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U. S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Sir / Madam:

Subject: VIRGIL C. SUMMER NUCLEAR STATION
DOCKET NO. 50/395
OPERATING LICENSE NO. NPF-12
TECHNICAL SPECIFICATION BASES REVISIONS
UPDATED THROUGH OCTOBER 2005

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 in accordance with the Technical Specification Bases Control Program all changes and revisions to the Technical Specification (TS) Bases since the program was implemented in June 2004.

This TS Bases Update includes changes to the TS Bases that were made under the provisions of 10CFR50.59, but have not previously been submitted to the Commission. Technical changes are annotated by vertical revision bars and the Revision Notice number at the bottom of the page.

If there are any questions, please contact Robert G. Sweet at (803) 345-4080.

I declare under penalty of perjury that the foregoing is true and correct.

11-29-05
Executed On


Jeffrey B. Archie

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File (813.20)
DMS (RC-05-0195)

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 Attachment
 L-05-0003
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 Page 1 of 7

TECHNICAL SPECIFICATION BASES REVISIONS
UPDATED THROUGH OCTOBER 2005

RN #	Date Approved	Pages Affected
BRN 04-001	07/20/04	B 3/4 0-2 B 3/4 0-2a B 3/4 0-2b B 3/4 0-2c
BRN 05-001	10/31/05	B 3/4 1-2 B 3/4 1-3
BRN 05-002	06/22/05	B 3/4 6-4

INSTRUCTION SHEET
V. C. SUMMER NUCLEAR STATION
TECHNICAL SPECIFICATION

<u>Remove Pages</u>	<u>Insert Pages</u>
B 3/4 0-1 -- B 3/4 0-2	B 3/4 0-1 -- B 3/4 0-2
B 3/4 0-2a -- B 3/4 0-2b	B 3/4 0-2a -- B 3/4 0-2b
---	B 3/4 0-2c -- blank sheet
B 3/4 1-1 -- B 3/4 1-2	B 3/4 1-1 -- B 3/4 1-2
B 3/4 1-3 -- B 3/4 1-4	B 3/4 1-3 -- B 3/4 1-4
B 3/4 6-3 -- B 3/4 6-4	B 3/4 6-3 -- B 3/4 6-4

3/4.0 APPLICABILITY

BASES

The specification of this section provide the general requirements applicable to each of the Limiting Conditions for Operation and Surveillance Requirements within Section 3/4.

3.0.1 This specification defines the applicability of each specification in terms of defined OPERATIONAL MODES or other specified conditions and is provided to delineate specifically when each specification is applicable.

3.0.2 This specification defines those conditions necessary to constitute compliance with the terms of an individual Limiting Condition for Operation and associated ACTION requirement.

3.0.3 This specification delineates the measures to be taken for circumstances not directly provided for in the ACTION statements and whose occurrence would violate the intent of the specification. For example, Specification 3.5.2 requires two independent ECCS subsystems to be OPERABLE and provides explicit ACTION requirements if one ECCS subsystem is inoperable. Under the requirements of Specification 3.0.3, if both of the required ECCS subsystems are inoperable, within one hour measures must be initiated to place the unit in at least HOT STANDBY within the next 6 hours, and in at least HOT SHUTDOWN within the following 6 hours. As a further example, Specification 3.6.2.1 requires two Reactor Building Spray Systems to be OPERABLE and provides explicit ACTION requirements if one spray system is inoperable. Under the requirements of Specification 3.0.3, if both of the required Reactor Building Spray Systems are inoperable, within one hour measures must be initiated to place the unit in at least HOT STANDBY within the next 6 hours, in at least HOT SHUTDOWN within the following 6 hours and in COLD SHUTDOWN in the subsequent 24 hours.

3.0.4 This specification provides that entry into an OPERATIONAL MODE or other specified applicability condition must be made with (a) the full complement of required systems, equipment or components OPERABLE and (b) all other parameters as specified in the Limiting Conditions for Operation being met without regard for allowable deviations and out of service provisions contained in the ACTION statements.

