



Commonwealth Edison
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October 26, 1990

Dr. Thomas E. Murley, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

ATTN: Document Control Desk

Subject: Dresden Nuclear Power Station Units 2 and 3
Quad Cities Nuclear Power Station Units 1 and 2
Request for Scheduling Relief
for DCRDR Annunciator Modifications
NRC Dockets 50-237/249 and 50-254/265

Reference: J. A. Silady to T. E. Murley letter dated
November 17, 1989

Dr. Murley:

The referenced letter requested a scheduling extension to the implementation of the annunciator modification which was developed to resolve Human Engineering Deficiencies (HEDs) identified during the Detailed Control Room Design Review (DCRDR). Since that time, Commonwealth Edison has determined that additional time will be required to complete the modifications for Dresden Station (Units 2 and 3) and Quad Cities Station (Units 1 and 2). The purpose of this letter is to request scheduling relief and to provide the basis for the request.

The schedules which were contained in the referenced letter were developed based on the experience gained during the installation of the modification at Quad Cities Unit 1 (which was the lead unit). Since that time, we have further realized that the installation methodologies for this complex modification must be more effectively controlled by additional verifications and by limiting the work scope released in the individual work packages. Attachment A provides more detail on the background for the scheduling extension request.

We therefore request that one additional Refueling Outage be allowed in order to complete the modifications for each unit at Dresden Station and Quad Cities Station. While the modifications will not be completed in accordance with the schedule proposed in the referenced letter, a substantial portion of the modification (and resolution of HEDs) will be accomplished. Of the fifteen (15) HEDs associated with the Dresden modification, twelve (12) HEDs will be resolved following the completion of the currently approved implementation schedule. Twelve (12) of twenty-five (25) HEDs will be resolved at Quad Cities at the end of the upcoming Unit 1 and 2 Outages. Attachment B describes the requested scheduling extensions. Attachment C contains a summary of the HEDs to be completed during the upcoming outages.

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Finally, Attachment D provides an evaluation of the safety significance of the requested schedular extensions in view of the Category and Level Classifications for the HEDs.

Commonwealth Edison would appreciate the NRC's consideration in granting the schedular extension. We are continuing to aggressively pursue the completion of the improvements recommended during the conduct of DCRDR both during non-outage and outage periods. It is, however, paramount to complete this modification with the necessary controls to ensure safe operation of the units. Therefore, the previously approved schedule for implementation of the modification is no longer achievable and the schedular relief is necessary.

If there are any questions regarding this letter or if the content of this letter would like to be further discussed, please do not hesitate to contact me.

Very truly yours,



Rita Stols
Nuclear Licensing Administrator

Attachments

ZNLD/ID260

cc: A.B. Davis, Regional Administrator
B.L. Siegel - Project Manager (Dresden)
L.N. O'lsan - Project Manager (Quad Cities)
S. G. DuPont - Senior Resident Inspector (Dresden)
T. Taylor - Senior Resident Inspector (Quad Cities)

ATTACHMENT A

Background

On October 26, 1989 members of the NRC's and Commonwealth Edison's (CECo) staffs conducted a conference call to discuss the implementation schedule for the annunciator modification associated with the Detailed Control Room Design Review (DCRDR). At that time, CECO recognized that the annunciator modification could not be completed within the previously proposed schedule and requested a new implementation schedule as follows:

		<u>Refueling Outage</u>	<u>Scheduled Start Of Outage</u>
Quad Cities	Unit 1	Following Cycle 11	(11/90)
Quad Cities	Unit 2	End of Cycle 11	(08/91)
Dresden	Unit 2	End of Cycle 13	(03/92)
Dresden	Unit 3	End of Cycle 12	(05/91)

The need to extend the completion date was based on the experience gained during the initial installation phase at Quad Cities Unit 1 (which was the lead plant). The total number of man-hours required for project completion was determined to be under estimated based on the Unit 1 experience. Further, only limited resources could be applied due to space restrictions, i.e. only a three person crew can work in a single panel. Finally it was realized that several panels were only available for a short period of time, i.e. when the affected equipment is out-of-service. The NRC granted the extension for the completion of the modification.

