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

Gentlemen:

Subject: VIRGIL C. SUMMER NUCLEAR STATION
DOCKET NO. 50/395
OPERATING LICENSE NO. NPF-12
RESPONSE TO IST PROGRAM ANOMALIES (LTR 890004)

South Carolina Electric & Gas Company (SCE&G) is submitting the attachment to address anomalies cited in the October 16, 1991, Safety Evaluation Report (SER) with regards to the Virgil C. Summer Nuclear Station (VCSNS) Inservice Testing (IST) Program. The attachment describes the VCSNS actions to resolve the anomalies.

It should be noted that certain responses address the update of the IST program second 10-year interval. VCSNS is currently in the ninth year of the first 10-year interval and, therefore, does not intend to make two changes to the program in such a short interval.

Should you have any questions concerning this matter, please contact Mr. David Haile at (803) 345-4322.

Very truly yours,

John L. Skolds

DCH:JLS:lcd
Attachment

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This attachment provides a restatement of the anomalies identified in Appendix B of the SER dated October 16, 1991. Each anomaly is followed by the VCSNS response to resolve the concerns identified in the anomaly.

Anomaly 1: The licensee has requested relief from measuring bearing temperature, inlet pressure, and differential pressure on the diesel generator fuel oil transfer pumps (see Section 2.1.1.1 of this report) and proposed to measure pump flow rate and vibration once per month and to assign administrative limits for pump flow rate. The licensee's proposed corrective action acceptance criteria are unacceptable since they could allow the pump to degrade less than one half normal capacity before requiring corrective action. Relief should be granted provided the calculated flow rate meets the accuracy requirements of Table IWP-4110-1. Relief should not be granted to use the proposed acceptance criteria. The licensee should establish flow rate reference values and use the acceptance criteria of Section XI, Table IWP-3100-2.

Response: VCSNS cannot currently meet the accuracy requirements of IWP-3100-1 for the calculated flow rate of the diesel generator fuel oil transfer pumps due to the limited number of measured parameters available and the tolerances allowed for these parameters. Therefore, VCSNS will implement a modification(s) to increase the accuracy of the calculated flow rate. The modification(s) will be implemented upon completion of design approval and during an outage of sufficient time for installation prior to the end of Refuel Outage 7. The flow rate reference values and acceptance criteria will be in accordance with Table IWP-3100-2.

Anomaly 2: The licensee has requested relief from establishing fixed reference values for flow and differential pressure for their service and chilled water pumps (see Sections 2.2.2.1 and 2.5.1.1 of this report) and proposed to use pump curves to compare flow and differential pressure. Acceptance criteria based on the curve should not conflict with Technical Specification or Facility Safety Analysis Report operability criteria. Since the levels of vibration may vary significantly depending on where the pump is operating relative to the pump curve, a set of vibration reference values would have to be established for each pump curve used that give equivalent protection as provided by the Code. Relief should be granted provided the insitu pump curves are developed, or manufacturers curves are validated, when the pump is known to be operating acceptably, as described in this report, and acceptance criteria for vibration measurements give equivalent protection as provided by the Code.

Response: VCSNS will develop insitu pump curves for each pump to evaluate the flow vs. differential pressure performance of the pump. Also, vibration reference data will be collected such that acceptance criteria for vibration measurements will give equivalent protection as provided by the Code.

Anomaly 3: The licensee has requested relief from the allowable range requirements of Section XI for flow and differential pressure measurements on their service water pumps (see Section 2.2.3.1 of this report) and proposed to establish expanded ranges to accommodate added instrument errors. The licensee has not demonstrated that the proposed acceptance criteria will give adequate assurance of pump operational readiness when applied to their pump test parameter values during testing.

Service water system P&IDs, dated 3/13/89, show a flow element and indicator installed in each service water header such that each header can be isolated, or split if operated in parallel, and individual pump flow rates can be obtained. Since the licensee has not shown that using the Code specified acceptance criteria is impractical or that it imposes an excessive hardship without a compensating benefit to safety, and since the licensee's proposed alternative does not provide a reasonable alternative to the Code requirements, relief should not be granted as requested.