The intent of this provision is to insure that facility operation is not initiated with either required equipment or systems inoperable or other specified limits being exceeded.

Exceptions to this provision have been provided for a limited number of specifications when startup with inoperable equipment would not affect plant safety. These exceptions are stated in the ACTION statements of the appropriate specifications.

APPLICABILITY

BASES

4.0.1 Technical Specification 4.0.1 establishes the requirement that surveillance requirements (SR) must be met during the MODES or other specified conditions in the Applicability for which the requirements of the LCO apply, unless otherwise specified in the individual SRs. This specification is to ensure that surveillances are performed to verify the OPERABILITY of systems and components, and that variables are within specified limits. Failure to meet a SR within the specified frequency, in accordance with 4.0.2, constitutes a failure to meet an LCO.

Systems and components are assumed to be OPERABLE when the associated SRs have been met. Nothing in this specification, however, is to be construed as implying that systems or components are OPERABLE when:

- a. The systems or components are known to be inoperable, although still meeting the SRs; or
- b. The requirements of the surveillance(s) are known not to be met between required surveillance performances.

Surveillances do not have to be performed when the unit is in a MODE or other specified condition for which the requirements for the associated LCO are not applicable, unless otherwise specified. The SRs associated with a test exception are only applicable when the test exception is used as an allowable exception to the requirements of a specification.

Unplanned events may satisfy the requirements (including applicable acceptance criteria) for a given SR. In this case, the unplanned event may be credited as fulfilling the performance of the SR. This allowance includes those SRs whose performance is normally precluded in a given MODE or other specified condition.

Surveillances, including surveillances invoked by required Actions, do not have to be performed on inoperable equipment because the ACTIONS define the remedial measures that apply. Surveillances have to be met and performed in accordance with 4.0.2, prior to returning the equipment to OPERABLE status.

Upon completion of maintenance, appropriate post maintenance testing is required to declare equipment OPERABLE. This includes ensuring applicable surveillances are not failed and their most recent performance is in accordance with 4.0.2. Post maintenance testing may not be possible in the current MODE or other specified conditions in the Applicability due to the necessary unit parameters not having been established. In these situations, the equipment may be considered OPERABLE provided testing has been satisfactorily completed to the extent possible and the equipment is not otherwise believed to be incapable of performing its design function. This will allow operation to proceed to a MODE or other specified condition where other necessary post maintenance tests can be performed.

Some examples of this process are:

- a. Emergency Feedwater (EFW) pump turbine maintenance during refueling that requires testing at steam pressures > 800 psi. However, if other appropriate testing is satisfactorily completed, the EFW system can be considered

APPLICABILITY

BASES

OPERABLE. This allows startup and other necessary testing to proceed until the plant reaches the steam pressure required to perform the testing.

- b. High head safety injection (HHSI) maintenance during shutdown that requires system functional tests at a specified pressure. Provided other appropriate testing is satisfactorily completed, startup can proceed with HHSI considered **OPERABLE.** This allows operation to reach the specified pressure to complete the necessary post maintenance testing.

4.0.2 Specification 4.0.2 establishes the limit for which the specified time interval for Surveillance Requirements may be extended. It permits an allowable extension of the normal surveillance interval to facilitate surveillance scheduling and consideration of plant operating conditions that may not be suitable for conducting the surveillance; e.g., transient conditions or other ongoing surveillance or maintenance activities. It also provides flexibility to accommodate the length of a fuel cycle for surveillances that are performed at each refueling outage and are specified with an 18-month surveillance interval. It is not intended that this provision be used repeatedly as a convenience to extend surveillance intervals beyond that specified for surveillances that are not performed during refueling outages. The limitation of Specification 4.0.2 is based on engineering judgment and the recognition that the most probable result of any particular surveillance being performed is the verification of conformance with the Surveillance Requirements. This provision is sufficient to ensure that the reliability ensured through surveillance activities is not significantly degraded beyond that obtained from the specified surveillance interval.

