

ATTACHMENT 1

MARKED-UP TECHNICAL SPECIFICATION PAGE

<u>Page</u>	<u>Specification</u>	<u>Change Description</u>
3/4 5-4	4.5.2.d.1., "Emergency Core Cooling Systems"	Removes the surveillance requirement to test the autoclosure capability every 18 months.

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EMERGENCY CORE COOLING SYSTEMS

SURVEILLANCE REQUIREMENTS

4.5.2 Each ECCS subsystem shall be demonstrated OPERABLE:

- a. At least once per 12 hours by verifying that the following valves are in the indicated positions with power to the valve operators removed:

<u>Valve Number</u>	<u>Valve Function</u>	<u>Valve Position</u>
1. 8884	HHSI Hot Leg Injection	Closed
2. 8886	HHSI Hot Leg Injection	Closed
3. 8888A	LHSI Cold Leg Injection	Open
4. 8888B	LHSI Cold Leg Injection	Open
5. 8889	LHSI Hot Leg Injection	Closed
6. 8701A	RHR Inlet	Closed
7. 8701B	RHR Inlet	Closed
8. 8702A	RHR Inlet	Closed
9. 8702B	RHR Inlet	Closed

- b. At least once per 31 days by:

1. Verifying that each valve (manual, power operated or automatic) in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position, and
2. Verifying that the ECCS piping is full of water by venting the ECCS pump casings and accessible discharge piping high points.

- c. By a visual inspection which verifies that no loose debris (rags, trash, clothing, etc.) is present in the reactor building which could be transported to the RHR and Spray Recirculation sumps and cause restriction of the pump suctions during LOCA conditions. This visual inspection shall be performed:

1. For all accessible areas of the reactor building prior to establishing CONTAINMENT INTEGRITY, and
2. Of the areas affected within the reactor building at the completion of each reactor building entry when CONTAINMENT INTEGRITY is established.

- d. At least once per 18 months by:

1. Verifying automatic ~~isolation and~~ interlock action of the RHR system from the Reactor Coolant System by ensuring that,

~~a.)~~ with a simulated or actual Reactor Coolant System pressure signal greater than or equal to 425 psig, the interlocks prevent the valves from being opened; ~~and~~

~~b.)~~ with a simulated or actual Reactor Coolant System pressure signal less than or equal to 750 psig, the interlocks will cause the valves to automatically close.

ATTACHMENT 2

SAFETY EVALUATION

SAFETY EVALUATION FOR VIRGIL C. SUMMER NUCLEAR STATION

Description of amendment request:

Virgil C. Summer Nuclear Station (VCSNS) Technical Specification 4.5.2.d.1., "Emergency Core Cooling Systems," currently requires that the Residual Heat Removal System (RHRS) Autoclosure Interlock (ACI) action be verified at least once per eighteen months. During normal and emergency conditions, the low pressure RHRS (design pressure of 600 psig) is isolated from the high pressure Reactor Coolant System (RCS) (normal operating pressure of 2235 psig). This isolation is necessary to: 1) avoid damages resulting from overpressurization, and 2) minimize the potential for loss of integrity of the low pressure system and possible radioactive releases to the environment. Because the RHR relief valves have adequate capacity to mitigate transients which occur during operation of the RHRS (Reference WCAP-11835, Section 5), the purpose of the ACI is to provide a second layer of protection between the RCS and RHRS during plant startup and normal operations. The ACI function, therefore, is to preclude conditions that could lead to an interfacing systems Loss of Coolant Accident (LOCA) by ensuring that both suction/isolation valves in each RHRS train are fully closed when the RCS is pressurized above the RHRS design pressure.

Recent events in the nuclear industry have caused the NRC to be concerned with the potential for failure of the ACI circuitry to cause inadvertent RHR isolation with the resulting loss of RHR capability during cold shutdown and refueling operations. To address this concern, Westinghouse has performed an extensive evaluation to study the impact of removing the ACI feature. (Westinghouse Owners Group Generic Analysis, WCAP-11736, and V. C. Summer Nuclear Station Plant Specific Analysis, WCAP-11835). The results of these analyses show that removal of the RHR ACI improves the availability of the RHR system during short-term and long-term cooldown, and also decreases the frequency of an interfacing LOCA.

As stated earlier, the function of the ACI feature is to preclude conditions that could lead to intersystem LOCA's. The results of the Westinghouse analysis show that the frequencies of these Event V accidents decrease when the ACI feature is removed and a control room alarm is installed to alert the operators when an inlet isolation valve is not fully closed when the RCS pressure is above the alarm setpoint. Removal of RHR ACI capability, therefore, results in a positive impact on safety. Because of this positive impact on plant safety, SCE&G is planning to remove the RHR ACI capability from VCSNS during the next refueling outage. To support this effort, SCE&G is submitting this Technical Specifications change request. Specifically, the proposed amendment will permanently delete the surveillance requirement to test the RHR ACI capability every 18 months.

Safety Evaluation:

To justify the removal of the RHRS suction isolation valve autoclosure interlock, Westinghouse performed a probabilistic analysis in three areas.

