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A SCANA COMPANY

November 18, 2005
RC-05-0193

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

ATTN: Mr. R. E. Martin

Dear Sir / Madam:

Subject: VIRGIL C. SUMMER NUCLEAR STATION (VCSNS)
DOCKET NO. 50/395
OPERATING LICENSE NO. NPF-12
RESPONSE TO NRC GENERIC LETTER 2003-01
CONTROL ROOM HABITABILITY

Reference:
1. Stephen A. Byrne (SCE&G) letter RC-05-0003 to Document Control Desk (NRC), "Change to Activity Schedule," January 31, 2005

2. Stephen A. Byrne (SCE&G) letter RC-03-0167 to Document Control Desk (NRC), "60-Day Response to NRC Generic Letter 2003-01," August 8, 2003

On June 12, 2003, the U.S. Nuclear Regulatory Commission (NRC) issued NRC Generic Letter 2003-01 to request that utilities provide information that demonstrates that the control room at their facility complies with the current licensing and design bases and applicable regulatory requirements (GDC 1, 3, 4, 5, and 19), and that suitable design, maintenance and testing control measures are in place for maintaining this compliance.

South Carolina Electric & Gas Company (SCE&G) acting for itself and as agent for South Carolina Public Service Authority, submitted a 60-day response on August 8, 2003 (Reference 2) as required by the generic letter because SCE&G had determined that all necessary actions to provide the requested information could not be achieved within the prescribed 180 days.

SCE&G identified activities that were scheduled to be completed in 2004. This schedule was structured to allow for review and evaluation of the required testing along with the implementation of any program revisions to be followed by a submittal of results. SCE&G also stated that should it become apparent that activities would extend beyond the projected completion date, an updated schedule would be provided. An updated schedule was provided by SCE&G on January 31, 2005 (Reference 1).

All activities identified by the referenced letters are complete. The attachment provides the SCE&G response to Generic Letter 2003-01 as it pertains to VCSNS.

Tracer gas inleakage testing of the Control Room Envelope (CRE) was performed at VCSNS March 22 through March 27, 2005. Results indicated that inleakage into the CRE was within the limit that could be tolerated under the VCSNS licensing basis. During the inleakage testing, SCE&G identified that isolation damper leakage may potentially exceed allowable limits under postulated long term filter plugging. Additional testing was performed simulating plugged filters.

A1D2

The additional testing demonstrated that "A" train isolation damper leakage was satisfactory and within current limits. "B" train damper leakage was found to be in the nonconservative direction and static pressure was noted as low.

Investigation through the VCSNS Corrective Action Program revealed that an inlet damper to the control room emergency filter plenum was not traveling to the full-open position. This created additional resistance on the system that affected the "B" train isolation damper downstream. The cause for the inadequate inlet damper closure is attributed to a set screw becoming insecure on the crank arm attached to the blade shaft due to increased friction created by dry film lubricant accumulation. The crank arm could then slip on the blade shaft when the actuator functioned resulting in incomplete blade closure at the limit switch setpoint. This condition was repaired under work order 0521984. SCE&G is performing further evaluations to determine any additional corrective actions.

Upon the repair discussed above, the "B" train was tested for the simulated plugged filter and leakage was found to be in the conservative direction and within limits. This final testing was completed on September 21, 2005.

If you have any questions or require additional information, please contact Mr. Robert G. Sweet at (803) 345-4080.

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

11-18-05
Executed on

Jeffrey B. Archie

JT/JBA/dr

Attachment

c: N. O. Lorick
S. A. Byrne
N. S. Carns
G. S. Champion (w/o Attachment)
R. J. White
W. D. Travers
R. E. Martin
NRC Resident Inspector
K. M. Sutton
RTS (C-03-1931)
File (815.14)
DMS (RC-05-0193)

SCE&G Response
to
NRC Generic Letter 2003-01
Control Room Habitability
Regarding V. C. Summer Nuclear Station

Addressees were requested to provide the following information regarding this generic letter.

1. ***Provide confirmation that your facility's control room meets the applicable habitability regulatory requirements (e.g., GDC 1, 3, 4, 5, and 19) and that the CRHSs are designed, constructed, configured, operated, and maintained in accordance with the facility's design and licensing bases. Emphasis should be placed on confirming:***

RESPONSE:

As described in Section 9.4 of the V. C. Summer Nuclear Station (VCSNS) Final Safety Analysis Report (FSAR), air conditioning, heating, cooling, and ventilating systems are provided for the control room. The Control Room Normal and Emergency Heating and Ventilation System is in place to maintain ambient air temperatures in all areas within the control room pressure boundary for the comfort and safety of personnel, satisfy environmental requirements of equipment, meet the radiation requirements of 10 CFR 20, and satisfy the design requirements of General Design Criterion (GDC) 19.

The control room pressure boundary envelops the control room, the technical support center, and the cable spreading area under the control room. Hence, these areas are referred to as the Control Room Envelope (CRE).