4.0.3 Surveillance Requirement (SR) 4.0.3 establishes the flexibility to defer declaring affected equipment inoperable or an affected variable outside their specified limits when a surveillance has not been completed within the specified frequency. A delay period of up to 24 hours or up to the limit of the specified frequency, whichever is greater, applies from the point in time that it is discovered that the surveillance has not been performed in accordance with SR 4.0.2 and not at the time that the specified frequency was not met.

This delay period provides adequate time to complete surveillances that have been missed. This delay period permits the completion of a surveillance before complying with required Actions or other remedial measures that might preclude completion of the surveillance.

The basis for this delay period includes consideration of unit conditions, adequate planning, availability of personnel, the time required to perform the surveillance, the safety significance of the delay in completing the required surveillance, and the recognition that the most probable result of any particular surveillance being performed is the verification of conformance with the requirements.

When a surveillance with a frequency based not on time intervals, but upon specified unit conditions, operating situations, or requirements of regulations (e.g., prior to entering MODE 1 after each fuel loading, or in accordance with 10 CFR 50, Appendix J, as modified by approved exemptions, etc.) is discovered to not have been performed when specified, SR 4.0.3 allows for the full delay period up to the specified frequency to perform the surveillance. However, since there is not a time interval specified, the missed surveillance should be performed at the first reasonable opportunity.

APPLICABILITY

BASES

SR 4.0.3 provides a time limit for, and allowances for the performance of, surveillances that become applicable as a consequence of MODE changes imposed by required Actions.

Failure to comply with specified frequencies for SRs is expected to be an infrequent occurrence. Use of the delay period established by SR 4.0.3 is a flexibility, which is not intended to be used as an operational convenience to extend surveillance intervals.

While up to 24 hours or the limit of the specified frequency is provided to perform the missed surveillance, it is expected that the missed surveillance will be performed at the first reasonable opportunity. The determination of first reasonable opportunity should include consideration of the impact on plant risk (from delaying the surveillance as well as any plant configuration changes required or shutting the plant down to perform the surveillance) and impact on any analysis assumptions, in addition to unit conditions, planning, availability of personnel, and the time required to perform the surveillance. This risk impact should be managed through the program in place to implement 10 CFR 50.65(a)(4) and its implementing guidance, NRC Regulatory Guide 1.182, "Assessing and Managing Risk Before Maintenance Activities at Nuclear Power Plants." This Regulatory Guide addresses consideration of temporary and aggregate risk impacts, determination of risk management action thresholds, and risk management action up to and including plant shutdown. The missed surveillance should be treated as an emergent condition as discussed in the Regulatory Guide. The risk evaluation may use quantitative, qualitative, or blended methods. The degree of depth and rigor of the evaluation should be commensurate with the importance of the component. Missed surveillances for important components should be analyzed quantitatively. If the results of the risk evaluation determine the risk increase is significant, this evaluation should be used to determine the safest course of action. All missed surveillances will be placed in the Corrective Action Program.

If a surveillance is not completed within the allowed delay period, then the equipment is considered inoperable or the variable is considered outside the specified limits and the Allowed Outage Time (AOT) for the required Action for the applicable LCO conditions begin immediately upon expiration of the delay period. If a surveillance is failed within the delay period, then the equipment is inoperable, or the variable is considered outside the specified limits and the AOT of the required Action for the applicable LCO begin immediately upon the failure of the surveillance.

Completion of the surveillance within the delay period allowed by this specification, or within the AOT of the Action, restores compliance with SR 4.0.1.

4.0.4 This specification establishes the requirement that all applicable surveillances must be met before entry into an OPERATIONAL MODE or other condition of operation specified in the Applicability statement. The purpose of this specification is to ensure that system and component OPERABILITY requirements or parameter limits are met before entry into a MODE or condition for which these systems and components ensure safe operation of the facility. This provision applies to changes in OPERATIONAL MODES or other specified conditions associated with plant shutdown as well as startup.

APPLICABILITY

BASES

Under the provision of this specification, the applicable Surveillance Requirements must be performed within the specified surveillance interval to ensure that the Limiting Conditions for Operation are met during initial plant startup or following a plant outage.

