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SCE&G®
A SCANA COMPANY

October 10, 2012
RC-12-0146

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555-0001

Dear Sir / Madam:

Subject: VIRGIL C. SUMMER NUCLEAR STATION (VCSNS) UNIT 1
DOCKET NO. 50-395
OPERATING LICENSE NO. NPF-12
SOUTH CAROLINA ELECTRIC & GAS (SCE&G) RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION
LICENSE AMENDMENT REQUEST - LAR 10-03912
TECHNICAL SPECIFICATION CHANGE REQUEST FOR TS 3.5.4, REFUELING WATER STORAGE TANK (RWST)

References:

1. Thomas D. Gatlin Letter (RC-12-0075) dated June 29, 2012, License Amendment Request - LAR 10-03912 Technical Specification Change Request for TS 3.5.4, Refueling Water Storage Tank (RWST); ADAMS Accession No. ML121850005

2. SCE&G Response to Request for Additional Information (RC-12-0132) License Amendment Request - LAR 10-03912 Technical Specification Change Request for TS 3.5.4, Refueling Water Storage Tank (RWST) ADAMS Accession No. ML12258A073

3. SCE&G Response to Request for Additional Information (RC-12-0141) License Amendment Request - LAR 10-03912 Technical Specification Change Request for TS 3.5.4, Refueling Water Storage Tank (RWST) ADAMS Accession No. ML12268A319

South Carolina Electric & Gas Company (SCE&G) is submitting additional information regarding License Amendment Request LAR 10-03912, Technical Specification Change Request for TS 3.5.4, Refueling Water Storage Tank (RWST). This information is provided in the Attachment. There are no regulatory commitments made by this letter.

A001
NRR

If you have any questions about this submittal, please contact Mr. Bruce L. Thompson at (803) 931-5042.

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

10-10-12
Executed on

Thomas D. Gatlin

JW/TDG/wm
Attachment: SCE&G's Response to NRC Question

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PRSF (RC-12-0146)

VIRGIL C. SUMMER NUCLEAR STATION (VCSNS) Unit 1
DOCKET NO. 50-395
OPERATING LICENSE NO. NPF-12

ATTACHMENT

SCE&G's Submitted Additional Information

Evaluation of Current Leakage to 20" RWST Header

There are 10 flow paths connecting piping systems with post-LOCA recirculation fluid and valve XVT06701. Each flow path has two closed valves plus XVT06701.

From HHSI Pump Suction (Drawing 302-675)
LCV-115B, XVC08926, XVT06701
LCV-115D, XVC08926, XVT06701

From LHSI (RHR) Pump Suction (Drawing 302-693)
XVC08958A, XVG08809A, XVT06701
XVC08958B, XVG08809B, XVT06701

From LHSI (RHR) Discharge (Drawing 302-693)
XVG08887A, XVG08881 (locked closed), XVT06701
XVG08887B, XVG08881 (locked closed), XVT06701

From RB Spray Pump Suction (Drawing 302-661)
XVC03006A, XVG03001A, XVT06701
XVC03006B, XVG03001B, XVT06701

From RB Spray Discharge (Drawing 302-661)
XVG03010A (locked closed), XVG03011, XVT06701
XVG03010B (locked closed), XVG03011, XVT06701

Leakage from HHSI (Charging Pump) Suction Isolation

The HHSI (Charging Pump) is isolated from the RWST by LCV-115B/D (drawing 302-675). These valves are normally closed and open on an SI signal. During switchover to cold leg recirculation the valves are closed. Check valve XVC08926 is in series with each of these valves.

Check valve XVC08926 is tested for closure as a part of the Inservice Testing Program and the Condition Monitoring Program, as documented in GTP-302 and STP-230.006E. With LCV-115B and LCV-115D closed to form a pressure boundary, the pipe is pressurized with a hydro test pump via a two gallon graduated tank. The pressure is maintained between 60 psig and 65 psig for a period of 5 minutes, and changes in the tank level are noted. The acceptance for this test is 4 gpm leakage. The most recent test (2009) recorded zero change in level and therefore zero leakage. This manner of testing also confirms zero leakage across LCV-115B and LCV0115D since they form test pressure boundary.

