## WBN2Public Resource

**From:** Boyd, Desiree L [dlboyd@tva.gov]
**Sent:** Monday, June 17, 2013 8:02 AM
**To:** Hon, Andrew; Epperson, Dan; Quichocho, Jessie; Poole, Justin
**Cc:** Arent, Gordon; Hamill, Carol L; Boyd, Desiree L
**Subject:** TVA letter to NRC_06-13-13_Revised Specifications from Dev Rev G of Unit 2 TS
**Attachments:** 06-13-13_Revised Specifications from Dev Rev G of Unit 2 TS_Final.pdf

***Please see attached TVA letter that was sent to the NRC today.***

***Thank You***


*Désireé L. Boyd*
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Watts Bar Nuclear Plant, Unit 2
NRC Docket No. 50-391

**Subject:** **Watts Bar Nuclear Plant (WBN) Unit 2 – Submittal of Three Revised Specifications from Developmental Revision G of the Unit 2 Technical Specification (TS)**

References:
1. TVA Letter to NRC dated April 5, 2013, "Application to Modify Administrative Controls Section of WBN Unit 1 Technical Specifications (TS-WBN-13-01)"
2. NRC Letter to TVA dated December 5, 2012, "Watts Bar Nuclear Plant, Unit 1 – Issuance of Amendment Regarding Technical Specification Changes in Dose Equivalent I-131 Spike Limit and Allowable Value for Control Room Air Intake Radiation Monitors (TAC NO. ME8156)" (ML12279A115)

This letter provides changes to various sections of the Unit 2 developmental TS and TS Bases needed to support dual unit operation and to incorporate recently approved changes to the Unit 1 TS.

The enclosure provides a description of each of the changes and the rationale for making the change. Attachment 1 to the enclosure provides the original Unit 2 TS pages marked-up to show the changes. Attachment 2 to the enclosure provides the original Unit 2 TS Bases pages marked-up to show the changes. Attachment 3 to the enclosure provides the TS pages retyped with the changes incorporated. Attachment 4 to the enclosure provides the Unit 2 TS Bases pages retyped with the changes incorporated.

There are no new commitments in this letter. If you have any questions, please contact Gordon Arent at (423) 365-2004.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 13th day of June, 2013.

Respectfully,

R. A. Hruby, Jr.

Raymond A. Hruby, Jr.
General Manager, Technical Services
Watts Bar Unit 2

Enclosure: Revisions to Developmental TS and TS Bases Revision G

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**ENCLOSURE 1**

**TENNESSEE VALLEY AUTHORITY**
**WATTS BAR NUCLEAR PLANT, UNIT 2**

**Revisions to Developmental TS and TS Bases Revision G**

ATTACHMENTS

1. TS Changes (Mark-Up) for WBN, Unit 2
2. TS Bases Changes (Mark-Up) for WBN, Unit 2
3. TS Changes (Final Typed) for WBN, Unit 2
4. TS Bases Changes (Final Typed) for WBN, Unit 2

## 1.0 SUMMARY DESCRIPTION

This letter provides several revisions and updates to the Unit 2 Developmental Technical Specifications (TS) and TS Bases. With the exception of TS Table 3.3.7-1, the entire TS or TS Bases section being revised has been provided for clarity even if no changes were made to some of the pages in the section.

## 2.0 CHANGES

### 2.1 TS 3.4.16 Reactor Coolant System Specific Activity

**Change Required:**

Revise TS Table 3.3.7-1 to correct the Main Control Room Radiation Monitor Allowable Value to the latest calculated value. Revise TS 3.4.16 and associated Bases to change the maximum allowable Reactor Coolant System (RCS) dose equivalent Iodine-131 concentration from 21 μCi/gm to 14 μCi/gm.

**Justification:**

The above changes are necessary due to correction of vendor sensitivity information for the Main Control Room Radiation Monitor and correction to dose conversion factor input parameters to the FSAR Chapter 15 accident dose analysis. These changes were submitted to NRC for approval on Unit 1 and were subsequently approved by NRC in WBN Unit 1 Amendment 91 (Reference 2). These changes are also appropriate for Unit 2 since the Main Control Room Radiation Monitor is common between Unit 1 and Unit 2, and the FSAR Chapter 15 accident dose calculations apply to both Unit 1 and Unit 2. The Unit 2 FSAR Chapter 15 dose analyses were approved by NRC SER Supplement 25, dated December 2011. The analyses reviewed and approved by the NRC for Unit 2 included this change.

### 2.2 TS 3.7.7 Component Cooling System

**Change Required:**

TS 3.7.7 requires the operability of two Component Cooling System (CCS) trains whenever Unit 2 is in Mode 1, 2, 3 or 4. If one train of CCS is inoperable in any of these modes, Action A of this TS requires the restoration of the inoperable CCS train to operable status within 72 hours or entry into Action B. The attached markup of TS 3.7.7 and associated bases provide the changes needed to ensure Unit 2 CCS Train B operability when CCS pump 1B-B is aligned to Unit 2 CCS Train B as a replacement for CCS pump C-S. This change will allow CCS pump C-S to be out of service for maintenance without the need to enter Action A of TS 3.7.7.

**Justification:**

The CCS is normally aligned with CCS pump 2A-A (Train A electrical power) and CCS pump 2B-B (Train B electrical power) supplying water to the Train 2A header and CCS pump C-S (Train B electrical power) supplying water to the Train 2B header. The design of CCS allows for the alignment of either CCS pump 1B-B or 2B-B to the CCS Train B header as a replacement for CCS pump C-S. The most common reason for this configuration will be in the event that CCS pump C-S is removed from service for maintenance. However, to meet operability requirements for Unit 2, each CCS pump must comply with Surveillance Requirement (SR) 3.7.7.4. This SR requires verification that the CCS pump starts automatically on an actual or simulated actuation signal. Although CCS pump 2B-B will be in compliance with this surveillance requirement when aligned to CCS Train B, CCS pump 1B-B cannot comply because it does not receive a Unit 2 Safety Injection (SI) signal (CCS pump 1B-B only receives a Unit 1 SI signal). However, when CCS pump 1B-B is aligned to CCS Train 2B as a replacement for CCS pump C-S, Unit 2 Train B operability is assured if CCS pump 1B-B is operable and running. This assurance is provided based on the following:

1. In the event of an SI signal on Unit 2 without a loss of offsite power, CCS pump 1B-B will continue to run and provide cooling water to CCS Train 2B.

2. In the event of an SI signal on Unit 2, in conjunction with a loss of offsite power, CCS pump 1B-B will automatically load onto the emergency diesel generator and provide cooling water to CCS Train 2B.

A new SR is being added for CCS pump 1B-B when it is aligned as a replacement for CCS pump C-S to ensure Unit 2 Train B operability. This SR will require CCS pump 1B-B to be operable and running when substituted for CCS pump C-S to establish operability for Unit 2 CCS Train B. These changes provide an equivalent level of protection as the current TS.

**2.3 TS 5.9.2 Annual Radiological Environmental Operating Report**

TS 5.9.2 states that, "The report shall identify the TLD results that represent collocated dosimeters in relation to the NRC TLD program and the exposure period associated with each result." The NRC TLD Program was cancelled at the end of 1997, as reported in Press Release No. 98-08. Therefore, there is no longer a need to report these results or to reference this program.

This proposed change is consistent with NRC-approved Technical Specification Task Force (TSTF) Traveler TSTF-348 and brings the Unit 2 wording into conformance with a pending Unit 1 License Amendment Request (Reference 1).