When a shutdown is required to comply with ACTION requirements, the provisions of Specification 4.0.4 do not apply because this would delay placing the facility in a lower MODE of operation.

Under the terms of this specification, for example, during initial plant startup or following extended plant outages, the applicable surveillance activities must be performed within the stated surveillance interval prior to placing or returning the system or equipment into OPERABLE status.

3/4.1 REACTIVITY CONTROL SYSTEMS

BASES

3/4.1.1 BORATION CONTROL

3/4.1.1.1 and 3/4.1.1.2 SHUTDOWN MARGIN

A sufficient SHUTDOWN MARGIN ensures that 1) the reactor can be made subcritical from all operating conditions, 2) the reactivity transients associated with postulated accident conditions are controllable within acceptable limits, and 3) the reactor will be maintained sufficiently subcritical to preclude inadvertent criticality in the shutdown condition.

SHUTDOWN MARGIN requirements vary throughout core life as a function of fuel depletion, RCS boron concentration, and RCS T_{avg} . In MODES 1 and 2 the most restrictive condition occurs at EOL, with T_{avg} at no load operating temperature, and is associated with a postulated steam line break accident and resulting uncontrolled RCS cooldown. In the analysis of this accident, a minimum SHUTDOWN MARGIN of 1.77 percent delta k/k is required to control the reactivity transient. Accordingly, the SHUTDOWN MARGIN requirement is based upon this limiting condition and is consistent with FSAR safety analysis assumptions. In MODES 3, 4 and 5 the most limiting accident is a boron dilution accident. The SHUTDOWN MARGIN is varied as a function of average RCS boron concentration in order to provide adequate protection in these MODES.

3/4.1.1.3 MODERATOR TEMPERATURE COEFFICIENT

The limitations on moderator temperature coefficient (MTC) are provided to ensure that the value of this coefficient remains within the limiting condition assumed in the FSAR accident and transient analyses.

The MTC values of this specification are applicable to a specific set of plant conditions; accordingly, verification of MTC values at conditions other than those explicitly stated will require extrapolation to those conditions in order to permit an accurate comparison.

The most negative MTC value equivalent to the most positive moderator density coefficient (MDC), was obtained by incrementally correcting the MDC used in the FSAR analyses to nominal operating conditions. These corrections

REACTIVITY CONTROL SYSTEMS

BASES

MODERATOR TEMPERATURE COEFFICIENT (Continued)

involved subtracting the incremental change in the MDC associated with a core condition of all rods inserted (most positive MDC) to an all rods withdrawn condition and, a conversion for the rate of change of moderator density with temperature at RATED THERMAL POWER conditions. This value of the MDC was then transformed into the limiting End of Cycle Life (EOL) MTC value. The 300 ppm surveillance limit MTC value represents a conservative value (with corrections for burnup and soluble boron) at a core condition of 300 ppm equilibrium boron concentration and is obtained by making these corrections to the limiting EOL MTC value.

The surveillance requirements for measurement of the MTC at the beginning and near the end of the fuel cycle are adequate to confirm that the MTC remains within its limits since this coefficient changes slowly due principally to the reduction in RCS boron concentration associated with fuel burnup.

3/4.1.1.4 MINIMUM TEMPERATURE FOR CRITICALITY

This specification ensures that the reactor will not be made critical with the Reactor Coolant System average temperature less than 551°F. This limitation is required to ensure 1) the moderator temperature coefficient is within its analyzed temperature range, 2) the protective instrumentation is within its normal operating range, 3) the pressurizer is capable of being in an OPERABLE status with a steam bubble, and 4) the reactor pressure vessel is above its minimum RT_{NDT} temperature.

3/4.1.2 BORATION SYSTEMS

The boron injection system ensures that negative reactivity control is available during each mode of facility operation. The components required to perform this function include 1) borated water sources, 2) charging pumps, 3) separate flow paths, 4) boric acid transfer pumps, and 5) an emergency power supply from OPERABLE diesel generators.

