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SCE&G®
A SCANA COMPANY

January 7, 2010
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U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

ATTN: Document Control Desk

Subject: Virgil C. Summer Nuclear Station (VCSNS) Units 2 and 3 Combined License Application (COLA) - Docket Numbers 52-027 and 52-028
Response to NRC Request for Additional Information (RAI) Letter No.074 Related to Emergency Planning

Reference: Letter from Denise L. McGovern (NRC) to Alfred M. Paglia (SCE&G), Request for Additional Information Letter No. 074 Related to SRP Section 13.3 for the Virgil C. Summer Nuclear Station Units 2 and 3 Combined License Application, dated December 2, 2009.

The enclosure to this letter provides the South Carolina Electric & Gas Company (SCE&G) response to the RAI items included in the above referenced letter. The enclosure also identifies any associated changes that will be incorporated in a future revision of the VCSNS Units 2 and 3 COLA.

Should you have any questions, please contact Mr. Alfred M. Paglia by telephone at (803) 345-4191, or by email at apaglia@scana.com.

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

Executed on this 7th day of January, 2010.

Sincerely,

Ronald B Clary

Ronald B. Clary
Vice President
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JMG/RBC/jg

Enclosure

D083
NRO

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**NRC RAI Letter No. 074 Dated December 2, 2009**

**SRP Section: 13.03 – Emergency Planning**

**QUESTIONS for Licensing and Inspection Branch (NSIR/DPR/LIB) (EP)**

**NRC RAI Number: 13.03-44**

Basis: 10 CFR 50.47(b)(8); NUREG-0654/FEMA-REP-1; Evaluation Criterion H.1; Evaluation Criterion H.2; Supplement 1, NUREG-0737
SRP 13.3 ACCEPTANCE CRITERIA: Requirements A and E; Acceptance Criteria 1, 2, and 5; SRP Section 15.0.3 Acceptance Criterion 3

In RAI 13.3-22(D)(1) the staff requested an explanation for how the criteria in NUREG-0696 is satisfied. In a response letter dated May 8, 2009, the applicant stated that the facilities will meet the guidance of NUREG-0696 with the exception of face to face communication between the TSC and the Control room personnel.

In accordance with SRP Section 15.0.3 (Acceptance Criterion 3) the staff reviews whether the total calculated radiological consequences in the TSC for the postulated fission product releases fall within the exposure acceptance criteria specified in GDC 19 of 5 rem TEDE(0.05Sv) for the duration of the design basis accidents (DBAs).

Provide the radiological consequence analysis for the VC Summer TSC for the postulated DBAs. The DBAs are listed and evaluated in Chapter 15 of the certified AP1000 DCD, Revision 15 and in the AP1000 Design Certification Amendment Application (AP1000 DCD, Revision 16). The radiological analysis should include, but are not limited to, the following parameters:

1. TSC ventilation air inlet and recirculation flow rates
2. HEPA filter and charcoal absorber fission product removal efficiencies
3. TSC unfiltered air n-leakage rate
4. Atmospheric dispersion factors (X/Q values) at TSC air intakes
5. TSC occupancy factors
6. TSC free air volume
7. Occupant breathing rate
8. Description of the ventilation design

In addition, NUREG 0737, Supplement1, "Requirements for Emergency Response Capability," Section 8.2.1(b), "Technical Support Center (TSC) Requirements." states that the TSC is to be located within the site protected area so as to facilitate necessary interaction with control room, OSC, EOF and other personnel involved with the emergency. In Section 2.H.1.b, "Technical Support Center," of the VCSNS Emergency Plan and Departure VCS 18.8.1 of the AP1000 DCD, it states that the proposed TSC is located outside of and between the Protected Areas for Unit 1 and Units 2/3. Section

1.B, "Facility Description," of the VCSNS Emergency Plan states Units 2/3 are approximately 1 mile south-southwest of Unit 1.

Provide additional information to address the siting of the TSC outside of the Protected Area of Units 2/3 and the physical location is approximately 1 mile from the Control Rooms of Units 2/3 in relation to the Supplement 1, NUREG-0737 requirements.

**VCSNS RESPONSE:**

Standard Review Plan 15.0.3 states that the radiation protection design of the Technical Support Center (TSC) is acceptable if the total calculated radiological consequences for the postulated fission product release fall within the 5 rem Total Effective Dose Equivalent (TEDE) exposure acceptance criteria specified for the Control Room for the duration of the accident. Formal calculations have not been completed for the TSC but design consideration for the facility and the parameters for the ventilation system have been selected to limit the dose in the TSC to less than the 5 rem TEDE acceptance criteria of the Standard Review Plan. A supplemental response will be provided at a later date that provides the results of the formal dose calculation.

AP1000 DCD, Revision 17, Chapter 15 presents an evaluation of Control Room doses following a Loss-of-Coolant Accident (LOCA). Although DCD Section 6.4 shows Control Room doses for other design basis accidents, the LOCA analysis in Chapter 15 is representative of a Control Room habitability evaluation. Following the DCD approach, the site TSC habitability analysis is performed for a LOCA only. At the onset of the LOCA, the TSC is assumed to be in the normal ventilation mode, with the switch to the emergency mode occurring manually based on high radiation readings. It is conservatively assumed that the TSC is isolated and switches to the emergency ventilation mode 75 minutes into the accident (15 minutes for notification of responders and 60 minutes for activation of the TSC ventilation).

