



Nebraska Public Power District

COOPER NUCLEAR STATION  
P.O. BOX 98, BROWNVILLE, NEBRASKA 68321  
TELEPHONE (402) 825-3811

CNSS800507

August 20, 1980

Mr. K. V. Seyfrit, Director  
U.S. Nuclear Regulatory Commission  
Office of Inspection and Enforcement  
Region IV  
611 Ryan Plaza Drive  
Suite 1000  
Arlington, Texas 76011

Dear Sir:

This amended report is submitted in accordance with Section 6.7.2.B.2 of the Technical Specifications for Cooper Nuclear Station and discusses a reportable occurrence that was discovered on March 12, 1980 and was originally reported on April 10, 1980. A licensee event report form is also enclosed.

Report No.: 50-298-80-08-1  
Report Date: August 20, 1980  
Occurrence Date: March 12, 1980  
Facility: Cooper Nuclear Station  
Brownville, Nebraska 68321

Identification of Occurrence:

A condition which could have resulted in operation in a degraded mode permitted by Section 3.5.D of the Technical Specifications.

Conditions Prior to Occurrence:

The reactor was in the cold shutdown condition for refueling.

Description of Occurrence:

During the first scheduled five year inspection of the Reactor Core Isolation Cooling (RCIC) turbine, it was discovered that a piece was missing from a bucket on the turbine wheel and that an adjacent bucket was bent.

Designation of Apparent Cause of Occurrence:

The investigation indicates the damage to the bucket on the RCIC turbine wheel was due to non-impact type impingement of a foreign object on the outside diameter surface.

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Analysis of Occurrence:

The RCIC System is designed to support the shutdown of the reactor in the situation when the reactor feedwater system is unavailable. The RCIC turbine drives the RCIC pump. The RCIC turbine is a Terry wheel turbine. The drive steam for the turbine issues from the steam chest through expanding nozzles at high velocity and enters the turbine wheel buckets where its direction is reversed. The seventy wheel buckets are semi-circular and are milled in the periphery of the solid wheel.

Vendor examination indicates that the fracture of the turbine bucket was caused by a non-impact type impingement of a foreign object on the outside diameter surface. The fracture initiated by a tearing overload and propagated to final separation by overload, as well. No evidence was found to indicate a progressive fracture mode (fatigue for instance) nor of an involvement of corrosives in the fracture process.

It was also concluded that the fracture was not caused by impact. Impact fractures are accompanied by little or no plastic deformation. Furthermore, impact fracture surfaces show indications of cleavage or intergranular fracture (modes of brittle fracture). Since all of these features were absent, it was concluded that the fracture took place relatively slowly, and exclusively by a ductile overload process. A review of the operating history of the unit does not indicate an appreciable change in operating characteristics. Therefore, the time when the damage occurred cannot be determined. It is believed that the subject non-impact type impingement occurred during initial installation of the RCIC turbine. During mechanical alignment, the turbine must be rotated by hand and at this time, a foreign object could have been wedged between the turbine bucket and the outside diameter surface.

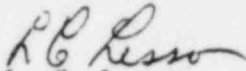
At the time of discovery of this occurrence, the reactor was in cold shutdown and the RCIC System was not required to be operable. The system had met Technical Specification surveillance requirements and was considered operable at the time of the reactor shutdown. This occurrence presented no adverse consequences from the standpoint of public health and safety.

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Corrective Action:

The damaged turbine wheel was replaced and the RCIC system was tested successfully during the next reactor startup. No further action is planned.

Sincerely,



L. C. Lessor  
Station Superintendent  
Cooper Nuclear Station

LCL:cg  
Attach.