Attachment B to BECo 90-48

## Amended Technical Specification Pages

The proposed change amends the PNPS Technical Specifications with the attached pages as follows:

| Remove Page | Insert Page |
|---|---|
| 7 | 7 |
| 8 | 8 |
| 8a | 8a |
| 26 | 26 |
| 54 | 54 |
| 55a | 55a |
| 71 | 71 |

D. Whenever the reactor is in the cold shutdown condition with irradiated fuel in the reactor vessel, the water level shall not be less than 12 in. above the top of the normal active fuel zone.

In the event of operation with a maximum fraction of limiting power density (MFLPD) greater than the fraction of rated power (FRP), the setting shall be modified as follows:

$$S \leq (0.58W + 62\%) \left[\frac{FRP}{MFLPD}\right] \text{ 2 Loop}$$

Where,

FRP = fraction of rated thermal power (1998 MWt)

MFLPD = maximum fraction of limiting power density where the limiting power density is 13.4 KW/ft for all fuel.

The ratio of FRP to MFLPD shall be set equal to 1.0 unless the actual operating value is less than the design value of 1.0, in which case the actual operating value will be used.

For no combination of loop recirculation flow rate and core thermal power shall the APRM flux scram trip setting be allowed to exceed 120% of rated thermal power.

b. APRM Flux Scram Trip Setting (Refuel or Start and Hot Standby Mode)

When the reactor mode switch is in the REFUEL or STARTUP position, the APRM scram shall be set at less than or equal to 15% of rated power.

c. IRM

The IRM flux scram setting shall be ≤120/125 of scale.

B. APRM Rod Block Trip Setting

1. ARM Rod Block Trip Setting (Run Mode)

When the mode switch is in the run position, the APRM rod block trip setting shall be:

$S_{RB} \leq 0.58W + 50\%$ 2 Loop

Where,

$S_{RB}$ = Rod block setting in percent of rated thermal power (1998 MWt)

W = Percent of drive flow required to produce a rated core flow of 69 Mlb/hr.

In the event of operating with a maximum fraction limiting power density (MFLPD) greater than the fraction of rated power (FRP), the setting shall be modified as follows:

$$S \leq (0.58W + 50\%) \left[\frac{FRP}{MFLPD}\right] \quad \text{2 Loop}$$

Where,

FRP = fraction of rated thermal power

MFLPD = maximum fraction of limiting power density where the limiting power density is 13.4 KW/ft for all fuel.

The ratio of FRP to MFLPD shall be set equal to 1.0 unless the actual operating value is less than the design value of 1.0, in which case the actual operating value will be used.

2. APRM Rod Block Trip Setting (Refuel and Startup Modes)

When the reactor mode switch is in the refuel or startup positions, the APRM rod block trip setting shall be set at less than or equal to 13% of rated power, but always less than the APRM flux scram trip setting in Specification 2.1.A.1.b.

C. Reactor low water level scram setting shall be ≥ 9 in. on level instruments.

D. Turbine stop valve closure scram settings shall be ≤ 10 percent valve closure.

E. Turbine control valve fast closure setting shall be ≥ 150 psig control oil pressure at acceleration relay.

F. Condenser low vacuum scram setting shall be ≥ 23 in. Hg. vacuum.

G. Main steam isolation scram setting shall be ≤ 10 percent valve closure.

H. Main steam isolation on main steam line low pressure at inlet to turbine valves. Pressure setting shall be ≥ 880 psig.