# ATTACHMENT 1

## TS Changes (Mark-Up) for WBN, Unit 2

Table 3.3.7-1 (page 1 of 1)
CREVS Actuation Instrumentation

| FUNCTION | REQUIRED CHANNELS | SURVEILLANCE REQUIREMENTS | ALLOWABLE VALUE |
|---|---|---|---|
| 1. Manual Initiation | 2 trains | SR 3.3.7.3 | NA |
| 2. Control Room Radiation Control Room Air Intakes | 2 | SR 3.3.7.1<br>SR 3.3.7.2<br>SR 3.3.7.4 | ≤ 1.647E-04 ~~9.45E-05~~ μC/cc (3,308 cpm) |
| 3. Safety Injection | Refer to LCO 3.3.2, "ESFAS Instrumentation," Function 1, for all initiation functions and requirements. | | |

## 3.4 REACTOR COOLANT SYSTEM (RCS)

### 3.4.16 RCS Specific Activity

LCO 3.4.16 The specific activity of the reactor coolant shall be within limits.

APPLICABILITY: MODES 1 and 2,
MODE 3 with RCS average temperature ($T_{avg}$) ≥ 500°F.

ACTIONS

| CONDITION | REQUIRED ACTION | | COMPLETION TIME |
|---|---|---|---|
| A. DOSE EQUIVALENT I-131 > 0.265 μCi/gm. | --------------------NOTE-------------------<br>LCO 3.0.4.c is applicable.<br>------------------------------------------------- | | |
| | A.1 | Verify DOSE EQUIVALENT I-131 ≤ ~~21~~ 14 μCi/gm. | Once per 4 hours |
| | AND | | |
| | A.2 | Restore DOSE EQUIVALENT I-131 to within limit. | 48 hours |
| B. Gross specific activity of the reactor coolant not within limit. | B.1 | Perform SR 3.4.16.2. | 4 hours |
| | AND | | |
| | B.2 | Be in MODE 3 with $T_{avg}$ < 500°F. | 6 hours |

(continued)

ACTIONS (continued)

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| C. Required Action and associated Completion Time of Condition A not met.<br><br>OR<br><br>DOSE EQUIVALENT I-131 > ~~21~~ 14 μCi/gm. | C.1 Be in MODE 3 with $T_{avg}$ < 500°F. | 6 hours |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.4.16.1 | Verify reactor coolant gross specific activity ≤ 100/ $\bar{E}$ μCi/gm. | 7 days |
| SR 3.4.16.2 | -------------------------------NOTE------------------------------<br>Only required to be performed in MODE 1.<br>--------------------------------------------------------------------<br><br>Verify reactor coolant DOSE EQUIVALENT I-131 specific activity ≤ 0.265 μCi/gm. | 14 days<br><br>AND<br><br>Between 2 hours and 6 hours after a THERMAL POWER change of ≥ 15% RTP within a 1 hour period |

(continued)

SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.4.16.3 | -------------------------------NOTE------------------------------<br>Required to be performed within 31 days after a minimum of 2 effective full power days and 20 days of MODE 1 operation have elapsed since the reactor was last subcritical for ≥ 48 hours.<br>-------------------------------------------------------------------<br><br>Determine Ē from a sample taken in MODE 1 after a minimum of 2 effective full power days and 20 days of MODE 1 operation have elapsed since the reactor was last subcritical for ≥ 48 hours. | 184 days |

## 3.7 PLANT SYSTEMS

### 3.7.7 Component Cooling System (CCS)

LCO 3.7.7 Two CCS trains shall be OPERABLE.

----------------------------------------------------NOTE----------------------------------------------------
**CCS Pump 1B-B aligned to CCS Train B supports an OPERABLE CCS Train B for Unit 2 only when CCS Pump 1B-B is OPERABLE and OPERATING as verified by SR 3.7.7.5**
------------------------------------------------------------------------------------------------------------

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

ACTIONS

| CONDITION | REQUIRED ACTION | | COMPLETION TIME |
|---|---|---|---|
| A. One CCS train inoperable. | A.1 | -------------NOTE------------ Enter applicable Conditions and Required Actions of LCO 3.4.6, "RCS Loops-MODE 4," for residual heat removal loops made inoperable by CCS. --------------------------------- | |
| | | Restore CCS train to OPERABLE status. | 72 hours |
| B. Required Action and associated Completion Time of Condition A not met. | B.1 | Be in MODE 3. | 6 hours |
| | AND | | |
| | B.2 | Be in MODE 5. | 36 hours |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.7.7.1 | Verify that the alternate feeder breaker to the C-S pump is open. | 7 days |
| SR 3.7.7.2 | -------------------------------NOTE------------------------------<br>Isolation of CCS flow to individual components does not render the CCS inoperable.<br>-------------------------------------------------------------------<br><br>Verify each CCS manual, power operated, and automatic valve in the flow path servicing safety related equipment, that is not locked, sealed, or otherwise secured in position, is in the correct position. | 31 days |
| SR 3.7.7.3 | Verify each CCS automatic valve in the flow path that is not locked, sealed, or otherwise secured in position, actuates to the correct position on an actual or simulated actuation signal. | 18 months |
| SR 3.7.7.4 | Verify each CCS pump starts automatically on an actual or simulated actuation signal. **When CCS Pump 1B-B is substituted for CCS Pump C-S to establish CCS Train B operability, SR 3.7.7.4 does not apply to CCS Pump 1B-B (See SR 3.7.7.5).** | 18 months |
| **SR 3.7.7.5** | **When CCS Pump 1B-B is substituted for CCS Pump C-S for Unit 2 CCS Train B operability, then,**<br><br>**Verify CCS 1B-B is aligned to CCS Train B and is operating.** | **12 hours** |

5.0 ADMINISTRATIVE CONTROLS

5.9 Reporting Requirements

The following reports shall be submitted in accordance with 10 CFR 50.4.

5.9.1 DELETED

5.9.2 Annual Radiological Environmental Operating Report

-----------------------------------------------NOTE-----------------------------------------------
A single submittal may be made for a multiple unit station. The submittal should combine sections common to all units at the station.
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The Annual Radiological Environmental Operating Report covering the operation of the unit during the previous calendar year shall be submitted by May 15 of each year. The report shall include summaries, interpretations, and analyses of trends of the results of the Radiological Environmental Monitoring Program for the reporting period. The material provided shall be consistent with the objectives outlined in the Offsite Dose Calculation Manual (ODCM), and in 10 CFR 50, Appendix I, Sections IV.B.2, IV.B.3, and IV.C.

The Annual Radiological Environmental Operating Report shall include the results of analyses of all radiological environmental samples and of all environmental radiation measurements taken during the period pursuant to the locations specified in the table and figures in the ODCM, as well as summarized and tabulated results of these analyses and measurements in the format of the table in the Radiological Assessment Branch Technical Position, Revision 1, November 1979. ~~The report shall identify the TLD results that represent collocated dosimeters in relation to the NRC TLD program and the exposure period associated with each result.~~ In the event that some individual results are not available for inclusion with the report, the report shall be submitted noting and explaining the reasons for the missing results. The missing data shall be submitted in a supplementary report as soon as possible.

