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 ACIL:50-331 Duane Arnold Energy Center, Iowa Electric Light & Pow 05000331  
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 MCGAUGHY,R.W. Iowa Electric Light & Power Co.  
 RECIP.NAME RECIPIENT AFFILIATION  
 DAVIS,A.B. Region 3 (Post 820201)

SUBJECT: Forwards response to violations noted in Insp Rept  
 50-331/90-15 re fire protection procedures.

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Iowa Electric Light and Power Company

November 21, 1990  
NG-90-2717

Mr. A. Bert Davis  
Regional Administrator  
Region III  
U. S. Nuclear Regulatory Commission  
799 Roosevelt Road  
Glen Ellyn, IL 60137

Subject: Duane Arnold Energy Center  
Docket No: 50-331  
Op. License DPR-49  
Response to Notice of Violation  
Transmitted with Inspection Report 90015

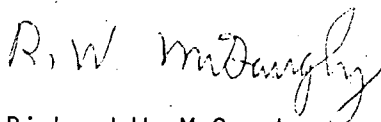
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Dear Mr. Davis:

This letter and attachment are provided in response to the Notice of Violation concerning certain activities at the Duane Arnold Energy Center. This response also fulfills the reporting requirements of Technical Specification 6.11.3.f for degraded Fire Protection Systems.

If you have any questions regarding this response, please feel free to contact our office.

Very truly yours,



Richard W. McGaughy  
Vice President Production

RWM/BKS/pl

- Attachments: 1) Response to Notice of Violation  
Transmitted with Inspection Report 90015  
2) Investigation into Fire Pump Operability

cc: U. S. NRC Document Control Desk (Original)  
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Iowa Electric Light and Power Company  
Response to Notice of Violation  
Transmitted with Inspection Report 90-015

**NRC NOTICE OF VIOLATION 1**

Technical Specification Section 6.8, "Plant Operating Procedures," requires that detailed fire protection program procedures be prepared, implemented and maintained.

Fire Protection Procedure 1412.3, "Control of Ignition Sources," requires that combustibles be moved at least 35 feet away or that the combustibles be properly shielded from cutting and welding operations.

Contrary to the above, on August 1, 1990, the licensee failed to move or adequately shield combustibles within 35 feet of a cutting and welding operation in the Heater Bay Area.

This is a Severity Level IV violation (Supplement 1).

**NRC NOTICE OF VIOLATION 2**

Technical Specification 4.13.B.1.e requires that each fire pump develop a flow of at least 3100 gallons per minute with a discharge pressure of 112 pounds per square inch gage.

Contrary to the above, on September 13, 1990, the inspector identified that the electric driven fire pump failed to develop a flow of at least 3100 gallons per minute with a discharge pressure of 112 pounds per square inch gage during the surveillance on September 8, 1989.

This is a Severity Level IV violation (Supplement 1).

**NRC NOTICE OF VIOLATION 3**

As part of the licensee's approved fire protection program, the licensee committed to include fire protection in the Quality Assurance Program.

Chapter 11 of the Quality Assurance Manual, "Inspection and Testing," requires that electric fire pump post maintenance testing be performed to assure that the fire pump is functioning properly before returning the pump to service after maintenance.

Contrary to the above, on August 6, 1989, after corrective actions were performed to improve the performance of the electric fire pump, the fire pump was not tested to verify that the pump could develop 3100 gpm at a discharge pressure of 112 psig as required by the station fire pump procedures.

This is a Severity Level IV violation (Supplement 1).

## RESPONSE TO NOTICE OF VIOLATION 1

As noted in the Inspection Report, the violation has been corrected. Consequently, no reply was required.

## RESPONSE TO NOTICE OF VIOLATION 2

### Corrective Actions Taken and the Results Achieved

Due to the concerns detailed in the Notice of Violation and in Section 3.j of the Inspection Report, fire pump operability was reviewed. The review determined that neither pump is able to produce the Technical Specification required pressure of 112 psig (as read on the discharge gage) with at least 3100 gpm flow without the use of the pump head correction. The last test results indicate that the diesel fire pump provided 3100 gpm at 109 psig and that the electric fire pump provided 3150 gpm at 110 psig. Both pumps were declared inoperable. In accordance with Technical Specification 3.13.B.3.b, a backup fire suppression water system was established consisting of the combined operation of both fire pumps. A surveillance test was performed to demonstrate the combined capability of the pumps. The test demonstrated that both pumps operating simultaneously at 3150 gpm total flow produced 147 psig at the diesel fire pump discharge gage and 148 psig at the electric fire pump discharge gage. Thus the combined operation of both pumps is well able to meet Technical Specification requirements. Administrative controls have been established that require the continuous availability of both fire pumps at all times.

To provide an additional level of compensatory measure beyond having both fire pumps available, visual inspections of the area with the largest automatic system demand were initiated. Due to ALARA concerns, video cameras have been installed to allow for remote accomplishment of those visual inspections.

A review of actual fire suppression water system requirements for the plant has been initiated. Once that review is complete, Technical Specifications and Bases will be revised if necessary to reflect the fire pump flow and pressure requirements to meet the largest automatic system demand. Also, any necessary modifications to the fire suppression water system will be performed.

### Corrective Actions to be Taken to Prevent Recurrence:

A review of the fire suppression water system requirements in the plant will be completed. Based on that review, the necessary changes to the Technical Specifications and Bases as well as any necessary modifications will be performed.

