ATTACHMENT I TO IPN-91-044

PROPOSED TECHNICAL SPECIFICATION CHANGES

RELATED TO

REFUELING WATER STORAGE TANK

BORON CONCENTRATION AND RELATED

TECHNICAL SPECIFICATIONS

NEW YORK POWER AUTHORITY
INDIAN POINT 3 NUCLEAR POWER PLANT
DOCKET NO. 50-286
DPR-64

3.2 CHEMICAL AND VOLUME CONTROL SYSTEM

Applicability

Applies to the operational status of the Chemical and Volume Control System.

Objective

To define those conditions of the Chemical and Volume Control System necessary to ensure safe reactor operation.

Specification

A. When fuel is in the reactor there shall be at least one flow path to the core for boric acid injection.

B. The reactor shall not be brought above the cold shutdown condition unless the following requirements are met:

1. Two charging pumps shall be operable.

2. Two boric acid transfer pumps shall be operable one of which shall be operating to recirculate the contents of the Boron Injection Tank.

3. The boric acid storage system shall contain a minimum of 6100 gallons of 11 1/2% to 13% by weight (20,112 ppm to 22,735 ppm of boron) boric acid solution at a temperature of at least 145°F.

4. System piping and valves shall be operable to the extent of establishing one flow path from the boric acid storage system and one flow path from the refueling water storage tank (RWST) to the Reactor Coolant System and a recirculation flow path between the boric acid storage system and the Boron Injection Tank.

5. The appropriate boric acid storage tank level indicator(s) and the Boron Injection Tank recirculation flow indicator shall be operating.

6. Two channels of heat tracing shall be operable for the flow path from the boric acid storage system to the Reactor Coolant System.

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Continuous recirculation between the boric acid storage system and the boron injection tank, and operability of the heat tracing circuit of the recirculation line insures that a flow path exists from the boric acid storage system to the boron injection tank.

A combined minimum deliverable volume of 6100 gallons with an averaged concentration of the 11 1/2% to 13% by weight (20,112 ppm to 22,735 ppm of boron) of boric acid are required to meet cold shutdown conditions. An upper concentration limit of 13% (22,735 ppm of boron) boric acid in the boric acid storage system is specified to maintain solution solubility at the specified low temperature limit of 145°F. One channel of heat tracing is sufficient to maintain the specified low temperature limit. The second channel of heat tracing provides backup for continuous plant operation when one channel is inoperable. Should both channels of heat tracing become inoperable, the reactor will be shutdown and can easily be borated before the line temperature is reduced near the boric acid precipitive temperature.

The city water system is used as a source of water for emergency cooling of the charging pumps and as a source of flush water to remove concentrated boric acid from the piping between the outlet of the boric acid storage tanks and the inlet to the charging pumps in the unlikely event of a complete loss of electrical power and/or a complete loss of service water resulting from turbine missiles.

References

1) FSAR - Section 9.2
2) FSAR - Section 6.2

3.3 ENGINEERED SAFETY FEATURES

Applicability

Applies to the operating status of the Engineered Safety Features.

Objective

To define those limiting conditions for operating that are necessary: 1) to remove decay heat from the core in emergency or normal shutdown situations; 2) to remove heat from containment in normal operating and emergency situations; 3) to remove airborne iodine from the containment atmosphere following a Design Basis Accident; 4) to minimize containment leakage to the environment subsequent to a Design Basis Accident; 5) to minimize the potential for and consequences of Reactor Coolant System pressure transients.

Specification

The following specifications apply except during low temperature physics tests.

A. Safety Injection and Residual Heat Removal Systems

1. The reactor coolant system T_{avg} shall not exceed 200°F unless the following requirements are met:

   a. The refueling water storage tank contains a minimum of 346,870 gallons of water at a boron concentration $\geq$2400 ppm and $\leq$2600 ppm.

   b. One refueling water storage tank low level alarm operable and set to alarm between 98,100 gallons and 100,850 gallons of water in the tank.

c. One residual heat removal pump and heat exchanger together with the associated piping and valves operable.

d. One recirculation pump together with its associated piping and valves operable.

2. If the Safety Injection and Residual Heat Removal Systems are not restored to meet the requirements of 3.3.A.1 within 1 hour the reactor shall be in the cold shutdown condition within the next 20 hours.