The Control Room Normal and Emergency Heating and Ventilation System continuously supplies filtered, cooled or heated air to the CRE, during normal conditions. Filtered and cooled air is provided during post accident and loss of offsite power conditions. By operation of either of the two supply trains, the system admits small amounts of outside make-up air to the control room to maintain positive pressure during normal and emergency operation, or admits 100% outside air during purge mode.

VCSNS utilizes a positive-pressure CRE. There have been no modifications to the CRE or Habitability Systems outside the current licensing basis submittals. The FSAR discussion reflects the as-built design. Surveillance testing is performed in accordance with Technical Specification 4.7.6.e.3, to demonstrate that, following a Safety Injection or high radiation signal, the air handling systems will pressurize and maintain a positive pressure of greater than 1/8 inch w.g. with a maximum of 1000 scfm per train of outside air during system operation.

An overall FSAR review, including sections dealing with Control Room Habitability, was conducted comparing the FSAR against VCSNS Design Basis Documents, Technical Specifications, and plant procedures. Other controlled documents (e.g. design calculations

and drawings) were used on a case-by-case basis to corroborate the FSAR. Regulatory documents (e.g., Technical Specifications, GDC 1, 3, 4, 5, and 19, etc.) served as higher level documents for assessing the accuracy of the FSAR. Relative to Control Room Habitability, any discrepancies between the FSAR and other documents have been investigated and resolved.

Control Room Habitability current licensing basis is defined in FSAR 6.4 with reference to supporting systems included. Regulatory Guide conformance position is presented in FSAR, Appendix 3A. NUREG 0737, TMI Action I.D.3.4 items are discussed in FSAR Table 6.4-3, with corresponding SCE&G response and the qualifying FSAR source referenced.

The current inspection program for VCSNS consists of fire barrier assemblies and penetrations being inspected along with periodic inspections of floors, doors, ceilings, and walls of the Control Room Pressure Boundaries. The charcoal filter plenums are inspected every two years which includes door seal inspections and plenum drain sump seal inspections. Dampers, damper linkage, damper blade seals, duct joint sealing, and access door seals are inspected by plant programs. The blade seals are inspected every two years. Fire damper inspections are performed annually. Fans and all flange connections are inspected every two years. Floor drain seals are inspected every 6 months. Boundary breach control is administered per station administrative procedure SAP-603, "Program for Control of the Control Room Pressure Boundary". Operations personnel take rounds and logs each shift to check pressure differential and ensure TS compliance of outside air integrity of the boundary.

The existing inspection programs including the CRE Breach Control Program are sufficient to ensure that the control room boundary integrity will maintain its design functions. This conclusion is substantiated by the fact that the measured inleakage values are very small even when the ventilation system and boundary were tested in an as-found condition after some twenty years of operation. Furthermore, routine surveillance testing has proven that the leakage characteristics have remained essentially constant through the years as there has never been any adjustment of the outside air flow rates required.

Based on above discussion, the Control Room Habitability systems are consistent with design and licensing bases.

a) That the most limiting unfiltered inleakage into your CRE (and the filtered inleakage if applicable) is no more than the value assumed in your design basis radiological analyses for control room habitability. Describe how and when you performed the analyses, tests, and measurements for this confirmation.

RESPONSE:

Limiting radiological consequences within the control room occur during a postulated Loss-of-Coolant Accident (LOCA). Current design basis analyses for this accident are performed in accordance with Regulatory Guide 1.4 and presented in Section 15.4 of the FSAR. Credit is taken for maintenance of a positive pressure within the control room

relative to its surroundings and, as indicated in FSAR Table 15.4-17, only 10 cfm (i.e., for normal ingress and egress) of unfiltered air is assumed to enter the CRE.

In preparation for testing to measure leakage into the CRE, analyses were performed to determine a maximum allowable limit for unidentified in-leakage. Using current licensing basis methods, it was determined that GDC-19 limits would be met for up to 55 scfm of unidentified (i.e., unfiltered) inleakage per operating train of CR HVAC. This maximum will be reflected in a planned FSAR revision.

A baseline ASTM E741 integrated test was performed March 22 through March 27, 2005 to measure leakage into the CRE. Measurements were performed by NUCON, International in conjunction with site procedures. Filtered outside air was found to be within the current Technical Specification limits of 1000 scfm per train; and, the maximum unfiltered CRE inleakage recorded was 41 scfm. The March 2005 testing thus confirms that the actual filtered and unfiltered inleakages into the CRE are less than the values supported by current design basis radiological methods.

b) That the most limiting unfiltered inleakage into your CRE is incorporated into your hazardous chemical assessments. This inleakage may differ from the value assumed in your design basis radiological analyses. Also confirm that the reactor control capability is maintained from either the control room or the alternate shutdown panel in the event of smoke.

RESPONSE:

Hazardous chemical assessments consider a chlorine cylinder release and failure of the Ammonium Hydroxide Tank in accordance with the guidance of Regulatory Guide 1.78, respectively. Current analyses are based on design inleakages and have inherent margins to accommodate potential increases in CRE inleakage.

