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UPDATE FOR IP3 TECHNICAL REQUIREMENTS MANUAL

AFFECTED SECTION	REMOVE	INSERT
List of Effective Sections	Page 1 of 1 with Effective date 12/04/2002	Page 1 of 1 with Effective date 03/06/2003
Section 3.1.C.1; Boration Systems – MODES 1, 2, 3, and 4	Revision 0 Pages 3.1.C.1-1 through -7	Revision 1 Pages 3.1.C.1-1 through -8
Section 3.1.C.2; Boration Systems – MODES 5 and 4	Revision 0 Pages 3.1.C.2-1 through -5	Revision 1 Pages 3.1.C.2 -1 through -6

LIST OF EFFECTIVE SECTIONS

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1.3	0	1.3-1 through 8	03/19/2001
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5.0	0	5.0-1 through 7	03/19/2001

Vice President, Operations - IP3 [signature] 3/5/03

Signature / Date

3.1 REACTVITY CONTROL SYSTEMS

3.1.C. BORATION SYSTEMS

3.1.C.1 Boration Systems – MODES 1, 2, 3 and 4

TRO 3.1.C.1 The following boration capability shall be OPERABLE:

a. Two charging pumps OPERABLE;
b. One boration injection flow path from the boric acid storage tank(s) (BASTs) with a minimum volume 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 minimum of 145°F;
c. One boration injection flow path from the refueling water storage tank (RWST);
d. City water to the charging pump coolers and for flushing the concentrated boric acid piping flow path.

APPLICABILITY: MODES 1, 2, 3 and 4.

NOTES

1. The RWST with a minimum borated water volume of boric acid solution is required for operability but is controlled by Improved Technical Specifications (ITS) 3.5.4 for MODES 1, 2, 3 and 4.
2. The TRM also has a TRO 3.7.B for charging pumps 31 and 32.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required charging pump inoperable.	A.1 Restore charging pump to OPERABLE.	72 Hours
B. One required boron injection flow path inoperable.	B.1 Restore boron injection flow path to OPERABLE.	72 Hours
C. City water not available.	C.1 Restore city water to all required charging pumps and restore flushing capability.	87 Hours
D. Required Action and Completion Time of A.1, B.1, or C.1 not met.	D.1 Be in MODE 3, AND D.2 Complete the required action of A.1, B.1 and C.1.	6 Hours 7 Days
E. Required Action and Completion Time of D.2 not met.	E.1 Be in MODE 5.	30 Hours

(continued)

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
TRS 3.1.C.1.1	CHANNEL CHECK BAST Level Indication.	12 hours
TRS 3.1.C.1.2	DEMONSTRATE that heat traced portions of the boration flow path containing concentrated boric acid are greater than 145°F.	7 Days
TRS 3.1.C.1.3	DEMONSTRATE the solution temperature in the BAST(s) is greater than 145°F.	7 Days
TRS 3.1.C.1.4	DEMONSTRATE the boric acid storage system has a minimum borated water volume of 6100 gallons of 11½% to 13% by weight boric acid solution.	7 Days
TRS 3.1.C.1.5	DEMONSTRATE charging pumps are OPERABLE.	In accordance with the Inservice Testing Program
TRS 3.1.C.1.6	Perform CHANNEL CALIBRATION of boric acid makeup flow channel.	24 Months
TRS 3.1.C.1.7	Calibrate Boric Acid Tank Level Indication and temperature indicator.	24 Months
TRS 3.1.C.1.8	-------------------------NOTE------------------------------ This TRS is not required to be performed to meet the TRO. -- Calibrate volume control tank level	24 Months
TRS 3.1.C.1.9	DEMONSTRATE the capability to provide city water to charging pump cooling and verify that temporary connections available for city water flush boric acid piping.	24 Months

BASES

BACKGROUND

The Chemical Volume and Control System (CVCS) was installed to meet the requirements, in part, of proposed General Design Criteria (GDC) 27, GDC 28, and GDC 30 (Reference 1). GDC 27 requires two independent reactivity control systems of which the CVCS is one. GDC 28 requires CVCS to be capable of making and holding the core subcritical from a hot condition. GDC 30 requires one of the reactivity control systems to be capable of making the core subcritical under any credible accident conditions.

GDC 29 requires one of the reactivity control systems to be capable of making the core subcritical under any anticipated operating condition, including transients, where the most reactive rod is withdrawn sufficiently fast to prevent fuel damage limits from being exceeded. The control rods meet this requirement.

