

**SURVEILLANCE REQUIREMENTS**

SURVEILLANCE	FREQUENCY
<p>SR 3.4.14.1      -----NOTES-----</p> <ol style="list-style-type: none"> <li>1.    Not required to be performed in MODES 3 and 4.</li> <li>2.    Not required to be performed on the RCS PIVs located in the RHR flow path when in the shutdown cooling mode of operation.</li> <li>4.    RCS PIVs actuated during the performance of this Surveillance are not required to be tested more than once if a repetitive testing loop cannot be avoided.</li> </ol> <p>-----</p> <p>Verify leakage from each RCS PIV is equivalent to <math>\leq 0.5</math> gpm per nominal inch of valve size up to a maximum of 5 gpm at an RCS pressure <math>\geq 2215</math> psig and <math>\leq 2255</math> psig.</p>	<p>18 months, prior to entering MODE 2</p> <p><u>AND</u></p> <p>Following valve actuation due to automatic or manual action or flow through the valve (except for RCS PIVs located in the RHR flow path)</p>
<p>SR 3.4.14.2      -----NOTE-----</p> <p>Not required to be met when the RHR System valves are required open in accordance with SR 3.4.12.3.</p> <p>-----</p> <p>Verify RHR System autoclosure interlock causes the valves to close automatically with a simulated or actual RCS pressure signal <math>\geq 700</math> psig and <math>\leq 750</math> psig.</p>	<p>18 months</p>

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BASES

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LCO  
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The LCO PIV leakage limit is 0.5 gpm per nominal inch of valve size with a maximum limit of 3 or 5 gpm depending on the valve. The previous NRC Standard criterion of 1 gpm for all valve sizes imposed an unjustified penalty on the larger valves without providing information on potential valve degradation and resulted in higher personnel radiation exposures. A study concluded a leakage rate limit based on valve size was superior to a single allowable value.

Reference 7 permits leakage testing at a lower pressure differential than between the specified maximum RCS pressure and the normal pressure of the connected system during RCS operation (the maximum pressure differential) in those types of valves in which the higher service pressure will tend to diminish the overall leakage channel opening. In such cases, the observed rate may be adjusted to the maximum pressure differential by assuming leakage is directly proportional to the pressure differential to the one half power.

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APPLICABILITY

In MODES 1, 2, 3, and 4, this LCO applies because the PIV leakage potential is greatest when the RCS is pressurized. In MODE 4, valves in the RHR flow path are not required to meet the requirements of this LCO when in, or during the transition to or from, the RHR mode of operation.

In MODES 5 and 6, leakage limits are not provided because the lower reactor coolant pressure results in a reduced potential for leakage and for a LOCA outside the containment.

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ACTIONS

The Actions are modified by two Notes. Note 1 provides clarification that each flow path allows separate entry into a Condition. This is allowed based upon the functional independence of the flow path. Note 2 requires an evaluation of affected systems if a PIV is inoperable. The leakage may have affected system operability, or isolation of a leaking flow path with an alternate valve may have degraded the ability of the interconnected system to perform its safety function.

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BASES

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SURVEILLANCE  
REQUIREMENTS

SR 3.4.14.1 (continued)

For the two PIVs in series, the leakage requirement applies to each valve individually and not to the combined leakage across both valves. If the PIVs are not individually leakage tested, one valve may have failed completely and not be detected if the other valve in series meets the leakage requirement. In this situation, the protection provided by redundant valves would be lost.

Testing is to be performed every 18 months, a typical refueling cycle, on all PIVs listed in the TRM. The 18 month Frequency is consistent with 10 CFR 50.55a(g) (Ref. 8) as contained in the Inservice Testing Program, is within frequency allowed by the American Society of Mechanical Engineers (ASME) Code, Section XI (Ref. 7), and is based on the need to perform such surveillances under the conditions that apply during an outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power.

In order to satisfy ALARA requirements, leakage may be measured indirectly (as from performance of pressure indicators) if accomplished in accordance with approved procedures and supported by computations showing that the method is capable of demonstrating valve compliance with leakage criteria.

