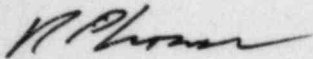
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Attachment 1 contains a completion schedule for the resolution of those HED's for which short term corrective actions were identified. It further provides a proposed schedule for the implementation of the individual special studies and a dispositioning of associated HED's. Also identified is the anticipated schedule for resolution of the most safety significant HED's.

Very truly yours,



RPC:JRL:SNB:SGW:nlf  
encl.

cc: DB-1 NRC Resident Inspector

SUPPLEMENT 1 TO NUREG 0737  
DETAILED CONTROL ROOM DESIGN REVIEW IMPLEMENTATION SCHEDULE

I. SCHEDULE FOR RESOLUTION OF HEDS WITH SHORT TERM CORRECTIVE ACTIONS

The expected completion date for the resolution of each HED with an identified short term corrective action, is provided in Table 2, together with a very brief description of the planned disposition. HED P.9.2-7, which was included in this list in the DCRDR Summary Report, was not included in Table 2. The short term corrective action originally identified was determined to be inappropriate, and this HED has instead been included for consideration in the display study.

The completion date referenced in the table is the date on which the identified disposition was or will be accomplished. In some cases, the identified disposition may be the initiation of some other corrective action mechanism such as the Toledo Edison Facility Modification Program. Corrective action by this program is initiated when a Facility Change Request (FCR) form is prepared. This process then tracks the requested project/modification through completion and includes a method of prioritizing the project/modification with respect to all other projects. The completion of these projects is in accordance with the Toledo Edison Integrated Living Schedule Program, Toledo Edison Serial No. 1043, submitted July 16, 1984.

II. RE-EVALUATION OF HUMAN ENGINEERING DESCREPANCIES

As mentioned previously, the re-evaluation of the most safety significant HEDs was undertaken to help identify which special studies would provide the most safety significant improvements to the Davis-Besse Control Room. The HEDs reviewed were those originally prioritized as "A" or "B" in the DCRDR Summary Report.

The review of these HEDs was further prompted by the recognition that the safety significance of these HEDs varied considerably. Section 6.1 of the DCRDR Summary Report identified the process used to prioritize HEDs. A very strict and conservative interpretation of the terms "plant safety functions", "mitigate the consequences of an accident", and "unsafe operations or plant conditions" was used in this evaluation. This resulted in HEDs being prioritized as "A" or "B" if it was even remotely significant.

To more appropriately assess the safety significance of these HEDs, the review team was assembled (with the exception of the human factors specialists) and each HED was given a high/medium/low safety significance ranking. The definition of these rankings are as follows:

- |        |  |
|--------|--|
| High   | - The hypothesized error will prevent or degrade a safety function                                     |
| Medium | - The hypothesized error will challenge a safety system or could potentially degrade a safety function |
| Low    | - The hypothesized error could potentially challenge a safety system                                   |

The results of this review are given in Table 1 which presents the significance ranking for each HED along with a brief description of proposed corrective action. Of the 29 HEDs evaluated, only one was determined to have high safety significance. Eight HEDs were evaluated as having medium safety significance, and the remaining twenty were categorized as having low safety significance.

Of the high and medium safety significant HEDs, four were originally to be dispositioned by the Steam and Feedwater Rupture Control System (SFRCS) Special Study. Three of these HEDs were to be dispositioned by the Display Study and the remaining two were to be evaluated in the Label and Location Aids Study. Additionally, of the three HEDs originally to be dispositioned in the Display Study, one HED was specifically related to the SFRCS.

With these results and an understanding of the magnitude of effort involved in all of the studies, we determined that the SFRCS Study would provide the most significant benefits. Of the remaining studies, the Label and Location Aids Study and the Display Study provide the most benefit to the operator. The remaining studies will provide the least significant Control Room improvements.

### III. SFRCS SPECIAL STUDY

Because of the safety significance of the HEDs associated with the Steam and Feedwater Rupture Control System, Toledo Edison has placed special attention upon their resolution. Those HEDs to be dispositioned in the SFRCS Study along with related HEDs from other studies, have been reviewed by Toledo Edison Operations and Engineering personnel, including individuals from the DCRDR Review Team.