Response: VCSNS has completed a modification which installed the individual header flow meters IFE-4586 and IFE-4587 and, therefore, eliminates the need for a relief request. VCSNS hereby withdraws relief request Pump E.2.

Anomaly 4: The licensee has requested relief from the requirement of Section XI to measure flow rate of the charging pumps (see Section 2.4.1.1 of this report) and proposed to measure flow rate during refueling outages. The proposed alternative has not been shown to provide an acceptable level of quality and safety and relief should not be granted from the Code requirements.

The licensee should continue to measure pump flow rate quarterly. The licensee should also perform the flow test during refueling outages when a full flow path to the RCS is available and comply with the Code instrument accuracy requirements. If the licensee determines that the Code flow rate instrument accuracy or acceptance criteria requirements cannot be met during quarterly testing the licensee should request relief from these requirements and justify their proposed alternatives. The licensee should specifically address the individual instrument and total loop accuracies and show the proposed testing will give adequate assurance of pump operational readiness and provide a reasonable alternative to the Code requirements.

Response: The charging pumps at VCSNS model the exception to quarterly full flow testing described in Generic Letter (GL) 89-04, position 9. Therefore, this exception to the code will be documented in the program using GL 89-04 as the justification/basis.

The following points document the VCSNS logic for applying GL 89-04, position 9, to these pumps:

- 1) During normal plant operation, the non-instrumented minimum flow path is the only testable flow path that does not place the plant in a transient and/or challenge safety system operation.

The normal charging path presents three impasses. The first being the requirement to close the minimum-flow isolation valve to divert all flow through instrumented flow paths. This alignment would increase the risk of pump damage during a secondary system line break and contradicts the guidance of IE Bulletin 80-18.

The second impasse is the requirement to maintain a fixed flow rate on a system whose normal function is to vary flow to maintain pressurizer level. Therefore, fixing the charging flow rate could cause a pressurizer level transient of some magnitude depending on the reference flow rate selected and the plant conditions (i.e., letdown configuration) at the time of the test. It should be noted that the maximum letdown flow rate is approximately 120 gpm and to minimize the pressurizer level transient, a reference flow rate for the charging pumps would be selected which is less than or equal to 120 gpm. This flow is relatively close to the minimum-flow path flow rate of approximately 60 gpm and is located on the pump characteristic curve where there is essentially no change in differential pressure for the change in flow rate. Thus, there is no increase in the likelihood to detect pump degradation by testing via the normal charging path as opposed to the minimum flow path.

The third impasse, is related to ALARA concerns for test personnel. Since the normal charging path consists of four branch lines (three seal injection lines and one charging line), the additive error resulting from four separate instruments requires that extremely accurate test transmitters be installed to meet the Section XI required accuracy. To install these transmitters, the test personnel would have to enter posted high radiation areas. For these reasons VCSNS will comply with the provisions of GL 89-04 position 9 which states:

"In cases where flow can only be established through a non-instrumented minimum-flow path during quarterly pump testing and a path exists at cold shutdowns or refueling outages to perform a test of the pump under full or substantial flow conditions, the staff has determined that the increased interval is an acceptable alternative to the Code requirements, provided that pump differential pressure, flow rate, and bearing vibration measurements are taken during

this testing and that quarterly testing also measuring at least pump differential pressure and vibration is continued. Data from both of these testing frequencies should be trended as required by IWP-6000. Since the above position is a deviation from the Code required testing, it should be documented in the IST program."

Anomaly 5: In the licensee's program for testing valves, on p. 13, Paragraph 6.2.4, GTP-302, the statement is made that "If a power operated valve fails to exhibit the required change of valve stem or disk position or exceeds its maximum allowed stroke time by this testing, corrective action will be initiated immediately. If the test deficiency is not, or cannot be corrected within 24 hours, the valve will be declared inoperable."