On December 14, 1989 Quad Cities Unit 1 experienced a turbine trip. During this event, annunciator (F-11) "Reactor Feed Pump/Turbine Trip Reactor Vessel High Level" did not alarm as expected. Investigation of the event revealed that the leads for the annunciator were lifted (as a result of the annunciator modification) and were not subsequently relanded. The cause of the event was that this modification did not receive added effective measures commensurate with the complexity of the modification. As a result of this event, additional controls were applied to prevent recurrence of such an error. This event was the topic of a Management Meeting held at the Region III Office on January 11, 1990 and at that time the potential of extending the implementation of the modification was briefly discussed.

While no operating event (similar to the Quad Cities December, 1989 event) related to the installation of this modification has occurred at Dresden, the Quad Cities event clearly demonstrated the need to ensure the modification is effectively controlled. It has been determined that the modification should be implemented in a more limited scope of work per installation package (than previously implemented) to reduce the impact on the operating units and ensure continued safe operation. As a result of the change to the installation methodology, additional time is required to complete the modification.

Attachment B

DCRDR ANNUNCIATOR MODIFICATION SCHEDULAR EXTENSION REQUEST

	1988	1989	1990	1991	1992	1993
	JFMAMJJASOND	JFMAMJJASOND	JFMAMJJASOND	JFMAMJJASOND	JFMAMJJASOND	JFMAMJJASOND
Dresden U2		█ 2nd RO 11/88	█ 3rd RO 9/90	█ 4th RO 3/92	█ 5th RO 10/93	
Dresden U3			█ 2nd RO 12/89	█ 3rd RO 3/91	█ 4th RO 10/92	
Quad U1		█ 2nd RO 9/89	█ 3rd RO 11/90	█ 4th RO 3/92		
Quad U2	█ 2nd RO 4/88		█ 3rd RO 2/90	█ 4th RO 8/91	█ 5th RO 3/93	

Legend: Month/Year
 DCRDR Outage #
 █ Start of Outage
 — Based on FSAR definitions
 — Previously approved scheduled relief (to end of outage)
 - - - Proposed schedule change

ATTACHMENT C

Dresden Annunciator Modification

The following activities are scheduled to be completed during the 1992 Unit 2 and 1991 Unit 3 Refueling Outages:

- All required multiple inputs will be split out to the Sequence of Events Recorder (SER) which will display both the "alarm" and "reset" condition.
- The "alarm and "reset" horns will be mounted and set to the required frequencies and intensity levels. The "alarm" horn will be operational; however the "reset alarm" horn will not sound, i.e., audible ringback will not be available.
- Visual reflash via the SER print out will be operating. Audible reflash will not be available.

Human Engineering Deficiencies (HEDs)
Status

There are fifteen (15) HEDs associated with the Annunciator Modification at Dresden. The following HEDs will be completed during the fourth Refueling Outage (3/92) on Unit 2 and the third Refueling Outage (3/91) on Unit 3:

<u>Index #</u>	<u>HED #</u>	<u>FSR Pg</u>	<u>Cat/Lvl</u>	<u>Action To Resolve</u>
231	2.2.1.B-1	90	2C	Auditory Coding
232	2.2.1.C.2-3	358	2C	Auditory Coding
107	2.2.1.C.2-4	358	2C	Auditory Coding
233	2.2.2.A-1	92	2C	Auditory Coding
108	2.2.2.A-2	92	2C	Auditory Coding
237	2.2.3.A-1	92	2C	Auditory Coding
191	2.2.3.A-2	92	2C	Auditory Coding
468	2.2.5.A-1	17	2C	Auditory Coding
469	2.2.5.B-3	18	2C	Auditory Coding
470	2.2.6.C-1	93	2C	Auditory Coding
368	3.2.1/OS-2	104	2B	Auditory Coding
472	3.2.1.D-6	20	2C	Auditory Coding

In the subsequent outage (Fall 1993 for Unit 2, Fall 1992 for Unit 3), the following HEDs will be completed.

281	3.1.5.A-1	103	2C	Annunciator Ringback and
354	3.3.2.B-1	107	2C	Flashrate.
343	3.1.2.C.3-7	100	2B	Multiple-Input Reflash

Quad Cities Annunciator Modification

The following activity is scheduled to be completed during the Fall 1990 Unit 1 and Fall 1991 Unit 2 Refueling Outage:

- The "alarm and "reset" horns will be mounted and set to the required frequencies and intensity levels. The "alarm" horn will be operational; however, the "reset alarm" horn will not sound, i.e., audible ringback will not be available.

