

ATTACHMENT 2 TO AEP:NRG:1180  
MARKED-UP TECHNICAL SPECIFICATION PAGES

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REACTOR COOLANT SYSTEM

OPERATIONAL LEAKAGE

LIMITING CONDITION FOR OPERATION

3.4.6.2 Reactor Coolant System leakage shall be limited to:

- a. No PRESSURE BOUNDARY LEAKAGE,
- b. 1 GPM UNIDENTIFIED LEAKAGE,
- c. 600 gallons per day total primary-to-secondary leakage through all steam generators and 150 gallons per day through any one steam generator for Fuel Cycle 13,
- d. 10 GPM IDENTIFIED LEAKAGE from the Reactor Coolant System, and
- e. Seal line resistance greater than or equal to  $2.27E-1$  ft/gpm<sup>2</sup> and,
- ~~f. 1 GPM leakage from any reactor coolant system pressure isolation valve specified in Table 3.4.0.~~

APPLICABILITY: MODES 1, 2, 3 and 4. ~~///~~ \*

ACTION:

- a. With any PRESSURE BOUNDARY LEAKAGE, be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.
- b. With any Reactor Coolant System leakage greater than any one of the above limits, excluding PRESSURE BOUNDARY LEAKAGE, reduce the leakage rate to within limits within 4 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
- ~~c. With any reactor coolant system pressure isolation valve(s) leakage greater than the above limit, except when:
  - ~~1. The leakage is less than or equal to 5.0 gpm, and~~
  - ~~2. The most recent measured leakage does not exceed the previous measured leakage\* by an amount that reduces the~~~~

~~\* To satisfy ALARA requirements, measured leakage may be measured indirectly (as from the 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 the leakage criteria.~~

\* ~~///~~ Specification 3.4.6.2.e is applicable with average pressure within 20 psi of the nominal full pressure value.

## REACTOR COOLANT SYSTEM

### LIMITING CONDITION FOR OPERATION (Continued)

~~margin between the most recent measured leakage and the maximum limit of 5.0 gpm by 50% or more,~~

~~declare the leaking valve inoperable and isolate the high pressure portion of the affected system from the low pressure portion by the use of a combination of at least two closed valves, one of which may be the OPERABLY check valve and the other a closed de-energized motor operated valve. Verify the isolated condition of the closed de-energized motor operated valve at least once per 24 hours, or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.~~

### SURVEILLANCE REQUIREMENTS

4.4.6.2.1 Reactor Coolant System leakages shall be demonstrated to be within each of the above limits by:

- a. Monitoring the containment atmosphere particulate radioactivity monitor at least once per 12 hours.
- b. Monitoring the containment sump inventory and discharge at least once per 12 hours.
- c. Determining the seal line resistance at least once per 31 days when the average pressurizer pressure is within 20 psi of its nominal full pressure value. The seal line resistance measured during the surveillance must be greater than or equal to 2.27 E-1 ft/gpm<sup>2</sup>. The seal line resistance,  $R_{SL}$ , is determined from the following expression:

$$R_{SL} = \frac{2.31 (P_{CHP} - P_{SI})}{Q^2}$$

where:  $P_{CHP}$  = charging pump header pressure, psig

$P_{SI}$  = 2112 psig (low pressure operation)

2262 psig (high pressure operation)

2.31 = conversion factor (12 in/ft)<sup>2</sup> / (62.3 lb/ft<sup>3</sup>)

$Q$  = the total seal injection flow, gpm

The provisions of Specification 4.0.4 are not applicable for entry into MODES 3 and 4.

