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Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Sir / Madam:

Subject: VIRGIL C. SUMMER NUCLEAR STATION UNIT 1
DOCKET NO. 50/395
OPERATING LICENSE NO. NPF-12
TECHNICAL SPECIFICATION BASES REVISION
UPDATED THROUGH JUNE 2012

In accordance with Technical Specification 6.8.4.i., South Carolina Electric & Gas Company (SCE&G), acting for itself and as agent for South Carolina Public Service Authority, submits revisions to the Technical Specification (TS) Bases in accordance with the Technical Specification Bases Control Program.

This TS Bases update includes changes to the TS Bases since the previous submittal in August 2011. These changes were made under the provisions of 10CFR50.59. Technical changes are annotated by vertical revision bars and the Bases Revision Notice (BRN) number or license amendment number at the bottom of the page.

If you have any questions or require additional information, please contact Bruce Thompson at (803) 931-5042.

Very truly yours,

Thomas D. Gatlin

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A001
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TECHNICAL SPECIFICATION BASES REVISIONS
UPDATED THROUGH JUNE 2012

Revision Notice #	Date Approved	Pages Affected
BRN 12-001	05/31/12	B 3/4 4-4 B 3/4 4-4a B 3/4 4-4b B 3/4 4-4c B 3/4 4-4d B 3/4 4-4e B 3/4 4-4f B 3/4 4-4g B 3/4 4-4h
AMENDMENT NO. 187	03/06/12	B 3/4 3-1

SUMMARY OF BASES CHANGES

BRN No. 12-001
Description of Change: Revise the Bases for Technical Specifications (TS) 3/4.4.6.1 which was previously approved under License Amendment No. 186 (ML11326A250), Leakage Detection Systems, by adding a note that allows concurrent actions.

Reason and Basis for Change: License Amendment No. 186 was based upon guidance provided in NRC-approved Revision 3 to TSTF-513, "Revise PWR Operability Requirements and Actions for RCS Leakage Instrumentation." The format and content for Amendment 186 was based upon guidance provided in NUREG-1431, Revision 3, "Standard Technical Specifications Westinghouse Plants." Section 1.3 of NUREG-1431 allows entry into multiple action statements concurrently.

TS Amendment No. 187
Description of Change: Revise the Bases for TS 3/4.3.1 and 3/4.3.2, "Reactor Trip and Engineered Safety Actuation System Instrumentation," which was approved under License Amendment No. 187 (ML12047A192), by adding statements that the Slave Relay Tests will be performed on an 18-month frequency for specific Westinghouse type AR relays.

Reason and Basis for Change: License Amendment No. 187 was based upon Westinghouse topical report WCAP-13877-P-A, Revision 2, "Reliability Assessment of Westinghouse Type AR Relays Used as SSPS Slave Relays," which provided technical justification for extending the surveillance test frequency from quarterly to every 18 months or each refueling outage for Westinghouse Type AR relays used in SSPS applications.

3/4.4.6 REACTOR COOLANT SYSTEM LEAKAGE

3/4.4.6.1 LEAKAGE DETECTION SYSTEMS

Background

The RCS leakage detection systems required by this specification are provided to monitor and detect leakage from the Reactor Coolant Pressure Boundary. These detection systems are consistent with the recommendations of Regulatory Guide 1.45, "Reactor Coolant Pressure Boundary Leakage Detection Systems," May 1973.

Leakage detection systems must have the capability to detect significant reactor coolant pressure boundary (RCPB) degradation as soon after occurrence as practical to minimize the potential for propagation to a gross failure. Thus, an early indication or warning signal is necessary to permit proper evaluation of all UNIDENTIFIED LEAKAGE. In addition to meeting the OPERABILITY requirements described below, the monitors are typically set to provide the most sensitive response without causing an excessive number of spurious alarms.

Limiting Condition for Operation (LCO)

The LCO requires instruments of diverse monitoring principles to be OPERABLE to provide confidence that small amounts of UNIDENTIFIED LEAKAGE are detected in time to allow actions to place the plant in a safe condition, when RCS leakage indicates possible Reactor Coolant Pressure Boundary (RCPB) degradation.