In the subsequent outage (Spring 1992 for Unit 1, Spring 1993 for Unit 2), the following activities will be completed:

- The splitting out of all required multiple inputs to the SER for the display of both the "alarm" and "reset" condition.
- The implementation of a visual reflash via the SER printout.
- The setting of different visual tile flash rates for "alarming" tiles as opposed to "resetting" or "clearing" tiles.

Human Engineering Deficiencies
Status

At Quad Cities there are twenty-five (25) HEDs associated with the annunciator modification. To date the following HEDs have been completed:

<u>Index #</u>	<u>HED #</u>	<u>FSR Page</u>	<u>Cat/Lvl</u>	<u>Action to Resolve</u>
67	7.3.2.F.1-1	346	2C	Printing of alarm tile panel and box coordinator on computer alarm message
78	7.3.2.F.2-1	346	2C	

The following HEDs will be completed during the Fall 1990 Refueling Outage (11/90) on Unit 1 and the Fall 1991 Refueling Outage (8/91) on Unit 2:

<u>Index #</u>	<u>HED #</u>	<u>FSR Page</u>	<u>Cat/Level</u>	<u>Action to Resolve</u>
109	2.2.1.B-1	54	2B	Auditory Coding
110	2.2.1.C.2-1	54	2B	Auditory Coding
111	2.2.2.A-1	53	2C	Auditory Coding
399	2.2.5.A-1	55	2B	Auditory Coding
398	2.2.5.B-1	56	2B	Auditory Coding
400	2.2.6.A-1	57	2B	Auditory Coding
401	2.2.6.C-1	58	2B	Auditory Coding
404	3.2.1.D-1	69	2B	Auditory Coding
17	3.2.1.F-1	71	2B	Auditory Coding
323	3.2.1.F/OS-2	71	2B	Auditory Coding

In the subsequent outage (Spring, 1992 for Unit 1 and Spring, 1993 for Unit 2), the following HEDs will be completed.

<u>Index #</u>	<u>HED #</u>	<u>FSR Page</u>	<u>Cat/Level</u>	<u>Action to Resolve</u>
74	3.1.2.C.1-1	62	1C	Multiple-Input Reflash
27	3.3.4.C-1	62	1C	Multiple-Input Reflash
27	3.3.4.C-2	62	1C	Multiple-Input Reflash
27	3.3.4.C-3	62	1C	Multiple-Input Reflash
27	3.3.4.C-4	62	1C	Multiple-Input Reflash
12	3.1.2.C.2-1	64	2B	Multiple-Input Reflash
13	3.1.2.C.3-1	65	2B	Multiple-Input Reflash
15	3.3.4.A-1	68	2C	Multiple-Input Reflash
16	3.1.5.B.1-1-1	68	2C	Annunciator Ringback and Flashrate
15	3.1.5.A-1	68	2C	Annunciator Ringback and Flashrate
20	3.3.2.B-1	74	2C	Annunciator Ringback and Flashrate
18	3.3.1.A-1	72	2B	Alarm Tile
32	3.3.4.A-1	80	2A	Reconfiguration

ATTACHMENT D

Safety Significance of Revised Schedule for Annunciator Upgrades

Commonwealth Edison Company's Human Factors Group has evaluated the Safety Significance of the HEDs associated with the Dresden and Quad Cities Annunciator Modifications. Extending the completion of the modification by one additional refueling cycle would have minimal safety impact. The evaluation was predicated on reviews of the original HEDs, the HED Assessment Team (HEDAT) meeting notes, the Final Summary Reports (FSR) and Supplements, each respective control room, the annunciator response procedures, and the modification's engineering synopsis.

There was only one level "A" HED associated with the annunciator modification. The remaining HEDs were all Level "B" or "C". As documented in the CECO DCRDR Program Plan and the Dresden and Quad Cities Final Summary Reports (FSRs), Level "A" HEDs were those with documented errors, documented control based problems, or in the judgement of the assessment team (HEDAT) may have a significant impact on plant safety and/or productivity. Level "B" HEDs were those with a moderate effect and Level "C" were those with a minimal effect. The one level "A" HED was Quad Cities HED Number 32 (FSR page 80). It documented multiple-input "Trouble" type alarms, and was categorized as a 2A and "Accept-As-Is" in the original DCRDR FSR. It was subsequently reevaluated by the HEDAT with feedback from the NRC and changed to a "Second Outage Commitment" in the Supplement to the FSR.

