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SUBJECT: Submits comments on generic issue 23, "Reactor Coolant Pump Seal Failure." Endorses comments by WOG,BWOG & NUMARC. 3

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September 30, 1991

Chief, Regulatory Publications Branch
Division of Freedom of Information and Publication Services
Office of Administration
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Comments on GI-23,
"Reactor Coolant Pump Seal Failure"

Dear Sir:

In the Federal Register dated April 19, 1991, the Nuclear Regulatory Commission requested comments on Generic Issue 23, Reactor Coolant Pump Seal Failure. We fully endorse the comments submitted by the WOG, BWOG and NUMARC in letters dated September 27, 1991 and September 30, 1991, respectively. Supplementing that, we are submitting the attached comments on Generic Issue 23. These are additional comments specific to Duke Power Company in response to certain questions stated in the Federal Register Notice.

Very truly yours,

M.S. Tuckman

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REACTOR COOLANT PUMP SEALS

Response to Questionnaire
for Duke Power Stations

1.1 Has your operating experience with the RCP seals changed since 1983? If it has, then information regarding the history of RCP failures, including occurrences of forced outages is of interest. Information regarding all types of operation, including startup, is desired.

Response:

For Oconee, since 1983, real performance has been superior and no cases of forced outages have occurred.

For McGuire, some minor start-up problems occurred on Unit 1 in 1981. Unit 2 has had two occurences resulting in seal replacement. One resulted in a forced shutdown, but neither had seal leakoff of greater than 6 gpm.

For Catawba, Unit 1 experienced seal failure during coastdown and resulted in a forced shutdown in 1986. Unit 2 had only two experiences, both associated with start-up and both with less than an average leak rate of 7 gpm.

Overall, Duke has experienced excellent reactor coolant pump and seal performance with 20 Westinghouse and 8 Bingham pumps and seals.

1.2 If your operating experience has changed, to what do you attribute the change (e.g., improved quality assurance and quality control, improved maintenance, better procedures, improved instrumentation, design changes)?

Response:

Aside from increased experience, improvements for all three stations in seal reliability are due to several or all of the following:

* Review and upgrade of procedures. For example, at Oconee, more hold points have been added to allow Technical Advisor or Accountable Engineer inspection.

* Dedicated in-house maintenance crews.

* Training on full scale mock-up.

* Upgrade of Westinghouse seal material to silicon nitride.

* Modifications, for example at Oconee, where the Bingham pump shaft was reconfigured to minimize O' ring damage during installation.

* Installation of static testing device to test seal cartridges.

1.3 How often are seals being routinely replaced (e.g., every refueling)?

Response:

At Oconee, the No. 1 Seal (Westinghouse) runner, ring, face materials and O' rings are replaced every fourth refueling outage. The No. 2 and No. 3 Seal wear materials are replaced depending on inspection results. The entire Bingham seal cartridge is replaced every fourth refueling outage.

At McGuire and Catawba, seals are replaced depending on inspection results.

2. The NRC staff is interested in obtaining any available data regarding degraded cooling or loss of cooling to the seals to support assertions that seals can survive long periods of time (i.e., hours) without cooling.

Response:

At Oconee, surveys of plant personnel indicate no incidence of loss of cooling to the seals since 1983. At McGuire and Catawba, an incidence of short duration only (15 seconds) occurred. No effects on seal parameters were observed.

3.1 Are there procedures currently in place that are intended to prevent seal leaks from becoming small break LOCAs during both normal plant operation and loss of seal cooling events such as station blackout? Are the required operator actions the same for normal plant operations as for loss of cooling events?

Response:

At Oconee, there are operations procedures that are intended to prevent seal leaks from becoming large break LOCAs during normal operation and during station blackout. In addition, there are procedures that address the effects of degraded seal cooling due to loss of component cooling flow or loss of seal injection flow.

Operators are trained on abnormal operating procedures including station blackout emergency procedures. Cooling flow to the RCP seals could be re-established in a matter of a few minutes from the time of loss of AC power by activating onsite emergency backup power.

At McGuire and Catawba, there are abnormal and emergency procedures to address

the effects of degraded or loss of seal cooling due to loss of seal injection and /or loss of component cooling flow. Operators have been trained in these procedures which allow them to diagnose degraded seal cooling in a matter of about five minutes and restore seal cooling in a few minutes, if necessary,from alternate power sources.

3.2 Has the RCP instrumentation been evaluated to determine whether operators have sufficient information to implement the procedures?

Response:

At Oconee, the RCP instrumentation was recently evaluated relative to its usefulness/useability. The following were identified as needing some type of correction:

* The need for real time flow measurement in the control room.

* Difficulty in reading control room chart recorders.

* Position of return flow temperature probe.

At McGuire and Catawba, no changes have been made to the instrumentation to help monitor RCP seal performance. However, at McGuire, a vibration upgrade for pumps and motors is planned.

Instrument availability is accounted for in procedures by alternate insrumentation.

3.3 How is RCP seal vendor information used in establishing operation and maintenance practices for the RCP seals?

Response:

Vendor technical bulletins and production updates are used to develop and upgrade operating and maintenance procedures.

3.4 In some cases, industry practice allows continued plant operation with the RCP seal when first or second stages have failed. Do you limit this practice? If so, what are the limiting conditions?

Response:

For Oconee, continued operation is not allowed with either Bingham or Westinghouse seals having only a single stage operable.

For McGuire and Catawba, the limiting conditions are those recommended by Westinghouse which do not allow operating on the second stage seal any longer than

it takes to bring the unit to safe shutdown.

3.5 What additional quality assurance and procedural measures can be taken regarding RCP seals to improve safety?

Response:

None. Except for seal components identified by ASME Section XI as pressure boundary material, procured seals and seal parts are not considered as QA -1. All parts, however are procured from a single source and are QA inspected upon receipt.

Also, the maintenance procedures used have been reviewed and refined countless times in the life of the station and thus maximize the reliability of the seals. This is further enhanced by the use of refresher training on full scale mock-up RCP seals prior to outage maintenance.