This charging pump flow path is normally exposed to a pressure differential of approximately 20 psi. The Volume Control Tank (normal charging pump suction source) is at approximately the same elevation as the RWST and is normally pressurized to approximately 20 psig. Back leakage through the isolation valves would go to the RWST. Leakage on an hourly basis would not be significant for the large RWST (40 ft ID). However, the RWST has been isolated for an extended period of over 250 days. A postulated back leak of 0.05 gpm over this time period is 18000 gallons. This would be a 3.5% level change in the RWST. The RWST level for 2012 is provided in Figure 1. There is no indication of significant level increase providing further evidence the charging pump suction path is not back leaking.

Based on these two items, the back leakage from LCV-115B/D and XVC08926 is essentially zero.

Leakage from LHSI (RHR) Suction and Discharge

The RHR suction is isolated from the RWST by check valves XVC08958A/B and motor operated valves XVG08809A/B. The MOVs are open during normal operation and safety injection, and are closed during switchover to cold leg recirculation.

Check valves XVC08958A/B are tested for closure as a part of the Inservice Testing Program and the Condition Monitoring Program, as documented in GTP-302 and STP-205.004. The means of testing the valves is to open the cross-tie from the RHR discharge header to the charging pump suction. This pressurizes the RHR system based on the pressure and head from the Volume Control Tank. The RHR pump suction pressure is measured and the differential pressure across the check valve is determined. It is in the range of 20 psig for most tests. While the test acceptance criteria are large, the measured results reflect actual equipment condition.

This method of testing pressurizes the entire RHR system. The discharge flow paths are a part of the pressure boundary between the RHR system and the RWST. The test measures potential leakage from both the suction and discharge of the RHR system back to the RWST. The test is run for 10 minutes with changes in the Volume Control Tank monitored with a calibrated level instrument. For the B train, tests run in 2011 and 2012 indicate zero level change and therefore zero back leakage. For the A train, the 2011 test indicated zero level change. The 2012 A train test indicated a 0.1% level change in the VCT. This translates into 1.4 gallons for a calculated 0.14 gpm leakage rate.

RHR Train B has in the last cycle experience a recurrent pressurization. Activities to reduce air intrusion have resulted in the loop being water solid. It is currently theorized that ambient temperature changes are causing the pressurization. A plot of RHR pressure for a recent occurrence is provided in Figure 2.

Regardless of the cause, the RHR loop B is being pressurized. The only way this could happen is if the associated check valve (XVC08958B) is leak tight. The RWST head normally pressurizes the RHR suction pipe to about 35 psig. At 70 psig, the differential pressure is 35 psid. This is consistent with the expected pressure differentials during post-LOCA operation, thus leading to the conclusion leakage during recirculation is zero.

RHR Train A has not experience pressurizations similar to RHR Train B. This appears to be consistent with the 2012 check valve test indicating some minor leakage.

During normal plant shutdown and startup, the RHR system is aligned to the RCS at pressures up to about 400 psig. The RWST suction is isolated from the RWST by closing valves XVG08809A/B. Check valves XVC08958A/B would be in the closed position. No back leakage concerns have been identified in this alignment with elevated pressure. Figure 3 provides a plot of RWST Level during a 4 day period where the RHR system was in operation at 400 psig during the last refueling outage. Oscillations in RWST level follow ambient temperature changes. No noticeable increase in level due to in-leakage is noted. Although no conclusion can be drawn from this operational data alone (i.e., because of the large size of the RWST), it does in combination with system indicators imply no significant RHR leakage as pressure is increased beyond those expected post-LOCA.

