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OCT 6 1982

Docket No. 50-334

Mr. J. J. Carey, Vice President  
Duquesne Light Company  
Nuclear Division  
Post Office Box 4  
Shippingport, Pennsylvania 15077

Dear Mr. Carey:

SUBJECT: AUXILIARY FEEDWATER SYSTEM (AFWS) STATUS INDICATION (TMI ITEM II.E.1.2)

Re: Letter, J. J. Carey to S. A. Varga, July 20, 1982

By the referenced letter, you responded to two open items documented in our Safety Evaluation Report, dated July 2, 1982. Item 2 of the evaluation report requested that Duquesne Light commit to modifying the ESF status panel such that automatic status indication will occur when an AFWS Pump is taken out of service. The evaluation further stated that the operational procedures do not minimize the potential for operator errors associated with placing the AFW pump control switch in the PULL-TO-LOCK position. The NRC staff position was, and still is, that automatic indication should be provided in the control room at the system level to indicate a bypass or the deliberately induced inoperability of a safety system.

Duquesne Light Company does not agree with the above evaluation, and provided information in the referenced letter to substantiate this disagreement. We reviewed this information and visited Beaver Valley Power Station to examine the as-built condition of the AFWS panels in the control room. Our Safety Evaluation Report is enclosed.

We conclude that, on a short-term basis, the present redundant administrative checks and tag-out procedure, along with the reasonably obvious PULL-TO-LOCK orientation of the AFW pump control handles should be sufficient to minimize the potential for operator errors. While we consider the present human engineering design related to AFW status indication inadequate, we defer additional action to the forthcoming detailed control room design review. Such review will be based on the guidelines of NUREG-0700 and the forthcoming System Status Verification Guidelines.

Sincerely,

Original signed by:

S. A. Varga

Steven A. Varga, Chief  
Operating Reactors Branch No. 1  
Division of Licensing

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Enclosure:

Safety Evaluation Report

cc w/enclosure:

See next page

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REckenrode

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SVarga

10/6/82

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Duquesne Light Company

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

SAFETY EVALUATION REPORT  
OFFICE OF NUCLEAR REACTOR REGULATION  
BEAVER VALLEY UNIT 1  
AUXILIARY FEEDWATER SYSTEM STATUS INDICATION  
(Part of TMI Action Item II.E.1.2)

Introduction

Duquesne Light Company, by letter dated July 20, 1982, responded to two open items documented in a Safety Evaluation Report (Reference 1).

Item 2 of the evaluation report requested that Duquesne Light commit to modifying the ESF status panel such that automatic status indication will occur when an AFWS Pump is taken out of service. The evaluation further stated that the operational procedures do not minimize the potential for operator errors associated with placing the AFW pump control switch in the PULL-TO-LOCK position. The NRC staff position was, and still is, that automatic indication should be provided in the control room at the system level to indicate a bypass or the deliberately induced inoperability of a safety system.

Duquesne Light Company does not agree with the above evaluation, and provided information in a letter (Reference 2) to substantiate this disagreement. The staff has reviewed this information and visited Beaver Valley Power Station to examine the as-built condition of the AFWS panels in the control room.

Evaluation

The following analysis is provided on a point-by-point basis:

1. Beaver Valley has redundant administrative checks as follows:
  - o AFW pump controls and MOV switch positions are verified and logged by the STA on each shift.
  - o Control board walkdown per shift (performed by Control Room Operator, Nuclear Shift Foreman, and Nuclear Shift Supervisor).

Although Beaver Valley's redundant administrative checks are better than a single check, they only ensure that the control positions are known at two instances in time during an eight-hour shift. From a human factors point of view administrative controls and procedures are prone to human error and must be considered unreliable. For this reason Item C.1 of Reg. Guide 1.47 states that administrative procedures should be supplemented by an automatic indication at the system level.

2. Duquesne Light Company states that "equivalent information" to that afforded by an automatic backlight feature is already provided to the operator. The staff does not consider the present control room indications to be "equivalent" to an automatic backlit indicator. Specifically, extinguishment of the pump status indicating light in the PULL-TO-LOCK position is a negative indication. Such indications are not recommended as status indicators. (See NUREG-0700, Guideline 6.5.3.1(c)(1).) In addition, these lights are difficult to see unless the operator is standing directly in front of the control and looking down over the handle.
3. The 30° counterclockwise rotation of the control switch in the PULL-TO-LOCK position is probably the most obvious indication that the AFW pump is bypassed, but is still not a positive indication as it can be lost in the visual "noise" of many identical controls, some also rotated 30°. The 0.5" vertical displacement adds little as an indication of the locked control.
4. The ESF status board location is poor in general, and specifically if it is to be used by an operator in the vicinity of the AFW pump control panel. If it is to be a summary of all ESF systems, it should be readable from a centralized location. Its current location and size is less than optimal.
5. Manual initiation of status board lights by an operator is a poor and unreliable method of indication. It adds a task to the operator's procedure which accomplishes no useful function. Thus, the operator tends to perform this administrative secondary task only when he has completed more important operational tasks, and as a result, may forget it. When this occurs the operator would have conflicting indications. This would result in confusion rather than provide useful information. In the Beaver Valley control room, this situation is compounded by the excessive distance between the AFWS panel and the ESF panels.

### Conclusions

Review of the additional information provided by Duquesne Light Company and review of the as-built condition in the control room continues to support the basic staff position that automatic status indication of the bypassed and inoperable status of the AFWS is needed. The inadequate human engineering design and location of the ESF panel further supports the recommendation that any requirements of this type be made in an integrated way in the context of the licensee's forthcoming detailed control room design review based on the guidelines of NUREG-0700 and the forthcoming System Status Verification Guidelines.

On a short-term basis, the redundant administrative checks and tag-out procedure, along with the reasonably obvious PULL-TO-LOCK orientation of the AFW pump control handles should be sufficient to minimize the potential for operator errors related to the AFW system. Use of the current manual ESF panel for AFW system status should continue only to maintain consistency in the procedure applied to all ESF system indications.

References

1. Letter, S. A. Varga to J. J. Carey, July 2, 1982, Subject: Safety Evaluation, Beaver Valley Unit 1 Auxiliary Feedwater System Automatic Initiation and Flow Indication (TMI Action Plan Item II.E.1.2)
2. Letter, J. J. Carey to S. A. Varga, July 20, 1982, Subject: Response to 7/2/82 letter.

Dated: OCT 6 1982

Principal Contributor:  
R. Eckenrode