This statement conflicts with GL 89-04, Position 8, which states in part, ". . . it is the staff's position that as soon as the data is recognized as being within the Required Action Range for pumps or exceeding the limiting value of full-stroke time for valves, the associated component must be declared inoperable and the Technical Specification Action time must be started." In other words, if a valve fails to exhibit the required change of stem or disk position or exceeds its specified limiting value of full-stroke time, it must be declared inoperable immediately, not after a 24 hour period has elapsed. The licensee should revise the IST program to agree with this staff position.

Response: General Test Procedure (GTP) - 302 has been changed to eliminate the 24 hour delay for declaring a valve inoperable where its stroke time falls into the required action range.

Anomaly 6: GTP-302, Attachment VII, Table C, p. 1 of 1, Maximum Stroke Time Determination, presents guidance that may be used to calculate maximum stroke times for power operated valves. This Table does not appear to be in accordance with the guidance presented in GL 89-04, Position 5. All valves with nominal full-stroke times greater than 2 seconds could have stroke times that exceed the limits of Section XI, Paragraph IWV-3413(c), by a large margin before exceeding the calculated maximum limiting value of full-stroke time. The continued operational readiness of any valve would be questionable if that valve's full-stroke time doubled, as allowed by Table C, when compared to the stroke time of the previous test.

The licensee should revise Table C to establish the maximum value of limiting stroke time for power operated valves in accordance with the guidance presented in GL 89-04, Position 5. Corrective action should be taken as described in the "Minutes of the Public Meetings on Generic Letter 89-04, response to question 34."

Response: GTP-302, Attachment VII, has been revised to reflect GL 89-04, position 5. A review, and update if necessary, of all valve IST implementing procedures will be made to ensure acceptance criteria are in accordance with GL 89-04, Position 5, as part of the second 10 year interval.

Anomaly 7: The licensee has requested relief (Relief Request E.2) to test various valves during cold shutdown when those valves cannot be tested quarterly during power operation. This relief request is unnecessary because Section XI, Paragraphs IWV-3412 and -3522, specifically allow valve testing to be deferred to cold shutdown if that testing is impractical during power operation. The licensee should delete this relief request and include the information contained in the Alternate Test, which explains how cold shutdown testing will be conducted.

Response: VCSNS hereby withdraws relief request Valve E.2 and will replace the relief request with cold shutdown justification for these valves.

Anomaly 8: It is unclear how reverse flow closure of Category A/C check valves XVC-7541, -7544, -8046, -8861, and -8947 is verified each cold shutdown. These valves might be verified in their closed safety function position by a leak rate test, such as Appendix J, Type C. However, this is usually performed only during reactor refueling outages. This test frequency does not meet the Section XI requirements. The licensee should justify a test interval beyond that allowed by the Code in a relief request or test these valves in accordance with the Code test frequency requirements. If closure testing is done at each cold shutdown, the test should be described in the cold shutdown justification.

Response: VCSNS hereby withdraws relief request Valve M.2 for XVC-7541 and XVC-7544. These valves are classified as passive valves and per the direction of IWV-3700 only require leakage testing on a 24 month interval.

Valve XVC-8046 is a normally closed valve whose safety position is also closed and which is rarely used (<1%) in making up to the PRT. This valve will be reclassified as a passive valve thereby only requiring a leakage test be performed.

Valves XVC-8861 and XVC-8947 are classified as active valves and will continue to receive a closure test each quarter and a leakage test each outage (≤24 months) as is required by Section IWV.

Anomaly 9: The licensee has requested relief (Relief Request N.3) from the Code test data trending and increased test frequency corrective action requirements for Category A reactor building purge supply, XVB-0001A and -0001B, and purge exhaust valves, -0002A and -0002B. These valves will be leak rate tested every 7 months per plant Technical Specifications. The

combined leakage rate allowed for both valves equals the Technical Specification limit for each valve, 3620 cc/min.