(continued)

**ATTACHMENT 2**

**TS Bases Changes (Mark-Up) for WBN, Unit 2**

# B 3.4 REACTOR COOLANT SYSTEM (RCS)

## B 3.4.16 RCS Specific Activity

BASES

BACKGROUND

The maximum dose to the whole body and the thyroid that an individual at the site boundary can receive for 2 hours during an accident is specified in 10 CFR 100 (Ref. 1). The maximum dose to the whole body and the thyroid that an individual occupying the Main Control Room can receive for the accident duration is specified in 10 CFR 50, Appendix A, GDC 19. The limits on specific activity ensure that the doses are held to a small fraction of the 10 CFR 100 limits and within the 10 CFR 50, Appendix A, GDC 19 limits during analyzed transients and accidents.

The RCS specific activity LCO limits the allowable concentration level of radionuclides in the reactor coolant. The LCO limits are established to minimize the offsite and Main Control Room radioactivity dose consequences in the event of a steam generator tube rupture (SGTR) or main steam line break (MSLB) accident.

The LCO contains specific activity limits for both DOSE EQUIVALENT I-131 and gross specific activity. The allowable levels are intended to limit the 2 hour dose at the site boundary to a small fraction of the 10 CFR 100 dose guideline limits, and ensure the Main Control Room accident dose is within the appropriate 10 CFR 50, Appendix A, GDC 19 dose guideline limits.

The evaluations showed the potential offsite and Main Control Room dose levels for a SGTR and MSLB accident were within the appropriate 10 CFR 100 and GDC 19 guideline limits.

(continued)

BASES (continued)

APPLICABLE SAFETY ANALYSES

The LCO limits on the specific activity of the reactor coolant ensures that the resulting 2 hour doses at the site boundary and Main Control Room accident doses will not exceed the appropriate 10 CFR 100 dose guideline limits and 10 CFR 50, Appendix A, GDC 19 dose guideline limits following a SGTR or MSLB accident. The SGTR and MSLB safety analysis (Ref. 2) assumes the specific activity of the reactor coolant at the LCO limit and an existing reactor coolant steam generator (SG) tube leakage rate of 150 gallons per day (GPD). The safety analysis assumes the specific activity of the secondary coolant at its limit of 0.1 μCi/gm DOSE EQUIVALENT I-131 from LCO 3.7.14, "Secondary Specific Activity."

The analysis for the SGTR and MSLB accidents establish the acceptance limits for RCS specific activity. Reference to these analyses is used to assess changes to the unit that could affect RCS specific activity, as they relate to the acceptance limits.

The analyses are for two cases of reactor coolant specific activity. One case assumes specific activity at 0.265 μCi/gm DOSE EQUIVALENT I-131 with an iodine spike immediately after the accident that increases the iodine activity in the reactor coolant by a factor of 500 times the iodine production rate necessary to maintain a steady state iodine concentration of 0.265 μCi/gm DOSE EQUIVALENT I-131. The second case assumes the initial reactor coolant iodine activity at ~~21~~ 14 μCi/gm DOSE EQUIVALENT I-131 due to a pre-accident iodine spike caused by an RCS transient. In both cases, the noble gas activity in the reactor coolant equals the LCO limit of 100/ $\bar{E}$ μCi/gm for gross specific activity.

The analysis also assumes a loss of offsite power at the same time as the SGTR and MSLB event. The SGTR causes a reduction in reactor coolant inventory. The reduction initiates a reactor trip from a low pressurizer pressure signal or an RCS overtemperature ΔT signal. The MSLB results in a reactor trip due to low steam pressure.

The coincident loss of offsite power causes the steam dump valves to close to protect the condenser. The rise in pressure in the ruptured SG discharges radioactively contaminated steam to the atmosphere through the SG power operated relief valves and the main steam safety valves. The unaffected SGs remove core decay heat by venting steam to the atmosphere until the cooldown ends.

(continued)

BASES

| | |
|---|---|
| APPLICABLE SAFETY ANALYSES (continued) | The safety analysis shows the radiological consequences of an SGTR and MSLB accident are within the appropriate 10 CFR 100 and 10 CFR 50, Appendix A, GDC 19 dose guideline limits. Operation with iodine specific activity levels greater than the LCO limit is permissible, if the activity levels do not exceed ~~21~~ 14 μCi/gm DOSE EQUIVALENT I-131, in the applicable specification, for more than 48 hours. The safety analysis has concurrent and pre-accident iodine spiking levels up to ~~21~~ 14 μCi/gm DOSE EQUIVALENT I-131.<br><br>The limits on RCS specific activity are also used for establishing standardization in radiation shielding and plant personnel radiation protection practices.<br><br>RCS specific activity satisfies Criterion 2 of the NRC Policy Statement. |
| LCO | The specific iodine activity is limited to 0.265 μCi/gm DOSE EQUIVALENT I-131, and the gross specific activity in the reactor coolant is limited to the number of μCi/gm equal to 100 divided by $\bar{E}$ (average disintegration energy of the sum of the average beta and gamma energies of the coolant nuclides). The limit on DOSE EQUIVALENT I-131 ensures the 2 hour thyroid dose to an individual at the site boundary and accident dose to personnel in the Main Control Room during the Design Basis Accident (DBA) will be within the allowed thyroid dose. The limit on gross specific activity ensures the 2 hour whole body dose to an individual at the site boundary and accident dose to personnel in the Main Control Room during the DBA will be within the allowed whole body dose.<br><br>The SGTR and MSLB accident analysis (Ref. 2) shows that the 2 hour site boundary dose levels and Main Control Room accident dose are within acceptable limits. Violation of the LCO may result in reactor coolant radioactivity levels that could, in the event of a SGTR or MSLB, lead to site boundary doses that exceed the 10 CFR 100 dose guideline limits, or Main Control Room accident dose that exceed the 10 CFR 50, Appendix A, GDC 19 dose limits. |

(continued)

BASES (continued)

APPLICABILITY

In MODES 1 and 2, and in MODE 3 with RCS average temperature ≥ 500°F, operation within the LCO limits for DOSE EQUIVALENT I-131 and gross specific activity are necessary to contain the potential consequences of an accident to within the acceptable Main Control Room and site boundary dose values.

For operation in MODE 3 with RCS average temperature < 500°F, and in MODES 4 and 5, the release of radioactivity in the event of a SGTR is unlikely since the saturation pressure of the reactor coolant is below the lift pressure settings of the main steam safety valves.

ACTIONS

A.1 and A.2

With the DOSE EQUIVALENT I-131 greater than the LCO limit, samples at intervals of 4 hours must be taken to demonstrate that the limit of ~~21~~ 14 μCi/gm is not exceeded. The Completion Time of 4 hours is required to obtain and analyze a sample. Sampling is done to continue to provide a trend.

The DOSE EQUIVALENT I-131 must be restored to within limits within 48 hours. The Completion Time of 48 hours is required, if the limit violation resulted from normal iodine spiking.

A Note permits the use of the provisions of LCO 3.0.4.c. This allowance permits entry into the applicable MODE(S) while relying on the ACTIONS. This allowance is acceptable due to the significant conservatism incorporated into the specific activity limit, the low probability of an event which is limiting due to exceeding this limit, and the ability to restore transient specific activity excursions while the plant remains at, or proceeds to power operation.

(continued)

BASES

ACTIONS (continued)

B.1 and B.2

With the gross specific activity in excess of the allowed limit, an analysis must be performed within 4 hours to determine DOSE EQUIVALENT I-131. The Completion Time of 4 hours is required to obtain and analyze a sample.

The change within 6 hours to MODE 3 and RCS average temperature < 500°F lowers the saturation pressure of the reactor coolant below the setpoints of the main steam safety valves and prevents venting the SG to the environment in an SGTR event. The allowed Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 below 500°F from full power conditions in an orderly manner and without challenging plant systems.