Of the HEDs reviewed, one (9.2-54), was given a High safety significance as described in Section II. This HED is actually composed of three individual parts, only one of which was determined to be of high significance. This problem is associated with the SFRCS manual initiation switches. The arrangement of two of the switches is reversed from what the operator would logically expect to see. With the existing arrangement, an operator attempting to manually initiate SFRCS on either a low steam pressure on Steam Generator 1 or low steam pressure on Steam Generator 2 may inadvertently block any SFRCS

actuation. The automatic actuation of SFRCS on either of these two conditions would not be affected by this switch arrangement unless the operator chose to manually initiate SFRCS and made an error in the selection of the switches used.

Control Room operators have already been trained on this potential problem and procedures have been modified to clearly explain the condition. An FCR has already been initiated to modify this switch arrangement. We anticipate that this problem will be resolved no later than the end of the fifth refueling outage.

The review of the remaining HEDs resulted in the development of additional modification proposals. Included in these proposals are the addition of selected Control Room indications for parameters used as inputs to the SFRCS, the addition of computer inputs from the SFRCS to indicate various SFRCS trip conditions, and the addition and rearrangement of selected SFRCS related annunciators. These proposals are currently being evaluated for feasibility. These proposed modifications should effectively resolve the HEDs given a medium safety significance classification. We anticipate resolution of these HEDs no later than the end of the sixth refueling outage.

The remaining HEDs which were to be covered by the SFRCS Study, as described in Section 7 of the DCRDR Summary Report, will be dispositioned no later than the seventh refueling outage.

#### IV. SCHEDULE FOR COMPLETION OF SPECIAL STUDIES

Although the SFRCS Study has received the most significant attention, progress has been made on some of the other studies.

##### A. Label and Location Aids

Two HEDs, to be resolved as a part of the Label and Location Aids Study, were given a medium safety significance classification as described in Section II. These two HEDs were involved with the Safety Features Actuation System mimic panel and the lack of a mimic on the Auxiliary Feedwater System controls and displays. Additionally, one of the HEDs originally to be evaluated in the Displays Study was given a medium safety significance classification and will be reviewed for possible corrective action as a part of the Label and Location Aids Study.

Planning for the Label and Location Aids Study and the review and update of some of the documentation basic to this study has already been initiated. We anticipate that control panel modifications resulting from this study will be made during the following three refueling outages (fifth, sixth, and seventh). While the three HEDs identified as having medium safety signifi-

cance will receive the top priority in this study, their final resolution may not be complete until the sixth refueling outage depending upon the type of corrective action selected.

B. Display Study

Planning for the Display Study activities has been initiated. A preliminary review of the HEDs to be dispositioned in the Display Study has indicated a number of minor problems with the displays on the post-accident monitoring panels. The one HED in this group given a medium safety significance classification was in regards to these displays. Since the post-accident monitoring panel is physically separated from the remaining Control Room panels, we have initiated an independent review of these displays and have developed preliminary modification proposals to resolve these deficiencies. We anticipate that the HED given the medium safety significance classification and probably all other HEDs associated with post-accident monitoring panels will be resolved no later than the sixth refueling outage.

All HEDs associated with the Display Study will be dispositioned by the seventh refueling outage.

C. Other Special Studies

Of the HEDs in the remaining studies, none were determined to have any serious safety significance. Various levels of activities have been initiated on the remaining studies. We anticipate that all HEDs will be dispositioned by the seventh refueling outage.

Table 1

HED SAFETY SIGNIFICANCE RANKING

NUMBER	TITLE	SIGNIFICANCE CLASS	PROPOSED DISPOSITION
P.1.7-10	No lamp test, dual bulbs or dual filament bulbs	L	Evaluate affected displays to assure all have some form of redundant information.
P.1.7-11	Pushbuttons or indicator lights that have shorted out while bulbs were being replaced	L	Procedural/training problem - procedures modified - training requirements identified.
P.3.1-37	Annunciators with inputs from more than one parameter is not avoided	L	Review in annunciator study.
P.4.1-4	Controls positioned too close together that adjacent controls were accidentally activated	L	Actual problem is ambiguous labeling - to be corrected in Label and Location Aids Study.
P.5.1-2	Indicator lights that indicate system/equipment status when light is off	L	Evaluate affected displays to assure all have some form of redundant indication.
P.5.1-6	Scales where the maximum values are too large for the scale	M	Change request initiated to incorporate new indication.
P.5.1-7	Pointers on meters do not fall off scale	L	Look at possibility of new display device.
P.5.1-9	Multi-scale meters that are confusing to read	M	Correct with labeling in Label and Location Aids Study or replace meter.
P.5.1-29	Meters with pointers that have parallax problems	L	Change request to modify indicators initiated.