After reviewing our records we believe that the original HED was misclassified by the HEDAT as an "A" level HED. There were no "documented" problems that accounted for the HED. It is possible that the HEDAT considered this a "document" generated HED since its source was the Operator Survey phase of the DCRDR. However, the survey results were not intended to be a source of "documented" problems or errors per the definition of an "A" Level HED categorization. Deviation reports (DVRs), Licensing Event reports (LERs) and INPO Significant Operating Event Reports (SOERs) were the source of such "documentation". In addition, operator comments recorded on the original HED by the Human Factors Specialist indicate that the only alarms that the operator could make some corrective action response to in the control room concerned "Trouble" at the Generator Hydrogen Seal Oil or Stator Cooling local panels. Both were judged not to be time critical by the Human Factors Specialist and Subject Matter Expert assisting with that portion of the DCRDR. Therefore, it is doubtful that failure to address this HED would have a significant impact on plant safety and/or productivity as required for a Level "A" classification. Further, all other multiple-input alarms at both stations were categorized as either Level "B" or "C". We believe therefore that Quad Cities HED 32 should have been classified as a level "B" HED. Consequently, at most, the HEDs associated with the Annunciator System modification have only a moderate or minimal impact on plant safety or performance.

In addition, all the HEDs were classified as Category 2 except one HED at Quad Cities which again we believe, after further evaluation, was misclassified as a Category 1 HED. According to the CECO DCRDR Program Plan and the Dresden and Quad Cities Final Summary Report, Category 1 HEDs were those associated with an engineered safeguard system or an engineered safety feature while Category 2 HEDs were those associated with plant systems not included in Category 1. Quad Cities HED Number 74 (FSR page 62) was classified as a IC. The original handwritten HED Number 74 had an extensive Equipment Identification (EID) roster associated with it that specifically identified multi-input annunciator tiles in the Residual Heat Removal (RHR), High Pressure Coolant Injection (HPCI) and Core Spray systems as problematic. It is likely that the HEDAT miscued in their assessment on the system specified on the EID roster in classifying HED 74 as opposed to cueing on the Annunciator System as a system which is non-safety related according to the FSAR. Further, all other HEDs at both Dresden and Quad Cities that documented the same problem were classified as Category 2. HED Number 27, was originally classified in the assessment process as Category 2 Level B HEDs. The HEDAT assumed the IC classification when HED 27 was grouped with HED 74 because HED 74 had a more conservative classification, Category 1 vs. Category 2. Therefore, according to Category and Level classification, the HEDs associated with the annunciator modification are not safety-related and pose only a minimal or moderate impact on plant performance (productivity or efficient operation).

Finally, the annunciator system offers the stations the capability to enhance their annunciator systems beyond the original DCRDR commitments to the NRC. For example, our original commitment was to provide a computer listing of safety-related and/or time critical multiple-input alarm messages. The system being installed has the capability of being expanded so that all annunciator inputs can be printed. This in turn will make the alarm listing more than a multiple-input alarm status display. It will become a Sequence of Events Recording (SER) device facilitating daily operations and transient analyses. We have an internal commitment to expand the system to its fullest potential as an SER. Further, it will have the capability of being programmed and adjusted to virtually eliminate frequently occurring nuisance alarms. Also it can be expanded to accommodate a CRT display of alarm status. Although such features will not be fully implemented in conjunction with the FSR committed upgrades, the eventual capabilities of the system should also be considered as supportive of the proposed schedule revision and indicative of CECO's serious intent to enhance the man-machine control room interfaces.

CECO recognizes that delays in implementing DCRDR enhancements are not desirable and should be avoided whenever feasible, even for HEDs not classified as having safety significance. However, for reasons described above, CECO has concluded: a) that the previously committed schedule for annunciator upgrades is no longer feasible to maintain, and b) that the necessary schedule revisions will not significantly impact the safety of plant operations.