I. Reactor low-low water level initiation of CSCS systems setting shall be at or above -49 in. indicated level.

| 3.1 LIMITING CONDITION FOR OPERATION | 4.1 SURVEILLANCE REQUIREMENTS |
|---|---|
| 3.1 REACTOR PROTECTION SYSTEM | REACTOR PROTECTION SYSTEM |
| Applicability: | Applicability: |
| Applies to the instrumentation and associated devices which initiate a reactor scram. | Applies to the surveillance of the instrumentation and associated devices which initiate reactor scram. |
| Objective: | Objective: |
| To assure the operability of the reactor protection system. | To specify the type and frequency of surveillance to be applied to the protection instrumentation. |
| Specification: | Specification: |
| A. The setpoints, minimum number of trip systems, and minimum number of instrument channels that must be operable for each position of the reactor mode switch shall be as given in Table 3.1.1. The system response times from the opening of the sensor contact up to and including the opening of the trip actuator contacts shall not exceed 50 milli-seconds. | A. Instrumentation systems shall be functionally tested and calibrated as indicated in Tables 4.1.1 and 4.1.2 respectively. |
| B. The maximum fraction of limiting power density (MFLPD) shall be less than or equal to the fraction of rated power (FRP) when thermal power is greater than or equal to 25% of rated thermal power. | B. Verify the maximum fraction of limiting power density is less than or equal to the fraction of rated power once within 12 hours after thermal power is greater than or equal to 25% of rated thermal power and every 24 hours thereafter. |
| C. If MFLPD is greater than FRP, adjust the APRM high flux setpoints to the relationships given in Specification 2.1.A.1.a and 2.1.B.1 within 6 hours. | |
| D. If the required actions and associated completion times of Specification 3.1.C cannot be met, reduce thermal power to less than 25% of rated thermal power within 4 hours. | |

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TABLE 3.2.C-1

INSTRUMENTATION THAT INITIATES CONTROL ROD BLOCKS

| Trip Function | Minimum Operable Channels per Trip Function | Required Operational Conditions | Action |
|---|---|---|---|
| APRM Upscale (Flow Biased) | 4 | Run | (1) |
| APRM Upscale (Setdown) | 4 | Startup/Refuel | (1) |
| APRM Inoperative | 4 | Run/Starup/Refuel | (1) |
| APRM Downscale | 4 | Run | (1) |
| Rod Block Monitor (Flow Biased) | 2 | Run, except trip is bypassed when reactor power is $\leq$ 30% | (1) (2) |
| Rod Block Monitor Inoperative | 2 | Run, except trip is bypassed when reactor power is $\leq$ 30% | (1) (2) |
| Rod Block Monitor Downscale | 2 | Run, except trip is bypassed when reactor power is $\leq$ 30% | (1) (2) |
| IRM Downscale | 6 | Startup/Refuel, except trip is bypassed when IRM is on its lowest range | (1) |
| IRM Detector not in Startup Position | 6 | Startup/Refuel, trip is bypassed when mode switch is placed in Run | (1) |
| IRM Upscale | 6 | Startup/Refuel | (1) |
| IRM Inoperative | 6 | Startup/Refuel | (1) |
| SRM Detector not in Startup Position | 3 | Startup/Refuel, except trip is bypassed when SRM count rate is $\geq$ 100 counts/ second or IRMs on Range 3 or above. (4) | (1) |
| SRM Downscale | 3 | Startup/Refuel, except trip is bypassed when IRMs on Range 3 or above. (4) | (1) |
| SRM Upscale | 3 | Startup/Refuel, except trip is bypassed when the IRM range switches are on Range 8 or above. (4) | (1) |
| SRM Inoperative | 3 | Startup/Refuel, except trip is bypassed when the IRM range switches are on Range 8 or above. (4) | (1) |
| Scram Discharge Instrument Volume Water Level - High | 2 | Run/Startup/Refuel | (3) |
| Scram Discharge Instrument Volume - Scram Trip Bypassed | 1 | Run/Startup/Refuel | (3) |
| Recirculation Flow Converter - Upscale | 2 | Run | (1) |
| Recirculation Flow Converter - Inoperative | 2 | Run | (1) |
| Recirculation Flow Converter - Comparator Mismatch | 2 | Run | (1) |