Based on the check valve leakage test and system operating experience, the RHR Train B isolation valves from the RWST are not suspected of back leaking. The RHR Train A may have a limited back leakage of 0.14 gpm.

Leakage from Containment Spray Valves

The Containment Spray suction isolation check valves XVC03006A/B are disassembled and inspected as a part of the Inservice Testing Program and the Condition Monitoring Program, as documented in GTP-302 and STP 401.006. The procurement documentation for the valves includes allowable leakage rates as follows.

Valve	Leakage Rate	Leakage Rate	Delta P
XVG03001A/B	120 cc/hr	0.0005 gpm	300 psid
XVC03006A/B	120 cc/hr	0.0005 gpm	300 psid
XVG03010A\B	80 cc/hr	0.0004 gpm	300 psid
XVG03011	80 cc/hr	0.0004 gpm	300 psid

The total Containment Spray System allowable design leakage could be:

Train A Suction	0.0005 gpm
Train B Suction	0.0005 gpm
Test Line (common)	0.0004 gpm
Total	0.0014 gpm

Containment Pressure

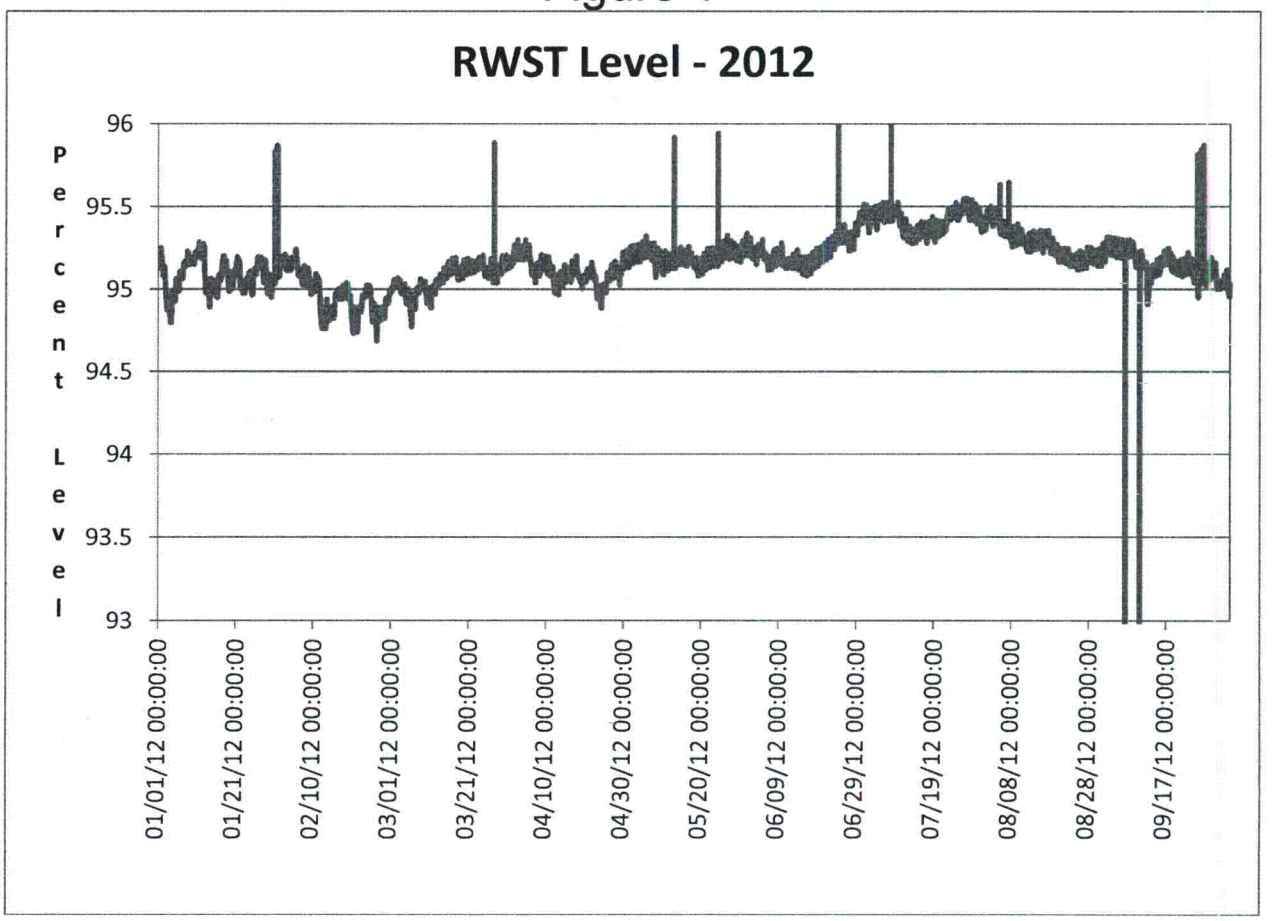
The maximum containment pressure for post-LOCA is shown in FSAR Figure 6.2-1. The maximum pressure is less than 44 psig which occurs during the injection phase of the LOCA. During recirculation, the maximum pressure is approximately 38 psig (second peak on FSAR figure). The pressure drops below 20 psig at approximately 20000 seconds or less than 6 hours into the event. So, for more than 99% of the 30 day dose calculation, maximum containment pressures are consistent with or below test pressures.

