



February 13, 1992

OCAN029202

U. S. Nuclear Regulatory Commission
Document Control Desk
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Washington, DC 20555

Subject: Arkansas Nuclear One - Units 1 & 2
Docket Nos. 50-313 and 50-368
License Nos. DPR-51 and NPF-6
Inservice Testing Program
Reference Value Relief Requests
for Service Water Pumps

Gentlemen:

NRC Inspection Report 50-313/91-30; 50-368/91-30, dated December 10, 1991 (OCNA129102), refers to the inspection conducted October 4 through November 19, 1991, at Arkansas Nuclear One, Units 1 and 2 (ANO-1&2). As part of this inspection, portions of "Service Water and Auxiliary Cooling System", Procedure 1104.029 were observed. The inservice test (IST) observed demonstrates the operability of a Service Water pump following major pump maintenance. The inspector identified a procedural inconsistency concerning the Service Water pump test acceptance criteria using a pump performance curve to compare test data in determining pump operability.

Due to this concern, a conference call was conducted on December 19, 1991, between NRR, Region IV, and ANO. During this call, ANO and NRR discussed the use of a curve as part of the acceptance criteria for the Service Water pumps. As a result, it was recommended that an IST relief request be submitted for the use of a pump performance curve in determining pump operability. ANO subsequently committed to submit the relief request. Because a curve is also utilized for the ANO-2 Service Water pumps, a relief request is also submitted for ANO-2. The purpose of this letter is to submit the subject relief requests.

Entergy Operations believes the subject ASME Code, Section XI requirement is written such that the use of a pump performance curve can be interpreted to be multiple sets of reference values. However, based on a stricter interpretation of the Code, Entergy Operations requests relief from the ASME Code Section XI requirement of Section IWP-3110, "Reference Values",

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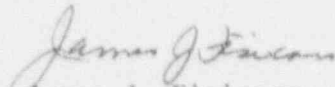
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of one or more fixed sets of values for the Service Water pumps at ANO-1&2. Entergy Operations proposes to utilize multiple sets of reference values in the form of a curve for monitoring the pump's hydraulic performance. Relief Requests 33 for ANO-1 (Attachment 1) and PR-6 for ANO-2 (Attachment 2) are attached for your review and approval.

ANO proposes to continue to use a single reference value for vibration monitoring purposes. In-plant testing has shown that the use of a curve for monitoring this parameter, due to varying flow conditions, is unwarranted. The test results indicate that the vibration levels are not flow dependent over the range of typical inservice test flows associated with these pumps.

Should you have any questions regarding this issue, please contact me.

Very truly yours,


James J. Fisicaro
Director, Licensing

JJF/RWC/sjf
Attachments

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ATTACHMENT 1

RELIEF REQUEST - 33

System: Service Water (SW)

Pump: P-4A, P-4B, P-4C

Function: These pumps provide an assured source of cooling water to various safety related and safe shutdown components. They also provide cooling water to various balance-of-plant components during normal plant operation.

Code Requirement: IWP-3110 Reference Values

"Reference values are defined as one or more fixed sets of values of the quantities shown in Table IWP-3100-1 as measured or observed when the equipment is known to be operating acceptably."

Basis for Relief: During normal plant operation, either two or three Service Water Pumps are required to be in operation. The pumps provide cooling water flow to the two safety grade Service Water loops and to the non-safety grade Auxiliary Cooling Water loop. Interrupting the cooling water flow to certain of these components would result in an immediate plant transient or a plant trip. The system flow requirements are defined by the service loads of the supplied components. Throttling of the pump discharge valve would cause a loss of adequate flow to certain heat exchangers and aligning additional loads to achieve a repeatable flow condition is not feasible due to system loading variations.

Alternative Testing: ANO proposes to utilize multiple sets of reference values in the form of a curve as opposed to one or more fixed sets of values for monitoring pump hydraulic performance. The reference flow versus differential pressure (ΔP) curve represents hydraulic performance over the entire flow range of the pump. The reference curve is generated by varying system loading to span the range of flows encountered in normal operation and encompass the flows required to meet system requirements for an accident condition. Pump ΔP is measured at each flow point and the flow vs ΔP reference curve is generated. Alert and required action range curves are derived as multipliers of the reference value curve such that the appropriate acceptance criteria is specified at any point on the curve. The reference value curve is reconfirmed or a new one defined by the collection of several data points at various flows following significant maintenance activities involving rotating assembly removal, repair or replacement. The reference curve is reconfirmed by performance of the normal inservice quarterly test following less significant maintenance activities.

The system load requirements define the flow at which a particular inservice test is run. The pump differential is measured and compared to the reference curve and associated acceptance criteria at that flow. The delta between the reference curve and the actual pump operating point is converted to a percent deviation value which is used for trending purposes. The percent deviation is calculated by subtracting the reference curve value from the test value and then dividing by the reference curve value.

ANO proposes to continue to use a single reference value for vibration monitoring purposes. In-plant testing has shown that the use of a curve for monitoring this parameter due to varying flow conditions is unwarranted. The test results indicate that the vibration levels are not flow dependent over the range of typical inservice test flows associated with these pumps.

ATTACHMENT 2

RELIEF REQUEST NUMBER PR-6

System: Service Water (SW)

Pump: 2P-4A, 2P-4B, 2P-4C

Function: These pumps provide an assured source of cooling water to various safety related and safe shutdown components. They also provide cooling water to various balance-of-plant components during normal plant operation.

Code Class: 3

Code Requirement: IWP-3110 Reference Values

"Reference values are defined as one or more fixed sets of values of the quantities shown in Table IWP-3100-1 as measured or observed when the equipment is known to be operating acceptably."

Basis for Relief: During normal plant operation, either two or three Service Water Pumps are required to be in operation. The pumps provide cooling water flow to the two safety grade Service Water loops and to the non-safety grade Auxiliary Cooling Water loop. Interrupting the cooling water flow to certain of these components would result in an immediate plant transient or a plant trip. The system flow requirements are defined by the service loads of the supplied components. Throttling of the pump discharge valve would cause a loss of adequate flow to certain heat exchangers and aligning additional loads to achieve a repeatable flow condition is not feasible due to system loading variations.

Alternative Testing: ANO proposes to utilize multiple sets of reference values in the form of a curve as opposed to one or more fixed sets of values for monitoring pump hydraulic performance. The reference flow versus differential pressure (ΔP) curve represents hydraulic performance over the entire flow range of the pump. The reference curve is generated by varying system loading to span the range of flows encountered in normal operation and encompass the flows required to meet system requirements for an accident condition. Pump ΔP is measured at each flow point and the flow vs ΔP reference curve is generated. Alert and required action range curves are derived as multipliers of the reference value curve such that the appropriate acceptance criteria is specified at any point on the curve.

The reference value curve is reconfirmed or a new one defined by the collection of several data points at various flows following significant maintenance activities involving rotating assembly removal, repair or replacement. The reference curve is reconfirmed by performance of the normal inservice quarterly test following the significant maintenance activities.

The system load requirements define the flow at which a particular inservice test is run. The pump differential is measured and compared to the reference curve and associated acceptance criteria at that flow. The delta between the reference curve and the actual pump operating point is converted to a percent deviation value which is used for trending purposes. The percent deviation is calculated by subtracting the reference curve value from the test value and then dividing by the reference curve value.

ANO proposes to continue to use a single reference value for vibration monitoring purposes. In-plant testing has shown that the use of a curve for monitoring this parameter due to varying flow conditions is unwarranted. The test results indicate that the vibration levels are not flow dependent over the range of typical inservice test flows associated with these pumps.