The LCO requires three instruments to be OPERABLE.

The reactor building sump is used to collect UNIDENTIFIED LEAKAGE. The LCO requirements apply to the total amount of UNIDENTIFIED LEAKAGE collected in the sump. Detection of leakage is accomplished by obtaining a flow rate into the sump from comparison of level changes over a specified time period. Whenever the measured flow rate into the sump from unidentified sources exceeds 1 gallon per minute, a "greater than 1 gpm" alarm is actuated. The identification of UNIDENTIFIED LEAKAGE will be delayed by the time required for the UNIDENTIFIED LEAKAGE to travel to the reactor building sump and it may take longer than one hour to detect a 1 gpm increase in UNIDENTIFIED LEAKAGE, depending on the origin and magnitude of the leakage. This sensitivity is acceptable for reactor building sump level monitor OPERABILITY.

The reactor coolant contains radioactivity that, when released to the containment, can be detected by the gaseous or particulate containment atmosphere radioactivity monitor. Only one of the two detectors is required to be OPERABLE. Radioactivity detection systems are included for monitoring both particulate and gaseous activities because of their sensitivities and rapid responses to RCS leakage, but have recognized limitations. Reactor coolant radioactivity levels will be low during initial reactor startup and for a few weeks thereafter, until activated corrosion products have been formed and fission products appear from fuel element cladding contamination or cladding defects. If there are few fuel element cladding defects and low levels of activation products, it may not be possible for the gaseous or particulate containment atmosphere radioactivity monitors to detect a 1 gpm increase within 1 hour during normal

LEAKAGE DETECTION SYSTEMS (Continued)

operation. However, the gaseous or particulate containment atmosphere radioactivity monitor is OPERABLE when it is capable of detecting a 1 gpm increase in unidentified LEAKAGE within 1 hour as discussed in UFSAR Section 12.2.4.2.2, "Reactor Building Air Sample Line, Channel RM-A2."

An increase in humidity of the containment atmosphere could indicate the release of water vapor to the containment. A flow switch is located in each of the common condensate drain headers from the reactor building cooling units. Each flow switch is set to actuate an alarm in the control room, should a flow rate exceeding 0.5 gpm occur. The time required to detect an increase above the normal value varies based on environmental and system conditions and may take longer than 1 hour. This sensitivity is acceptable for reactor building cooling unit condensate flow rate monitor OPERABILITY.

The LCO is satisfied when monitors of diverse measurement means are available. Thus, the reactor building sump level monitor, in combination with a gaseous or particulate radioactivity monitor and a reactor building cooling unit condensate flow rate monitor, provides an acceptable minimum.

Actions*

a. With the required reactor building sump level monitor inoperable, no other form of sampling can provide the equivalent information; however, the reactor building atmosphere radioactivity monitor will provide indications of changes in leakage. Together with the reactor building atmosphere radioactivity monitor, the periodic surveillance for RCS water inventory balance, surveillance requirement 4.4.6.2.1.d, must be performed at an increased frequency of 24 hours to provide information that is adequate to detect leakage. Note 1 is added allowing that surveillance requirement 4.4.6.2.1.d is not required to be performed until 12 hours after establishing steady state operation (stable temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and RCP seal injection and return flows). The 12 hour allowance provides sufficient time to collect and process all necessary data after stable plant conditions are established.

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* Actions a-f of TS 3.4.6.1 were revised by T.S. Amendment 186 and was based on Tech Spec Task Force (TSTF) Change Traveler 513. The TSTF was developed from the format of NUREG 1431 (Improved Technical Specifications), which allows concurrent actions. Section 1.3 of NUREG 1431 states that:

> "If situations are discovered that require entry into more than one Condition at a time within a single LCO (multiple Conditions), the Required Actions for each Condition must be performed within the associated Completion Time. When in multiple Conditions, separate Completion Times are tracked for each Condition starting from the time of discovery of the situation that required entry into the Condition."

