

3/4.2 POWER DISTRIBUTION LIMITS

3/4.2.1 AXIAL FLUX DIFFERENCE (AFD)

LIMITING CONDITION FOR OPERATION

3.2.1 The indicated AXIAL FLUX DIFFERENCE (AFD) shall be maintained within the target band specified in the CORE OPERATING LIMITS REPORT (COLR).

APPLICABILITY: MODE 1 ABOVE 50% RATED THERMAL POWER\*.

ACTION:

- a. With the indicated AXIAL FLUX DIFFERENCE outside of the target band and with THERMAL POWER:
  1. Above 90% of RATED THERMAL POWER, within 15 minutes:
    - a) Either restore the indicated AFD to within the target band limits, or
    - b) Reduce THERMAL POWER to less than 90% of RATED THERMAL POWER.
  2. Between 50% and 90% of RATED THERMAL POWER:
    - a) POWER OPERATION may continue provided:
      - 1) The indicated AFD has not been outside of the target band for more than 1 hour penalty deviation cumulative during the previous 24 hours, and
      - 2) The indicated AFD is within the acceptable operation limits specified in the COLR. Otherwise, reduce THERMAL POWER to less than 50% of RATED THERMAL POWER within 30 minutes and reduce the Power Range Neutron Flux-High Trip Setpoints to  $\leq 55\%$  of RATED THERMAL POWER within the next 4 hours.
    - b) Surveillance testing of the Power Range Neutron Flux Channels may be performed pursuant to Specification 4.3.1.1.1 provided the indicated AFD is maintained within the limits. A total of 16 hours operation may be accumulated with the AFD outside of the target band during this testing without penalty deviation.

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\* See Special Test Exception 3.10.2

SURVEILLANCE REQUIREMENTS (Continued)

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- c. At least once per 18 months during shutdown, by:
  - 1. Cycling each power operated (excluding automatic) valve in the flow path that is not testable during plant operation, through at least one complete cycle of full travel.
  - 2. Verifying that each automatic valve in the flow path actuates to its correct position on a test signal.
  - 3. Verifying that each spray pump starts automatically on a test signal.
  
- d. At least once per 10 years by performing an air or smoke flow test through each spray header and verifying each spray nozzle is unobstructed.

SURVEILLANCE REQUIREMENTS (Continued)

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- d. Verify, at the frequency specified in the Inservice Testing Program, that each recirculation spray pump's developed head at the flow test point is greater than or equal to the required developed head as specified in the Inservice Testing Program and the Containment Integrity Safety Analysis.
- e. At least once per 18 months during shutdown, by:
  - 1. Cycling each power operated (excluding automatic) valve in the flow path not testable during plant operation, through at least one complete cycle of full travel.
  - 2. Verifying that each automatic valve in the flow path actuates to its correct position on a test signal.
  - 3. Initiating flow through each River Water subsystem and its two associated recirculation spray heat exchangers, and verifying a flow rate of at least 8000 gpm.
- f. At least once per 10 years by performing an air or smoke flow test through each spray header and verifying each spray nozzle is unobstructed.

BASES

3/4.6.2.1 and 3/4.6.2.2 CONTAINMENT QUENCH AND RECIRCULATION SPRAY SYSTEMS (Continued)

Verifying that each recirculation spray system pump's developed head at the flow test point is greater than or equal to the required developed head ensures that recirculation spray system pump performance has not degraded during the cycle. The term "required developed head" refers to the value that is assumed in the Containment Integrity Safety Analysis for the recirculation spray pump's developed head at a specific flow point. This value for the required developed head at a flow point is defined as the MOP in the IST Program. The verification that the pump's developed head at the flow test point is greater than or equal to the required developed head is performed by using a MOP curve. The MOP curve is contained in the IST Program and was developed using the required developed head at a specific flow point as a reference point. From the reference point, a curve was drawn which is a constant percentage below the current pump performance curve. Based on the MOP curve, a verification is performed to ensure that the pump's developed head at the flow test point is greater than or equal to the required developed head. Flow and differential head are normal test parameters of centrifugal pump performance required by Section XI of the ASME Code. Since the recirculation spray system pumps cannot be tested with flow through the spray headers, they are tested on bypass flow. This test confirms one point on the pump design curve and is indicative of overall performance. Such inservice tests confirm component OPERABILITY, trend performance, and detect incipient failures by indicating abnormal performance.

The ten year surveillance interval for performing an air or smoke flow test through each spray header is considered adequate for detecting obstruction of the nozzles due to the passive design of the spray header and the header's components being constructed with stainless steel.

3/4.6.2.3 CHEMICAL ADDITION SYSTEM

The OPERABILITY of the chemical addition system ensures that sufficient NaOH is added to the containment spray in the event of a LOCA. The limits on NaOH minimum volume and concentration, ensure that 1) the iodine removal efficiency of the spray water is maintained because of the increase in pH value, and 2) corrosion effects on components within containment are minimized. These assumptions are consistent with the iodine removal efficiency assumed in the accident analyses.