Table 1

HED SAFETY SIGNIFICANCE RANKING

NUMBER	TITLE	SIGNIFICANCE CLASS	PROPOSED DISPOSITION
P.6.1-12	Labels that are not placed above the panel elements they describe	L	Correct in Label and Location Aids Study.
P.6.1-15	Temporary labels and magnetic labels and information tags obscure components/labels	L	Procedural problem to be corrected.
9.2-1	SFRCS Display Arrangement does not support operations tasks	M	Change request initiated to add and rearrange indications.
9.2-4	Related controls and displays not collocated	I	Procedure problem only - modify procedure.
9.2-5	Misleading Panel Arrangements (ICS)	L	Correct in Label and Location Aids Study.
9.2-6	Violation of operator expectancy (control type)	L	Correct in Label and Location Aids Study - trip switches to be covered.
9.2-7	Insufficient display accuracy (AFW) - reliability	L	Initiate change request to replace indicator.
9.2-18	Availability/consistency of information (SFRCS)	M	Change request initiated to add and rearrange indication.
9.2-20	Incident isolation groups are not consistent (SFAS)	L	Initiate change request to relocate switches or correct with Label and Location Aids Study.



Table 1

HED SAFETY SIGNIFICANCE RANKING

NUMBER	TITLE	SIGNIFICANCE CLASS	PROPOSED DISPOSITION
9.2-28	Misleading FW flow indication	L	Initiate change request to modify input to flow recorders.
9.2-30	Critical displays not visible from bench-board ( $T_h$ and $T_c$ ).	L	SPDS consolidates information.
9.2-33	Lack of mimics (AFW)	M	Correct in Label and Location Aids Study.
9.2-42	Logic system SG level control inputs and indications have different compensations (ICS, SFRCS)	M	Evaluate calibration procedures and resolve.
9.2-43	Control not available in CR (startup valve SFRCS block)	L	Immediate feedback available - extremely low probability event requiring use of control - no action.
9.2-47	Unclear mimic relationships (decay heat pump/HPI pump)	M	Correct in Label and Location Aids Study.
9.2-54 Part 1	Controls not located/arranged to support emergency task sequence	Part 1 H	Procedural clarification made, change request initiated.
		Part 2 M	Change request initiated.
		Part 3 L	Consider in Label and Location Aids Study.
9.2-65	Inadequate information (main turbine)	L	Displays available but unreliable - required maintenance to be determined.

Table 1

HED SAFETY SIGNIFICANCE RANKING

NUMBER	TITLE	SIGNIFICANCE CLASS	PROPOSED DISPOSITION
9.2-83	Inadequate info - ICS - Track mode	L	Initiate change request to add alarm - consider in annunciator study.
9.2-84	Inadequate info - Deaerator - Level control valve position	L	Initiate change request to add indicator.
P.9.8-7	Displays that do not provide the precision or accuracy required	M	Change request to modify indicators initiated.

Table 2

LIST OF HEDs FOR WHICH SHORT TERM CORRECTIVE ACTIONS HAVE BEEN IDENTIFIED

<u>HED NO.</u>	<u>DESCRIPTION</u>	<u>CORRECTIVE ACTION</u>	<u>SCHEDULED COMPLETION DATE</u>
P.1.1-3	Work Space - Reference Document Storage in Control Room	Additional shelving was added in the Control Room to make more usable space available. A review of all the books and reference material on the shelves was made, and the books were rearranged so the important documents (those used most during normal operation and those most vital during an accident) were in the most desirable locations. The new book arrangement was approved by Operations management. In addition, new binders were purchased to replace any old, defective binders.	Completed
P.1.1-5	Work Space - Dedicated Communication Links, Reactor Operator to Shift Supervisor	An intercom has been added between the Control Room and the Shift Supervisor's office to provide a direct link. This, in conjunction with the numerous Gai-Tronics stations and phone stations, provides excellent communication between the Shift Supervisor's office and the Control Room. Also, an SRO is now required to be in the Control Room area, reducing the need for communication with the Shift Supervisor's office.	Completed
P.1.6-6	Noise - Signal discriminability, fire alarm annunciator	FCR 79-189 will provide an annunciator for the fire alarm panel. This will eliminate the problem of the noise to signal discriminability on the fire alarm system.	Completed
P.1.7-1	Maintainability - Recorder supplies	I&C support is now available 24 hours per day, 7 days per week, eliminating this concern. Also, a set of keys to the supply cabinets was provided to the Shift Supervisor to provide access to the material at all times.	Completed
P.1.7-5	Identifying bulbs and recorder supplies	An index was made of the control switches in the Control Room to indicate the identifying number of each control switch light. Therefore, if a bulb cannot be identified by removal, the index can be used for identification. Since I&C now is on shift around the clock, recorders are serviced by the I&C Department.	Completed
P.1.7-6	Maintainability - Spare bulbs, recorder paper	Station administrative procedures were modified to identify that the Control Room operators are responsible for maintaining an adequate bulb supply in the Control Room. A note was added to the supply drawer to remind the operators to reorder bulbs as soon as the supply begins to get low. Spare recorder paper is inventoried and maintained by the I&C group.	Completed