Those valves that can stop or throttle flow coming from or going to its intended location are flowpath valves. These include the valves that provide for the minimum required pump flow capability. Diversion valves that can pass significant flow and render the function inoperable are also to be considered flowpath valves.

Valves that pass minimum diversion flow, such as vents, drains, instrument root valves, and sample valves are not flowpath valves. Flow diversion through such valves would be generally self evident and readily detectable allowing for prompt corrective action.

REACTIVITY CONTROL SYSTEMS

BASES

BORATION SYSTEMS (Continued)

With the RCS average temperature above 200°F, a minimum of two boron injection flow paths are required to ensure single functional capability in the event an assumed failure renders one of the flow paths inoperable. The boration capability of either flow path is sufficient to provide the required SHUTDOWN MARGIN from expected operating conditions of 1.77% delta k/k or as required by Figure 3.1-3 after xenon decay and cooldown to 200°F. The maximum expected boration capability requirement occurs from full power equilibrium xenon conditions and is satisfied by 13269 gallons of 7000 ppm borated water from the boric acid storage tanks or 98631 gallons of 2300 ppm borated water from the refueling water storage tank.

With the RCS temperature below 200°F, one injection system is acceptable without single failure consideration on the basis of the stable reactivity condition of the reactor and the additional restrictions prohibiting CORE ALTERATIONS and positive reactivity changes in the event the single injection system becomes inoperable.

The boron capability required below 200°F is sufficient to provide the required SHUTDOWN MARGIN of 1 percent delta k/k or as required by Figure 3.1-3 after xenon decay and cooldown from 200°F to 140°F. This condition is satisfied by either 2000 gallons of 7000 ppm borated water from the boric acid storage tanks or 23266 gallons of 2300 ppm borated water from the refueling water storage tank.

The contained water volume limits include allowance for water not available because of discharge line location and other physical characteristics.

The OPERABILITY of one boron injection system during REFUELING ensures that this system is available for reactivity control while in MODE 6.

3/4.1.3 MOVABLE CONTROL ASSEMBLIES

The specifications of this section ensure that (1) acceptable power distribution limits are maintained, (2) the minimum SHUTDOWN MARGIN is maintained, and (3) limit the potential effects of rod misalignment on associated accident analyses. OPERABILITY of the control rod position indicators is required to determine control rod positions and thereby ensure compliance with the control rod alignment and insertion limits.

REACTIVITY CONTROL SYSTEMS

BASES

MOVABLE CONTROL ASSEMBLIES (Continued)

For purposes of determining compliance with Technical Specification 3.1.3.1, any inoperability of full length control rod(s), due to being immovable, invokes ACTION statement "a".

The intent of Technical Specification 3.1.3.1 ACTION statement "a" is to ensure that before leaving ACTION statement "a" and utilizing ACTION statement "c" that the rod urgent failure alarm is illuminated or that an obvious electrical problem is detected in the rod control system by minimal electrical troubleshooting techniques. Expedient action will be taken to determine if rod immovability is due to an electrical problem in the rod control system.

The ACTION statements which permit limited variations from the basic requirements are accompanied by additional restrictions which ensure that the original design criteria are met. Misalignment of a rod requires measurement of peaking factors or a restriction in THERMAL POWER; either of these restrictions provide assurance of fuel rod integrity during continued operation. In addition, those safety analyses affected by a misaligned rod are reevaluated to confirm that the results remain valid during future operation.

The maximum rod drop time restriction is consistent with the assumed rod drop time used in the safety analyses. Measurement with T_{avg} greater than or equal to 551°F and with all reactor coolant pumps operating ensures that the measured drop times will be representative of insertion times experienced during a reactor trip at operating conditions.

Control rod positions and OPERABILITY of the rod position indicators are required to be verified on a nominal basis of once per 12 hours with more frequent verifications required if an automatic monitoring channel is inoperable. These verification frequencies are adequate for assuring that the applicable LCO's are satisfied.