- d. Performance of a Reactor Coolant System water inventory balance at least once per 72 hours during steady state operation, and



~~TABLE 3.4-0~~

~~REACTOR COOLANT SYSTEM PRESSURE ISOLATION VALVES~~

VALVE NUMBER

FUNCTION (a)

SI-170L2  
RH133

Low Head Safety Injection  
Loop 2, cold leg

SI-170L3  
RH134

Loop 3, cold leg

~~(a) Minimum test differential pressure shall not be below 150 psid.~~

## REACTOR COOLANT SYSTEM

### BASES

Maintaining an operating leakage limit of 150 gpd per steam generator (600 gpd total) for Fuel Cycle 13 will minimize the potential for a large leakage event during steam line break under LOCA conditions. Based on the NDE uncertainties, bobbin coil voltage distribution and crack growth rate from the previous inspection, the expected leak rate following a steam line rupture is limited to below 120 gpm in the faulted loop and 150 gpd per steam generator in the intact loops, which will limit offsite doses to within 10 percent of the 10 CFR 100 guidelines. If the projected end of cycle distribution of crack indications results in primary-to-secondary leakage greater than 120 gpm in the faulted loop during a postulated steam line break event, additional tubes must be removed from service in order to reduce the postulated primary-to-secondary steam line break leakage to below 120 gpm.

PRESSURE BOUNDARY LEAKAGE of any magnitude is unacceptable since it may be indicative of an impending gross failure of the pressure boundary. Should PRESSURE BOUNDARY LEAKAGE occur through a component which can be isolated from the balance of the Reactor Coolant System, plant operation may continue provided the leaking component is promptly isolated from the Reactor Coolant System since isolation removes the source of potential failure.

~~The Surveillance Requirements for RCS Pressure Isolation Valves provide added assurance of valve integrity thereby reducing the probability of gross valve failure and consequent intersystem LOCA. Leakage from the RCS Pressure Isolation Valves is IDENTIFIED LEAKAGE and will be considered as a portion of the allowed limit.~~

### 3/4.4.7 CHEMISTRY

The limitations on Reactor Coolant System chemistry ensure that corrosion of the Reactor Coolant System is minimized and reduces the potential for Reactor Coolant System leakage or failure due to stress corrosion. Maintaining the chemistry within the Steady State Limits provides adequate corrosion protection to ensure the structural integrity of the Reactor Coolant System over the life of the plant. The associated effects of exceeding the oxygen, chloride, and fluoride limits are time and temperature dependent. Corrosion studies show that operation may be continued with contaminant concentration levels in excess of the Steady State Limits, up to the Transient Limits, for the specified limited time intervals without having a significant effect on the structural integrity of the Reactor Coolant System. The time interval permitting continued operation within the restrictions of the Transient Limits provides time for taking corrective actions to restore the contaminant concentrations to within the Steady State Limits.



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REACTOR COOLANT SYSTEM

OPERATIONAL LEAKAGE

LIMITING CONDITION FOR OPERATION

3.4.6.2 Reactor Coolant System leakage shall be limited to:

- a. No PRESSURE BOUNDARY LEAKAGE,
- b. 1 GPM UNIDENTIFIED LEAKAGE,
- c. 1 GPM total primary-to-secondary leakage through all steam generators and 500 gallons per day through any one steam generator,
- d. 10 GPM IDENTIFIED LEAKAGE from the Reactor Coolant System, *and*
- e. Seal line resistance greater than or equal to  $2.27 \text{ E-1 ft/gpm}^2$ .

~~f. 1 GPM leakage from any reactor coolant system pressure isolation valve specified in Table 3.4.0.~~

APPLICABILITY: MODES 1, 2, 3 and 4 ~~and~~ \*

ACTION:

- a. With any PRESSURE BOUNDARY LEAKAGE, be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.
- b. With any Reactor Coolant System leakage greater than any one of the above limits, excluding PRESSURE BOUNDARY LEAKAGE, reduce the leakage rate to within limits within 4 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

~~c. With any reactor coolant system pressure isolation valve(s) leakage greater than the above limit, except when:~~

~~1. The leakage is less than or equal to 5.0 gpm, and~~

~~2. The most recent measured leakage does not exceed the previous measured leakage\* by an amount that reduces the~~

~~\*To satisfy ALARA requirements, measured leakage may be measured indirectly (as from the 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 the leakage criteria.~~

\* ~~Specification 3.4.6.2.e is applicable with average pressurizer pressure within 20 psi of the nominal full pressure value.~~

REACTOR COOLANT SYSTEM

SURVEILLANCE REQUIREMENTS (Continued)

- e. Monitoring the reactor head flange leakoff system at least once per 24 hours.