Table 2

LIST OF HEDs FOR WHICH SHORT TERM CORRECTIVE ACTIONS HAVE BEEN IDENTIFIED

<u>HED NO.</u>	<u>DESCRIPTION</u>	<u>CORRECTIVE ACTION</u>	<u>SCHEDULED COMPLETION DATE</u>
P.1.7-7	Maintainability - Paper and ink replenishment on recorders	I&C personnel now perform the paper and ink replenishments on the Control Room recorders. On a daily basis, a periodic check of the Control Room strip charts is performed. This has eliminated the need for the operators to perform this function.	Completed
P.1.7-9	Maintainability - Bulb replacement, operators being shocked	The main cause of the shocking was a metal bulb extractor which would cause the bulb contacts to short. This metal bulb extractor has been eliminated and a plastic bulb extractor is now being used.	Completed
P.1.7-11	Maintainability - Lights shorted out in Switchyard Panel	Although the main cause of this is probably the metal bulb extractor which has now been removed, the Switchyard Panel is powered by 120 volts AC, making it susceptible to arcing during bulb changing. The Control Room operators have been instructed to leave the replacement of these bulbs to the electricians, eliminating this concern for the Control Room operators.	Completed
P.2.1-2	Communication - Gai-Tronics cords in traffic paths	It appears the cords on several of the Gai-Tronics stations had been stretched and did not recoil to take them out of the traffic path when they were not in use. All affected cords were replaced.	Completed
P.3.1-29	Alarm typer failures	A service contract with DEC has now been initiated which includes routine preventative maintenance. This appears to be increasing the reliability of the typer. Further reduction of the nuisance alarms per the Nuisance Alarm Reduction Program will reduce the loading on the alarm typer. Since the alarms can be viewed on the CRTs and the line printer can be used to print out any rapid sequence of alarms, no specific human factor problems remain.	Completed
P.3.1-35 P.3.1-36	Annunciators - Coordinate Designators	Although the annunciators at Davis-Besse do not have a letter and number descriptor, the numeric labeling is suitable for the layout of the Station procedures. The digit before the decimal identifies the panel number and the digits after the decimal identify the numeric order of the panel. Most Control Room operators do not have problems with identifying the proper procedure for a tile with the present labeling. The item has been referred to the Training Department for review to determine if any additional training is required.	Completed
P.4.1-1	Controls - Critical control guards	FCR 84-132 has been written to add flip covers, cylinders, or extension guards on critical controls inside and outside the Control Room.	Completed

Table 2

LIST OF HEDs FOR WHICH SHORT TERM CORRECTIVE ACTIONS HAVE BEEN IDENTIFIED

<u>HED NO.</u>	<u>DESCRIPTION</u>	<u>CORRECTIVE ACTION</u>	<u>SCHEDULED COMPLETION DATE</u>
P.4.1-7	Controls - Interlocks	A permanent warning label has been added to the prime interlock control concern on the Control Rod Drive Panel. Other controls on interlocks are covered during the operator training program.	Completed
P.9.2-30	V&V - Walk-through - Display Visibility	Although both $T_h$ and $T_c$ and a large $T_{ave}$ meter are visible in numerous areas of the Control Room, additional enhancements have been made by the installation of the Safety Parameter Display System (SPDS). The P/T displays have been installed on the SPDS screens making $T_h$ and $T_c$ visible in all required areas of the Control Room.	Completed
P.9.2-37	V&V - Walk-through - Display Accuracy	The problems identified in the emergency procedures have been corrected to ensure meter accuracy required is not more than half of an increment.	Completed
P.9.2-88	V&V - Walk-through - Timers	An electronic timer has been purchased for review and provided to the Control Room operators. This provides a more accurate timing device than the mechanical timers previously provided. Additional electronic timers will be provided if the Control Room workload requires.	Completed