In preparation for testing to measure leakage into the CRE, additional analyses were performed to determine a maximum allowable limit for unidentified inleakage. Using current methods, it was determined that the inleakage limit was controlled by radiological as opposed to chemical hazards considerations. That is, the hazardous chemical analyses could accommodate additional inleakage well in excess of that allowed by the radiological analyses (i.e., > 55 scfm).

For smoke events, a postulated fire in the control room will not interfere with evacuation and subsequent control in the Control Room Evacuation Panel (CREP) rooms. Smoke from an external event could hypothetically cause evacuation of the control room; however, the transit path can be safely utilized to the CREP rooms that are isolated from the outside environment.

Subsequent to recent inleakage measurements, an assessment has been completed which confirms that the plant can be safely shut down from either the control room or the CREP rooms during an internal or external smoke event. The following discussion

provides the assessment of smoke infiltration described in NRC Regulatory Guide 1.196 C.2.6.

VCSNS is appropriately prepared to mitigate the effects of smoke infiltration from a smoke event originating outside or inside the control room. The CREP rooms are located on the 436' elevation of the Intermediate Building (plant layout drawing FSAR Fig. 1.2-12). These rooms are not within the Control Room Envelope (CRE). Furthermore, the CREP rooms and the control room are separated by horizontal and vertical distances which incorporate numerous fire barriers along the egress paths.

Therefore, a fire or smoke event in one of these areas will not affect the other. The CREP rooms are isolated rooms whose ventilation systems do not communicate with any other system and has no outside air intake (FSAR Fig. 9.4-15). Thus, the CREP rooms would remain isolated from the effects of an external smoke event.

In conclusion, if there is a fire in the control room or otherwise such that control and indication are unreliable, the control room can be safely evacuated with confidence to the remote CREP rooms where subsequent actions will ensure the plant is in a safe shutdown condition with temperature and inventory being controlled. If there is smoke in the control room due to an event originating outside the control room, the Duty Shift Supervisor has the option to use SCBA or evacuate the control room thus ensuring that a smoke challenge will not prevent the control room operators from controlling the reactor. In conjunction with these efforts, there are additional personnel and equipment available in accordance with pre-fire plans to mitigate the effects of fire and smoke in the control room.

c) ***That your technical specifications verify the integrity of the CRE, and the assumed inleakage rates of potentially contaminated air. If you currently have a ΔP surveillance requirement to demonstrate CRE integrity, provide the basis for your conclusion that it remains adequate to demonstrate CRE integrity in light of the ASTM E741 testing results. If you conclude that your ΔP surveillance requirement is no longer adequate, provide a schedule for: 1) revising the surveillance requirement in your technical specification to reference an acceptable surveillance methodology (e.g., ASTM E741), and 2) making any necessary modifications to your CRE so that compliance with your new surveillance requirement can be demonstrated.***

RESPONSE:

VCSNS has a positive pressure control room design and Technical Specification surveillance Requirement 4.7.6.e.3 demonstrates that the Control Room Normal and Emergency Heating and Ventilation System can maintain the CRE at a positive pressure relative to adjacent areas. SCE&G will submit a proposed license amendment request within twelve months after final disposition of TSTF-448, "Control Room Habitability" by the NRC. The amendment request will include a new Technical Specification Surveillance Requirement to determine inleakage in accordance with a Control Room

Integrity Program. A new section will be added to Technical Specification Section 6.8, "Programs and Manuals", that will specify the scope of the Control Room Integrity Program. The Control Room Integrity Program will rely on the use of tracer gas inleakage testing.

Test results were found to be within the allowable inleakage limit. Because the measured inleakage is relatively small, there are no apparent modifications or other maintenance actions which can be taken to improve the inleakage characteristics.

If your facility does not currently have a technical specification surveillance requirement for your CRE integrity, explain how and at what frequency you confirm your CRE integrity and why this is adequate to demonstrate CRE integrity.

RESPONSE:

The VCSNS CRE integrity has surveillance requirements prescribed by Technical Specification Surveillance Requirement 4.7.6.e.3.

2. ***If you currently use compensatory measures to demonstrate control room habitability, describe the compensatory measures at your facility and the corrective actions needed to retire these compensatory measures.***

RESPONSE:

SCE&G does not currently utilize any compensatory measures to demonstrate control room habitability at VCSNS. The nominal value of unfiltered inleakage (41 scfm maximum) measured during recent testing, is below the maximum allowable value of unfiltered inleakage (55 scfm) that can be supported by current licensing basis analyses.

3. ***If you believe that your facility is not required to meet either the GDC, the draft GDC, or the "Principal Design Criteria" regarding control room habitability, in addition to responding to 1 and 2 above, provide documentation (e.g., Preliminary Safety Analysis Report, Final Safety Analysis Report sections, or correspondence) of the basis for this conclusion and identify your actual requirements.***

RESPONSE:

As noted in response to Requested Information Item 1, the VCSNS control room complies with the applicable regulatory requirements.