Allowable Leakage

The current AST LOCA Dose assessment includes recirculation loop leakage from the piping and valves. This leakage is in the Auxiliary Building and would be equivalent to back leakage through XVT06701. The analytical limit is 0.8072 gpm for a Control Room Dose of 5.00 TEDE. The equivalent Operational Limit for the leakage is 0.4036 gpm and has been met during all surveillances. This provides a 0.4036 gpm margin which may be applied to the potential back leakage through XVT06701.

Given the actual test results along with the design and condition monitoring of the isolation valves, the potential back leakage indications are below the available margin. With these considerations, the sensitivity studies based on approved AST LOCA Dose methodology would continue to be met assuming a single active failure associated with having XVT06701 intermittently opened.

Figure 1


RWST Level - 2012
Percent Level
96
95.5
95
94.5
94
93.5
93
01/01/12 00:00:00
01/21/12 00:00:00
02/10/12 00:00:00
03/01/12 00:00:00
03/21/12 00:00:00
04/10/12 00:00:00
04/30/12 00:00:00
05/20/12 00:00:00
06/09/12 00:00:00
06/29/12 00:00:00
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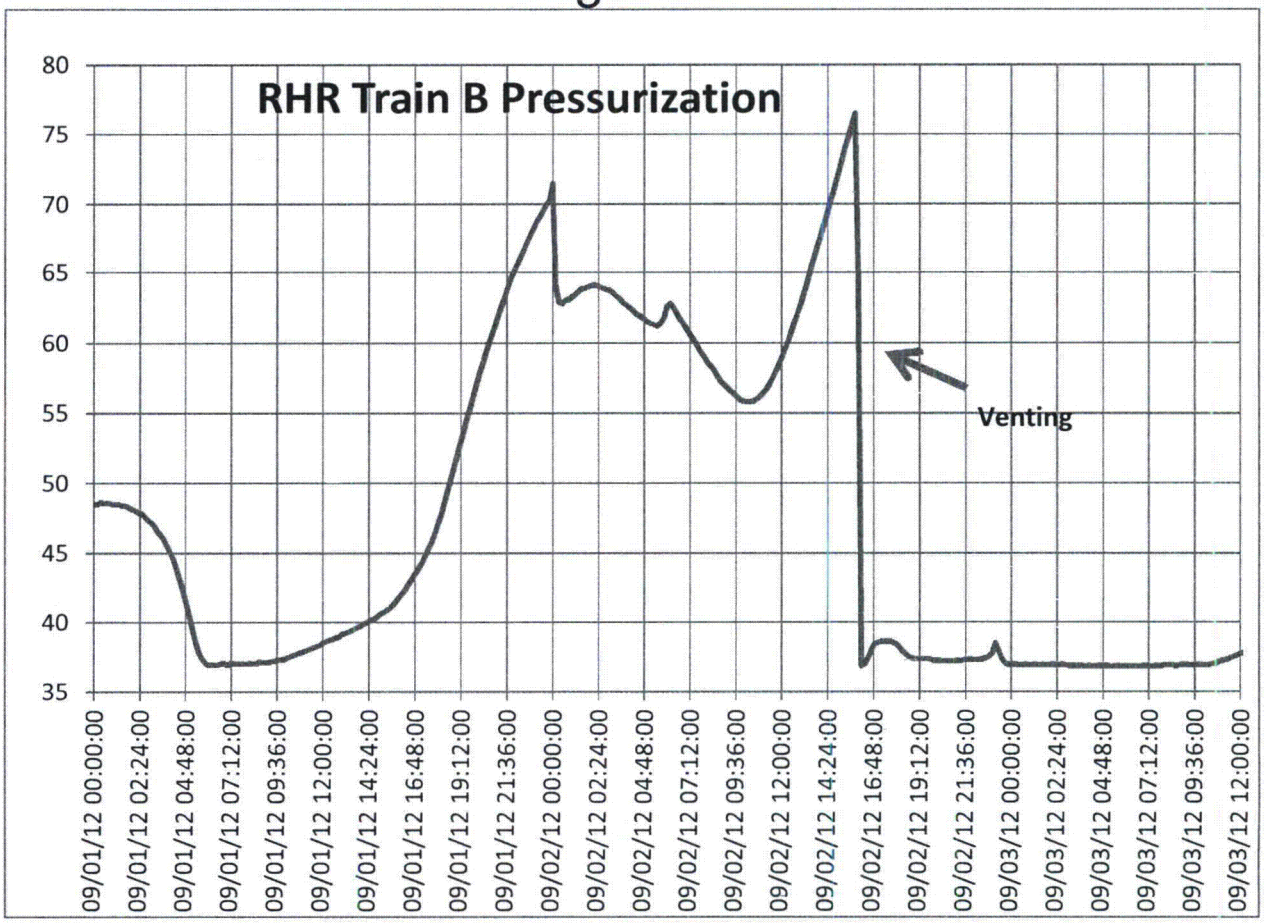
08/28/12 00:00:00
09/17/12 00:00:00