The detailed design phase of the TSC spaces and the HVAC system has not been completed. The TSC will be designed and constructed to support the existing VCSNS Unit 1 prior to being required to support operation of Unit 2 or 3. The HVAC conceptual design is described below. The flow rates have been developed as bounding values for the response to this RAI and the calculation of TSC doses. The boundary of the TSC envelope will be designed and constructed to be resistant to in-leakage. Unfiltered in-leakage is expected to be less than the assumed value described below. The filtered recirculation flow rate and filter efficiencies are anticipated to be greater than those provided below. Therefore, the amount of radioactivity in the TSC is expected to be less than the calculated values. The following parameters are provided as inputs to the dose calculation to be described in the supplemental response.

1. TSC ventilation air inlet and recirculation flow rates

   The system design provides 1000 cfm of outside air make-up (unfiltered) to the TSC prior to isolation, after isolation 1000 cfm (filtered). An additional 1000 cfm of air is recirculated through the charcoal cleanup unit. See the description below for more detail.

2. HEPA filter and charcoal absorber fission product removal efficiencies

   The system provides 99% removal efficiency for particulates and 90% decontamination efficiency for radioiodine. These efficiencies are consistent with those provided in Table 9.4-1 of Revision 17 of the DCD for the Control Room.

3. TSC unfiltered air in-leakage rate

   The in-leakage assumed for the TSC dose calculation is 500 cfm of unfiltered air after isolation.

4. Atmospheric dispersion factors (X/Q values) at TSC air intake

   The X/Q values at the TSC air intake are as follows, with the release assumed at ground level from the location of the plant vent. These values which bound the containment shell ground level release are calculated using ARCON96 based on two years of meteorological data:

| | |
|---|---|
| 0 – 2 hr | 2.33E-05 sec/$m^3$ |
| 2 – 8 hr | 1.84E-05 sec/$m^3$ |
| 8 – 24 hr | 7.65E-06 sec/$m^3$ |
| 24 – 96 hr | 6.00E-06 sec/$m^3$ |
| 96 – 720 hr | 4.58E-06 sec/$m^3$ |

5. TSC occupancy factors

   The standard Control Room occupancy factors from Section 4.2.6 of Regulatory Guide 1.183, July 2000, are assumed for the TSC:

| | |
|---|---|
| 0 – 24 hr | 1.0 (100%) |
| 24 – 96 hr | 0.6 (60%) |
| 96 – 720 hr | 0.4 (40%) |

6. TSC free air volume

   The TSC is approximately 72' by 130', with an additional 14' by 40' area provided as a potential eating area. The floor area includes those vestibule areas that function as air locks, but not areas that contain the ventilation system fans and

filter plenums. The floor to ceiling height is 14.5'. These dimensions provide a volume of 143,840 $ft^3$ for the dose evaluation of the facility. The TSC free air volume will be no greater than 143,840 $ft^3$.

7. Occupant breathing rate

   The breathing rate of 3.5E-4 $m^3$/sec for the TSC occupant is assumed for the duration of the accident. This rate is consistent with that for the control room operator in Section 4.2.6 of Regulatory Guide 1.183, July 2000.

8. Description of the ventilation design

   The ventilation design for the TSC is modeled after Figure 1 of Regulatory Guide 1.52, Revision 3, June 2001, with minor deviations. Neither the moisture separators nor the heater are expected to be required in the charcoal unit. The ventilation equipment is not going to be located in the TSC ventilation envelope.

   During normal operation the system functions as a normal ventilation system providing temperature control, filtration and some amount of outside air make-up. During emergency conditions a charcoal absorber unit is placed in service. This unit is intended to provide filtration of part of the air being recirculated in the TSC as well as the outside air make-up for the TSC. During the emergency mode of operation the system maintains a 1/8" wg positive pressure in the TSC relative to outside, by admitting 1000 cfm of outside air. This flow of 1000 cfm provides enough ventilation (filtered fresh air) for 100 people. The charcoal absorber unit filters an additional 1000 cfm of air that is recirculated from the TSC. There is also an unfiltered recirculation rate of 15,000 cfm, but this has no bearing on the radiological analysis.

   The HVAC system is not designed as Seismic Category I and is not provided with redundant fans, filters, or power supplies, as allowed by the NUREG-0696 requirements for the TSC. Each TSC entrance is provided with a vestibule that functions similar to an air lock to minimize air in-leakage due to personnel egress.

The TSC will not be physically located 1 mile from Units 2 & 3. Units 2 & 3 will be approximately 1 mile from Unit 1. The TSC will be located southwest of Unit 1 and northwest of Units 2 & 3 within the Owner Controlled Area. The separation of the TSC from any of the three Control Rooms will be approximately 2500 ft, with approximately a ten to fifteen minute walking time. Use of current technologies such as updated computer equipment, teleconferencing, real time system monitoring through plant computer networks, and telephone and radio systems for primary and emergency communications will bridge the physical separation. The facility will have access to plant drawings, procedures, and computer applications needed to support the evaluation and decision making processes of the Emergency Response Organization

(ERO). The TSC will be a larger, dedicated facility and located in the basement of the new Nuclear Operations Building which will house Operations Support, Engineering, Site Management, and other plant organizations assigned to the ERO to augment the Shift Staffing in an emergency. This is expected to facilitate the activation of the TSC, thus improving the timeliness of taking critical tasks from the Control Room staff.

This response is PLANT SPECIFIC.

**ASSOCIATED VCSNS COLA REVISIONS:**

No COLA Revisions have been identified as a result of this response.

**ASSOCIATED ATTACHMENTS:**

None