C.1

If a Required Action and the associated Completion Time of Condition A is not met or if the DOSE EQUIVALENT I-131 is greater than ~~21~~ 14 μCi/gm, the reactor must be brought to MODE 3 with RCS average temperature < 500°F within 6 hours. The Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 below 500°F from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.4.16.1

SR 3.4.16.1 requires performing a gamma isotopic analysis as a measure of the gross specific activity of the reactor coolant at least once every 7 days. While basically a quantitative measure of radionuclides with half lives longer than 15 minutes, excluding iodines, this measurement is the sum of the degassed gamma activities and the gaseous gamma activities in the sample taken. This Surveillance provides an indication of any increase in gross specific activity.

Trending the results of this Surveillance allows proper remedial action to be taken before reaching the LCO limit under normal operating conditions. The Surveillance is applicable in MODES 1 and 2, and in MODE 3 with $T_{avg}$ at least 500°F. The 7-day Frequency considers the unlikelihood of a gross fuel failure during the time.

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 3.4.16.2

This Surveillance is performed in MODE 1 only to ensure iodine remains within limit during normal operation and following rapid power changes when fuel failure is more apt to occur. The 14-day Frequency is adequate to trend changes in the iodine activity level, considering gross activity is monitored every 7 days. The Frequency, between 2 hours and 6 hours after a power change ≥ 15% RTP within a 1 hour period, is established because the iodine levels peak during this time following fuel failure; samples at other times would provide inaccurate results.

SR 3.4.16.3

A radiochemical analysis for $\bar{E}$ determination is required every 184 days (6 months) with the plant operating in MODE 1 equilibrium conditions. The $\bar{E}$ determination directly relates to the LCO and is required to verify plant operation within the specified gross activity LCO limit. The analysis for $\bar{E}$ is a measurement of the average energies per disintegration for isotopes with half lives longer than 15 minutes, excluding iodines. The Frequency of 184 days recognizes $\bar{E}$ does not change rapidly.

This SR has been modified by a Note that indicates sampling is required to be performed within 31 days after a minimum of 2 effective full power days and 20 days of MODE 1 operation have elapsed since the reactor was last subcritical for at least 48 hours. This ensures that the radioactive materials are at equilibrium so the analysis for $\bar{E}$ is representative and not skewed by a crud burst or other similar abnormal event.

REFERENCES

1. Title 10, Code of Federal Regulations, Part 100.11, “Determination of Exclusion Area, Low Population Zone, and Population Center Distance,” 1973.

2. Watts Bar FSAR, Section 15.4, “Condition IV - Limiting Faults.”

(continued)

# B 3.7 PLANT SYSTEMS

## B 3.7.7 Component Cooling System (CCS)

BASES

BACKGROUND

The CCS provides a heat sink for the removal of process and operating heat from safety related components during a Design Basis Accident (DBA) or transient. During normal operation, the CCS also provides this function for various non-essential components, as well as the spent fuel storage pool. The CCS serves as a barrier to the release of radioactive byproducts between potentially radioactive systems and the Essential Raw Cooling Water (ERCW) System, and thus to the environment.

The CCS is arranged as two independent, full-capacity cooling trains, Train A and Train B. Train A in Unit 2 is served by CCS Hx B and CCS pump 2A-A. Pump 2B-B, which is actually Train B equipment, is also normally aligned to the Train A header in Unit 2. However, pump 2B-B can be realigned to Train B on loss of Train A.

Train B is served by CCS Hx C. Normally, only CCS pump C-S is aligned to the Train B header since few non-essential, normally-operating loads are assigned to Train B. However, pump 2B-B can be realigned to the Train B header on a loss of the C-S pump.

Each safety related train is powered from a separate bus. An open surge tank in the system provides pump trip protective functions to ensure that sufficient net positive suction head is available. The pump in each train is automatically started on receipt of a safety injection signal, and all non-essential components will be manually isolated.

CCS Pump 1B-B may be substituted for CCS Pump C-S supplying the Unit 2 CCS Train B header provided the OPERABILITY requirements are met.

Additional information on the design and operation of the system, along with a list of the components served, is presented in the FSAR, Section 9.2.2 (Ref. 1). The principal safety related function of the CCS is the removal of decay heat from the reactor via the Residual Heat Removal (RHR) System. This may be during a normal or post accident cooldown and shutdown.

(continued)

APPLICABLE SAFETY ANALYSES

The design basis of the CCS is for one CCS train to remove the post loss of coolant accident (LOCA) heat load from the containment sump during the recirculation phase, with a maximum CCS temperature of 110°F (Ref. 2). The Emergency Core Cooling System (ECCS) LOCA and containment OPERABILITY LOCA each model the maximum and minimum performance of the CCS, respectively. The normal temperature of the CCS is 95°F, and, during unit cooldown to MODE 5 ($T_{cold}$ < 200°F), a maximum temperature of 110°F is assumed. The CCS design based on these values, bounds the post accident conditions such that the sump fluid will not increase in temperature after alignment of the RHR heat exchangers during the recirculation phase following a LOCA, and provides a gradual reduction in the temperature of this fluid as it is supplied to the Reactor Coolant System (RCS) by the ECCS pumps.

The CCS is designed to perform its function with a single failure of any active component, assuming a loss of offsite power.

The CCS also functions to cool the unit from RHR entry conditions ($T_{cold}$ < 350°F), to MODE 5 ($T_{cold}$ < 200°F), during normal and post accident operations. The time required to cool from 350°F to 200°F is a function of the number of CCS and RHR trains operating. One CCS train is sufficient to remove decay heat during subsequent operations with $T_{cold}$ < 200°F. This assumes a maximum ERCW temperature of 85°F occurring simultaneously with the maximum heat loads on the system.

The CCS satisfies Criterion 3 of the NRC Policy Statement.

LCO

The CCS trains are independent of each other to the degree that each has separate controls and power supplies and the operation of one does not depend on the other. In the event of a DBA, one CCS train is required to provide the minimum heat removal capability assumed in the safety analysis for the systems to which it supplies cooling water. To ensure this requirement is met, two trains of CCS must be OPERABLE. At least one CCS train will operate assuming the worst case single active failure occurs coincident with a loss of offsite power.

A CCS train is considered OPERABLE when:

a. The pump and associated surge tank are OPERABLE; and

b. The associated piping, valves, heat exchanger, and instrumentation and controls required to perform the safety related function are OPERABLE.

(continued)

LCO (continued)

c. If CCS Pump 1B-B is substituted for CCS Pump C-S supplying the Unit 2 CCS Train B header, CCS Pump 1B-B is only considered OPERABLE when aligned to the CCS Train B header and operating.

The isolation of CCS from other components or systems not required for safety may render those components or systems inoperable but does not affect the OPERABILITY of the CCS.

CCS Pump 1B-B only receives a safety injection (SI) signal from Unit 1. If CCS Pump 1B-B is in a standby mode and is aligned as a substitute for CCS Pump C-S, then Unit 2 CCS train B will not be operable. Conversely, if CCS Pump 1B-B is operating and aligned as a substitute for CCS Pump C-S supplying the CCS Train B header, then Unit 2 CCS Train B is OPERABLE. The presence of an SI signal in Unit 2 will have no effect on CCS Pump 1B-B and the pump will continue to operate. In the event of a loss of offsite power, with or without an SI signal present, CCS Pump 1B-B will be automatically sequenced onto its respective diesel and continue to perform its required safety function.

APPLICABILITY

In MODES 1, 2, 3, and 4, the CCS is a normally operating system, which must be prepared to perform its post accident safety functions, primarily RCS heat removal, which is achieved by cooling the RHR heat exchanger.