Figure 2


RHR Train B Pressurization
Venting
80
75
70
65
60
55
50
45
40
35
09/01/12 00:00:00
09/01/12 02:24:00
09/01/12 04:48:00
09/01/12 07:12:00
09/01/12 09:36:00
09/01/12 12:00:00
09/01/12 14:24:00
09/01/12 16:48:00
09/01/12 19:12:00
09/01/12 21:36:00
09/02/12 00:00:00
09/02/12 02:24:00
09/02/12 04:48:00
09/02/12 07:12:00
09/02/12 09:36:00
09/02/12 12:00:00
09/02/12 14:24:00
09/02/12 16:48:00
09/02/12 19:12:00
09/02/12 21:36:00
09/03/12 00:00:00
09/03/12 02:24:00
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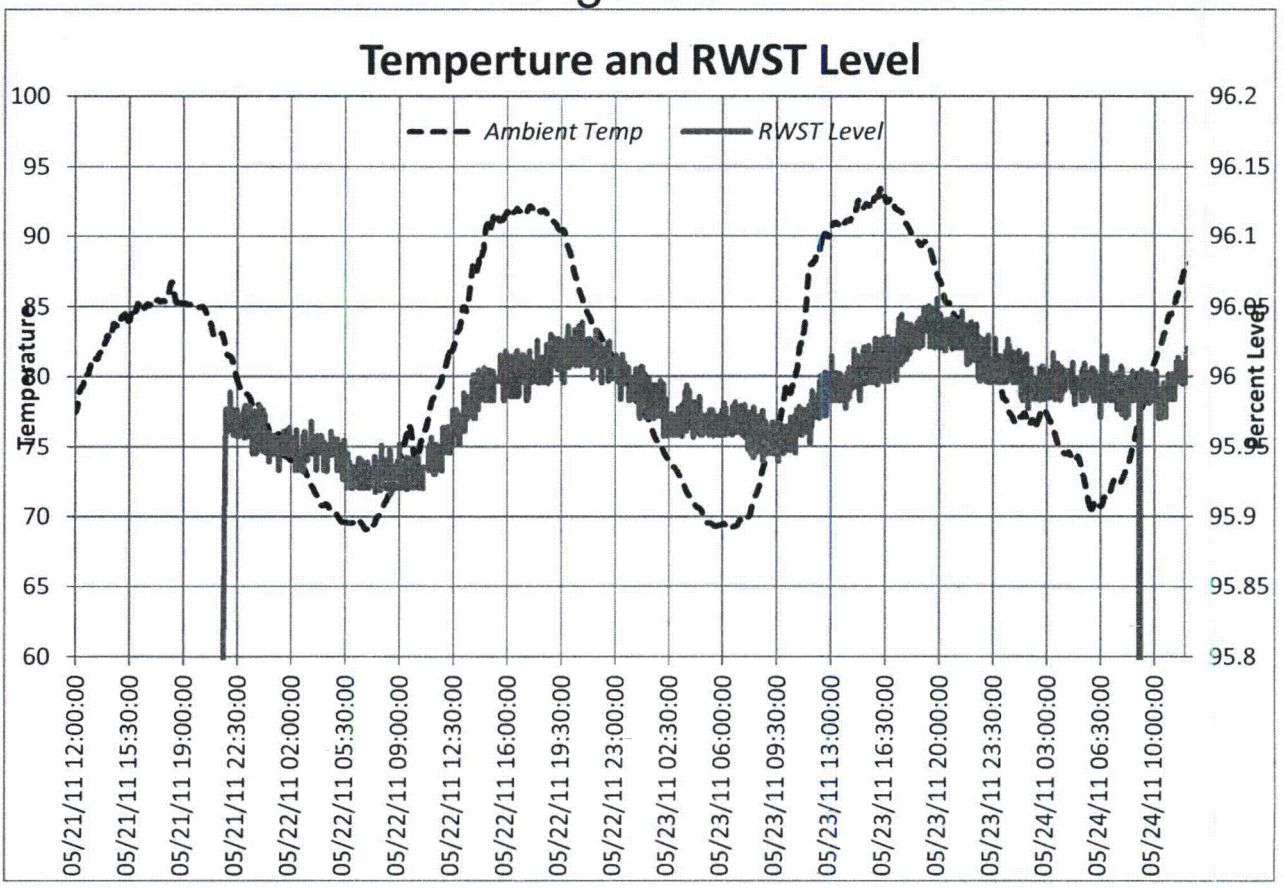
09/03/12 12:00:00

Figure 3


Temperture and RWST Level
Ambient Temp
RWST Level
Temperature
Percent Level
100
95
90
85
80
75
70
65
60
96.2
96.15
96.1
96.05
96
95.95
95.9
95.85
95.8
05/21/11 12:00:00
05/21/11 15:30:00
05/21/11 19:00:00
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05/22/11 02:00:00
05/22/11 05:30:00
05/22/11 09:00:00
05/22/11 12:30:00
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05/22/11 19:30:00
05/22/11 23:00:00
05/23/11 02:30:00
05/23/11 06:00:00
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