~~4.4.6.2.2 Each reactor coolant system pressure isolation valve specified in Table 3.4-0 shall be demonstrated OPERABLE pursuant to Specification 4.0.5, except that in lieu of any leakage testing required by Specification 4.0.5, each valve shall be demonstrated OPERABLE by verifying leakage to be within its limit prior to entering MODE 3:~~

~~a. After each refueling outage:~~

~~b. Whenever the plant has been in COLD SHUTDOWN for 72 hours or more and if leakage testing has not been performed in the previous 9 months;~~

~~c. Prior to returning the valve to service following maintenance, repair or replacement work on the valve.~~



1 2 3 4

## REACTOR COOLANT SYSTEM

### BASES

The limitation on seal line resistance ensures that the seal line resistance is greater than or equal to the resistance assumed in the minimum safeguards LOCA analysis. This analysis assumes that all of the flow that is diverted from the boron injection line to the seal injection line is unavailable for core cooling.

The total steam generator tube leakage limit of 1 GPM for all steam generators not isolated from the RCS ensures that the dosage contribution from the tube leakage will be limited to a small fraction of Part 100 limits in the event of either a steam generator tube rupture or steam line break. The 1 GPM limit is consistent with the assumptions used in the analysis of these accidents. The 500 gpd leakage limit per steam generator ensures that steam generator tube integrity is maintained in the event of a main steam line rupture or under LOCA conditions.

PRESSURE BOUNDARY LEAKAGE of any magnitude is unacceptable since it may be indicative of an impending gross failure of the pressure boundary. Should PRESSURE BOUNDARY LEAKAGE occur through a component which can be isolated from the balance of the Reactor Coolant System, plant operation may continue provided the leaking component is promptly isolated from the Reactor Coolant System since isolation removes the source of potential failure.

~~The Surveillance Requirements for RCS Pressure Isolation Valves provide added assurance of valve integrity thereby reducing the probability of gross valve failure and consequent intersystem LOCA. Leakage from the RCS Pressure Isolation Valves is IDENTIFIED LEAKAGE and will be considered as a portion of the allowed limit.~~

### 3/4.4.7 CHEMISTRY

The limitations on Reactor Coolant System chemistry ensure that corrosion of the Reactor Coolant System is minimized and reduces the potential for Reactor Coolant System leakage or failure due to stress corrosion. Maintaining the chemistry within the Steady State Limits provides adequate corrosion protection to ensure the structural integrity of the Reactor Coolant System over the life of the plant. The associated effects of exceeding the oxygen, chloride, and fluoride limits are time and temperature dependent. Corrosion studies show that operation may be continued with contaminant concentration levels in excess of the Steady State Limits, up to the Transient Limits, for the specified limited time intervals without having a significant effect on the structural integrity of the Reactor Coolant System. The time interval permitting continued operation within the restrictions of the Transient Limits provides time for taking corrective actions to restore the contaminant concentrations to within the Steady State Limits.

ATTACHMENT 3 TO AEP:NRC:1180

PROPOSED REVISED TECHNICAL SPECIFICATIONS PAGES



REACTOR COOLANT SYSTEM

OPERATIONAL LEAKAGE

LIMITING CONDITION FOR OPERATION

3.4.6.2 Reactor Coolant System leakage shall be limited to:

- a. No PRESSURE BOUNDARY LEAKAGE,
- b. 1 GPM UNIDENTIFIED LEAKAGE,
- c. 600 gallons per day total primary-to-secondary leakage through all steam generators and 150 gallons per day through any one steam generator for Fuel Cycle 13,
- d. 10 GPM IDENTIFIED LEAKAGE from the Reactor Coolant System, and
- e. Seal line resistance greater than or equal to  $2.27E-1$  ft/gpm<sup>2</sup>.