(Reference WCAP-11835, Section 7). The three areas in this analysis were: 1) the likelihood of an interfacing system LOCA; 2) RHRS availability and 3) low temperature overpressurization concerns. Each of the three areas was analyzed utilizing the current control circuitry configuration and then with the proposed modification to the control circuitry. The net change in each area was determined and the overall net detriments and benefits were weighed to determine the acceptability of removal of the autoclosure interlock from a probabilistic standpoint.

The data used in this analysis was derived primarily from two documents- NUREG/CR-2815 Rev. 1, "Probabilistic Safety Analysis Procedures Guide" (Reference 5 in WCAP-11835) and IEEE-500, "IEEE Guide to the Collection and Presentation of Electrical, Electronic, Sensing Component, and Mechanical Equipment Reliability Data for Nuclear-Power Generating Stations," (Reference 6 in WCAP-11835). The component failure data is presented in Table 4-1 of WCAP-11835.

Testing information was obtained from the Technical Specifications while maintenance information was extracted from the "Individual Plant Evaluation Methodology for Pressurized Water Reactors," (Reference 7 in WCAP-11835).

The mean human error probabilities were calculated utilizing the medians and error factors from NUREG/CR-1278 (Reference 8 in WCAP-11835) and assuming a log normal distribution. Each human error calculation is explained in the individual analyses and is shown in the Appendices of WCAP-11835.

The analyses provided in WCAP-11736 and WCAP-11835 (which is the VCSNS Site Specific Evaluation) demonstrate that administrative procedures and installation of a control room alarm to alert the operator that an inlet isolation valve is not fully closed when the RCS pressure is above the alarm setpoint will provide adequate controls to ensure the RHR system will be isolated from the RCS.

The probabilistic and overpressurization analyses addressed the effect of removing the ACI on RHR availability and the potential for interfacing system LOCA and low temperature overpressurization. For VCSNS, the results indicate that the frequency of an interfacing system LOCA is reduced by 33 percent, and the short-term and long-term cooling phase failure probabilities are reduced by 24 and 38 percent, respectively. The failure probability for RHR initiation and the consequences of low temperature overpressure events are not significantly impacted by removal of the RHR ACI (Reference WCAP-11835, Section 7).

With the ACI circuitry on the RHR inlet isolation valve removed, a failure of a pressure transmitter cannot result in the valves stroking closed. Thus, the postulated occurrence of a single failure isolating both RHR trains is not feasible during operation of the RHRS for decay heat removal.

To summarize, SCE&G plans to remove the RHR ACI capability from V. C. Summer Nuclear Station during the next refueling outage. The requested Technical Specifications change supports this modification by deleting the 18 month Surveillance Requirement for the autoclosure interlock. Westinghouse has provided the technical justification for the change in WCAP-11736 and WCAP-11835. The results of these analyses demonstrate that with the RHR ACI removed at VCSNS:

- (a) the frequency of an interfacing system LOCA is reduced by 33 percent.
- (b) the short and long term cooling phase failure probabilities are reduced by 24 and 38 percent respectively.
- (c) the failure probability for RHR initiation and the consequences of low temperature overpressure events are not significantly impacted.

In addition to removing the Surveillance Requirement, SCE&G is installing administrative procedures and a control room alarm to alert the operators when an inlet isolation valve is not fully closed when the RCS pressure is above the alarm setpoint.

ATTACHMENT 3

NO SIGNIFICANT HAZARDS EVALUATION

SIGNIFICANT HAZARDS EVALUATION FOR
VIRGIL C. SUMMER NUCLEAR STATION
RESIDUAL HEAT REMOVAL AUTOCLOSURE INTERLOCK REMOVAL

Description of amendment request:

Virgil C. Summer Nuclear Station (VCSNS) Technical Specification 4.5.2.d.1., "Emergency Core Cooling Systems," currently requires that the Residual Heat Removal System (RHRS) Autoclosure Interlock (ACI) action be verified at least once per eighteen months. During normal and emergency conditions, the low pressure RHRS (design pressure of 600 psig) is isolated from the high pressure Reactor Coolant System (RCS) (normal operating pressure of 2235 psig). This isolation is necessary to: 1) avoid damages resulting from overpressurization, and 2) minimize the potential for loss of integrity of the low pressure system and possible radioactive releases to the environment. Because the RHR relief valves have adequate capacity to mitigate transients which occur during operation of the RHRS (Reference WCAP-11835, Section 5), the purpose of the ACI is to provide a second layer of protection between the RCS and RHRS during plant startup and normal operations. The ACI function, therefore, is to preclude conditions that could lead to an interfacing systems Loss of Coolant Accident (LOCA) by ensuring that both suction/isolation valves in each RHRS train are fully closed when the RCS is pressurized above the RHRS design pressure.

Recent events in the nuclear industry have caused the NRC to be concerned with the potential for failure of the ACI circuitry to cause inadvertent RHR isolation with the resulting loss of RHR capability during cold shutdown and refueling operations. To address this concern, Westinghouse has performed an extensive evaluation to study the impact of removing the ACI feature. (Westinghouse Owners Group Generic Analysis, WCAP-11736, and V. C. Summer Nuclear Station Plant Specific Analysis, WCAP-11835). The results of these analyses show that removal of the RHR ACI improves the availability of the RHR system during short-term and long-term cooldown, and also decreases the frequency of an interfacing LOCA.