CONTAINMENT SYSTEMS

BASES

3/4.6.1.7 REACTOR BUILDING VENTILATION SYSTEM

The 36-inch containment purge supply and exhaust isolation valves are required to be closed during plant operation since these valves have not been demonstrated capable of closing during a LOCA or steam line break accident. Maintaining these valves closed during plant operations ensures that excessive quantities of radioactive materials will not be released via the containment purge system. To provide assurance that the 36-inch valves cannot be inadvertently opened, they are sealed closed in accordance with the Standard Review Plan 6.2.4 which includes mechanical devices to seal or lock the valve closed, or prevent power from being supplied to the valve operator.

The use of the containment purge lines is restricted to the 6 inch purge supply and exhaust isolation valves since unlike the 36 inch valves the 6 inch valves will close during a LOCA or steam line break accident and therefore the site boundary dose guidelines of 10 CFR 100 would not be exceeded in the event of an accident during purging operations.

Periodic leakage integrity tests for purge supply and exhaust isolation valves with resilient material seals will be performed in accordance with the Containment Leakage Rate Testing Program.

3/4.6.2. DEPRESSURIZATION AND COOLING SYSTEMS

3/4.6.2.1 REACTOR BUILDING SPRAY SYSTEM

The OPERABILITY of the reactor building spray system ensures that reactor building depressurization and cooling capability will be available in the event of a steam line break. The pressure reduction and resultant lower containment leakage rate are consistent with the assumptions used in the accident analyses.

The reactor building spray system and the reactor building cooling system are redundant to each other in providing post accident cooling of the reactor building atmosphere. However, the reactor building spray system also provides a mechanism for removing iodine from the reactor building atmosphere and therefore the time requirements for restoring an inoperable spray system to OPERABLE status have been maintained consistent with that assigned other inoperable ESF equipment.

CONTAINMENT SYSTEMS

BASES

3/4.6.2.2 SPRAY ADDITIVE SYSTEM

The OPERABILITY of the spray additive system ensures that sufficient NaOH is added to the reactor building spray in the event of a LOCA. The limits on NaOH volume and concentration ensure a pH value of between 7.5 and 11.0 for the solution recirculated within containment after a LOCA. This pH band minimizes the evolution of iodine and minimizes the effect of chloride and caustic stress corrosion on mechanical systems and components. The contained solution volume limit includes an allowance for solution not usable because of tank discharge line location or other physical characteristics. These assumptions are consistent with the iodine removal efficiency assumed in the accident analyses.

3/4.6.2.3 REACTOR BUILDING COOLING SYSTEM

The OPERABILITY of the reactor building cooling system ensures that 1) the reactor building air temperature will be maintained within limits during normal operation, and 2) adequate heat removal capacity is available when operated in conjunction with the reactor building spray systems during post-LOCA conditions.

The reactor building cooling system and the reactor building spray system provide post accident cooling of the reactor building atmosphere. These two independent systems incorporate different principles of heat removal, with RB Spray being more effective in the short term in limiting peak pressure and temperature conditions within the RB. Since RB Spray operation maximizes margin to the RB design limits for maximum pressure and temperature, the allowable out of service time requirements for the reactor building cooling system have been appropriately adjusted. However, the allowable out of service time requirements for the reactor building spray system have been maintained consistent with that assigned other inoperable ESF equipment since the reactor building spray system also provides a mechanism for removing iodine from the reactor building atmosphere.

The accident analysis requires the service water booster pump to be passing 4,000 gpm to both RBCUs within 86.5 seconds. This time encompasses the driving of all necessary service water valves to the correct positions, i.e., fully opened or fully closed. Reference Technical Specification Bases B 3/4.3.1 and B 3/4.3.2 for additional details.

3/4.6.3 PARTICULATE IODINE CLEANUP SYSTEM

The OPERABILITY of the containment filter trains ensures that sufficient iodine removal capability will be available in the event of a LOCA. The reduction in containment iodine inventory reduces the resulting site boundary radiation doses associated with containment leakage. The operation of this system and resultant iodine removal capacity are consistent with the assumptions used in the LOCA analyses.