

NRC STAFF COMMENTS ON INSERVICE PUMP AND VALVE TESTING PROGRAMS AND
RELIEF REQUESTS

The NRC staff, after reviewing a number of pump and valve testing programs, has determined that further guidance might be helpful to illustrate the type and extent of information we feel is necessary to expedite the review of these programs. We feel that the Licensee can, by incorporating these guidelines into each program submittal, reduce considerably the staff's review time and time spent by the Licensee in responding to NRC staff requests for additional information.

The pump testing program should include all safety related* Class 1, 2 and 3 pumps which are installed in water cooled nuclear power plants and which are provided with an emergency power source.

The valve testing program should include all the safety related valves in the following systems excluding valves used for operating convenience only, such as manual vent, drain, instrument and test valves, and valves used for maintenance only.

PWR

- a. High Pressure Injection System
- b. Low Pressure Injection System
- c. Accumulator Systems
- d. Containment Spray System
- e. Primary and Secondary System Safety and Relief Valves
- f. Auxiliary Feedwater Systems
- g. Reactor Building Cooling System
- h. Active Components in Service Water and Instrument Air Systems which are required to support safety system functions.
- i. Containment Isolation Valves required to change position to isolate containment.
- j. Chemical & Volume Control System
- k. Other key components in Auxiliary Systems which are required to directly support plant shutdown or safety system function.

*Safety related - necessary to safely shut down the plant and mitigate the consequences of an accident.

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- l. Residual Heat Removal System
- m. Reactor Coolant System

DWR

- a. High Pressure Core Injection System
- b. Low Pressure Core Injection System
- c. Residual Heat Removal System (Shutdown Cooling System)
- d. Emergency Condenser System (Isolation Condenser System)
- e. Low Pressure Core Spray System
- f. Containment Spray System
- g. Safety, Relief, and Safety/Relief Valves
- h. RCIC (Reactor Core Isolation Cooling) System
- i. Containment Cooling System
- j. Containment isolation valves required to change position to isolate containment
- k. Standby liquid control system (Boron System)
- l. Automatic Depressurization System (any pilot or control valves, associated hydraulic or pneumatic systems, etc.)
- m. Control Rod Drive Hydraulic System ("Scram" function)
- n. Other key components in Auxiliary Systems which are required to directly support plant shutdown or safety system function.
- o. Reactor Coolant System

Inservice Pump and Valve Testing Program

- I. Information required for NRC Staff Review of the Pump and Valve Testing Program
 - A. Three sets of P&ID's, which include all of the systems listed above, with the code class and system boundaries clearly marked. The drawings should include all of the components present at the time of submittal and a legend of the P&ID symbols.
 - B. Identification of the applicable ASME Code Edition and Addenda
 - C. The period for which the program is applicable.
 - D. Identify the component code class.

- E. For Pump testing: Identify
 1. Each pump required to be tested (name and number)
 2. The test parameters to be measured
 3. The test frequency
 - F. For valve testing: Identify
 1. Each valve in ASME Section XI Categories A & B that will be exercised every three months during normal plant operation (indicate whether partial or full stroke exercise, and for power operated valves list the limiting value for stroke time.)
 2. Each valve in ASME Section XI Category A that will be leak tested during refueling outages (Indicate the leak test procedure you intend to use)
 3. Each valve in ASME Section XI Categories C, D and E that will be tested, the type of test and the test frequency. For check valves, identify those that will be exercised every 3 months and those that will only be exercised during cold shutdown or refueling outages.
- II. Additional Information That Will Be Helpful in Speeding Up the Review Process
- A. Include the valve location coordinates or other appropriate location information which will expedite our locating the valves on the P&IDs.
 - B. Provide P&ID drawings that are large and clear enough to be read easily.
 - C. Identify valves that are provided with an interlock to other components and a brief description of that function.

Relief Requests from Section XI Requirements

The largest area of concern for the NRC staff, in the review of an inservice valve and pump testing program, is in evaluating the basis for justifying relief from Section XI Requirements. It has been our experience

that many requests for relief, submitted in these programs, do not provide adequate descriptive and detailed technical information. This explicit information is necessary to provide reasonable assurance that the burden imposed on the licensee in complying with the code requirements is not justified by the increased level of safety obtained.

Relief requests which are submitted with a justification such as "Impractical", "Inaccessible", or any other categorical basis, will require additional information, as illustrated in the enclosed examples, to allow our staff to make an evaluation of that relief request. The intention of this guidance is to illustrate the content and extent of information required by the NRC staff, in the request for relief, to make a proper evaluation and adequately document the basis for that relief in our safety evaluation report. The NRC staff feels that by receiving this information in the program submittal, subsequent requests for additional information and delays in completing our review can be considerably reduced or eliminated.

I. Information Required for NRC Review of Relief Requests

- A. Identify component for which relief is requested:
 1. Name and number as given in FSAR
 2. Function
 3. ASME Section III Code Class
 4. For valve testing, also specify the ASME Section XI valve category as defined in IWV-2000
- B. Specifically identify the ASME Code requirement that has been determined to be impractical for each component.
- C. Provide information to support the determination that the requirement in (B) is impractical; i.e., state and explain the basis for requesting relief.
- D. Specify the inservice testing that will be performed in lieu of the ASME Code Section XI requirements.
- E. Provide the schedule for implementation of the procedure(s) in (D).