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TABLE 3.2.C-2
CONTROL ROD BLOCK INSTRUMENTATION SETPOINTS

| Trip Function | Trip Setpoint |
|---|---|
| APRM Upscale | See Specification 2.1.B |
| APRM Inoperative | Not Applicable |
| APRM Downscale | $\geq$ 2.5 Indicated on Scale |
| Rod Block Monitor (Flow Biased) | $\leq (0.65\ W + 42\%) \left[\frac{FRP}{MFLPD}\right]$ (1) |
| Rod Block Monitor Inoperative | Not Applicable |
| Rod Block Monitor Downscale | $\geq$ 5/125 of Full Scale |
| IRM Downscale | $\geq$ 5/125 of Full Scale |
| IRM Detector not in Startup Position | Not Applicable |
| IRM Upscale | $\leq$ 108/125 of Full Scale |
| IRM Inoperative | Not Applicable |
| SRM Detector not in Startup Position | Not Applicable |
| SRM Downscale | $\geq$ 3 counts/second |
| SRM Upscale | $\leq 10^5$ counts/second |
| SRM Inoperative | Not Applicable |
| Scram Discharge Instrument Volume Water Level - High | $\leq$ 18 gallons |
| Scram Discharge Instrument Volume - Scram Trip Bypassed | Not Applicable |
| Recirculation Flow Converter - Upscale | $\leq$ 120/125 of Full Scale |
| Recirculation Flow Converter - Inoperative | Not Applicable |
| Recirculation Flow Converter - Comparator Mismatch | $\leq$ 10% Flow Deviation for > 80% Rated Power, and<br>$\leq$ 15% Flow Deviation for $\leq$ 80% Rated Power |

(1) W is the percent of drive flow required to produce a rated core flow of 69 Mlb/hr. Trip level setting is in percent of design power (1998 MWt). For flows of 100% or greater, the rod block monitor maximum trip level setting shall be 107% power.

Amendment No. 42, 110,

3.2 BASES (Cont'd)

The control rod block functions are provided to prevent excessive control rod withdrawal so that MCPR does not decrease to the Safety Limit MCPR. The trip logic for this function is 1 out of n: e.g., any trip on one of six APRM's, eight IRM's, or four SRM's will result in a rod block.

The minimum instrument channel requirements assure sufficient instrumentation to assure the single failure criteria is met. The minimum instrument channel requirements for the RBM may be reduced by one for maintenance, testing, or calibration. This time period is only 3% of the operating time in a month and does not significantly increase the risk of preventing an inadvertent control rod withdrawal.

The APRM rod block function is flow biased in the run mode and prevents a significant reduction in MCPR, especially during operation at reduced flow. In the startup and refuel modes, the APRM rod block function is setdown below the APRM flux scram trip, as specified in Specification 2.1.B.2. The APRM provides gross core protection; i.e., limits the gross core power increase from withdrawal of control rods in the normal withdrawal sequence. The trips are set so that MCPR is maintained greater than the Safety Limit MCPR.

The RBM rod block function provides local protection of the core, for a single rod withdrawal error from a limiting control rod pattern.

The IRM rod block function provides local as well as gross core protection. The scaling arrangement is such that trip setting is less than a factor of 10 above the indicated level.

A downscale indication on an APRM or IRM is an indication the instrument has failed or the instrument is not sensitive enough. In either case the instrument will not respond to changes in control rod motion and thus, control rod motion is prevented. The downscale trips are as shown in Table 3.2.C.

The flow comparator and scram discharge volume high level components have only one logic channel and are not required for safety.

The refueling interlocks also operate one logic channel, and are required for safety only when the mode switch is in the refueling position.

For effective emergency core cooling for small pipe breaks, the HPCI system must function since reactor pressure does not decrease rapidly enough to allow either core spray or LPCI to operate in time. The automatic pressure relief function is provided as a backup to the

Marked-up Pages from Current Technical Specifications

D. Whenever the reactor is in the cold shutdown condition with irradiated fuel in the reactor vessel, the water level shall not be less than 12 in. above the top of the normal active fuel zone.