The CVCS provides control of the Reactor Coolant System boron inventory (Reference 2). This is normally accomplished by using any one of the three charging pumps in series with either one of the two boric acid transfer pumps. An alternate method of boration will be to use the charging pumps taking suction directly from the Refueling Water Storage Tank (RWST). A third method will be to depressurize and use the safety injection pumps (Reference 3) which is not considered in the TRM.

APPLICABLE SAFETY ANALYSES

The TRO helps to assure that the requirements of General Design Criteria 27 and 28 are met. The Chemical Volume and Control System malfunction assumes inadvertent dilution terminated by manual action to close the primary water makeup control valve and manual action to reborate.

TRO

The Chemical and Volume Control System provides control of the Reactor Coolant System boron inventory. This is normally accomplished by using any one of the three charging pumps in series with either one of the two boric acid transfer pumps. An alternate method of boration will be to use the charging pumps taking suction directly from the RWST.

When the reactor is above cold shutdown, a minimum of two boron injection flow paths are required to ensure high reliability of the boration function. The boration pathway from the RWST is through a single line that has three valves in series before the charging pump suction header. The boric acid transfer pathway is from one or both Boric Acid Storage Tanks (BASTs) and has several different valving arrangements and is operable as long as the pathway allows the required flow to be delivered to ensure ≥ 132 ppm/hr. Both pathways require the associated tanks to be operable. The LCO and surveillance requirements for the RWST are in Technical Specifications since the RWST supports emergency core cooling systems. Since these requirements are more restrictive and control required actions, a note clarifies that the Technical Specification controls action with an inoperable RWST.

(continued)

The boron capability of either flowpath is sufficient to provide the minimum required boration flowrate.

The quantity of boric acid in storage from either the boric acid storage system or the RWST is sufficient to borate the reactor coolant in order to reach cold shutdown at any time during core life.

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 (borate to cold shutdown after full power operation was achieved following refueling (Reference 2)) . An upper concentration limit of 13% (22,735 ppm of boron) boric acid in the boric acid storage tanks is specified to maintain solution solubility at the specified low temperature limit of 145°F. Each BAST has two electric heaters and one heater is sufficient to maintain the required temperature. The boration flow path has two channels of heat tracing. One channel of heat tracing is sufficient to maintain borated water above the solubility low temperature limit in the flow path to the charging pump header. The second channel of heat tracing provides backup when one channel is inoperable. Should all heat tracing become inoperable or the BAST temperature fall below 145°F, the boron injection path is considered inoperable. However, the reactor can be shutdown and borated from the RWST.

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 BASTs and the inlet to the charging pumps in the unlikely event of a complete loss of electrical power and/or loss of service water or component cooling water. The city water is backup for the loss of all AC power since the planned response uses the Appendix R diesel to power the charging pumps and the component cooling water that cools the charging pump. The original FSAR (Reference 4) identified a complete loss of service water resulting from turbine missiles and the TRO was written to address that event (Reference 5).

ACTIONS

A.1

With one required charging pump inoperable the two boron injection flow paths remain operable but subject to failure of the remaining charging pump. Restoring a second charging pump within 72 hours restores redundancy. The completion time of 72 hours is generally sufficient to restore equipment to operation. The 72 hours is acceptable since, with one charging pump available, there are still two reactivity control systems (i.e., the control rods and the remaining boration pathway) to bring the plant to MODE 3.

B.1

With one required boron injection flow path inoperable, restoring the other boron injection flow path within 72 hours restores redundancy. The

(continued)

completion time of 72 hours is generally sufficient to restore equipment to operation. The 72 hours is acceptable since, with one boration pathway unavailable, there are still two reactivity control systems (i.e., the control rods and the remaining boration pathway) to bring the plant to MODE 3. This is acceptable for the reasons discussed in A.1.

C.1

If there is a loss of city water to one or more charging pumps, those pumps are not operable for the station blackout event (loss of all AC power) until the Appendix R diesel is started and powers charging and component cooling water. The NSE removing the turbine missile event from the FSAR did not clearly eliminate the event as an accident. The 87 hour allowed outage time is based on the remote probability (i.e., less than 1.0E-7) that the event will occur (less than 1.0 E-5) during the allowed outage time.

D.1

If the required action of A cannot be met within the associated completion time, the plant must be placed in a condition in which need for the boron injection function is reduced. This is accomplished by placing the plant in MODE 3 and borating to assure shutdown margin per Technical Specifications.