3. The reactor coolant system T_{avg} shall not exceed 350°F unless the following requirements are met:

a. The refueling water storage tank contains a minimum of 346,870 gallons of water at a boron concentration $\geq$2400 ppm and $\leq$2600 ppm.

b. The boron injection tank contains 900 gallons of a boric acid solution of 11-1/2% to 13% by weight (20,112 ppm to 22,735 ppm of boron) at a temperature of at least 145°F. Two channels of heat tracing shall be operable for that portion of the flow path bounded by the boron injection tank inlet and outlet motor operated valves and the recirculation flow path to and from the boric acid tanks.

c. The four accumulators are pressurized between 600 and 700 psig and each contains a minimum of 775 ft^3 and a maximum of 815 ft^3 of water at a boron concentration $\geq$2000 ppm and $\leq$2600 ppm. Accumulator isolation valves 894A, B, C, and D shall be open and their power supplies deenergized whenever the reactor coolant system pressure is above 1000 psig.

2) RCS temperature and the source range detectors are monitored hourly;

and

3) no operations are permitted which would reduce the boron concentration of the reactor coolant system.

8. When the RCS cold leg temperature (T_{cold}) is at or below 326°F, no more than one safety injection pump shall be energized and aligned to feed the RCS.

B. Containment Cooling and Iodine Removal Systems

1. The reactor shall not be brought above the cold shutdown condition unless the following requirements are met:

a. The spray additive tank contains a minimum of 4000 gallons of solution with a sodium hydroxide concentration ≥35% and ≤38% by weight.

b. The five fan cooler-charcoal filter units and the two spray pumps, with their associated valves and piping, are operable.

2. The requirements of 3.3.B.1 may be modified to allow any one of the following components to be inoperable at one time:

ATTACHMENT II TO IPN-91-044

SAFETY EVALUATION FOR TECHNICAL SPECIFICATION CHANGES RELATED TO REFUELING WATER STORAGE TANK BORON CONCENTRATION AND RELATED TECHNICAL SPECIFICATIONS

NEW YORK POWER AUTHORITY
INDIAN POINT 3 NUCLEAR POWER PLANT
DOCKET NO. 50-286
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Section I - Description of Changes

This application for amendment to the Indian Point 3 Technical Specifications seeks to amend Section 3.2 (Chemical and Volume Control System) and Section 3.3.A (Safety Injection and Residual Heat Removal Systems). These sections are being amended to provide for an increased boron concentration in the Refueling Water Storage Tank (RWST) and related changes. These changes are required because the Indian Point 3 (IP3) plant will be using higher enrichment cores to support 24 month operating cycles.

Specifically the changes are:

1. REVISIONS

   a. Minimum RWST boron concentration changed to 2400 parts per million (ppm).

   b. Minimum Spray Additive Tank (SAT) NaOH concentration changed to 35% by weight (wt%).

   c. Maximum SI Accumulator Liquid Volume changed to 815 ft^3.

   d. Minimum Boric Acid Storage System volume changed to 6100 gallons.

2. ADDITIONS

   a. Maximum RWST boron concentration of 2600 ppm.

   b. Maximum Safety Injection (SI) Accumulator boron concentration changed to 2600 ppm.

   c. Maximum SAT NaOH concentration of 38% by weight (wt%).

Section II - Evaluation of Changes

Starting with cycle nine (9) Indian Point 3 will be using higher enrichment reactor cores in order to provide adequate excess reactivity to permit 24 month operating cycles. These higher enrichment cores necessitate the use of higher boron concentrations in the Refueling Water Storage Tank (RWST) in order to provide adequate negative reactivity to safely shut down the reactor during both normal and accident conditions. In addition, the volume in the Boric Acid Storage System must be increased to provide adequate negative reactivity to bring the plant to the cold shutdown condition.

The increase to the Spray Additive Tank (SAT) minimum Sodium Hydroxide (NaOH) concentration, and the addition of a maximum concentration limit are required to insure that adequate NaOH is injected with the containment spray solution to insure that the resultant sump pH is within the bounds of the accident analysis and the assumptions used for equipment qualification.