APPLICABILITY: MODES 1, 2, 3 and 4.\*

ACTION:

- a. With any PRESSURE BOUNDARY LEAKAGE, be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.
- b. With any Reactor Coolant System leakage greater than any one of the above limits, excluding PRESSURE BOUNDARY LEAKAGE, reduce the leakage rate to within limits within 4 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

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\*Specification 3.4.6.2.e is applicable with average pressure within 20 psi of the nominal full pressure value.

REACTOR COOLANT SYSTEM

SURVEILLANCE REQUIREMENTS

4.4.6.2.1 Reactor Coolant System leakages shall be demonstrated to be within each of the above limits by:

- a. Monitoring the containment atmosphere particulate radioactivity monitor at least once per 12 hours.
- b. Monitoring the containment sump inventory and discharge at least once per 12 hours.
- c. Determining the seal line resistance at least once per 31 days when the average pressurizer pressure is within 20 psi of its nominal full pressure value. The seal line resistance measured during the surveillance must be greater than or equal to 2.27 E-1 ft/gpm<sup>2</sup>. The seal line resistance, R<sub>SL</sub>, is determined from the following expression:

$$R_{SL} = \frac{2.31 (P_{CHP} - P_{SI})}{Q^2}$$

where: P<sub>CHP</sub> - charging pump header pressure, psig

P<sub>SI</sub> - 2112 psig (low pressure operation)

2262 psig (high pressure operation)

2.31 - conversion factor (12 in/ft)<sup>2</sup>/(62.3 lb/ft<sup>3</sup>)

Q - the total seal injection flow, gpm

The provisions of Specification 4.0.4 are not applicable for entry into MODES 3 and 4.

- d. Performance of a Reactor Coolant System water inventory balance at least once per 72 hours during steady state operation, and
- e. Monitoring the reactor head flange leakoff system at least once per 24 hours.