LEAKAGE DETECTION SYSTEMS (Continued)

Restoration of the required sump level monitor to OPERABLE status within a Completion Time of 30 days is required to regain the function after the monitor's failure. This time is acceptable, considering the Frequency and adequacy of the RCS water inventory balance required by the ACTION.

b. With both gaseous and particulate reactor building atmosphere radioactivity monitors inoperable, alternative action is required. Either grab samples of the containment atmosphere must be taken and analyzed or RCS water inventory balance, in accordance with surveillance requirement 4.4.6.2.1.d, must be performed to provide alternate periodic information.

   With a sample obtained and analyzed or water inventory balance performed every 24 hours, the reactor may be operated for up to 30 days to allow restoration of the required containment atmosphere radioactivity monitors. Alternatively, continued operation is allowed if the reactor building cooling unit condensate flow rate monitor is OPERABLE, provided grab samples are taken or water inventory balances performed every 24 hours.

   The 24 hour interval provides periodic information that is adequate to detect leakage. A Note 1 is added allowing that surveillance requirement 4.4.6.2.1.d is not required to be performed until 12 hours after establishing steady state operation (stable temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and RCP seal injection and return flows). The 12 hour allowance provides sufficient time to collect and process all necessary data after stable plant conditions are established. The 30 day allowed outage time recognizes at least one other form of leakage detection is available.

c. With the reactor building cooling unit condensate flow rate monitor inoperable, alternative action is again required. Either a CHANNEL CHECK for the required reactor building atmosphere radioactivity monitor or RCS water inventory balance, in accordance with surveillance requirement 4.4.6.2.1.d, must be performed to provide alternate periodic information. Provided a CHANNEL CHECK is performed every 8 hours or an RCS water inventory balance is performed every 24 hours, reactor operation may continue while awaiting restoration of the reactor building cooling unit condensate flow rate monitor to OPERABLE status. The 24 hour interval provides periodic information that is adequate to detect RCS leakage. Note 1 is added allowing that surveillance requirement 4.4.6.2.1.d is not required to be performed until 12 hours after establishing steady state operation (stable temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and RCP seal injection and return flows). The 12 hour allowance provides sufficient time to collect and process all necessary data after stable plant conditions are established.

LEAKAGE DETECTION SYSTEMS (Continued)

d. With the required reactor building sump level monitor and the reactor building cooling unit condensate flow rate monitor inoperable, the only means of detecting leakage is the required reactor building atmosphere radioactivity monitor. Note that this ACTION is applicable when the only OPERABLE monitor is the reactor building atmosphere gaseous radioactivity monitor. The reactor building atmosphere gaseous radioactivity monitor typically cannot detect a 1 gpm leak within one hour when RCS activity is low. In addition, this configuration does not provide the required diverse means of leakage detection. Indirect methods of monitoring RCS leakage must be implemented. Grab samples of the containment atmosphere must be taken to provide alternate periodic information. The 12 hour interval is sufficient to detect increasing RCS leakage. The ACTION provides 7 days to restore another RCS leakage monitor to OPERABLE status to regain the intended leakage detection diversity. The 7 day allowed outage time ensures that the plant will not be operated in a degraded configuration for a lengthy time period.

e. With the required reactor building atmosphere radioactivity monitor and the reactor building cooling unit condensate flow rate monitor inoperable, the only means of detecting leakage is the reactor building sump level monitor. This condition does not provide the required diverse means of leakage detection. The ACTION is to restore either of the inoperable required monitors to OPERABLE status within 30 days to regain the intended leakage detection diversity. The 30 day allowed outage time ensures that the plant will not be operated in a reduced configuration for a lengthy time period.

f. With all required monitors inoperable, no automatic means of monitoring leakage are available, and immediate plant shutdown in accordance with LCO 3.0.3 is required.

3/4.4.6.2 OPERATIONAL LEAKAGE

Background

Components that contain or transport the coolant to or from the reactor core make up the RCS. Component joints are made by welding, bolting, rolling, or pressure loading, and valves isolate connecting systems from the RCS.