II. Examples to Illustrate Several Possible Areas Where Relief May Be Granted and the Extent and Content of Information Necessary to Make An Evaluation

- A. Accessibility: The regulation specifically grants relief from the code requirement because of insufficient access provisions. However, a detailed discussion of actual physical arrangement of the component in question to illustrate the insufficiency of space for conducting the required test is necessary.

Discuss in detail the physical arrangement of the component in question to demonstrate that there is not sufficient space to perform the code required inservice testing.

What alternative surveillance means which will provide an acceptable level of safety have you considered and why are these means not feasible?

- B. Environmental Conditions (e.g., High radiation level, High temperature, High humidity, etc.)

Although it is prudent to maintain occupation radiation exposure for inspection personnel as low as practicable, the request for relief from the code requirements cannot be granted solely on the basis of high radiation levels alone. A balanced judgment between the hardships and compensating increase in the level of safety should be carefully established. If the health and safety of the public dictates the necessity of inservice testing, alternative means or even decontamination of the plant if necessary should be provided or developed.

Provide additional information regarding the radiation levels at the required test location. What alternative testing techniques which will provide an acceptable level of assurance of the integrity of the component in question have you considered and why are these techniques determined to be impractical?

- C. Instrumentation is not originally provided
Provide information to justify that compliance with the code requirements would result in undue burden or hardships without a compensating increase in the level of plant safety. What alternative testing methods which will provide an acceptable level of safety have you considered and why are these methods determined to be impractical?
- D. Valve Cycling During Plant Operation Could Put the Plant in an Unsafe Condition
The licensee should explain in detail why exercising tests during plant operation could jeopardize the plant safety.
- E. Valve Testing at Cold Shutdown or Refueling Intervals in Lieu of the 3 Month Required Interval
The licensee should explain in detail why each valve cannot be exercised during normal operation. Also, for the valves where a refueling interval is indicated, explain in detail why each valve cannot be exercised during cold shutdown intervals.

III. Acceptance Criteria for Relief Request

The Licensee must successfully demonstrate that:

1. Compliance with the code requirements would result in hardships or unusual difficulties without a compensating increase in the level of safety and noncompliance will provide an acceptable level of quality and safety, or
2. Proposed alternatives to the code requirements or portions thereof will provide an acceptable level of quality and safety.

Standard Format

A standard format, for the valve portion of the pump and valve testing program and relief requests, is included as an attachment to this Guidance. The NRC staff believes that this standard format will reduce the time spent by both the staff in our review and by the licensee in their preparation.

of the pump and valve testing program and submittals. The standard format includes examples of relief requests which are intended to illustrate the application of the standard format and are not necessarily a specific plan relief request.

ATTACHMENT

STANDARD FORMAT
VALVE INSERVICE TESTING PROGRAM SUBMITTAL

Valve Number	Class	Coordinates	Valve Category					Size (inches)	Valve Type	Actuator Type	Normal Position	Test Requirements	Relief Requests*	Testing Alternative	REMARKS (Not to be used for relief basls)
			A	B	C	D	E								
710	3	D-14					X	GA	M	LO	ET				
700	3	D-15				X		DE	HA	C	DT				
717	3	C-15			X		16	CK	SA	-	CV	X	CS		
702C	3	C-15			X		16	CK	SA	-	CV				
707	3	E-14			X		3	REL	SA	-	CV				
834	3	D-11	X				4	GL	H	C	Q	X	ET	60 sec.	
722B	3	B-11			X		3/4	REL	SA	-	SRV				
722C	3	B-11			X		3/4	REL	SA	-	SRV				
715	2	A-10			X		3	REL	SA	-	SRV				
729	2	B-10			X		3	REL	SA	-	SRV				
744B	2	D-14	X				10	GA	MO	C	Q			30 sec.	

Relief Request Basis

System: Auxiliary Coolant System, Component Cooling

1. Valve: 717
Category: C
Class: 3
Function: Prevent backflow from the reactor coolant pump cooling coils

Test Requirement: Exercise valve for operability every three months
Basis for relief: To test this valve would require interruption of cooling water to the reactor coolant pumps motor cooling coils. This action could result in damage to the reactor coolant pumps and thus place the plant in an unsafe mode of operation.

Alternative Testing: This valve will be exercised for operability during cold shutdowns.

2. Valve: 834
Category: B-E
Class: 3
Function: Isolate the primary water from the component cooling surge tank during plant operation. It is normally in the closed position, but routine operation of this valve will occur during refueling and cold shutdowns.

Test Requirement: Exercise valve (full stroke) for operability every three (3) months.

Basis for Relief: This valve is not required to change position during plant operation to accomplish its safety function. Exercising this valve will increase the possibility of surge tankline contamination.

Alternate Testing: Verify and record valve position before and after each valve operation.

3. Valve: 744B
Category: A
Class: 2
Function: Isolate the residual heat exchangers from the cold leg R.C.S. backflow and accumulation backflow.

Test Requirements: Seat leakage test

Basis for Relief: This valve is located in a high radiation field (2000 mr/hr) which would make the required seat leakage test hazardous to test personnel. We intend to seat leak test two other valves (875B and 876B) which are in series with this valve and will also prevent backflow. We feel that by complying with the seat leakage requirements we will not achieve a compensatory increase in the level of safety.

Alternative Testing: No alternative seat leak testing is proposed..