

LICENSEE EVENT REPORT

CONTROL BLOCK: 1 2 3 4 5 6

(PLEASE PRINT ALL REQUIRED INFORMATION)

LICENSEE NAME 01 ILQAD1				LICENSE NUMBER 00-000000-00										LICENSE TYPE 411111				EVENT TYPE 01					
CATEGORY 01 CONT MI				REPORT TYPE L		REPORT SOURCE L		DOCKET NUMBER 050-0254										EVENT DATE 011976				REPORT DATE 021876	

EVENT DESCRIPTION

During the scheduled refueling outage, a dye penetrant examination revealed cracks in the feedwater spargers and feedwater nozzles. The spargers were replaced and the nozzle cracks were ground out during the current outage. (RO 50-254/76-6)

SYSTEM COEF 7 CIA		CAUSE CODE E		COMPONENT CODE V E S I S I E L				PRIME COMPONENT SUPPLIER N		COMPONENT MANUFACTURER G O 8 0				VIOLATION N	
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CAUSE DESCRIPTION

The cause can be attributed to fatigue created by flow induced vibration and compounded by stresses induced by thermal cycling. Feedwater sparger and nozzle cracking

FACILITY STATUS 1 H		% POWER 000		OTHER STATUS NA		METHOD OF DISCOVERY C		DISCOVERY DESCRIPTION NA			
FORM OF ACTIVITY RELEASED 2 E		CONTENT OF RELEASE Z		AMOUNT OF ACTIVITY NA				LOCATION OF RELEASE NA			

PERSONNEL EXPOSURES

NUMBER 3 000		TYPE Z		DESCRIPTION NA			
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PERSONNEL INJURIES

NUMBER 4 000		DESCRIPTION NA			
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OFFSITE CONSEQUENCES

5 NA					
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LOSS OR DAMAGE TO FACILITY

TYPE 6 Z		DESCRIPTION NA			
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PUBLICITY

7 NA					
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Cause Description (cont'd) - has previously been found on Quad-Cities Unit 2 and various other BWR's of this type.

REPORT NUMBER: RO 50-254/76-6

REPORT DATE: February 18, 1976

OCCURRENCE DATE: January 19, 1976

FACILITY: Quad-Cities Nuclear Power Station
Cordova, Illinois 61242

IDENTIFICATION OF OCCURRENCE:

Indications of cracking on Unit 1 feedwater spargers and nozzles.

CONDITIONS PRIOR TO OCCURRENCE:

Unit 1 was in the REFUEL mode for a scheduled refueling outage.

DESCRIPTION OF OCCURRENCE:

On January 16, 1976, at 11:00 a.m., a dye penetrant examination revealed one indication of cracking on each of two spargers. The test was being performed upon request of the General Electric Co., which was concerned over the occurrence of cracking in several feedwater spargers of the design utilized in the Quad-Cities Unit 1 Reactor and because of the cracking problems found previously on the spargers in the Quad-Cities Unit 11 reactor.

Initial visual inspection of the spargers revealed no cracks, but dye penetrant testing indicated cracks on both the 60° and 150° spargers. The sparger crack indications were as follows:

- a. On the 60° sparger, a 1 1/2 inch linear indication propagated through the junction box-to-thermal sleeve weld.
- b. On the 150° sparger, a 2 inch linear indication propagated through the junction box-to-thermal sleeve weld.

The linear indications were interpreted as cracks and the inspection was terminated. Work Request 153-76 was initiated to replace the feedwater spargers and to inspect the feedwater nozzles.

Following the removal of the old spargers, a dye penetrant examination was conducted on the inner blend radius of the feedwater nozzles. Numerous linear indications were observed on all four nozzles. The majority of these indications were segregated on the upper half of the nozzles. The indications averaged two inches in length, and the length of the longest indication was five inches. These cracks were ground out, and the depths of the ground areas were as follows:

- a. On the 60° nozzle, two grinding areas protruded a maximum of 5/32 inch into the base metal.

- b. On the 150° nozzle, all grinding was confined to the clad metal.
- c. On the 240° nozzle, one grind area protruded 1/8 inch into the base metal.
- d. On the 330° nozzle, seven grinding areas protruded a maximum of 1/8 inch into the base metal.

DESIGNATION OF APPARENT CAUSE OF DEVIATION:

Equipment Failure

The cause of this event can be attributed to fatigue of the feedwater spargers caused by flow induced vibration, and compounded by stresses induced by the thermal gradients inherent between the feedwater piping and reactor vessel internals. Leakage between the sparger and the feedwater nozzle contributes significantly to vibration of the sparger assembly and also imposes thermal stresses on the nozzle.

The attached Unusual Event letter from Dresden Nuclear Power Station dated January 27, 1975 is relative to this same subject of feedwater sparger failures and was previously included as an attachment to a Quad-Cities Unit Unusual Event letter dated March 21, 1975 on this same subject. The analytical information presented in the attachment represents the General Electric Company and CECO Station Nuclear Engineering Department's analysis of sparger failure problem. The information is included as a supplement to this letter since it represents explanation and analysis of the cause of sparger failures also. The relevant portions of their letter are indicated by a vertical line in the left margin.

ANALYSIS OF OCCURRENCE:

The safety implications created by this occurrence are minimal due to the fact that the reactor was shutdown for refueling, and even though minor cracking may have been present, the feedwater spargers and nozzles were still capable of performing their designed functions. There was therefore no effect on safe plant operation nor on the health and safety of the public as a result of this occurrence.

CORRECTIVE ACTION:

Feedwater spargers of a new design were installed by February 11, 1976. The newly installed spargers for Quad-Cities Unit 1 and 2 will be inspected during their next scheduled refueling outages. All relevant feedwater nozzle indications were removed by grinding and retested satisfactorily prior to installation of the new spargers.

The new spargers being installed were designed with an interference fit at the controlled leakage land to eliminate leakage and thus reduce vibration and thermal induced stress cycling. The old spargers removed from Unit 1 reactor are being stored in Unit 11 spent fuel pool awaiting further disposition.

FAILURE DATA:

Cracking of the feedwater spargers and nozzles have previously been encountered and repaired at Quad-Cities Unit II as reported in deviation report D-4-2-75-30 and several other boiling water reactors around the country. The new feedwater sparger design was originated and manufactured by General Electric Company.



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NJK-76-60

February 18, 1976



J. Keppler, Regional Director
Office of Inspection and Enforcement
Region III
U. S. Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, Illinois 60137

Reference: Quad-Cities Nuclear Power Station
Docket No. 50-254, DPR-29, Unit 1
Appendix A, Section 6.6.2.d

Enclosed please find Reportable Occurrence Report No. 50-254/76-6 for Quad-Cities Nuclear Power Station.

This report is submitted to you in accordance with the requirements of Technical Specification 6.6.B.2.

Very truly yours,

COMMONWEALTH EDISON COMPANY
QUAD-CITIES NUCLEAR POWER STATION

N. J. Kalivianakis
Station Superintendent

NJK/DGC/lk

cc: G.A. Abrell

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