During plant life, the joint and valve interfaces can produce varying amounts of reactor coolant leakage, through either normal operational wear or mechanical deterioration. The purpose of the RCS Operational Leakage LCO is to limit system operation in the presence of leakage from these sources to amounts that do not compromise safety. This LCO specifies the types and amounts of leakage.

10 CFR 50, Appendix A, GDC 30, "Quality of Reactor Coolant Pressure Boundary," requires means for detecting and, to the extent practical, identifying the source of reactor coolant leakage. Regulatory Guide 1.45 describes acceptable methods for selecting leakage detection systems.

OPERATIONAL LEAKAGE (Continued)

The safety significance of RCS leakage varies widely depending on its source, rate, and duration. Therefore, detecting and monitoring reactor coolant leakage into the containment area is necessary. Quickly separating the identified leakage from the unidentified leakage is necessary to provide quantitative information to the operators, allowing them to take corrective action should a leak occur that is detrimental to the safety of the facility and the public.

A limited amount of leakage inside containment is expected from auxiliary systems that cannot be made 100% leak tight. Leakage from these systems should be detected, located, and isolated from the containment atmosphere, if possible, to not interfere with RCS leakage detection.

This LCO deals with protection of the reactor coolant pressure boundary (RCPB) from degradation and the core from inadequate cooling, in addition to preventing the accident analyses radiation release assumptions from being exceeded. The consequences of violating this LCO include the possibility of a loss of coolant accident (LOCA).

Applicable Safety Analyses

Except for primary-to-secondary leakage, the safety analyses do not address operational leakage. However, other operational leakage is related to the safety analyses for a LOCA; the amount of leakage can affect the probability of such an event. The safety analysis for an event resulting in steam discharge to the atmosphere assumes that primary-to-secondary leakage from all steam generators is 1 gpm or increases to 1 gpm as a result of accident induced conditions. The LCO requirement to limit primary-to-secondary leakage through any one steam generator to less than or equal to 150 gallons per day is significantly less than the conditions assumed in the safety analysis.

Primary-to-secondary leakage is a factor in the dose releases outside containment resulting from a steam line break (SLB) accident. To a lesser extent, other accidents or transients involve secondary steam release to the atmosphere, such as a steam generator tube rupture (SGTR). The leakage contaminates the secondary fluid.

The FSAR analysis for SGTR accounts for a bounding primary-to-secondary leakage rate equal to 1 gpm and the leakage rate associated with a double-ended rupture of a single tube. Leakage through the ruptured tube is the dominate contributor to dose releases. Since contaminated fluid in the ruptured steam generator is only briefly released to the atmosphere as steam via the main steam safety valves, the entire 1 gpm primary-to-secondary leakage is assumed to occur in the intact steam generators where it can be released during the subsequent cooldown of the plant. Overall, this pathway is a small contributor to dose releases.

The SLB is more limiting for site radiation releases. The safety analysis for the SLB accident assumes the entire 1 gpm primary-to-secondary leakage is through the effected steam generator as an initial condition. The dose consequences resulting from the SLB accident are well within the limits defined in 10 CFR 50.67 or the staff approved licensing basis (i.e., a small fraction of these limits).

The RCS operational leakage satisfies Criterion 2 of 10 CFR 50.36(c)(2)(ii).

OPERATIONAL LEAKAGE (Continued)

Limiting Condition for Operation (LCO)

Reactor Coolant System operational leakage shall be limited to:

a. PRESSURE BOUNDARY LEAKAGE

No PRESSURE BOUNDARY LEAKAGE is allowed, being indicative of material deterioration. Leakage of this type is unacceptable as the leak itself could cause further deterioration, resulting in higher leakage. Violation of this LCO could result in continued degradation of the Reactor Coolant Pressure Boundary. Leakage past seals and gaskets is not PRESSURE BOUNDARY LEAKAGE.

b. UNIDENTIFED LEAKAGE

One gallon per minute (gpm) of UNIDENTIFED LEAKAGE is allowed as a reasonable minimum detectable amount that the containment air monitoring and containment sump level monitoring equipment can detect within a reasonable time period. Violation of this LCO could result in continued degradation of the Reactor Coolant Pressure Boundary, if the leakage is from the pressure boundary.