This relief request is unnecessary. The Code requires these valves to be leak tested every two years. The licensee is leak testing them every six months, which is conservative. The licensee proposed not to trend leakage. Trending of containment isolation valve leakage rates per 1WV-3427(b) is exempted by GL 89-04, Position 10. Relief is not requested from IWV-3426 and -3427(a). The request indicates that these valves are leak tested individually and the test results are combined and compared to the leak rate limit applicable to either valve, also conservative. Therefore, this relief request may be withdrawn and compliance with GL 89-04, Position 10, indicated in the program. If relief is needed for reasons not addressed above the request should be revised and resubmitted.

Response: VCSNS hereby withdraws relief request Valve N.3 for valves XVB-0001 A & B and XVB-0002 A & B. VCSNS' testing of these valves is in accordance with the provisions of GL 89-04, position 10, and will be documented as such in the IST program.

Anomaly 10: The licensee has proposed testing the following valves during cold shutdowns when the reactor coolant pumps are secured at RCS half pipe fill conditions. These cold shutdown justifications are unacceptable as this plant condition will not occur each cold shutdown and the test interval could be as long as from refueling outage to refueling outage, which is not in accordance with the Code test frequency requirements. The licensee should provide a relief request that addresses and justifies this extended test interval in the IST program or test these valves in accordance with the Code test frequency requirements.

<u>Cold Shutdown Justification Id.</u>	<u>Valve Id.</u>	<u>Function</u>
CS-CC-1	XVC-9570 & -9602	containment component cooling water supply check valves
CS-CC-2	XVG-9568, -9600, -9605, & -9606	containment component cooling water supply and return valves
CS-CC-3	XVG-9625 & -9626	non-essential containment component cooling water header isolation valves
CS-CC-4	XVC-9632 & -9633	non-essential containment component cooling water header isolation check valves
CS-CC-7	XVT-8102A, -8102B, & -8102C	reactor coolant pump seal water injection

Response: The cold shutdown justifications have been revised to remove the half pipe reference, thereby increasing the test frequency to every cold shutdown which complies with Code requirements.

Anomaly 11: The licensee has included pressurizer auxiliary spray valve XVT-8145 in the IST program and proposed to test it during cold shutdowns. This proposal is acceptable. However, the downstream check valve 8377 is not in the program. This check valve must be included in the program if credit is taken for operational readiness of the pressurizer auxiliary spray flow path because it must change position to permit flow in the line. The licensee should review the safety-related function of this valve and revise the IST program to include this valve as necessary.

Response: VCSNS included valve XVC-8377 in the ISI Valve Test List as part of Revision 4 to GTP-302 and currently tests the valve in accordance with the provisions of the Code.

Anomaly 12: The licensee stated in the ISI Valve Test List, p. 7 of 33, that the safety position of valve XVC-8440, volume control tank outlet check, is close and that it is being full-stroke exercised quarterly. This does not appear to be the case because the motor-operated volume control tank outlet valves upstream of this check valve are being full-stroke exercised during cold shutdowns (see Cold Shutdown Justification CS-CVCS-1). The licensee should verify the testing frequency of valve XVC-8440 and revise the IST program as necessary.

Response: VCSNS determined that valve XVC-8440 is not required to perform a specific function in shutting down the reactor to cold shutdown or in mitigating the consequences of an accident and, thus, should not be included in the ISI valve program. Valve XVC-8440 was removed from GTP-302 in Revision 4.

Anomaly 13: Diesel generator system drawing no. IMS-22-006 was not available for review. This drawing shows the following valves:

10977A	10977L	10978A	10978B
10998A	10998B	10999A	10999B
20950A	10950B		

A complete evaluation of the diesel generator system components that should be included in the IST program and the testing of those components cannot be performed. Additionally, valve 20950A, listed above and on p. 9 of 33 in the ISI Valve Test List appears to be a typographical error. The licensee should address this inconsistency.

Response: Revision 4 to GTP-302 indicates that all the valves listed are being tested quarterly as active valves. VCSNS is confident that these valves are in compliance with code requirements. Also, the valve listed as 10950B was corrected to read 20950B in Revision 4.