In the event of operation with a maximum fraction of limiting power density (MFLPD) greater than the fraction of rated power (FRP), the setting shall be modified as follows:

$$S \leq (0.58W + 62\%) \left[\frac{FRP}{MFLPD}\right] \text{ 2 Loop}$$

Where,

FRP = fraction of rated thermal power (1998 MWt)

MFLPD = maximum fraction of limiting power density where the limiting power density is 13.4 KW/ft for all fuel.

The ratio of FRP to MFLPD shall be set equal to 1.0 unless the actual operating value is less than the design value of 1.0, in which case the actual operating value will be used.

For no combination of loop recirculation flow rate and core thermal power shall the APRM flux scram trip setting be allowed to exceed 120% of rated thermal power.

b. APRM Flux Scram Trip Setting (Refuel or Start and Hot Standby Mode)

When the reactor mode switch is in the REFUEL or STARTUP position, the APRM scram shall be set at less than or equal to 15% of rated power.

c. IRM

The IRM flux scram setting shall be ≤120/125 of scale.

When the mode switch is in the run position,

B. APRM Rod Block Trip Setting

1. APRM Rod Block Trip Setting (Run Mode)

The APRM rod block trip setting shall be:

$$S_{RB} \leq 0.58W + 50\% \text{ 2 Loop}$$

Amendment No. 15, 42, 72, 105,
~~Revision 108~~

2. APRM Rod Block Trip Setting (Refuel and Startup Modes)

When the reactor mode switch is in the refuel or startup positions, the APRM rod block trip setting shall be set at less than or equal to 13% of rated power, but always less than the APRM flux scram trip setting in Specification 2.1.A.1.b.

Where,

$S_{RB}$ = Rod block setting in percent of rated thermal power (1998 MWt)

W = Percent of drive flow required to produce a rated core flow of 69 Mlb/hr.

In the event of operating with a maximum fraction limiting power density (MFLPD) greater than the fraction of rated power (FRP), the setting shall be modified as follows:

$$S \leq (0.58W + 50\%) \left[\frac{FRP}{MFLPD}\right] \text{ 2 Loop}$$

Where,

FRP = fraction of rated thermal power

MFLPD = maximum fraction of limiting power density where the limiting power density is 13.4 KW/ft for all fuel.

The ratio of FRP to MFLPD shall be set equal to 1.0 unless the actual operating value is less than the design value of 1.0, in which case the actual operating value will be used.

C. Reactor low water level scram setting shall be ≥ 9 in. on level instruments.

D. Turbine stop valve closure scram settings shall be ≤ 10 percent valve closure.

E. Turbine control valve fast closure setting shall be ≥ 150 psig control oil pressure at acceleration relay.

F. Condenser low vacuum scram setting shall be ≥ 23 in. Hg. vacuum.

G. Main steam isolation scram setting shall be ≤ 10 percent valve closure.

Amendment No. 17, 42, 77, 107, ~~Revision 108~~

H. Main steam isolation on main steam line low pressure at inlet to turbine valves. Pressure setting shall be ≥ 800 psig.

I. Reactor low-low water level initiation of CSCS systems setting shall be at or above -49 in. indicated level.

no changes to this page, except relocation of material from Page 8

| 3.1 LIMITING CONDITION FOR OPERATION | 4.1 SURVEILLANCE REQUIREMENTS |
|---|---|
| 3.1 REACTOR PROTECTION SYSTEM | REACTOR PROTECTION SYSTEM |
| **Applicability:** | **Applicability:** |
| Applies to the instrumentation and associated devices which initiate a reactor scram. | Applies to the surveillance of the instrumentation and associated devices which initiate reactor scram. |
| **Objective:** | **Objective:** |
| To assure the operability of the reactor protection system. | To specify the type and frequency of surveillance to be applied to the protection instrumentation. |
| **Specification:** | **Specification:** |
| A. The setpoints, minimum number of trip systems, and minimum number of instrument channels that must be operable for each position of the reactor mode switch shall be as given in Table 3.1.1. The system response times from the opening of the sensor contact up to and including the opening of the trip actuator contacts shall not exceed 50 milli-seconds. | A. Instrumentation systems shall be functionally tested and calibrated as indicated in Tables 4.1.1 and 4.1.2 respectively.<br>B. Daily during reactor power operation, the maximum fraction of limiting power density shall be checked and the scram and APRM Rod Block settings given by equations in Specification 2.1.A.1 and 2.1.B shall be calculated if maximum fraction of limiting power density exceeds the fraction of rated power. |