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## REACTOR COOLANT SYSTEM

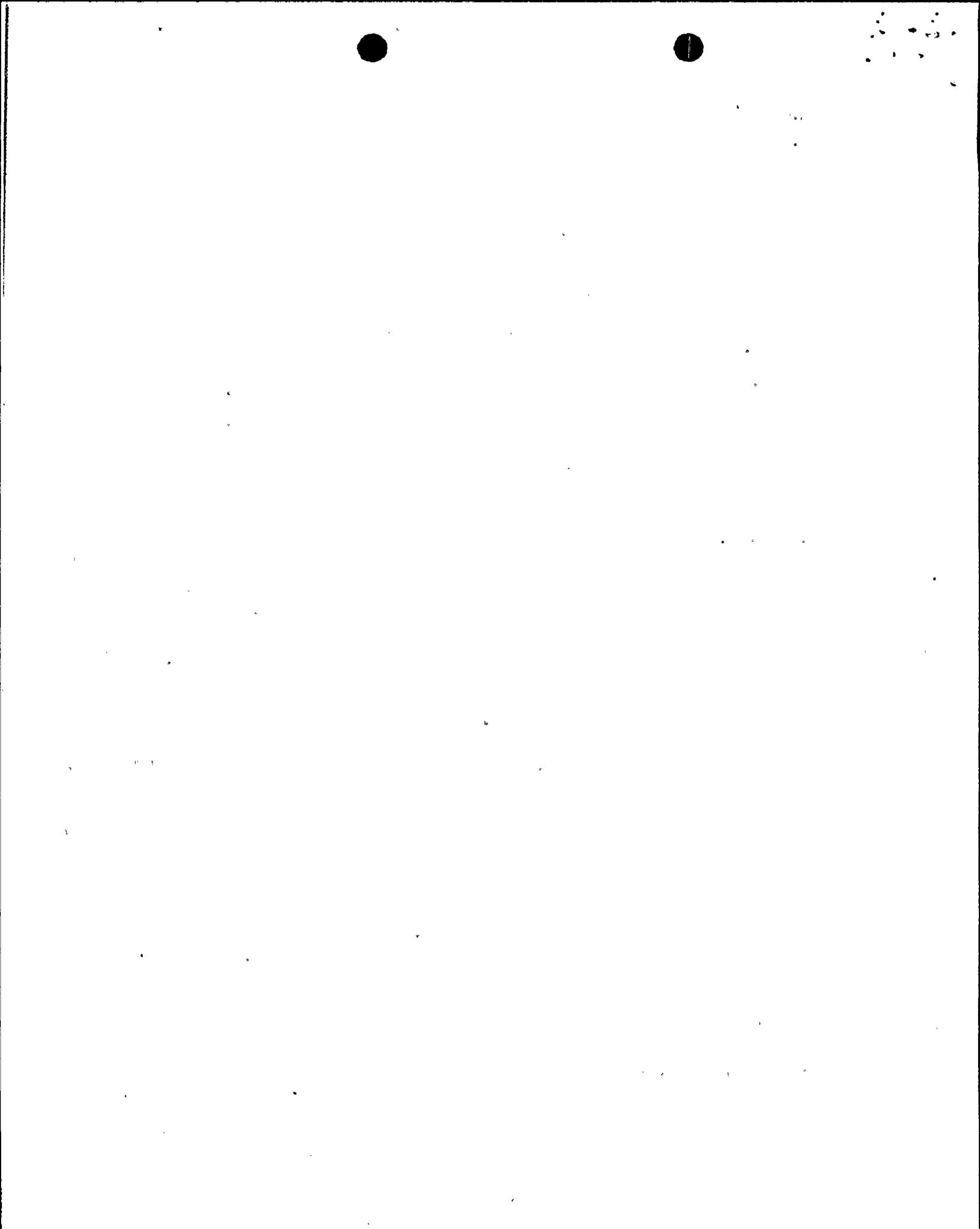
### BASES

Maintaining an operating leakage limit of 150 gpd per steam generator (600 gpd total) for Fuel Cycle 13 will minimize the potential for a large leakage event during steam line break under LOCA conditions. Based on the NDE uncertainties, bobbin coil voltage distribution and crack growth rate from the previous inspection, the expected leak rate following a steam line rupture is limited to below 120 pgm in the faulted loop and 150 gpd per steam generator in the intact loops, which will limit offsite doses to within 10 percent of the 10 CFR 100 guidelines. If the projected end of cycle distribution of crack indications results in primary-to-secondary leakage greater than 120 gpm in the faulted loop during a postulated steam line break event, additional tubes must be removed from service in order to reduce the postulated primary-to-secondary steam line break leakage to below 120 gpm.

PRESSURE BOUNDARY LEAKAGE of any magnitude is unacceptable since it may be indicative of an impending gross failure of the pressure boundary. Should PRESSURE BOUNDARY LEAKAGE occur through a component which can be isolated from the balance of the Reactor Coolant System, plant operation may continue provided the leaking component is promptly isolated from the Reactor Coolant System since isolation removes the source of potential failure.

### 3/4.4.7 CHEMISTRY

The limitations on Reactor Coolant System chemistry ensure that corrosion of the Reactor Coolant System is minimized and reduces the potential for Reactor Coolant System leakage or failure due to stress corrosion. Maintaining the chemistry within the Steady State Limits provides adequate corrosion protection to ensure the structural integrity of the Reactor Coolant System over the life of the plant. The associated effects of exceeding the oxygen, chloride, and fluoride limits are time and temperature dependent. Corrosion studies show that operation may be continued with contaminant concentration levels in excess of the Steady State Limits, up to the Transient Limits, for the specified limited time intervals without having a significant effect on the structural integrity of the Reactor Coolant System. The time interval permitting continued operation within the restrictions of the Transient Limits provides time for taking corrective actions to restore the contaminant concentrations to within the Steady State Limits.