c. Primary-to-Secondary Leakage Through Any One Steam Generator

The limit of 150 gallons per day (gpd) per steam generator is based on the operational leakage performance criterion in NEI 97-06, Steam Generator Program Guidelines (Reference 1). The Steam Generator Program operational leakage performance criterion in NEI 97-06 states, "The RCS operational primary-to-secondary leakage through any one steam generator shall be limited to 150 gpd." The limit is based on operating experience with steam generator tube degradation mechanisms that result in tube leakage. The operational leakage rate criterion in conjunction with the implementation of the Steam Generator Program is an effective measure for minimizing the frequency of steam generator tube ruptures.

d. IDENTIFIED LEAKAGE

Up to 10 gpm of IDENTIFIED LEAKAGE is considered allowable because leakage is from known sources that do not interfere with detection of UNIDENTIFED LEAKAGE and is well with the capability of the Reactor Coolant System Makeup System. IDENTIFIED LEAKAGE includes leakage to the containment from specifically known and located sources, but does not include PRESSURE BOUNDARY LEAKAGE or CONTROLLED LEAKAGE. Violation of this LCO could result in continued degradation of a component or system.

e. CONTROLLED LEAKAGE

The CONTROLLED LEAKAGE limitation restricts operation when the total flow supplied to the reactor coolant pump seals exceeds 33 gpm with the modulating valve in the supply line fully open at a nominal RCS reassure of 2235 psig. This limitation ensures that in the event of a LOCA, the safety injection flow will not be less than assumed in the accident analysis.

OPERATIONAL LEAKAGE (Continued)

f. Reactor Coolant System Pressure Isolation Valve Leakage

10CFR50.2, 10CFR50.55a(c), and GDC 55 of 10CFR50, Appendix A define RCS PIVs as any two normally closed valves in series within the reactor coolant pressure boundary (RCPB) which separate the high pressure RCS from an attached low pressure system. During their service lives, these valves can produce varying amounts of reactor coolant leakage through either normal operational wear or mechanical deterioration. The RCS PIV leakage LCO allows leakage through these valves in amounts that do not compromise safety.

The Reactor Coolant System Pressure Isolation Valve (PIV) Leakage limit applies to each individual valve. Leakage through both series PIVs in a line must be included as part of IDENTIFIED LEAKAGE governed by LCO 3.4.6.2, "Reactor Coolant System Operational Leakage." This is true during operation only when the loss of RCS mass through two series valves is determined by water inventory balance (SR 4.4.6.2.1.d). A known component of the identified leakage before operation begins is the least of the two individual leak rates determined for leaking series PIVs during the required surveillance testing. Leakage measured through one PIV in a line is not RCS operational LEAKAGE if the other PIV is leaktight.

Although this specification provides a limit on allowable PIV leakage rate, its main purpose is to prevent overpressure failure of the low-pressure portions of connecting systems. The leakage limit is an indication that the PIVs between the RCS and the connecting system are degraded or degrading. Excessive PIV leakage could lead to overpressure of the low-pressure piping or components, potentially resulting in a loss of coolant accident (LOCA) outside of containment.

The PIV leakage limit is 0.5 gpm per nominal inch of valve size with a maximum limit of 5 gpm. The NRC, through NUREG-1431, has endorsed this PIV leakage rate limit.

The surveillance requirements for RCS Pressure Isolation Valves provide added assurance of valve integrity thereby reducing the probability of gross valve failure and consequent intersystem LOCA. Leakage from the RCS Pressure Isolation Valves is IDENTIFIED LEAKAGE and will be considered as a portion of the allowed limit.

Leakage from the RCS Pressure Isolation Valves may be identified by surveillance testing performed during plant heatup or cooldown above 2000 psig and may be adjusted to obtain the leakage value at 2235 ± 20 psig using calculation guidance provided by the ASME OM Code.

Applicability

In MODES 1, 2, 3, and 4, the potential for Reactor Coolant Pressure Boundary leakage is greatest when the Reactor Coolant System is pressurized.

