



Commonwealth Edison
One First National Plaza, Chicago, Illinois
Address Reply to: Post Office Box 767
Chicago, Illinois 60690

BBS Ltr. #463-75

Dresden Nuclear Power Station
R.R. #1
Morris, IL 60450

July 30, 1975



Mr. James G. Keppler
Regional Director
Directorate of Regulatory Operation - Region III
U.S. Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, IL 60137

SUBJECT: Follow-up Report to Abnormal Occurrence Entitled "Cracks In
Control Rod Drive Collet Housings" (Report No. 50-249/1975-31)

Report No. 50-249/1975-31A

Dear Mr. Keppler:

Please find attached the "Summary Report of the Investigatory
Work Performed on Dresden 3 Control Rod Drive Collet Housing Cracks."
This report is submitted in accordance with the commitment specified
under "Corrective Action" of Report No. 50-249/1975-31.

Sincerely,

Arthur M. Roberts

for
B.B. Stephenson
Superintendent
Dresden Nuclear Power Station

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cc: File/NRC

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*Report in Incident
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Commonwealth Edison
One First National Plaza, Chicago, Illinois
Address: Reply to: Post Office Box 767
Chicago, Illinois 60690

BBS Ltr. #409-75

Dresden Nuclear Power Station
R. R. #1
Morris, Illinois 60450
July 3, 1975

Mr. James G. Keppler, Regional Director
Directorate of Regulatory Operation-Region III
U. S. Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, Illinois 60137

SUBJECT: REPORT OF ABNORMAL OCCURRENCE PER SECTION 6.6.A OF THE TECHNICAL
SPECIFICATIONS
CRACKS IN CONTROL ROD DRIVE COLLET HOUSINGS

- References: 1) Regulatory Guide 1.16 Rev. 1 Appendix A
- 2) Notification of Region III of U. S. Nuclear Regulatory Commission
Telephone: Mr. P. Johnson, 0800 hours on June 27, 1975
Telegram: Mr. J. Keppler, 1145 hours on June 27, 1975
- 3) Drawing Number

Report Number: 50-249/1975-31

Report Date: July 3, 1975

Occurrence Date: June 26, 1975

Facility: Dresden Nuclear Power Station, Morris, Illinois 60450

IDENTIFICATION OF OCCURRENCE

On June 26, 1975 cracks were discovered on the collet housings of control rod drives 984, 883, 1032, 1099.

CONDITIONS PRIOR TO OCCURRENCE

Unit-3 was shut down in a refueling outage.

DESCRIPTION OF OCCURRENCE

At approximately 0900 hours on June 26, 1975, while overhauling control rod drive 984, a maintenance foreman noticed a crack in the collet housing short tube.

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July 3, 1975

The crack was detectable visually, and was confirmed by means of a dye penetrant test. Commonwealth Edison's Operational Analysis Department (CAD) was contacted to evaluate the crack on #984, as well as examine control rod drives 883, 1032, and 1099, which were available for scrutiny. A Level II inspector confirmed that cracks were present in the collet housing of each of the four control rod drive mechanisms. In each case, the cracks occurred in the collet housing short tube below the water ports, in the area of increased wall thickness.

General Electric's Nuclear Energy Division was also contacted on June 26, 1975. GE examined their test control rod drive mechanisms for cracks similar to those experienced on Unit-3. Cracks were found that were nearly identical to those on the four control rod drives. A problem evaluation has been established by GE to study this problem and determine all possible effects.

Between June 27 and 30, 1975, several more control rod drive mechanisms were examined for cracks in the collet housing area. As of June 30, GE Level II inspectors have examined 18 mechanisms using the dye penetrant test. Of these 18 mechanisms, 11 have displayed some indication of cracking.

DESIGNATION OF APPARENT CAUSE OF OCCURRENCE

General Electric has observed similar cracks on test drive mechanisms that have been scram-cycled 2000 times, and more severe cracking on mechanisms scram-cycled more than 4000 times. GE was aware that cracking had occurred, but assumed the problem was associated with the abnormally high number of scram cycles performed. There was no indication that cracking would develop within the expected lifetime limit of 200 scrams. The cause of the cracking appears to be related to temperature cycles the drive experiences during a reactor scram. Alternately, if cooling water is lost or restricted, a thermal cycle will occur when the drive is operated with normal drive flow. At present, General Electric, the Operational Analysis Department, and Argonne National Laboratory are conducting independent metallurgical studies to determine the cause of the cracking. It has not been definitely determined that the cracks are due to thermal stress.

ANALYSIS OF OCCURRENCE

As demonstrated by 2000 and 4000 scram cycle tests conducted by GE, the probability of a total collet housing failure is quite remote. The collet housing is not a pressure barrier, but acts as a restraint to contain the collet assembly, experiencing a force of approximately 600 psi during withdrawal, and considerably less during scrams and insertions. This stress is vastly less than the yield strength of the collet housing metal. If the collet housing were to fail, the possibility exists that the collet barrel and spring could jam the collet fingers, reducing the scram speed or preventing the drive from being inserted. However, the probability of a number of drives failing simultaneously is extremely unlikely. Should such an implausible failure occur, highly localized core damage could result from abnormal rod patterns and power levels. The standby liquid control system would be available to reduce reactivity and maintain the reactor in a shutdown condition. All radioactivity would be contained either within the reactor vessel or the standby gas treatment system. There would be no danger to plant personnel or the public.

July 3, 1975


CORRECTIVE ACTION

Immediate corrective action has been to initiate analyses of the cracked material. Future actions will be determined by the outcome of the studies now in progress. New housing assemblies have been received to replace the cracked assemblies. A follow-up report will be submitted as soon as a definitive cause can be established.

FAILURE DATA

There have been no known failures of collet housings to date.

The control rod drive mechanism is manufactured by the General Electric Company. This drive mechanism is the same type used on all boiling water reactors manufactured by General Electric since 1967.


E. B. Stephenson
Superintendent

BBS:smp

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