

AEOD TECHNICAL REVIEW REPORT\*

UNIT: Cooper  
DOCKET NO: 50-298  
LICENSEE: Nebraska Public Power District  
NSSS/AE: GE/B&R

TR REPORT NO: AEOD/T419  
DATE: August 20, 1984  
EVALUATOR/CONTACT: C. Hsu

SUBJECT: CONTAMINATION OF SNUBBER BLEED SCREW AND LOCKUP POPPET VALVE

EVENT DATE: June 17, 1983 (LER 83-10/03L-0)

SUMMARY

On June 17, 1983 with the plant in cold shutdown, while performing functional tests, the licensee found that two hydraulic snubbers failed to meet the test requirements. Both snubbers were installed on safety-related systems. One was on the mainsteam line and the other on the service water line. The former failed to achieve the proper bleed rate and the latter failed to meet the proper lockup rate. These snubbers may have been inoperable during plant operation.

A subsequent licensee examination of the defective snubbers concluded that the failures could be attributed to foreign material plugging the bleed screw and lockup valve. The licensee indicated that both snubbers were installed in a dirty environment which could have been the source of the foreign material. However, based on this review, there appears to be no direct relationship between the contamination of the fluid in the defective snubbers and the dirty environment. An accumulation of dirty water on the floor near the location of the snubbers was described as the dirty environment. Since neither seal failure nor hydraulic fluid leakage was evident, it does not seem possible that dirty water on the floor could have penetrated into the snubbers and caused the contamination.

The subsequent functional tests of an additional 100 hydraulic snubbers by the licensee did not find additional snubber failures. Also, a search of the LER data base file in this review did not result in the identification of any other event involving fluid contamination in a snubber which was attributed to a dirty environment. The source of contamination and the mechanism of introducing foreign substances into the hydraulic fluid of the snubbers are not known. Based on our review, the event appears to be unique. Therefore, additional AEOD action does not appear to be needed.

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## DISCUSSION

LER 83-010/03L-0 reported that on June 17, 1983 with the plant in cold shutdown, during functional surveillance testing of snubbers by Wyle Lab., two hydraulic snubbers failed to meet the test criteria. One was on the main steam line which failed to achieve the proper bleed rate and the other was on the service water line which failed to meet the proper lockup rate. Section 4.6.H.5 of the plant technical specifications require hydraulic snubbers to have proper bleed rate and lockup rate. These snubbers may have been inoperable during plant operation.

A subsequent examination performed by the licensee on the defective snubbers revealed that a foreign substance on the bleed screw and the lockup poppet valve may have caused the snubbers to fail to operate properly. No other deficiencies were found during the examination that could have caused these failures. The failure could be attributed to foreign material plugging the bleed screw and the lockup poppet valve. The licensee indicated that both snubbers were installed in a dirty environment which could have been the source of the foreign material.

Both snubbers would allow for normal thermal movement of piping to which they were attached. Since no seismic events were recorded that required the operation of these snubbers during their period of installation in the plant, abnormal stress was not imposed upon the piping and associated seismic structure.

Both snubbers were completely rebuilt and tested for proper operation. As required by technical specifications additional hydraulic snubbers were selected for functional testing. This functional testing was still in progress at the time of this LER report. The corrective actions taken by the licensee were to inform their maintenance personnel of this event and the importance of preventing foreign substance from being introduced into a hydraulic snubber during installation and maintenance.

## FINDINGS

Our discussions with the licensee revealed that the defective hydraulic snubbers were being installed in the RHR pump room at a location close to the floor level. The floor had an accumulation of dirty water and was suspected as the source of the foreign material which was assumed to have penetrated into these snubbers and caused the bleed screw and lockup poppet valve to be plugged. However, had the dirty water been introduced through a seal joint or fluid connection of these snubbers, the hydraulic fluid in these snubbers would also have been leaked out through these defective joints. Since no fluid leakage at various fluid connections was noticed during this functional testing and none were noticed during previous visual inservice inspections, it does not appear that the contaminant was introduced through a seal joint or fluid connection of the snubbers during service as a result of "dirty environment."

The functional tests for additional units (approximately 100 snubbers) among the remaining hydraulic snubbers revealed no additional snubber failures. In this review, a search of the LER data base file was conducted for hydraulic snubber failure due to fluid contamination. This search did not result in the identification of any other event involving hydraulic snubber failure or degradation which was attributed to fluid contamination due to a dirty environment. The LER data base searches included SCSS, RECON and NPRDS.

In what appears to have been a special situation, failure of hydraulic snubbers identified in IE Information Notice 83-47 was a result of contaminated hydraulic fluid. The event in this Information Notice occurred at Crystal River 3 and was reported in LER 83-021. The functional tests by the licensee of all 261 safety related hydraulic snubbers resulted in the identification of 107 inoperable snubbers. An evaluation of the event determined that the most likely source of contamination was particulate matter left in the fluid reservoirs after fabrication. As a result of this evaluation, the reservoir manufacturer has been required to flush each reservoir with cleaning solution before shipping.

For the event at Cooper, plant operational records indicate that both defective hydraulic snubbers were ITT Grinnell Model 200/201. The one on the mainstream line was removed by plant personnel and rebuilt in 1979 by ITT Grinnell and was functionally tested prior to installation. It had been visually inspected at subsequent refuelings and found to be satisfactory. The one on the service water line had been visually inspected at each refueling outage since its installation in 1973 and was found satisfactory during these inspections. Since the visual inservice inspections are not provided to verify either bleed rate or lockup rate, the foreign substance may have been inadvertently introduced into the snubbers through fluid reservoirs during routine maintenance, such as during hydraulic fluid replenishing.

The bleed off flow path in the snubber valve block is very small at the bleed screws. Any dirt or foreign matter can plug the bleed screws and cause the unit to fail to meet the bleed rate criteria. In a similar manner, foreign material can cause the lockup poppet valves to stick closed causing the unit to fail to meet the lockup rate criteria. This type of failure tends to compromise capability of the affected snubber to function properly during operational transients and to withstand seismic events. If snubbers fail to activate properly, the structural integrity of the piping system, to which it is attached, may not be maintained under operational transient conditions.

#### CONCLUSIONS

This event appears to be an isolated case. The foreign material was probably introduced inadvertently into the fluid reservoirs of these two particular snubbers during routine maintenance and eventually traveled to and plugged the bleed-off screws and the poppet valves as the flow paths are very small at these two places. The fluid contamination apparently was not related to the "dirty environment." Since no seal failure was evident, dirt water around the floor could not be assumed to have penetrated into the snubbers. This together with both the result of the licensee subsequent functional testing of an additional 100 snubbers and the result of our LER data base search leads us to believe that this event does not have generic implications. In addition, the installation and maintenance procedures for such snubbers provide guidance to prevent foreign substance from entering the reservoir of a snubber. The introduction of contaminant could be prevented by proper implementation of procedures. Therefore, we believe that no further AEOD action on this issue is necessary.