D.2

The completion time of 7 days in MODE 3 is sufficient to correct equipment problems not correctable at power and is acceptable since the plant has been borated but not placed through the cooldown transient. The discussion of alternate equipment and USNRC approved time limits in A.1 and B.1 is applicable.

E.1

If the required action of C cannot be met within the associated completion time, the plant must be placed in a condition in which the TRO requirements are not applicable. Placing the plant in MODE 5 achieves this.

SURVEILLANCE REQUIREMENTS

TRS 3.1.C.1.1

The CHANNEL CHECK of the BAST level indication is intended to ensure that the operators have the instrumentation necessary for determining BAST level. There will be zero level indication on loss of signal in the Foxboro bubbler or in the Radar Continuous Monitoring Instrumentation (RCMI). Blockage of the bubbler will cause a "Fail High" indication. The RCMI may not operate properly during transfer and at a level from approximately 60% to 65%.

(continued)

Failure of the instrument would not render the BAST inoperable since the level indication has alternate means of verifying injection to the core during boration (References 7 and 8). The CHANNEL CHECK serves to provide a shift check of level.

TRS 3.1.C.1.2

DEMONSTRATION that the heat traced portions of the boron injection flow path to the charging pump header are above the solubility temperature ensures that the heat trace is operable and that the boric acid will remain in solution. Portions of the boric acid flow path that are not required to establish flow are not required to be operable to meet the TRO. The frequency of 7 days is acceptable since there is a low temperature alarm in the Control Room (Reference 2) and a second heat tracing circuit. The solubility temperature is assured by using a surveillance criterion with margin (e.g., 145°F) and taking compensating action (e.g., shift readings) if the alarm is not working.

TRS 3.1.C.1.3

DEMONSTRATION that the BAST is at or above 145°F ensures that the boric acid will remain in solution. This also assures that at least one mechanism for heating each BAST in operation remains operable. The frequency of 7 days is acceptable since there is a low temperature alarm in the Control Room (Reference 2) and a second heater.

TRS 3.1.C.1.4

DEMONSTRATION that the BAST(s) have a minimum of 6100 gallons of borated water at the required boron concentrations ensures that there is sufficient boric acid to borate the reactor coolant in order to reach cold shutdown at any time in core life. The frequency of 7 days is acceptable since there is a low level alarm in the Control Room (Reference 2).

TRS 3.1.C.1.5

DEMONSTRATING that the charging pumps are operable in accordance with the IST program assures that the pumps are performing within their design limits. This test verifies developed flow to ensure that pump performance has not degraded. The frequency is in accordance with the Inservice Testing Program. The test provides reasonable assurance that the required flow of boric acid could be delivered.

TRS 3.1.C.1.6

CHANNEL CALIBRATION of the boric acid makeup flow channel assures the operators that the instrumentation is accurate and allows assessment of flow capability during operation.

(continued)

TRS 3.1.C.1.7

Each tank has a Radar Continuous Level Monitoring Instrument (RCMI) and a Foxboro bubbler level instrument that are calibrated every 24 months to assure that operators are provided with an indicator per tank for operability to provide information on the level of boric acid solution in the BAST. Local indication, CCR indication and a low-level alarm are provided from either the RCMI transmitter or the Foxboro bubbler level signals. In addition, provisions for dipstick level measurement is available for both tanks, but this method cannot be credited for operability since the RCMI level instruments are credited as an alternate means for verifying boron injection during boration (Reference 7). Each temperature indicator (TIC-103 and 107) is calibrated every 24 months to assure that it provides operators with correct information on the temperature of the boric acid solution in the BAST.

TRS 3.1.C.1.8

The volume control tank level indicator is a Regulatory Guide 1.97 instrument (Type D, Category 2) which is not required for system operability. The 24 month calibration assures that it is functioning properly.

TRS 3.1.C.1.9

DEMONSTRATION that the valves are OPERABLE and temporary connections available provides assurance of the OPERABILITY of the flow path for city water to the charging pumps and boric acid piping. This ensures that this water can be provided as backup for the station blackout and for a fire requiring use of the Appendix R diesel for shutdown. In both cases, the charging system is relied upon for boration to shutdown and CCW is made available by power from the Appendix R diesel. This will also assure availability for the turbine missile event.