Anomaly 1-: The licensee has requested relief from exercising several check valves according to the Section XI test frequency and method requirements (see Sections 3.4.1.1, 3.4.1.2, 3.6.1.1, and 3.6.2.1 of this report) and proposed to disassemble and inspect them during refueling outages.

Disassembly, inspection and manual full-stroking of the valve disk can adequately ascertain a check valve's internal condition. However, disassembly and inspection should be used to manually exercise check valves open and/or shut only when full forward flow or reverse flow testing is impractical. The NRC considers check valve disassembly and inspection to be a maintenance procedure not a test equivalent to exercising produced by fluid flow as required by Section XI. This procedure has some risks, which may make its routine use as a substitute for testing undesirable when some testing method is possible. Check valve disassembly is a valuable maintenance tool that can provide much information about valve internal condition and, as such, should be performed under the maintenance program at a frequency commensurate with the valve type and service.

The licensee should actively pursue the use of alternate testing methods to full-stroke exercise these valves, such as using non-intrusive diagnostic techniques to demonstrate whether they swing fully open during partial flow testing or closed when flow has ceased. When valve operational readiness cannot practically be determined by observation of system parameters, inspection may be used as an alternative, however, the licensee should perform post maintenance testing (e.g., forward flow and reverse flow closure capability) of each valve prior to returning it to service following the disassembly and inspection procedure.

The licensee's proposed disassembly and inspection program is not thoroughly stated and does not include corrective action(s) that will be taken if a valve fails the inspection. A determination that the proposal provides a reasonable alternative to the Code requirements cannot be made. However, a check valve inspection program performed in accordance with GL 89-04, Position 2, can adequately determine valve condition and provides a reasonable alternative. Therefore, relief should be granted provided the licensee performs check valve disassembly and inspection per GL 89-04, Position 2.

Response: VCSNS' disassembly and inspection program for check valves is in accordance with GL 89-04, position 2, and, thus, provides a reasonable alternative to full flow testing. VCSNS will clarify the required corrective

actions applied to a valve inspection failure when the program is updated for the second 10 year interval.

Anomaly 15: The licensee has requested relief from exercising the accumulator discharge check valves according to the Section XI test method and frequency requirements. The licensee has proposed (see Section 3.5.1.2 of this report) to full-stroke exercise them during refueling outages and to verify this using an acoustic technique. Relief should be granted provided the licensee complies with GL 89-04, Position 1.

Response: VCSNS meets the requirements of GL 89-04, position 1, with respect to the accumulator discharge check valves, by performing a full flow test each refueling.

Anomaly 16: The licensee should verify that the proposed full-stroke exercise of valves XVC-8973A, -8973B, -8973C, -8974A, and -8974B, low head SI header checks, is in fact a full-stroke exercise as defined in GL 89-04, Position 1, and that the valves are being individually full-stroke exercised even with the parallel flow paths. (See Cold Shutdown Justification (CS-SI-5))

Response: If possible, the ISI program will be revised prior to the end of Refueling 7 to test these valves in accordance with GL 89-04, position 1, by the use of non-intrusive verification of valve position. If this method cannot be established, then the valves will be tested in accordance with GL 89-04, position 2.

Anomaly 17: Simple check valves that serve a vacuum breaker function are to be tested quarterly, if practical, in accordance with the requirements of Section XI, Paragraph IWV-3520, for Category C check valves. The licensee should review the design and testing of valves 3014A and 3014B using this guidance. (See ISI Valve Test List, p. 26 of 33)

Response: VCSNS has verified that valves XVV-3014 A & B are not simple check valves, but rather they are valves specifically manufactured as vacuum breakers. As such, the program does correctly specify the Code requirements of IWV-3410 to be applied to the testing of these valves.

Anomaly 18: The following miscellaneous errata were identified during the program review and should be corrected as necessary.

- a) The licensee has incorrectly listed the location of check valve 6489B in the ISI Valve Test List. The location should be Dwg. 842, Cord. C-8. (See ISI Valve Test List, p. 32 of 33)

Response: This valve has been removed by a plant modification.