### Date When Full Compliance Will be Achieved:

Compliance will be achieved when any necessary changes to the Technical Specifications and Bases as well as any plant modifications are complete following the review of licensing and design requirements which will be completed by December 31, 1990.

### RESPONSE TO NOTICE OF VIOLATION 3

#### Corrective Actions Taken and the Results Achieved:

Following the maintenance performed on August 6, 1989, it was understood that electric fire pump operability had to be reestablished by performing the surveillance test. The test, as written, combines both the monthly and annual operability tests requirements. The steps required for each test are identified. In this case, neither the surveillance or the maintenance document specified which surveillance test was to be performed. At that time, it was determined that the monthly test would satisfactorily reestablish the operability of the pump. This test was not adequate because it does not test the electric fire pump to acceptance criteria as rigorous as the annual surveillance test. To ensure that adequate post maintenance testing is performed on the electric and diesel fire pumps in the future, the respective surveillance test for each was revised. The revision clearly identifies that following significant maintenance on the pumps, operability testing will be performed that satisfies the annual Technical Specification surveillance requirements. This supports current maintenance procedures for determining the required post maintenance testing.

#### Corrective Actions to be Taken to Prevent Recurrence:

The actions as described above are sufficient to prevent recurrence.

#### Date When Full Compliance Will be Achieved:

Full compliance was achieved with the completion of the revisions to the surveillance tests on November 2, 1990.

## INVESTIGATION INTO FIRE PUMP OPERABILITY

During investigation of the Inspection Report Notice of Violation #2, possible discrepancies were identified in the referenced Technical Specification values delineating the fire pump flow and pressure requirements for Sprinkler System #4. Because of this, actions were taken in addition to those required to address the Notice of Violation.

The Objective of the Fire Protection System Technical Specification 3.13 is to "assure the availability of the Fire Protection Systems to protect safety related systems required for safe plant shutdown." Technical Specification Bases 3.13 states that fire pump size is based on supplying the area with the largest automatic system demand plus 1000 gpm for hose streams with the shortest portion of the fire loop out of service (worst case).

Technical Specification Bases 3.13 identifies Sprinkler System #4 as the area that requires the largest automatic system demand: 2100 gpm and 112 psig at the discharge nozzle of the fire pump. The 2100 gpm with 112 psig at the discharge nozzle of the fire pump is based on supplying the required flow and pressure at the Sprinkler System #4 isolation valve (2100 gpm and 109 psig). This takes into consideration the head loss between the discharge of the pumps and the isolation valve, assuming that the shortest portion of the fire loop is out-of-service (worst case). When combined with the hose stream requirement of 1000 gpm, the total flow requirement is 3100 gpm.

Preliminary calculations have determined that the head loss utilized for determining the 112 psig discharge pressure is incorrect. To supply the 3100 gpm for Sprinkler System #4 including hose streams would appear to indicate that 140 psig is required at the fire pump discharge nozzle. Recognizing that neither individual pump alone could meet this demand and that a backup fire suppression water system was required by Technical Specification 3.13.B.3.b, a surveillance test was performed to test the combined capability of the fire pumps. The test demonstrated that both pumps operating simultaneously at 3150 gpm total flow produced 147 psig at the diesel fire pump discharge gage and 148 psig at the electric fire pump discharge gage.

Further investigation was performed into actual demands for Fire Protection System areas that include safety systems required for safe shutdown. The Fire Hazards Analysis identifies four safety related cables located in the area protected by Sprinkler System #4 that could effect safe shutdown. The investigation indicates that a destruction of those four cables by fire would not effect safe shutdown. Therefore, since the area protected by Sprinkler System #4 does not contain any safety related systems required for safe plant shutdown, it falls outside the guidance of Technical Specification 3.13. A review was done to identify the area with the largest automatic system demand containing safety related equipment required for safe shutdown.

The review identified that area as the Turbine Lube Oil Reservoir area in the Turbine building. This area requires 1424 gpm at 120 psig (including hose stream) at the fire pump discharge. As either fire pump alone can supply this demand, it is assured that all automatic system demands for areas which contain safety systems required for safe shutdown can be supplied by either fire pump. Consequently, the redundancy requirements of Technical Specification 3.13.B.1 can be satisfied for all areas required for safe shutdown. Sprinkler System #4 is the only area not adequately supplied by a single fire pump. Sprinkler System #4 is not a required sprinkler system under Technical Specification 3.13.C. Administrative controls have been established that require the continuous availability of both fire pumps at all times in order to meet the demand of Sprinkler System #4. Visual inspections of the area protected by Sprinkler System #4 were initiated. Video cameras were installed in the area protected by Sprinkler System #4 to allow for remote accomplishment of those visual inspections due to ALARA concerns. These cameras allow for an hourly visual inspection of that area and provides an additional level of compensatory measure beyond having both fire pumps available.

A review of licensing and design requirements will be completed by December 31, 1990. Once that review is complete, Technical Specifications and Bases will be revised if necessary to reflect the fire pump flow and pressure requirements to meet the largest automatic system demand. Also, any necessary modifications to the fire suppression water system will be performed. These changes will reestablish full redundancy for the fire pumps. In the interim, the established administrative controls will be maintained for Sprinkler System #4. In the event that either fire pump becomes inoperable, the following actions will be taken if a backup fire suppression water system can not be returned to an operable status within the 24 hour allowance of Technical Specification 3.13.B.3:

- a) the plant will be placed in a hot standby condition within 6 hours in accordance with Technical Specification 3.13.B.3 or
- b) a temporary Waiver of Compliance will be requested with the appropriate justification.