3/4.2 POWER DISTRIBUTION LIMITS

3/4.2.1 AXIAL FLUX DIFFERENCE (AFD)

LIMITING CONDITION FOR OPERATION

3.2.1 The indicated AXIAL FLUX DIFFERENCE (AFD) shall be maintained within the target band specified in the CORE OPERATING LIMITS REPORT (COLR).

APPLICABILITY: MODE 1 above 50 Percent RATED THERMAL POWER\*.

ACTION:

- a. With the indicated AXIAL FLUX DIFFERENCE outside of the target band and with THERMAL POWER:
  1. Above 90 percent of RATED THERMAL POWER, within 15 minutes:
    - a) Either restore the indicated AFD to within the target band limits, or
    - b) Reduce THERMAL POWER to less than 90 percent of RATED THERMAL POWER.
  2. Between 50 percent and 90 percent of RATED THERMAL POWER:
    - a) POWER OPERATION may continue provided:
      - 1) The indicated AFD has not been outside of the target band for more than 1 hour penalty deviation cumulative during the previous 24 hours, and
      - 2) The indicated AFD is within the acceptable operation limits specified in the COLR. Otherwise, reduce THERMAL POWER to less than 50 percent of RATED THERMAL POWER within 30 minutes and reduce the Power Range Neutron Flux-High Trip Setpoints to  $\leq 55$  percent of RATED THERMAL POWER within the next 4 hours.
    - b) Surveillance testing of the Power Range Neutron Flux Channels may be performed pursuant to Specification 4.3.1.1.1 provided the indicated AFD is maintained within the limits. A total of 16 hours operation may be accumulated with the AFD outside of the target band during this testing without penalty deviation.

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\*See Special Test Exception 3.10.2

SURVEILLANCE REQUIREMENTS (Continued)

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2. Verifying that each automatic valve in the flow path actuates to its correct position on a test signal.
3. Verifying that each spray pump starts automatically on a test signal.
- d. At least once per 10 years by performing an air or smoke flow test through each spray header and verifying each spray nozzle is unobstructed.

SURVEILLANCE REQUIREMENTS (Continued)

- d. Verify, at the frequency specified in the Inservice Testing Program, that each recirculation spray pump's developed head at the flow test point is greater than or equal to the required developed head as specified in the Inservice Testing Program and the Containment Integrity Safety Analysis.
- e. At least once per 18 months during shutdown, by:
  - 1. Cycling each power operated (excluding automatic) valve in the flow path not testable during plant operation, through at least one complete cycle of full travel.
  - 2. Verifying that each automatic valve in the flow path actuates to its correct position on a test signal.
  - 3. Initiating flow through each Service Water subsystem and its two associated recirculation spray heat exchangers, and verifying a flow rate of at least 11,000 gpm.
- f. At least once per 10 years by performing an air or smoke flow test through each spray header and verifying each spray nozzle is unobstructed.

BASES

3/4.6.2.1 and 3/4.6.2.2 CONTAINMENT QUENCH AND RECIRCULATION SPRAY SYSTEMS (Continued)

on bypass flow. This test confirms one point on the pump design curve and is indicative of overall performance. Such inservice tests confirm component OPERABILITY, trend performance, and detect incipient failures by indicating abnormal performance.

Verifying that each recirculation spray system pump's developed head at the flow test point is greater than or equal to the required developed head ensures that recirculation spray system pump performance has not degraded during the cycle. The term "required developed head" refers to the value that is assumed in the Containment Integrity Safety Analysis for the recirculation spray pump's developed head at a specific flow point. This value for the required developed head at a flow point is defined as the MOP in the IST Program. The verification that the pump's developed head at the flow test point is greater than or equal to the required developed head is performed by using a MOP curve. The MOP curve is contained in the IST Program and was developed using the required developed head at a specific flow point as a reference point. From the reference point, a curve was drawn which is a constant percentage below the current pump performance curve. Based on the MOP curve, a verification is performed to ensure that the pump's developed head at the flow test point is greater than or equal to the required developed head. Flow and differential head are normal test parameters of centrifugal pump performance required by Section XI of the ASME Code. Since the recirculation spray system pumps cannot be tested with flow through the spray headers, they are tested on bypass flow. This test confirms one point on the pump design curve and is indicative of overall performance. Such inservice tests confirm component OPERABILITY, trend performance, and detect incipient failures by indicating abnormal performance.

The ten year surveillance interval for performing an air or smoke flow test through each spray header is considered adequate for detecting obstruction of the nozzles due to the passive design of the spray header and the header's components being constructed with stainless steel.

3/4.6.2.3 CHEMICAL ADDITION SYSTEM

The OPERABILITY of the chemical addition system ensures that sufficient NaOH is added to the containment spray in the event of a LOCA. The limits on NaOH minimum volume and concentration, ensure that 1) the iodine removal efficiency of the spray water is maintained because of the increase in pH value, and 2) corrosion effects on components within containment are minimized. These assumptions are consistent with the iodine removal efficiency assumed in the accident analyses.