In MODES 5 and 6, leakage limits are not required because the reactor coolant pressure is far lower, resulting in lower stresses and reduced potentials for leakage.

OPERATIONAL LEAKAGE (Continued)

Actions

a. If any PRESSURE BOUNDARY LEAKAGE exists, or primary-to-secondary leakage is not within limit, the reactor must be brought to MODE 3 within 6 hours and MODE 5 within the next 30 hours. This ACTION reduces the leakage and also reduces the factors that tend to degrade the pressure boundary.

   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. In MODE 5, the pressure stresses acting on the Reactor Coolant Pressure Boundary are much lower, and further deterioration is much less likely.

b. Any operational leakage, excluding PRESSURE BOUNDARY LEAKAGE and primary-to-secondary leakage, in excess of the LCO limits must be reduced to within the limits within 4 hours. This allows time to verify leakage rates and either identify UNIDENTIFIED LEAKAGE or reduce leakage to within limits before the reactor must be shut down. This ACTION is necessary to prevent further deterioration of the Reactor Coolant Pressure Boundary.

c. With PIV leakage in excess of the limit, the high pressure portion of the affected system must be isolated within 4 hours, or be in at least hot standby within the next 6 hours, and cold shutdown within the following 30 hours. This ACTION is necessary to prevent over pressurization of low pressure systems, and the potential for intersystem LOCA.

Surveillance Requirements

4.4.6.2.1 Verifying Reactor Coolant System leakage to be within the LCO limits ensures the integrity of the Reactor Coolant Pressure Boundary is maintained.

PRESSURE BOUNDARY LEAKAGE would at first appear as UNIDENTIFIED LEAKAGE and can only be positively identified by inspection. It should be noted that leakage past seals and gaskets is not PRESSURE BOUNDARY LEAKAGE. UNIDENTIFIED LEAKAGE and IDENTIFIED LEAKAGE are determined by performance of a Reactor Coolant System water inventory balance.

The RCS water inventory balance must be met with the reactor at steady state operating conditions and near operating pressure. Therefore, the Surveillance is modified by a note. The note states that this Surveillance Requirement is not required to be performed until 12 hours after establishment of steady state operation.

For RCS operational leakage determination by water inventory balance, steady state is defined as stable RCS pressure, temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and Reactor Coolant Pump seal injection and return flows.

OPERATIONAL LEAKAGE (Continued)

Surveillance Requirements (Continued)

An early warning of PRESSURE BOUNDARY LEAKAGE or UNIDENTIFIED LEAKAGE is provided by the automatic systems that monitor containment atmosphere radioactivity and containment sump level. It should be noted that leakage past seals and gaskets is not PRESSURE BOUNDARY LEAKAGE. These leakage detection systems are specified in LCO 3.4.6.1, "Reactor Coolant System, Leakage Detection Systems."

Part (d) notes that this SR is not applicable to primary-to-secondary leakage because leakage of 150 gallons per day cannot be measured accurately by an RCS water inventory balance.

The 72-hour frequency is a reasonable interval to trend leakage and recognizes the importance of early leakage detection in the prevention of accidents.

4.4.6.2.2 This Surveillance Requirement verifies RCS Pressure Isolation Valve integrity thereby reducing the probability of gross valve failure and consequent intersystem LOCA.

4.4.6.2.3 This Surveillance Requirement verifies that primary-to-secondary leakage is less than or equal to 150 gpd through any one steam generator. Satisfying the primary-to-secondary leakage limit ensures that the operational leakage performance criterion in the Steam Generator Program is met. If this Surveillance Requirement is not met, compliance with LCO 3.4.5 should be evaluated. The 150-gpd limit is measured at room temperature as described in Reference 2. The operational leakage rate limit applies to leakage through any one steam generator. If it is not practical to assign the leakage to an individual steam generator, all the primary-to-secondary leakage should be conservatively assumed to be from one steam generator.