- b) The licensee has categorized valves XVC-7541 and -7544 Category A/C in the ISI Valve Test List but has incorrectly categorized them Category C in Cold Shutdown Justification CS-AC-2.

Response: The cold shutdown justification has been corrected.

- c) The licensee has categorized valves XCV-9680A and -9680B Category C in the ISI Valve Test List but has incorrectly categorized them Category A/C in Relief Request A.1. Additionally, this relief request is identified as A.1 in the List but is identified as A.5 on the relief request page.

Response: The relief request has been corrected.

- d) The licensee has incorrectly listed the location of valve XvT-8104 in the ISI Valve Test List. The location should be Dwg. 675, Cord. G-4. (See ISI Valve Test List, p. 4 of 33)

Response: GTP-302 has been corrected.

- e) The licensee has incorrectly listed the location of valve XVC-8348C in the ISI Valve Test List. The location should be Dwg. 673, Cord. G-14. (See ISI Valve Test List, p. 6 of 33)

Response: GTP-302 has been corrected.

- f) The licensee has categorized valves XVC-8481A, -8481B, and -8481C Category C in the ISI Valve Test List but has incorrectly categorized them Category B in their Relief Request B.2.

Response: The relief request has been corrected.

- g) The licensee has categorized valves XVC-8480A, -8480B, and -8480C Category C in the ISI Valve Test List but has incorrectly categorized them Category B in Cold Shutdown Justification CS-CVCS-10.

Response: The cold shutdown justification has been corrected.

- h) The licensee has incorrectly categorized valve XVC-6799, reactor building fire water supply check, as Category A on p. 12 of 33 in the ISI Valve Test List when it should be categorized A/C. Additionally, this check valve has been identified as being a passive valve while the motor operated valve upstream of it has been identified as active. The licensee should address this inconsistency.

- Response: 1) GTP-302 has been corrected.
2) The MOV is normally open and is required to close in an accident while the check valve is normally closed.

- i) The licensee has not assigned a category designation to valves IFV-478, -488, and -498, main feedwater control valves, and to valves IFV-3321, -3331, and -3341, main feedwater control valve bypasses, in the ISI program. These globe valves should be Category B and tested in accordance with the Section XI requirements for Category B power operated valves. (See Cold Shutdown Justifications CS-FW-2 and CS-FW-3)

Response: Per plant design, these valves are not code valves; however, the ISI program considers them to function as Category B valves and tests them as such. A footnote has been added to GTP-302 to clarify this.

- j) The licensee has categorized valves XVC-1684A, -1684B, and -1684C Category C in the ISI Valve Test List but has incorrectly categorized them Category B in Cold Shutdown Justification CS-FW-4.

Response: The cold shutdown justification has been corrected.

- k) The licensee has identified the system containing valve 6054 as System JR instead of HR on p. 14 of 33 of the ISI Valve Test List. Additionally, the CS column indicates MN/A instead of N/A.

Response: GTP-302 has been corrected.

- l) The licensee has categorized valve XVC-2661 Category A/C in the ISI Valve Test List but has incorrectly categorized it Category A in Cold Shutdown Justification CS-IA-1.

Response: The cold shutdown justification has been corrected.

- m) The licensee has categorized valves XVC-2876A and -2876B Category C in the ISI Valve Test List but has incorrectly categorized them Category B in Cold Shutdown Justification CS-MS-2.

Response: The cold shutdown justification has been corrected.

- n) The licensee has incorrectly listed the locations of relief valves 8708A and 8708B in the ISI Valve Test List. The location should be Dwg. 641, Cord. H-14 and F-14. (See ISI Valve Test List, p. 20 of 33)

Response: GTP-302 has been corrected.

- o) The licensee has incorrectly listed the Active or Passive function of valve XVC-8998A as 1 instead of "A" or "P" in the Active/Passive column on p. 24 of 33 of the ISI Valve Test List.

Response: GTP-302 has been corrected.