In MODE 5 or 6, the OPERABILITY requirements of the CCS are determined by the systems it supports.

(continued)

BASES

ACTIONS

A.1

Required Action A.1 is modified by a Note indicating that the applicable Conditions and Required Actions of LCO 3.4.6, "RCS Loops - MODE 4," be entered if an inoperable CCS train results in an inoperable RHR loop. This is an exception to LCO 3.0.6 and ensures the proper actions are taken for these components.

If one CCS train is inoperable, action must be taken to restore OPERABLE status within 72 hours. In this Condition, the remaining OPERABLE CCS train is adequate to perform the heat removal function. The 72 hour Completion Time is reasonable, based on the redundant capabilities afforded by the OPERABLE train, and the low probability of a DBA occurring during this period.

B.1 and B.2

If the CCS train cannot be restored to OPERABLE status within the associated Completion Time, the plant must be placed in a MODE in which the LCO does not apply. To achieve this status, the plant must be placed in at least MODE 3 within 6 hours and in MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

(continued)

SURVEILLANCE REQUIREMENTS

SR 3.7.7.1

This SR verifies that the C-S pump is powered from the normal power source when it is aligned for OPERABLE status. Verification of the correct power alignment ensures that the two CCS trains remain independent. The 7 day Frequency is based on engineering judgment, is consistent with procedural controls governing breaker operation, and ensures correct breaker position.

SR 3.7.7.2

This SR is modified by a Note indicating that the isolation of the CCS flow to individual components may render those components inoperable but does not affect the OPERABILITY of the CCS.

Verifying the correct alignment for manual, power operated, and automatic valves in the CCS flow path provides assurance that the proper flow paths exist for CCS operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since these valves are verified to be in the correct position prior to locking, sealing, or securing. This SR also does not apply to valves that cannot be inadvertently misaligned, such as check valves. This Surveillance does not require any testing or valve manipulation; rather, it involves verification that those valves capable of being mispositioned are in the correct position.

The 31 day Frequency is based on engineering judgment, is consistent with the procedural controls governing valve operation, and ensures correct valve positions.

SR 3.7.7.3

This SR verifies proper automatic operation of the CCS valves on an actual or simulated actuation signal. The CCS is a normally operating system that cannot be fully actuated as part of routine testing during normal operation. This Surveillance is not required for valves that are locked, sealed, or otherwise secured in the required position under administrative control. The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a unit outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown that these components usually pass the Surveillance when performed at the 18 month Frequency. Therefore, the Frequency is acceptable from a reliability standpoint.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 3.7.7.4

This SR verifies proper automatic operation of the CCS pumps on an actual or simulated actuation signal. The CCS is a normally operating system that cannot be fully actuated as part of routine testing during normal operation. The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a unit outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown that these components usually pass the Surveillance when performed at the 18 month Frequency. Therefore, the Frequency is acceptable from a reliability standpoint.

This SR does not apply to CCS Pump 1B-B when substituted for CCS Pump C-S to establish operability of Unit 2 CCS Train B. CCS Pump 1B-B does not receive an SI actuation signal from Unit 2. If it is operating and aligned as a substitute for CCS Pump C-S supplying the CCS Train B header, the presence of an SI signal in Unit 2 will have no effect on CCS Pump 1B-B and the pump will continue to perform its required safety function. In the event of a loss of offsite power, with or without an SI signal present, CCS Pump 1B-B will be automatically sequenced onto its respective diesel and continue to perform its required safety function.

SR 3.7.7.5

This SR assures the operability of Unit 2 CCS Train B when CCS Pump 1B-B is substituted for CCS Pump C-S. Since CCS Pump 1B-B does not receive an SI actuation signal from Unit 2, by verifying the pump is aligned and operating, assurance is provided that Unit 2 CCS Train B will be operable in the event of a Unit 2 SI actuation.

REFERENCES

1. Watts Bar FSAR, Section 9.2.2, "Component Cooling System."
2. Watts Bar Component Cooling System Description, N3-70-4002.

(continued)

# ATTACHMENT 3

## TS Changes (Final Typed) for WBN, Unit 2

Table 3.3.7-1 (page 1 of 1)
CREVS Actuation Instrumentation

| FUNCTION | REQUIRED CHANNELS | SURVEILLANCE REQUIREMENTS | ALLOWABLE VALUE |
|---|---|---|---|
| 4. Manual Initiation | 2 trains | SR 3.3.7.3 | NA |
| 5. Control Room Radiation Control Room Air Intakes | 2 | SR 3.3.7.1<br>SR 3.3.7.2<br>SR 3.3.7.4 | ≤ 1.647E-04 μC/cc (3,308 cpm) |
| 6. Safety Injection | Refer to LCO 3.3.2, "ESFAS Instrumentation," Function 1, for all initiation functions and requirements. | | |

## 3.4 REACTOR COOLANT SYSTEM (RCS)

### 3.4.16 RCS Specific Activity

LCO 3.4.16 The specific activity of the reactor coolant shall be within limits.

APPLICABILITY: MODES 1 and 2,
MODE 3 with RCS average temperature ($T_{avg}$) ≥ 500°F.

ACTIONS

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| D. DOSE EQUIVALENT I-131 > 0.265 μCi/gm. | --------------------NOTE-------------------<br>LCO 3.0.4.c is applicable.<br>------------------------------------------------- | |
| | A.1 Verify DOSE EQUIVALENT I-131 ≤ 14 μCi/gm. | Once per 4 hours |
| | AND | |
| | A.2 Restore DOSE EQUIVALENT I-131 to within limit. | 48 hours |
| E. Gross specific activity of the reactor coolant not within limit. | B.1 Perform SR 3.4.16.2. | 4 hours |
| | AND | |
| | B.2 Be in MODE 3 with $T_{avg}$ < 500°F. | 6 hours |

(continued)

ACTIONS (continued)

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| F. Required Action and associated Completion Time of Condition A not met.<br><br>OR<br><br>DOSE EQUIVALENT I-131 >14 μCi/gm. | C.1 Be in MODE 3 with $T_{avg}$ < 500°F. | 6 hours |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.4.16.1 | Verify reactor coolant gross specific activity ≤ 100/ $\bar{E}$ μCi/gm. | 7 days |
| SR 3.4.16.2 | -------------------------------NOTE------------------------------<br>Only required to be performed in MODE 1.<br>-------------------------------------------------------------------<br><br>Verify reactor coolant DOSE EQUIVALENT I-131 specific activity ≤ 0.265 μCi/gm. | 14 days<br><br>AND<br><br>Between 2 hours and 6 hours after a THERMAL POWER change of ≥ 15% RTP within a 1 hour period |

(continued)

SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.4.16.3 | -------------------------------NOTE------------------------------<br>Required to be performed within 31 days after a minimum of 2 effective full power days and 20 days of MODE 1 operation have elapsed since the reactor was last subcritical for ≥ 48 hours.<br>-------------------------------------------------------------------<br><br>Determine $\bar{E}$ from a sample taken in MODE 1 after a minimum of 2 effective full power days and 20 days of MODE 1 operation have elapsed since the reactor was last subcritical for ≥ 48 hours. | 184 days |

## 3.7 PLANT SYSTEMS

### 3.7.7 Component Cooling System (CCS)

LCO 3.7.7 Two CCS trains shall be OPERABLE.