REFERENCES:

1. Proposed Title 10, Code of Federal Regulations, Part 50 Appendix A, "General Design Criteria For Nuclear Power Plant Construction Permits", Criterion 27, "Redundancy of Reactivity Control," Criterion 28, "Reactivity Hot Shutdown Capability," Criterion 29, "Reactivity Shutdown Capability," and Criterion 30, "Reactivity Holddown Capability," published in Federal Register July 11, 1967

2. FSAR 9.2

3. Revised Feasibility Report For BIT Elimination For Indian Point Unit 3, " July 1988 (Westinghouse Report).

4. FSAR 14.A

5. NRC Inspection Report 74-02

(continued)

6. NRC "Final Policy Statement on Technical Specifications Improvements for Nuclear Power Reactors," dated July 22, 1993.

7. NSE 98-3-095-CVCS, Rev. 1, "Radar Level Measuring System for Boric Acid Storage Tanks 31 & 32."

8. 10 CFR 50.59 Evaluation 98-3-095CVCS, Revision 0; January 2003; regarding DCP 98-3-095 Revision 2.

3.1 REACTIVITY CONTROL SYSTEMS

3.1.C. BORATION SYSTEMS

3.1.C.2 Boration Systems - MODES 5 and 6

TRO 3.1.C.2 Boration injection capability shall be maintained by keeping at least one flow path to the core OPERABLE.

APPLICABILITY: MODES 5 and 6.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. The required boron injection path inoperable.	A.1 Suspend all operations involving core alterations and positive reactivity changes.	Immediately
	<u>AND</u>	
	A.2 Restore boron injection capability.	Immediately

(continued)

---NOTE---

1. Surveillance Requirements are only required to be met when their associated components are being credited to meet the TRO.

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
TRS 3.1.C.2.1	CHANNEL CHECK BAST Level Indication.	12 Hours
TRS 3.1.C.2.2	DEMONSTRATE that heat traced portions of the boration flow path containing a high concentration of boric acid are greater than 145°F.	7 Days
TRS 3.1.C.2.3	DEMONSTRATE the solution temperature in the Boric Acid Storage Tank(s) is greater than 145°F.	7 Days
TRS 3.1.C.2.4	DEMONSTRATE the boric acid storage system has a minimum borated water volume of 6100 gallons of 11½% to 13% by weight boric acid solution.	7 Days
TRS 3.1.C.2.5	DEMONSTRATE RWST borated water level is ≥35.4 feet.	7 Days
TRS 3.1.C.2.6	DEMONSTRATE RWST boron concentration is ≥2400 ppm and ≤2600 ppm.	31 Days
TRS 3.1.C.2.7	DEMONSTRATE charging pumps are OPERABLE.	In accordance with the Inservice Testing Program

(continued)

BASES

BACKGROUND	The Chemical Volume and Control System (CVCS) was installed to meet the requirements, in part, of proposed General Design Criteria (GDC) 27, GDC 28, and GDC 30 (References 1 and 2). GDC 27 requires two independent reactivity control systems of which the CVCS is one. GDC 28 requires CVCS to be capable of making and holding the core subcritical from a hot condition. GDC 30 requires one of the reactivity control systems to be capable of making the core subcritical under any credible accident conditions.
APPLICABLE SAFETY ANALYSES	The TRO helps to assure that the requirements of General Design Criteria 27 and 28 are met. The Chemical Volume and Control System malfunction assumes inadvertent dilution terminated by manual action to close the primary water makeup control valve and manual action to reborate.

TRO

The Chemical and Volume Control System provides control of the Reactor Coolant System boron inventory. This is normally accomplished by using any one of the three charging pumps in series with either one of the two boric acid transfer pumps. An alternate method of boration will be to use the charging pumps taking suction directly from the Refueling Water Storage Tank (RWST). Boron control in the vessel is not required when there is no fuel in the reactor.

When the reactor is in MODEs 5 or 6, one boron injection flow path (powered by an emergency power source to ensure operation with a loss of offsite power) is required to ensure functional capability in the event inventory control or boration is required. The following define the flow path:

1. One charging pump and boration injection flow path from the Boric Acid Storage Tanks (BASTs).
2. One charging pump and boration injection flow path from the RWST.
3. High head safety injection from the RWST when allowed by Technical Specifications.
4. Any flow path defined by the risk assessment process and implemented by approved procedures when the Reactor Coolant System is vented.

The boration pathway from the RWST is through a single line that has three valves in series before the charging pump suction header. The boric acid transfer pathway is from one or both BASTs and has several different valving arrangements and is OPERABLE as long as the pathway allows the required flow to be delivered. Both pathways require the associated tanks to be OPERABLE.