In addition, testing must be performed once after the valve has been opened by flow or exercised to ensure tight reseating except for RCS PIVs located in the RHR flow path (Q1/2E11V001A and B, Q1/2E11V016A and B, Q1/2E11V021A, B, C and Q1/2E11V042A and B). PIVs disturbed in the performance of this Surveillance should also be tested unless documentation shows that an infinite testing loop cannot practically be avoided. Testing must be performed after the valve has been reseated.

The leakage limit is to be met at the RCS pressure associated with MODES 1 and 2. This permits leakage testing at high differential pressures with stable conditions not possible in the MODES with lower pressures.

Entry into MODES 3 and 4 is allowed to establish the necessary differential pressures and stable conditions to allow for performance of this Surveillance. The Note that allows this provision is complementary to the Frequency of prior to entry into MODE 2. In addition, this Surveillance is not required to be performed on the RHR System when the RHR System is aligned to the RCS in the

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BASES

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SURVEILLANCE  
REQUIREMENTSSR 3.4.14.1 (continued)

shutdown cooling mode of operation. PIVs contained in the RHR shutdown cooling flow path must be leakage rate tested when RHR is secured and stable unit conditions and the necessary differential pressures are established. Leak rate testing is performed manually, with test personnel in the vicinity of the system connections in containment during setup and testing. Should the check valve that was being tested rupture or pressure in the system cause a rupture of the test equipment, there would be a concern for the safety of the personnel in the area. In addition, testing with RCS temperature above 212 °F would result in any leakage past the RHR valves flashing into steam making accurate measurement of the leakage rate impossible. Therefore, testing of the RHR System PIVs should normally be performed in Mode 5, as the test results are meaningful and plant conditions in Mode 5 minimize the potential impact on personnel safety.

SR 3.4.14.2

Verifying that the RHR autoclosure interlock is OPERABLE ensures that RCS pressure will not pressurize the RHR system beyond 125% of its design pressure of 600 psig. The autoclosure interlock isolates the RHR System from the RCS when the interlock setpoint is reached. The setpoint ensures the RHR design pressure will not be exceeded. The 18 month Frequency is based on the need to perform the Surveillance under conditions that apply during a plant outage. The 18 month Frequency is also acceptable based on consideration of the design reliability (and confirming operating experience) of the equipment.

The SR is modified by a Note that provides an exception to the requirement to perform this surveillance when using the RHR System suction relief valves for cold overpressure protection in accordance with SR 3.4.12.3.

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BASES

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SURVEILLANCE  
REQUIREMENTS  
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SR 3.4.14.3

Verifying that the RHR open permissive interlock is OPERABLE ensures that the RCS will not pressurize the RHR system beyond design of 600 psig. The open permissive interlock prevents opening the RHR System suction valves from the RCS when the RCS pressure is above the setpoint. The setpoint upper value ensures the RHR System design pressure will not be exceeded at the RHR pump discharge and was chosen taking into account instrument uncertainty and calibration tolerances. This value also provides assurance that the RHR System suction relief valves setpoint will not be exceeded.

The minimum value of the setpoint range is chosen based upon operational considerations (differential pressure) for the RCP seals and thus does not have a safety-related function. The 18 month Frequency is based on the need to perform the Surveillance under conditions that apply during a plant outage. The 18 month Frequency is also acceptable based on consideration of the design reliability (and confirming operating experience) of the equipment.

The SR is modified by a Note that provides an exception to the requirement to perform this surveillance when using the RHR System suction relief valves for cold overpressure protection in accordance with SR 3.4.12.3.

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REFERENCES

1. 10 CFR 50.2.
  2. 10 CFR 50.55a(c).
  3. 10 CFR 50, Appendix A, Section V, GDC 55.
  4. WASH-1400 (NUREG-75/014), Appendix V, October 1975.
  5. NUREG-0677, May 1980.
  6. Technical Requirement Manual (TRM).
  7. ASME, Boiler and Pressure Vessel Code, Section XI.
  8. 10 CFR 50.55a(g).
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