The Surveillance Requirement is modified by a note, which states that the Surveillance is not required to be performed until 12 hours after establishment of steady state operation. For Reactor Coolant System primary-to-secondary leakage determination, steady state is defined as stable Reactor Coolant System pressure, temperature, power level, pressurizer and makeup tank levels, makeup and letdown, and reactor coolant pump seal injection and return flows.

The frequency of 72 hours is a reasonable interval to trend primary-to-secondary leakage and recognizes the importance of early leakage detection in the prevention of accidents. The primary-to-secondary leakage is determined using continuous process radiation monitors or radiochemical grab sampling in accordance with the EPRI guidelines (Reference 2).

References

1. NEI 97-06, "Steam Generator Program Guidelines"

2. EPRI TR-104788, "Pressurized Water Reactor Primary-to-Secondary Leak Guidelines"

3/4.3.1 and 3/4.3.2 REACTOR TRIP AND ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

The OPERABILITY of the Reactor Protection System and Engineered Safety Feature Actuation System Instrumentation and interlocks ensure that 1) the associated action and/or reactor trip will be initiated when the parameter monitored by each channel or combination thereof reaches its setpoints, 2) the specified coincidence logic and sufficient redundancy is maintained to permit a channel to be out of service for testing or maintenance consistent with maintaining an appropriate level of reliability of the Reactor Protection and Engineered Safety Features instrumentation and, 3) sufficient system functions capability is available from diverse parameters.

The OPERABILITY of these systems is required to provide the overall reliability, redundancy, and diversity assumed available in the facility design for the protection and mitigation of accident and transient conditions. The integrated operation of each of these systems is consistent with the assumptions used in the accident analyses. The surveillance requirements specified for these systems ensure that the overall system functional capability is maintained comparable to the original design standards. The periodic surveillance tests performed at the minimum frequencies are sufficient to demonstrate this capability. Specified surveillance intervals have been determined in accordance with WCAP-10271, "Evaluation of Surveillance Frequencies and Out of Service Times for Reactor Protection Instrumentation System," and supplements to that report. Specified surveillance and maintenance outage times have been determined in accordance with WCAP-14333-P-A, Rev. 1, "Probabilistic Risk Analysis of the RPS and ESFAS Test Times and Completion Times," and Westinghouse letter CGE-05-46. Surveillance intervals and out of service times were determined based on maintaining an appropriate level of reliability of the Reactor Protection System and Engineered Safety Features instrumentation. The Slave Relay Test is performed on an 18-month frequency that is specific to Westinghouse AR relays. This test frequency is based on relay reliability assessments presented in WCAP-13877-P-A, "Reliability Assessment of Westinghouse Type AR Relays Used as SSPS Slave Relays," that is dependent on the qualified life and environmental conditions of the AR relays. Replacement relays other than Westinghouse type AR or reconciled Cutler-Hammer relays will require further analysis and NRC approval.

Consistent with the requirement in Regulatory Guide 1.177 to include Tier 2 insights into the decision-making process before taking equipment out of service, restrictions on concurrent removal of certain equipment when a logic train is inoperable for maintenance are included (note that these restrictions do not apply when a logic train is being tested under the 4-hour bypass Note). Entry into Actions 12, 14, 21, or 25 is not a typical, pre-planned evolution during power operation, other than for surveillance testing. Since Actions 12, 14, 21, or 25 are typically entered due to equipment failure, it follows that some of the following restrictions may not be met at the time of entry into Actions 12, 14, 21, or 25. If this situation were to occur during the 24-hour AOT of Actions 12, 14, 21, or 25, the configuration risk assessment procedure will assess the emergent condition and direct activities to restore the inoperable logic train and exit Actions 12, 14, 21, or 25, or fully implement these restrictions, or perform a unit shutdown, as appropriate from a risk management perspective. The following restrictions will be observed:

- To preserve ATWS mitigation capability, activities that degrade the availability of the emergency feedwater system, RCS pressure relief system (pressurizer PORVs and safety valves), AMSAC, or turbine trip should not be scheduled when a logic train is inoperable for maintenance.
- To preserve LOCA mitigation capability, one complete ECCS train that can be actuated automatically must be maintained when a logic train is inoperable for maintenance.