-----------------------------------------------------NOTE-----------------------------------------------------
CCS Pump 1B-B aligned to CCS Train B supports an OPERABLE CCS Train B for Unit 2 only when CCS Pump 1B-B is OPERABLE and OPERATING as verified by SR 3.7.7.5
-------------------------------------------------------------------------------------------------------------------

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

ACTIONS

| CONDITION | REQUIRED ACTION | | COMPLETION TIME |
|---|---|---|---|
| C. One CCS train inoperable. | A.1 | -------------NOTE------------<br>Enter applicable Conditions and Required Actions of LCO 3.4.6, "RCS Loops-MODE 4," for residual heat removal loops made inoperable by CCS.<br>----------------------------------<br><br>Restore CCS train to OPERABLE status. | <br><br><br><br><br><br><br><br><br>72 hours |
| D. Required Action and associated Completion Time of Condition A not met. | B.1<br><br>AND<br><br>B.2 | Be in MODE 3.<br><br><br><br>Be in MODE 5. | 6 hours<br><br><br><br>36 hours |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.7.7.1 | Verify that the alternate feeder breaker to the C-S pump is open. | 7 days |
| SR 3.7.7.2 | ------------------------------NOTE------------------------------<br>Isolation of CCS flow to individual components does not render the CCS inoperable.<br>-------------------------------------------------------------------<br><br>Verify each CCS manual, power operated, and automatic valve in the flow path servicing safety related equipment, that is not locked, sealed, or otherwise secured in position, is in the correct position. | 31 days |
| SR 3.7.7.3 | Verify each CCS automatic valve in the flow path that is not locked, sealed, or otherwise secured in position, actuates to the correct position on an actual or simulated actuation signal. | 18 months |
| SR 3.7.7.4 | Verify each CCS pump starts automatically on an actual or simulated actuation signal. When CCS Pump 1B-B is substituted for CCS Pump C-S to establish CCS Train B operability, SR 3.7.7.4 does not apply to CCS Pump 1B-B (See SR 3.7.7.5). | 18 months |
| SR 3.7.7.5 | When CCS Pump 1B-B is substituted for CCS Pump C-S for Unit 2 CCS Train B operability, then,<br><br>Verify CCS 1B-B is aligned to CCS Train B and is operating. | 12 hours |

## 5.0 ADMINISTRATIVE CONTROLS

### 5.9 Reporting Requirements

The following reports shall be submitted in accordance with 10 CFR 50.4.

5.9.1 DELETED

5.9.2 Annual Radiological Environmental Operating Report

-----------------------------------------------NOTE-----------------------------------------------
A single submittal may be made for a multiple unit station. The submittal should combine sections common to all units at the station.
-------------------------------------------------------------------------------------------------------

The Annual Radiological Environmental Operating Report covering the operation of the unit during the previous calendar year shall be submitted by May 15 of each year. The report shall include summaries, interpretations, and analyses of trends of the results of the Radiological Environmental Monitoring Program for the reporting period. The material provided shall be consistent with the objectives outlined in the Offsite Dose Calculation Manual (ODCM), and in 10 CFR 50, Appendix I, Sections IV.B.2, IV.B.3, and IV.C.

The Annual Radiological Environmental Operating Report shall include the results of analyses of all radiological environmental samples and of all environmental radiation measurements taken during the period pursuant to the locations specified in the table and figures in the ODCM, as well as summarized and tabulated results of these analyses and measurements in the format of the table in the Radiological Assessment Branch Technical Position, Revision 1, November 1979. In the event that some individual results are not available for inclusion with the report, the report shall be submitted noting and explaining the reasons for the missing results. The missing data shall be submitted in a supplementary report as soon as possible.

## ATTACHMENT 4

## TS Bases Changes (Final Typed) for WBN, Unit 2

B 3.4 REACTOR COOLANT SYSTEM (RCS)

B 3.4.16 RCS Specific Activity

BASES

BACKGROUND

The maximum dose to the whole body and the thyroid that an individual at the site boundary can receive for 2 hours during an accident is specified in 10 CFR 100 (Ref. 1). The maximum dose to the whole body and the thyroid that an individual occupying the Main Control Room can receive for the accident duration is specified in 10 CFR 50, Appendix A, GDC 19. The limits on specific activity ensure that the doses are held to a small fraction of the 10 CFR 100 limits and within the 10 CFR 50, Appendix A, GDC 19 limits during analyzed transients and accidents.

The RCS specific activity LCO limits the allowable concentration level of radionuclides in the reactor coolant. The LCO limits are established to minimize the offsite and Main Control Room radioactivity dose consequences in the event of a steam generator tube rupture (SGTR) or main steam line break (MSLB) accident.

The LCO contains specific activity limits for both DOSE EQUIVALENT I-131 and gross specific activity. The allowable levels are intended to limit the 2 hour dose at the site boundary to a small fraction of the 10 CFR 100 dose guideline limits, and ensure the Main Control Room accident dose is within the appropriate 10 CFR 50, Appendix A, GDC 19 dose guideline limits.

The evaluations showed the potential offsite and Main Control Room dose levels for a SGTR and MSLB accident were within the appropriate 10 CFR 100 and GDC 19 guideline limits.

(continued)

BASES (continued)

APPLICABLE SAFETY ANALYSES

The LCO limits on the specific activity of the reactor coolant ensures that the resulting 2 hour doses at the site boundary and Main Control Room accident doses will not exceed the appropriate 10 CFR 100 dose guideline limits and 10 CFR 50, Appendix A, GDC 19 dose guideline limits following a SGTR or MSLB accident. The SGTR and MSLB safety analysis (Ref. 2) assumes the specific activity of the reactor coolant at the LCO limit and an existing reactor coolant steam generator (SG) tube leakage rate of 150 gallons per day (GPD). The safety analysis assumes the specific activity of the secondary coolant at its limit of 0.1 μCi/gm DOSE EQUIVALENT I-131 from LCO 3.7.14, "Secondary Specific Activity."

The analysis for the SGTR and MSLB accidents establish the acceptance limits for RCS specific activity. Reference to these analyses is used to assess changes to the unit that could affect RCS specific activity, as they relate to the acceptance limits.

The analyses are for two cases of reactor coolant specific activity. One case assumes specific activity at 0.265 μCi/gm DOSE EQUIVALENT I-131 with an iodine spike immediately after the accident that increases the iodine activity in the reactor coolant by a factor of 500 times the iodine production rate necessary to maintain a steady state iodine concentration of 0.265 μCi/gm DOSE EQUIVALENT I-131. The second case assumes the initial reactor coolant iodine activity at 14 μCi/gm DOSE EQUIVALENT I-131 due to a pre-accident iodine spike caused by an RCS transient. In both cases, the noble gas activity in the reactor coolant equals the LCO limit of 100/ $\bar{E}$ μCi/gm for gross specific activity.

The analysis also assumes a loss of offsite power at the same time as the SGTR and MSLB event. The SGTR causes a reduction in reactor coolant inventory. The reduction initiates a reactor trip from a low pressurizer pressure signal or an RCS overtemperature ΔT signal. The MSLB results in a reactor trip due to low steam pressure.

The coincident loss of offsite power causes the steam dump valves to close to protect the condenser. The rise in pressure in the ruptured SG discharges radioactively contaminated steam to the atmosphere through the SG power operated relief valves and the main steam safety valves. The unaffected SGs remove core decay heat by venting steam to the atmosphere until the cooldown ends.