REACTOR COOLANT SYSTEM

OPERATIONAL LEAKAGE

LIMITING CONDITION FOR OPERATION

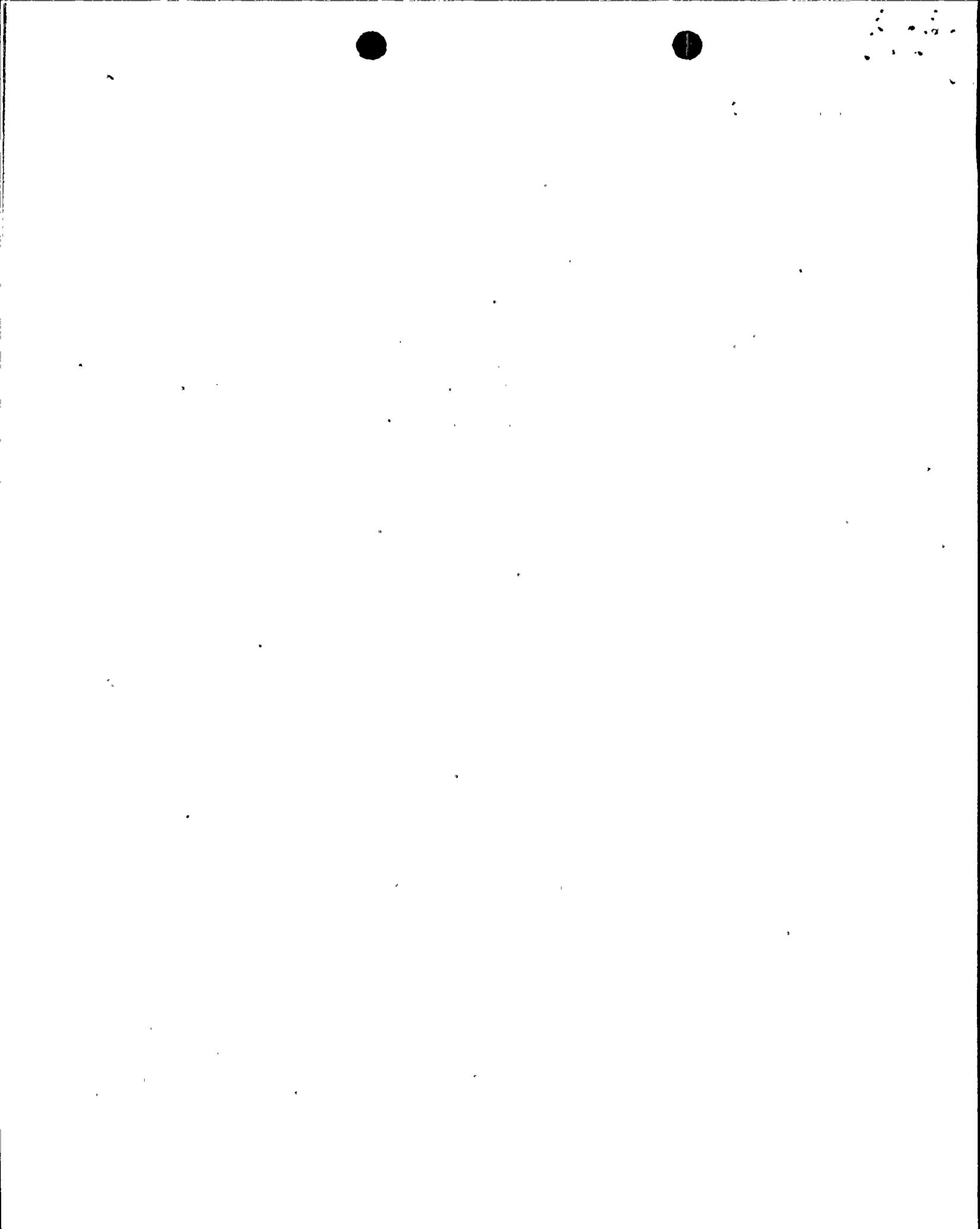
- 3.4.6.2 Reactor Coolant System leakage shall be limited to:
- a. No PRESSURE BOUNDARY LEAKAGE,
  - b. 1 GPM UNIDENTIFIED LEAKAGE,
  - c. 1 GPM total primary-to-secondary leakage through all steam generators and 500 gallons per day through any one steam generator,
  - d. 10 GPM IDENTIFIED LEAKAGE from the Reactor Coolant System, and
  - e. Seal line resistance greater than or equal to  $2.27 \text{ E-1 ft/gpm}^2$ .