← Insert (A) here

Verify the maximum fraction of limiting power density is less than or equal to the fraction of rated power once within 12 hours after thermal power is greater than or equal to 25% of rated thermal power and every 24 hours thereafter.

Insert (A)

B. The maximum fraction of limiting power density (MFLPD) shall be less than or equal to the fraction of rated power (FRP) when thermal power is greater than or equal to 25% of rated thermal power.

C. If MFLPD is greater than FRP, adjust the APRM high flux setpoints to the relationships given in Specifications 2.1.A.1.a and 2.1.B.1 within 6 hours.

D. If the required actions and associated completion times of Specification 3.1.C cannot be met, reduce thermal power to less than 25% of rated thermal power within 4 hours.

PNPS TABLE 3.2.C-1

INSTRUMENTATION THAT INITIATES CONTROL ROD BLOCKS

| Trip Function | Minimum Operable Channels per Trip Function | Required Operational Conditions | Action |
|---|---|---|---|
| APRM Upscale (Flow Biased) | 4 | ~~Run/Startup/Refuel~~ Startup/Refuel | (1) |
| APRM Upscale (Setdown) | 4 | Startup/Refuel | (1) |
| APRM Inoperative | 4 | Run/Startup/Refuel | (1) |
| APRM Downscale | 4 | Run | (1) |
| Rod Block Monitor (Flow Biased) | 2 | Run, except trip is bypassed when reactor power is ≤ 30% | (1) (2) |
| Rod Block Monitor Inoperative | 2 | Run, except trip is bypassed when reactor power is ≤ 30% | (1) (2) |
| Rod Block Monitor Downscale | 2 | Run, except trip is bypassed when reactor power is ≤ 30% | (1) (2) |
| IRM Downscale | 6 | Startup/Refuel, except trip is bypassed when IRM is on its lowest range | (1) |
| IRM Detector not in Startup Position | 6 | Startup/Refuel, trip is bypassed when mode switch is placed in Run | (1) |
| IRM Upscale | 6 | Startup/Refuel | (1) |
| IRM Inoperative | 6 | Startup/Refuel | (1) |
| SRM Detector not in Startup Position | 3 | Startup/Refuel, except trip is bypassed when SRM count rate is ≥ 100 counts/second or IRMs on Range 3 or above (4) | (1) |
| SRM Downscale | 3 | Startup/Refuel, except trip is bypassed when IRMs on Range 3 or above (4) | (1) |
| SRM Upscale | 3 | Startup/Refuel, except trip is bypassed when the IRM range switches are on Range 8 or above (4) | (1) |
| SRM Inoperative | 3 | Startup/Refuel, except trip is bypassed when the IRM range switches are on Range 8 or above (4) | (1) |
| Scram Discharge Instrument Volume Water Level - High | 2 | Run/Startup/Refuel | (3) |
| Scram Discharge Instrument Volume - Scram Trip Bypassed | 1 | Run/Startup/Refuel | (3) |
| Recirculation Flow Converter - Upscale | 2 | Run | (1) |
| Recirculation Flow Converter - Inoperative | 2 | Run | (1) |
| Recirculation Flow Converter - Comparator Mismatch | 2 | Run | (1) |