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

The safety analysis shows the radiological consequences of an SGTR and MSLB accident are within the appropriate 10 CFR 100 and 10 CFR 50, Appendix A, GDC 19 dose guideline limits. Operation with iodine specific activity levels greater than the LCO limit is permissible, if the activity levels do not exceed 14 μCi/gm DOSE EQUIVALENT I-131, in the applicable specification, for more than 48 hours. The safety analysis has concurrent and pre-accident iodine spiking levels up to 14 μCi/gm DOSE EQUIVALENT I-131.

The limits on RCS specific activity are also used for establishing standardization in radiation shielding and plant personnel radiation protection practices.

RCS specific activity satisfies Criterion 2 of the NRC Policy Statement.

LCO

The specific iodine activity is limited to 0.265 μCi/gm DOSE EQUIVALENT I-131, and the gross specific activity in the reactor coolant is limited to the number of μCi/gm equal to 100 divided by $\bar{E}$ (average disintegration energy of the sum of the average beta and gamma energies of the coolant nuclides). The limit on DOSE EQUIVALENT I-131 ensures the 2 hour thyroid dose to an individual at the site boundary and accident dose to personnel in the Main Control Room during the Design Basis Accident (DBA) will be within the allowed thyroid dose. The limit on gross specific activity ensures the 2 hour whole body dose to an individual at the site boundary and accident dose to personnel in the Main Control Room during the DBA will be within the allowed whole body dose.

The SGTR and MSLB accident analysis (Ref. 2) shows that the 2 hour site boundary dose levels and Main Control Room accident dose are within acceptable limits. Violation of the LCO may result in reactor coolant radioactivity levels that could, in the event of a SGTR or MSLB, lead to site boundary doses that exceed the 10 CFR 100 dose guideline limits, or Main Control Room accident dose that exceed the 10 CFR 50, Appendix A, GDC 19 dose limits.

(continued)

BASES (continued)

APPLICABILITY

In MODES 1 and 2, and in MODE 3 with RCS average temperature ≥ 500°F, operation within the LCO limits for DOSE EQUIVALENT I-131 and gross specific activity are necessary to contain the potential consequences of an accident to within the acceptable Main Control Room and site boundary dose values.

For operation in MODE 3 with RCS average temperature < 500°F, and in MODES 4 and 5, the release of radioactivity in the event of a SGTR is unlikely since the saturation pressure of the reactor coolant is below the lift pressure settings of the main steam safety valves.

ACTIONS

A.1 and A.2

With the DOSE EQUIVALENT I-131 greater than the LCO limit, samples at intervals of 4 hours must be taken to demonstrate that the limit of 14 μCi/gm is not exceeded. The Completion Time of 4 hours is required to obtain and analyze a sample. Sampling is done to continue to provide a trend.

The DOSE EQUIVALENT I-131 must be restored to within limits within 48 hours. The Completion Time of 48 hours is required, if the limit violation resulted from normal iodine spiking.

A Note permits the use of the provisions of LCO 3.0.4.c. This allowance permits entry into the applicable MODE(S) while relying on the ACTIONS. This allowance is acceptable due to the significant conservatism incorporated into the specific activity limit, the low probability of an event which is limiting due to exceeding this limit, and the ability to restore transient specific activity excursions while the plant remains at, or proceeds to power operation.

(continued)

BASES

ACTIONS (continued)

B.1 and B.2

With the gross specific activity in excess of the allowed limit, an analysis must be performed within 4 hours to determine DOSE EQUIVALENT I-131. The Completion Time of 4 hours is required to obtain and analyze a sample.

The change within 6 hours to MODE 3 and RCS average temperature < 500°F lowers the saturation pressure of the reactor coolant below the setpoints of the main steam safety valves and prevents venting the SG to the environment in an SGTR event. The allowed Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 below 500°F from full power conditions in an orderly manner and without challenging plant systems.

C.1

If a Required Action and the associated Completion Time of Condition A is not met or if the DOSE EQUIVALENT I-131 is greater than 14 μCi/gm, the reactor must be brought to MODE 3 with RCS average temperature < 500°F within 6 hours. The Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 below 500°F from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

SR 3.4.16.1

SR 3.4.16.1 requires performing a gamma isotopic analysis as a measure of the gross specific activity of the reactor coolant at least once every 7 days. While basically a quantitative measure of radionuclides with half lives longer than 15 minutes, excluding iodines, this measurement is the sum of the degassed gamma activities and the gaseous gamma activities in the sample taken. This Surveillance provides an indication of any increase in gross specific activity.

Trending the results of this Surveillance allows proper remedial action to be taken before reaching the LCO limit under normal operating conditions. The Surveillance is applicable in MODES 1 and 2, and in MODE 3 with $T_{avg}$ at least 500°F. The 7-day Frequency considers the unlikelihood of a gross fuel failure during the time.

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 3.4.16.2

This Surveillance is performed in MODE 1 only to ensure iodine remains within limit during normal operation and following rapid power changes when fuel failure is more apt to occur. The 14-day Frequency is adequate to trend changes in the iodine activity level, considering gross activity is monitored every 7 days. The Frequency, between 2 hours and 6 hours after a power change $\geq$ 15% RTP within a 1 hour period, is established because the iodine levels peak during this time following fuel failure; samples at other times would provide inaccurate results.

SR 3.4.16.3

A radiochemical analysis for $\bar{E}$ determination is required every 184 days (6 months) with the plant operating in MODE 1 equilibrium conditions. The $\bar{E}$ determination directly relates to the LCO and is required to verify plant operation within the specified gross activity LCO limit. The analysis for $\bar{E}$ is a measurement of the average energies per disintegration for isotopes with half lives longer than 15 minutes, excluding iodines. The Frequency of 184 days recognizes $\bar{E}$ does not change rapidly.

This SR has been modified by a Note that indicates sampling is required to be performed within 31 days after a minimum of 2 effective full power days and 20 days of MODE 1 operation have elapsed since the reactor was last subcritical for at least 48 hours. This ensures that the radioactive materials are at equilibrium so the analysis for $\bar{E}$ is representative and not skewed by a crud burst or other similar abnormal event.

REFERENCES

1. Title 10, Code of Federal Regulations, Part 100.11, “Determination of Exclusion Area, Low Population Zone, and Population Center Distance,” 1973.

2. Watts Bar FSAR, Section 15.4, “Condition IV - Limiting Faults.”

# B 3.7 PLANT SYSTEMS

## B 3.7.7 Component Cooling System (CCS)

BASES

BACKGROUND

The CCS provides a heat sink for the removal of process and operating heat from safety related components during a Design Basis Accident (DBA) or transient. During normal operation, the CCS also provides this function for various non-essential components, as well as the spent fuel storage pool. The CCS serves as a barrier to the release of radioactive byproducts between potentially radioactive systems and the Essential Raw Cooling Water (ERCW) System, and thus to the environment.

The CCS is arranged as two independent, full-capacity cooling trains, Train A and Train B. Train A in Unit 2 is served by CCS Hx B and CCS pump 2A-A. Pump 2B-B, which is actually Train B equipment, is also normally aligned to the Train A header in Unit 2. However, pump 2B-B can be realigned to Train B on loss of Train A.

Train B is served by CCS Hx C. Normally, only CCS pump C-S is aligned to the Train B header since few non-essential, normally-operating loads are assigned to Train B. However, pump 2B-B can be realigned to the Train B header on a loss of the C-S pump.

Each safety related train is powered from a separate bus. An open surge tank in the system provides pump trip protective functions to ensure that sufficient net positive suction head is available. The pump in each train is automatically started on receipt of a safety injection signal, and all non-essential components will be manually isolated.

CCS Pump 1B-B may be substituted for CCS Pump C-S supplying the Unit 2 CCS Train B header provided the OPERABILITY requirements are met.