APPLICABILITY: MODES 1, 2, 3 and 4\*

ACTION:

- a. With any PRESSURE BOUNDARY LEAKAGE, be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.
- b. With any Reactor Coolant System leakage greater than any one of the above limits, excluding PRESSURE BOUNDARY LEAKAGE, reduce the leakage rate to within limits within 4 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

\*Specification 3.4.6.2.e is applicable with average pressurizer pressure within 20 psi of the nominal full pressure value.



REACTOR COOLANT SYSTEM

SURVEILLANCE REQUIREMENTS

4.4.6.2.1 Reactor Coolant System leakages shall be demonstrated to be within each of the above limits by:

- a. Monitoring the containment atmosphere particulate radioactivity monitor at least once per 12 hours.
- b. Monitoring the containment sump inventory and discharge at least once per 12 hours.
- c. Determining the seal line resistance at least once per 31 days when the average pressurizer pressure is within 20 psi of its nominal full pressure value. The seal line resistance measured during the surveillance must be greater than or equal to 2.27 E-1 ft/gpm<sup>2</sup>. The seal line resistance, R<sub>SL</sub>, is determined from the following expression:

$$R_{SL} = \frac{2.31 (P_{CHP} - P_{SI})}{Q^2}$$

where: P<sub>CHP</sub> - charging pump header pressure, psig

P<sub>SI</sub> - 2262 psig (high pressure operation)

2.31 - conversion factor (12 in/ft)<sup>2</sup>/(62.3 lb/ft<sup>3</sup>)

Q - the total seal injection flow, gpm

The provisions of Specification 4.0.4 are not applicable for entry into MODES 3 and 4.

- d. Performance of a Reactor Coolant System water inventory balance at least once per 72 hours during steady state operation, and
- e. Monitoring the reactor head flange leakoff system at least once per 24 hours.



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## REACTOR COOLANT SYSTEM

### BASES

The limitation on seal line resistance ensures that the seal line resistance is greater than or equal to the resistance assumed in the minimum safeguards LOCA analysis. This analysis assumes that all of the flow that is diverted from the boron injection line to the seal injection line is unavailable for core cooling.

The total steam generator tube leakage limit of 1 GPM for all steam generators not isolated from the RCS ensures that the dosage contribution from the tube leakage will be limited to a small fraction of Part 100 limits in the event of either a steam generator tube rupture or steam line break. The 1 GPM limit is consistent with the assumptions used in the analysis of these accidents. The 500 gpd leakage limit per steam generator ensures that steam generator tube integrity is maintained in the event of a main steam line rupture or under LOCA conditions.

PRESSURE BOUNDARY LEAKAGE of any magnitude is unacceptable since it may be indicative of an impending gross failure of the pressure boundary. Should PRESSURE BOUNDARY LEAKAGE occur through a component which can be isolated from the balance of the Reactor Coolant System, plant operation may continue provided the leaking component is promptly isolated from the Reactor Coolant System since isolation removes the source of potential failure.

### 3/4.4.7 CHEMISTRY

The limitations on Reactor Coolant System chemistry ensure that corrosion of the Reactor Coolant System is minimized and reduces the potential for Reactor Coolant System leakage or failure due to stress corrosion. Maintaining the chemistry within the Steady State Limits provides adequate corrosion protection to ensure the structural integrity of the Reactor Coolant System over the life of the plant. The associated effects of exceeding the oxygen, chloride, and fluoride limits are time and temperature dependent. Corrosion studies show that operation may be continued with contaminant concentration levels in excess of the Steady State Limits, up to the Transient Limits, for the specified limited time intervals without having a significant effect on the structural integrity of the Reactor Coolant System. The time interval permitting continued operation within the restrictions of the Transient Limits provides time for taking corrective actions to restore the contaminant concentrations to within the Steady State Limits.