~~Revision 113~~ P

Amendment No. 15, 21, 42, 45, 72, 78, 104,

PNPS
TABLE 3.2.C-2
CONTROL ROD BLOCK INSTRUMENTATION SETPOINTS

See Specification 2.1.B

| Trip Function | Trip Setpoint |
|---|---|
| APRM Upscale ~~(Flow Biased)~~ | ~~≤ (0.58 W + 50%) [FRP / MFLPD] (1)~~ |
| APRM Inoperative | Not Applicable |
| APRM Downscale | ≥ 2.5 Indicated on Scale |
| Rod Block Monitor (Flow Biased) | ≤ (0.65 W + 42%) [FRP / MFLPD] (1) |
| Rod Block Monitor Inoperative | Not Applicable |
| Rod Block Monitor Downscale | ≥ 5/125 of Full Scale |
| IRM Downscale | ≥ 5/125 of Full Scale |
| IRM Detector not in Startup Position | Not Applicable |
| IRM Upscale | ≤ 108/125 of Full Scale |
| IRM Inoperative | Not Applicable |
| SRM Detector not in Startup Position | Not Applicable |
| SRM Downscale | ≥ 3 counts/second |
| SRM Upscale | ≤ $10^5$ counts/second |
| SRM Inoperative | Not Applicable |
| Scram Discharge Instrument Volume Water Level - High | ≤ 18 gallons |
| Scram Discharge Instrument Volume - Scram Trip Bypassed | Not Applicable |
| Recirculation Flow Converter - Upscale | ≤ 120/125 of Full Scale |
| Recirculation Flow Converter - Inoperative | Not Applicable |
| Recirculation Flow Converter - Comparator Mismatch | ≤ 10% Flow Deviation for > 80% Rated Power, and ≤ 15% Flow Deviation for ≤ 80% Rated Power |

(1) W is the percent of drive flow required to produce a rated core flow of 69 Mlb/hr. Trip level setting is in percent of design power (1998 MWt). For flows of 100% or greater, the rod block monitor maximum trip level setting shall be 107% power.

~~Revision 113~~
Amendment No. 47, 110,

3.2 BASES (Cont'd)

The control rod block functions are provided to prevent excessive control rod withdrawal so that MCPR does not decrease to the Safety Limit MCPR. The trip logic for this function is 1 out of n: e.g., any trip on one of six APRM's, eight IRM's, or four SRM's will result in a rod block.

The minimum instrument channel requirements assure sufficient instrumentation to assure the single failure criteria is met. The minimum instrument channel requirements for the RBM may be reduced by one for maintenance, testing, or calibration. This time period is only 3% of the operating time in a month and does not significantly increase the risk of preventing an inadvertent control rod withdrawal.

The APRM rod block function is flow biased in the run mode and prevents a significant reduction in MCPR, especially during operation at reduced flow. The APRM provides gross core protection; i.e., limits the gross core power increase from withdrawal of control rods in the normal withdrawal sequence. The trips are set so that MCPR is maintained greater than the Safety Limit MCPR.

The RBM rod block function provides local protection of the core, for a single rod withdrawal error from a limiting control rod pattern.

The IRM rod block function provides local as well as gross core protection. The scaling arrangement is such that trip setting is less than a factor of 10 above the indicated level.

A downscale indication on an APRM or IRM is an indication the instrument has failed or the instrument is not sensitive enough. In either case the instrument will not respond to changes in control rod motion and thus, control rod motion is prevented. The downscale trips are as shown in Table 3.2.C-2.

The flow comparator and scram discharge volume high level components have only one logic channel and are not required for safety.

The refueling interlocks also operate one logic channel, and are required for safety only when the mode switch is in the refueling position.

For effective emergency core cooling for small pipe breaks, the HPCI system must function since reactor pressure does not decrease rapidly enough to allow either core spray or LPCI to operate in time. The automatic pressure relief function is provided as a backup to the

In the startup and refuel modes, the APRM rod block function is setdown below the APRM flux scram trip, as specified in Specification 2.1.B.2.

~~Amendment No. 15, 42, 110,~~
~~Revision 113~~