An upper limit is being added to the RWST boron concentration to prevent precipitation of the RWST solution. The increase to the maximum boron concentration in the safety injection system accumulators is provided to bound the maximum concentration in the RWST in order to allow for potential mixing of the borated water in the two volumes. The increase in the maximum

accumulator volume is being made in order to provide increased operating margin about the nominal level.

Section III -No Significant Hazards Evaluation

Consistent with the requirements of 10 CFR 50.92, the enclosed application is judged to involve no significant hazards based on the following information:

(1) Does the proposed license amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

Response:

No. The evaluation of the proposed changes to the IP3 technical specifications indicates that the proposed changes will not adversely affect the RWST material or any other stainless steel surface that may come into contact with the RWST fluid. The changes do not alter the design, material and construction standards of the RWST and other potentially affected Nuclear Steam Supply System (NSSS) components that were applicable prior to the technical specification changes. The changes will not affect the phenomenon of Primary Water Stress Corrosion Cracking (PWSCC).

Injection of refueling water and NaOH into the containment post-accident is a safety related function designed to mitigate the consequences of the accident. The availability of this equipment is unrelated to accident initiation.

The previously analyzed consequences or probabilities of potential corrosion events have not been increased. Therefore, the probability and consequences of these accidents are not affected by these changes.

The probability and consequences of the non-loss of coolant accidents (LOCA) previously evaluated do not change due to the fact that the RWST boron concentration is not used as an input in the current IP3 licensing basis non-LOCA transient analyses. Further, following a large break loss of coolant accident (LBLOCA) iodine removal from the containment atmosphere by sprays, iodine retention in the sump solution and the generation of hydrogen within the containment are not adversely affected by the changes.

With regard to the consequences of accidents previously evaluated, the small break loss of coolant accident (SBLOCA) and LBLOCA peak clad temperatures (PCT) will remain below the 2200°F limit. Since the PCT will remain below the limit, the radiological releases will not be adversely affected.

(2) Does the proposed license amendment create the possibility of a new or different kind of accident from any accident previously evaluated?

Response:

No. The proposed changes will not cause the initiation of any accident nor create any new credible single failure. The changes do not result in any event previously deemed as incredible being made credible. The changes do not alter the design, material and construction standards of the RWST and other potentially affected Nuclear Steam Supply System (NSSS) components that were applicable prior to the technical specification changes. No new modes of operation are proposed for any components or systems involved in the changes and these components will function exactly as currently described in the IP3 FSAR. The changes will not create any new or credible LOCA because RCS component boron concentrations are already modeled in LOCAs currently analyzed.

(3) Does the proposed amendment involve a significant reduction in a margin of safety?

Response:

No. The proposed changes will not significantly affect the operation of the RWST or related components. Therefore, the Technical Specification changes will not reduce the margin of safety.

The changes do not invalidate any of the IP3 non-LOCA safety analysis results or conclusions. All of the non-LOCA safety analysis acceptance criteria continue to be met.

Iodine retention in the post-LOCA sump solution is not adversely affected by the proposed changes. Therefore, the radiological consequences of the LOCA are not affected and remain within the 10 CFR 100 dose acceptance criteria.

There is no adverse affect on containment post-LOCA hydrogen production and concentrations in containment will be maintain below the limit of 4.0 vol. %.

The proposed changes will not result in the SBLOCA or LBLOCA PCTs exceeding the acceptance limit of 2200°F, or in exceeding any other acceptance criterion defined in 10 CFR 100. Since adequate margin is maintained to the limits, no degradation of margin of safety has been calculated. Therefore, the proposed changes will not result in a significant reduction in margin of safety.

Section IV - Impact of Changes

These changes will not adversely impact the following:

ALARA Program
Security and Fire Protection Programs
Emergency Plan
FSAR or SER Conclusions
Overall Plant Operations and the Environment

Section V - Conclusions

The incorporation of these changes: a) will not increase the probability nor the consequences of an accident or malfunction of equipment important to safety as previously evaluated in the Safety Analysis Report; b) will not increase the possibility for an accident or malfunction of a different type than any evaluated previously in the Safety Analysis Report; c) will not reduce the margin of safety as defined in the bases for any Technical Specification; d) does not constitute an unreviewed safety question; and e) involves no significant hazards considerations as defined in 10 CFR 50.92.

Section VI - References

1) IP3 FSAR

2) IP3 SER