As stated earlier, the function of the ACI feature is to preclude conditions that could lead to intersystem LOCA's. The results of the Westinghouse analysis show that the frequencies of these Event V accidents decrease when the ACI feature is removed and a control room alarm is installed to alert the operators when an inlet isolation valve is not fully closed when the RCS pressure is above the alarm setpoint. Removal of RHR ACI capability, therefore, results in a positive impact on safety. Because of this positive impact on plant safety, SCE&G is planning to remove the RHR ACI capability from VCSNS during the next refueling outage. To support this effort, SCE&G is submitting this Technical Specifications change request. Specifically, the proposed amendment will permanently delete the surveillance requirement to test the RHR ACI capability every 18 months.

Basis for proposed no significant hazards consideration:

As required by 10CFR50.91 (a) (1), this evaluation is provided to demonstrate that a proposed license amendment to remove the RHR ACI at the Virgil C. Summer Nuclear Station (VCSNS) represents a no significant hazards consideration. In accordance with the three factor test of 10CFR50.92 (c), implementation of the proposed license amendment was analyzed and found not to: 1) involve a significant increase in the probability of a new or different kind of accident from any accident previously evaluated; 2) create the possibility of a new or different kind of accident from any accident previously evaluated; or 3) involve a significant reduction in a margin of safety.

Surveillance requirement 4.5.2.d.1 of the VCSNS Technical Specifications requires that the automatic isolation and interlock function of the RHR inlet isolation valves be demonstrated operable on an 18 month interval. However, with the ACI function removed, there is no longer a need to retain this surveillance requirement within the Technical Specifications.

Removal of the RHR ACI addresses utility and Commission concerns regarding the potential for failure of the ACI circuitry to cause inadvertent isolation of the RHR system with subsequent loss of RHR capability during cold shutdown and refueling operations.

During normal and emergency conditions, the low pressure RHR system (design pressure of 600 psig) is isolated from the high pressure Reactor Coolant System (RCS) (normal operating pressure of 2235 psig). Isolation is necessary to: 1) avoid damages resulting from overpressurization, and 2) minimize the potential for loss of integrity of the low pressure system and possible radioactive releases to the environment.

Two inlet isolation valves are provided on each line from the RCS to the RHR system. These motor-operated gate valves are normally-closed. These valves are interlocked with RCS pressure signals to prevent opening when the RCS pressure is greater than 425 psig (open permissive interlock) and to automatically close when the RCS pressure increases above 700 psig (ACI).

Thus, the open permissive interlock prevents inadvertent opening of the RHR isolation valves when the RCS pressure is above the valve opening setpoint, and the ACI ensures that the RHR isolation valves are fully closed when the RCS is pressurized above the valve closing setpoint. Although, the ACI provides an automatic closure of the RHR suction valves on high RCS pressure, overpressure protection of the RHR System is provided by the RHR relief valves and not the slow acting inlet isolation valves.

The analyses provided in WCAP-11736 and WCAP-11835 demonstrate that administrative procedures and installation of a control room alarm to alert the operator that an inlet isolation valve is not fully closed when the RCS pressure is above the alarm setpoint will provide adequate controls to ensure the RHR system will be isolated from the RCS.

The probabilistic and overpressurization analyses addressed the effect of removing the ACI on RHR availability and the potential for interfacing system LOCA and low temperature overpressurization. The results indicate that the frequency of an interfacing system LOCA is reduced by 33 percent, and the short-term and long-term cooling phase failure probabilities are reduced by 24 and 38 percent, respectively. The failure probability for RHR initiation and the consequences of low temperature overpressure events are not significantly impacted by removal of the RHR ACI.

With the ACI circuitry on the RHR inlet isolation valve removed, a failure of a pressure transmitter cannot result in the valves stroking closed. Thus, the postulated occurrence of a single failure isolating both RHR trains is not feasible.

SCE&G has evaluated the proposed changes against the significant hazards criteria of 10CFR50.92 and has determined that, if implemented, the proposed change will not:

1. Involve a significant increase in the probability or consequences of any accident previously evaluated because adequate overpressure protection of the RHR system will exist through alarms and relief valves. Further, the probability of a loss of decay heat removal due to closure of the RHR isolation valves has been significantly reduced.
2. Create the possibility of a new or different kind of accident from any previously evaluated because the probability of an interfacing LOCA has been significantly reduced.
3. Involve a significant reduction in a margin of safety because the removal of the RHR ACI provides a significant improvement in the availability of the RHR system. Also, Surveillance Requirement 4.5.2.d.1. of the VCSNS Technical Specifications requires that the automatic isolation and interlock function of the RHR suction/isolation valves be demonstrated operable on an 18 month interval. However, with the ACI removed, there is no longer a need to retain this Surveillance Requirement.

Therefore, based on the above considerations, SCE&G has determined that this change does not involve significant hazards consideration.