The quantity of boric acid in storage from either the boric acid storage system or the RWST must be sufficient to maintain the level of boron in the reactor coolant necessary to maintain cold shutdown at any time during core life. The value for the first two flow paths is based on the amount to accomplish this during operation unless a different value is demonstrated by calculation. Risk assessment determines the values for other flow paths.

(continued)

The TRM provides for the ability to use alternate means to establish boration. This TRM is intended to allow flexibility in the use of boration capability after the plant has been shutdown and before fuel is removed. For example, if the plant were shutdown and ready to remove fuel, the risk assessment process might define RWST gravity feed as a boration injection flow path in order to allow other equipment to be out of service.

ACTIONS

A.1

With the boron injection capability inoperable, the suspension of operations involving core alterations and positive reactivity changes will ensure that the potential for adding positive reactivity to the core is minimized.

A.2

With boration inoperable, efforts to restore boration should be made. This could include the use of alternate boration pathways or restoring one of the identified boration pathways. There is no fixed time for completion because fuel cannot be moved.

SURVEILLANCE REQUIREMENTS

TRS 3.1.C.2.1

The CHANNEL CHECK of the BAST level indication is intended to ensure that the operators have the instrumentation necessary for determining BAST level. There will be zero level indication on loss of signal in the Foxboro bubbler or in the Radar Continuous Monitoring Instrumentation (RCMI). Blockage of the bubbler will cause a "Fail High" indication. The RCMI may not operate properly during transfer and at a level from approximately 60% to 65%. Failure of the instrument would not render the BAST inoperable since the level indication has alternate means of verifying injection to the core during boration (References 3 and 4). The CHANNEL CHECK serves to provide a shift check of level.

TRS 3.1.C.2.2

DEMONSTRATION that the heat traced portions of the boron injection flow path to the charging pump header are above the solubility temperature ensures that the heat trace is operable and that the boric acid will remain in solution. Portions of the boric acid flow path that are not required to establish flow are not required to be operable to meet the specification. The frequency of 7 days is acceptable since there is a low temperature alarm in the Control Room (Reference 2) and a second heat tracing circuit. The solubility temperature is assured by using a surveillance criterion with margin (e.g., 145°F) and taking compensating action (e.g., shift readings) if the alarm is not working.

TRS 3.1.C.2.3

(continued)

DEMONSTRATION that the BAST is at or above 145°F ensures that the boric acid will remain in solution. This also assures that at least one mechanism for heating each BAST in operation remains operable. The frequency of 7 days is acceptable since there is a low temperature alarm in the Control Room (Reference 2) and a second heater.

TRS 3.1.C.2.4

DEMONSTRATION that the BAST(s) have a minimum of 6100 gallons of borated water at the required boron concentrations ensures that there is sufficient boric acid to borate the reactor coolant in order to reach MODE 5 at any time in core life.

This will conservatively assure that the reactor may be kept in MODE 5 or 6 while in that condition. The frequency of 7 days is acceptable since there is a low level alarm in the Control Room (Reference 2).

TRS 3.1.C.2.5

DEMONSTRATION that the RWST has a minimum of 35.4 feet water to ensure that there is sufficient boric acid to borate the reactor coolant in order to reach MODE 5 at any time in core life. This will conservatively assure that the reactor may be kept in MODE 5 or 6 while in that condition.

TRS 3.1.C.2.6

DEMONSTRATION that the RWST has a minimum required boron concentration ensures that there is sufficient boric acid to borate the reactor coolant in order to reach MODE 5 at any time in core life. This will conservatively assure that the reactor may be kept in MODE 5 or 6 while in that condition.

TRS 3.1.C.2.7

DEMONSTRATING that the charging pumps are operable in accordance with the IST program assures that the pumps are performing within their design limits. This test verifies developed head to ensure that pump performance has not degraded. The frequency is in accordance with the Inservice Testing Program. The test provides reasonable assurance that the required flow of boric acid could be delivered.

REFERENCES

1. Proposed Title 10, Code of Federal Regulations, Part 50 Appendix A, "General Design Criteria For Nuclear Power Plant Construction Permits", Criterion 27, "Redundancy of Reactivity Control," published in Federal Register July 11, 1967.

2. FSAR 9.2.

(continued)

3. NSE 98-3-095-CVCS, Rev. 1, "Radar Level Measuring System for Boric Acid Storage Tanks 31 & 32."

4. 10 CFR 50.59 Evaluation 98-3-095CVCS, Revision 0; January 2003; regarding DCP 98-3-095 Revision 2.