Jeffrey B. Archie
Vice President, Nuclear Operations
803.345.4214

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A SCANA COMPANY

April 20, 2005
RC-05-0057

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

Attention: Ms. K. R. Cotton

Dear Sir / Madam:

Subject: VIRGIL C. SUMMER NUCLEAR STATION (VCSNS)
DOCKET NO. 50/395
OPERATING LICENSE NO. NPF-12
NRC BULLETIN 2003-01, POTENTIAL IMPACT OF DEBRIS BLOCKAGE ON EMERGENCY SUMP RECIRCULATION AT PRESSURIZED-WATER REACTORS - REQUEST FOR ADDITIONAL INFORMATION

Reference:

1. S. A. Byrne to Document Control Desk, Bulletin 2003-01, 60-Day Response, dated August 6, 2003, RC-03-0164
2. K. R. Cotton, NRC, to Stephen A. Byrne Letter dated September 9, 2004, Request for Additional Information Regarding Bulletin 2003-01, (TAC NO. MB9617)
3. J. B. Archie to Document Control Desk, Response to Request For Additional Information, dated October 21, 2004, RC-04-0164

By the referenced letter (Reference 1), South Carolina Electric & Gas Company (SCE&G) provided the 60-day response to NRC Bulletin 2003-01 for the Virgil C. Summer Nuclear Station (VCSNS). In a letter dated September 9, 2004 (Reference 2), the NRC requested additional information from SCE&G in order to complete their review. In a letter dated October 21, 2004 (Reference 3) SCE&G provided a response to that request. During the staff review of that response, they determined that additional clarification was needed on two of those responses. This letter, with the attached discussion on the two items of concern, is being provided to supply that additional information.

A103

Should you have questions, please call Mr. Ron Clary at (803) 345-4757.

I certify under penalty of perjury that the information contained herein is true and correct.

4-20-05
Executed on

Jeffrey B. Archie
Vice President, Nuclear Operations

AMM/JBA/mb
Attachment
c: N. O. Lorick
N. S. Carns
T. G. Eppink (without attachment)
R. J. White
W. Travers
K. R. Cotton
Winston & Strawn
K. Leonelli
D. A. Baker
NRC Resident Inspector
NSRC
RTS (C-03-1897)
File (815.02)
DMS (RC-05-0057)

Attachment
Additional Clarification on Candidate Operator Actions (COA's) A1a and A3

COA A1a – Secure One Spray Pump Prior to Recirculation

The WOG WCAP states this COA is risk neutral.

For a Large Break LOCA the COA provides little benefit. Before the operators could get to an EOP step to stop one spray pump, the RWST would be significantly depleted. Stopping the spray pump would provide little additional injection time for the Large Break. Consistent with WOG WCAP, COA A1a provides no risk benefits for Large Break LOCA.

For Small and Medium Break LOCA (6" diameter or less), there is a potential for extending the injection time. This allows large/heavy particulates and other materials to settle out of the sump fluid. This would reduce the amount of material getting to the sump and thereby lessen the possibility of sump blockage. For V.C. Summer, extending the settling time is expected to have limited if any advantages for breaks less than 6" in diameter. The insulation at V.C. Summer is primarily Reflective Metal Insulation (RMI). For a 6" or under break the amount of RMI debris is limited. The 6" curb around the sumps will limit RMI getting to the sump screens and the head loss from small amounts of RMI would not be significant. V.C. Summer has a limited about of fibrous insulation (TempMat). Based on the TempMat locations (TempMat is not installed directly on RCS pressure boundary piping or components) a very limited amount or no fibrous debris would be generated for a 6" and under break. This means only latent debris would be transported to the sump screen. Extending the injection time does not provide a risk benefit for latent debris. V.C. Summer has no micro-porous insulation (calcium silicate, min-k, etc.)

There are risk negative factors for stopping one spray pump.

- Additional operator actions are added during a time critical response. This is of particular importance during Large Break LOCA.
- If the operating spray pump failed prior to switchover, the operators could be faced with conflicting high priority tasks. The operators would be directed to take immediate action to restart the spray pump that was just stopped. If the RWST switchover setpoint was reached during this period (which is likely), the operator would have conflicting high priority actions. Failing to complete switchover in the prescribed time could have adverse effects on core cooling.
- At V.C. Summer, each Spray pump and each RHR pump is provided with a separate sump strainer (four total strainers). Stopping one Spray pump

effectively reduces the surface area for debris accumulation by 25%. This is particularly important for a LOCA which does not dislodge fibrous material. With only latent debris considerations, the additional 25% could make the difference between thin bed formation and no thin bed formation.

Based on the above discussion, there is little or no benefit, while introducing risk negative effects. Overall, COA A1a is qualitatively judged to be risk negative for V.C. Summer. COA A1a will not be implemented.

COA A3 – Terminate One Train of SI After Recirculation

The WOG states there are advantages for dual sump plants.

At V.C. Summer each of the four pumps (2 RHR and 2 Spray) taking suction on a recirculation sump has a dedicated strainer. The risk positive factor for this change is that debris would collect on the operating strainers. Most of the debris would be collected at these operating strainers. At some later point, the other train could be started with clean screens. This would limit the potential blocking the second set of pumps strainers.

The risk negative impacts of this change are primarily concerned with the potential for interrupting core cooling. If the one operating RHR pump fails (active failure or passive loss of pump seal), the operators would have a limited time to restart and align the RHR pump intentionally stopped. This would involve opening the suction valves to the containment and then starting the pump. If the pump fails to restart or if either containment isolation valve fails to open, then core cooling would be lost. As discussed under COA 1A3, the potential for fibrous debris generation for breaks 6" and under is very limited at V.C. Summer. This means only latent debris fibers would be of concern for sump blockage. Decreasing the surface area increases the risk of a thin bed forming on the operating sump strainer.

Given the risk positive and risk negative considerations, COA A3 is judged to be risk neutral for V.C. Summer.

As an alternative, V.C. Summer is developing procedures and a supporting evaluation to throttle RHR flow when both trains are operating. By reducing the flow rate, the transport of material will be reduced and the head loss through the sump strainers will be reduced, as well as reducing the required NPSH for the pumps. This step will maximize the available screen surface area to limit the potential for thin bed formation when no fibrous insulation is dislodged. This is specifically applicable to 6" and smaller breaks which have a greater probably of

occurrence than the larger double ended guillotine breaks. The risk negative concerns for this alternative would be over throttling of the RHR flow. This is countered by monitoring of core exit temperatures, containment pressure and containment temperature. Over-all, the throttling of RHR flow is qualitatively judged to be risk positive for V.C. Summer.