Additional information on the design and operation of the system, along with a list of the components served, is presented in the FSAR, Section 9.2.2 (Ref. 1). The principal safety related function of the CCS is the removal of decay heat from the reactor via the Residual Heat Removal (RHR) System. This may be during a normal or post accident cooldown and shutdown.

(continued)

BASES (continued)

| | |
|---|---|
| APPLICABLE SAFETY ANALYSES | The design basis of the CCS is for one CCS train to remove the post loss of coolant accident (LOCA) heat load from the containment sump during the recirculation phase, with a maximum CCS temperature of 110°F (Ref. 2). The Emergency Core Cooling System (ECCS) LOCA and containment OPERABILITY LOCA each model the maximum and minimum performance of the CCS, respectively. The normal temperature of the CCS is 95°F, and, during unit cooldown to MODE 5 ($T_{cold}$ < 200°F), a maximum temperature of 110°F is assumed. The CCS design based on these values, bounds the post accident conditions such that the sump fluid will not increase in temperature after alignment of the RHR heat exchangers during the recirculation phase following a LOCA, and provides a gradual reduction in the temperature of this fluid as it is supplied to the Reactor Coolant System (RCS) by the ECCS pumps. |

The CCS is designed to perform its function with a single failure of any active component, assuming a loss of offsite power.

The CCS also functions to cool the unit from RHR entry conditions ($T_{cold}$ < 350°F), to MODE 5 ($T_{cold}$ < 200°F), during normal and post accident operations. The time required to cool from 350°F to 200°F is a function of the number of CCS and RHR trains operating. One CCS train is sufficient to remove decay heat during subsequent operations with $T_{cold}$ < 200°F. This assumes a maximum ERCW temperature of 85°F occurring simultaneously with the maximum heat loads on the system.

The CCS satisfies Criterion 3 of the NRC Policy Statement.

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LCO

The CCS trains are independent of each other to the degree that each has separate controls and power supplies and the operation of one does not depend on the other. In the event of a DBA, one CCS train is required to provide the minimum heat removal capability assumed in the safety analysis for the systems to which it supplies cooling water. To ensure this requirement is met, two trains of CCS must be OPERABLE. At least one CCS train will operate assuming the worst case single active failure occurs coincident with a loss of offsite power.

A CCS train is considered OPERABLE when:

a. The pump and associated surge tank are OPERABLE; and

b. The associated piping, valves, heat exchanger, and instrumentation and controls required to perform the safety related function are OPERABLE.

(continued)

BASES

LCO (continued)

c. If CCS Pump 1B-B is substituted for CCS Pump C-S supplying the Unit 2 CCS Train B header, CCS Pump 1B-B is only considered OPERABLE when aligned to the CCS Train B header and operating.

The isolation of CCS from other components or systems not required for safety may render those components or systems inoperable but does not affect the OPERABILITY of the CCS.

CCS Pump 1B-B only receives a safety injection (SI) signal from Unit 1. If CCS Pump 1B-B is in a standby mode and is aligned as a substitute for CCS Pump C-S, then Unit 2 CCS train B will not be operable. Conversely, if CCS Pump 1B-B is operating and aligned as a substitute for CCS Pump C-S supplying the CCS Train B header, then Unit 2 CCS Train B is OPERABLE. The presence of an SI signal in Unit 2 will have no effect on CCS Pump 1B-B and the pump will continue to operate. In the event of a loss of offsite power, with or without an SI signal present, CCS Pump 1B-B will be automatically sequenced onto its respective diesel and continue to perform its required safety function.

APPLICABILITY

In MODES 1, 2, 3, and 4, the CCS is a normally operating system, which must be prepared to perform its post accident safety functions, primarily RCS heat removal, which is achieved by cooling the RHR heat exchanger.

In MODE 5 or 6, the OPERABILITY requirements of the CCS are determined by the systems it supports.

(continued)

ACTIONS

A.1

Required Action A.1 is modified by a Note indicating that the applicable Conditions and Required Actions of LCO 3.4.6, "RCS Loops - MODE 4," be entered if an inoperable CCS train results in an inoperable RHR loop. This is an exception to LCO 3.0.6 and ensures the proper actions are taken for these components.

If one CCS train is inoperable, action must be taken to restore OPERABLE status within 72 hours. In this Condition, the remaining OPERABLE CCS train is adequate to perform the heat removal function. The 72 hour Completion Time is reasonable, based on the redundant capabilities afforded by the OPERABLE train, and the low probability of a DBA occurring during this period.

B.1 and B.2

If the CCS train cannot be restored to OPERABLE status within the associated Completion Time, the plant must be placed in a MODE in which the LCO does not apply. To achieve this status, the plant must be placed in at least MODE 3 within 6 hours and in MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.7.7.1

This SR verifies that the C-S pump is powered from the normal power source when it is aligned for OPERABLE status. Verification of the correct power alignment ensures that the two CCS trains remain independent. The 7 day Frequency is based on engineering judgment, is consistent with procedural controls governing breaker operation, and ensures correct breaker position.

SR 3.7.7.2

This SR is modified by a Note indicating that the isolation of the CCS flow to individual components may render those components inoperable but does not affect the OPERABILITY of the CCS.

Verifying the correct alignment for manual, power operated, and automatic valves in the CCS flow path provides assurance that the proper flow paths exist for CCS operation. This SR does not apply to valves that are locked, sealed, or otherwise secured in position, since these valves are verified to be in the correct position prior to locking, sealing, or securing. This SR also does not apply to valves that cannot be inadvertently misaligned, such as check valves. This Surveillance does not require any testing or valve manipulation; rather, it involves verification that those valves capable of being mispositioned are in the correct position.

The 31 day Frequency is based on engineering judgment, is consistent with the procedural controls governing valve operation, and ensures correct valve positions.

SR 3.7.7.3

This SR verifies proper automatic operation of the CCS valves on an actual or simulated actuation signal. The CCS is a normally operating system that cannot be fully actuated as part of routine testing during normal operation. This Surveillance is not required for valves that are locked, sealed, or otherwise secured in the required position under administrative control. The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a unit outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown that these components usually pass the Surveillance when performed at the 18 month Frequency. Therefore, the Frequency is acceptable from a reliability standpoint.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 3.7.7.4

This SR verifies proper automatic operation of the CCS pumps on an actual or simulated actuation signal. The CCS is a normally operating system that cannot be fully actuated as part of routine testing during normal operation. The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a unit outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown that these components usually pass the Surveillance when performed at the 18 month Frequency. Therefore, the Frequency is acceptable from a reliability standpoint.

This SR does not apply to CCS Pump 1B-B when substituted for CCS Pump C-S to establish operability of Unit 2 CCS Train B. CCS Pump 1B-B does not receive an SI actuation signal from Unit 2. If is operating and aligned as a substitute for CCS Pump C-S supplying the CCS Train B header, the presence of an SI signal in Unit 2 will have no effect on CCS Pump 1B-B and the pump will continue to perform its required safety function. In the event of a loss of offsite power, with or without an SI signal present, CCS Pump 1B-B will be automatically sequenced onto its respective diesel and continue to perform its required safety function.

SR 3.7.7.5

This SR assures the operability of Unit 2 CCS Train B when CCS Pump 1B-B is substituted for CCS Pump C-S. Since CCS Pump 1B-B does not receive an SI actuation signal from Unit 2, by verifying the pump is aligned and operating, assurance is provided that Unit 2 CCS Train B will be operable in the event of a Unit 2 SI actuation.

(continued)