



May 7, 2009  
NND-09-0114

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. 043

Reference: Letter from Ravindra G. Joshi (NRC) to Alfred M. Paglia (SCE&G), Request for Additional Information Letter No. 043 Related to SRP Section 2.4.2 for the Virgil C. Summer Nuclear Station Units 2 and 3 Combined License Application, dated April 7, 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. Al Paglia by telephone at (803) 345-4191, or by email at [apaglia@scana.com](mailto:apaglia@scana.com).

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

Executed on this 7<sup>th</sup> day of May, 2009.

Sincerely,

Ronald B. Clary  
General Manager  
New Nuclear Deployment

AMM/RBC/am

Enclosure

DO83  
MRO

Document Control Desk

Page 2 of 2

NND-09-0114

c (w/o attachment):

Luis A. Reyes

John Zieler

Stephen A. Byrne

Ronald B. Clary

Bill McCall

Kenneth J. Browne

Randolph R. Mahan

Kathryn M. Sutton

Amy M. Monroe

c (with attachment):

Chandu Patel

Courtney W. Smyth

John J. DeBlasio

Grayson Young

FileNet

**NRC RAI Letter No. 043 Dated April 7, 2009**

**SRP Section: 2.4.2 – Floods**

Question from Hydrologic Engineering Branch (RHEB)

**NRC RAI Number: 02.04.02-1**

10 CFR 100.20(c) requires consideration of the physical characteristics of the site. 10 CFR 52.79(a)(1)(iii) requires consideration of the most severe natural phenomena reported for the site with sufficient margin for the limited accuracy, quantity and time in which the data have been accumulated. Also, SRP 2.4.2 serves to assure that the locally-intense precipitation flood event discussed in Section 2.4.2 of the application will not adversely impact the proposed facilities' safety-related SSCs, or those that satisfy the RTNSS criteria.

In order to show compliance with 10 CFR 100.20(c) and 10 CFR 52.79(a)(1)(iii), and in light of the Staff positions expressed in SRP 2.4.2, please provide the following additional information:

- Clearly identify locations where supercritical flows are likely to occur in ditches, channels, and associated overland-flow areas. Also indicate locations where PMP-generated flood events produce velocities significantly larger than the design velocity for the channel bed material (i.e., where damage exceeding normal maintenance would result). For these locations, describe how failure of these drainage features will not degrade any structures related to safety.
- Clearly identify locations where hydraulic jumps are likely to form during the flooding event and provide a description of fortification measures to ensure that hydraulic forces induced by the jumps do not erode or degrade the ditches, channels, and overland flow areas. If the hydraulic structures are expected to fail during the PMP-generated flood event, provide a description describing how failure will not degrade any structures related to safety.
- Provide a detailed description of the lateral-structure flow simulated in the numerical model (HEC-RAS) discussed in section 2.4.2 of the FSAR. Include details regarding the expected flow path, depth and velocity of flow, erosion control measures, and a list of buildings and structures (including their RTNSS categorization, if appropriate) that are intercepted along the flow path.
- Provide a description of Administrative Controls or surveillance requirements to ensure the ditches, channels, and overland flow areas remain clear of

obstructions, the side-slopes remain stable, and that the site-drainage system will function as described in FSAR section 2.4.2 considering the length of the licensing period.

#### **VCSNS RESPONSE:**

The RAI questions are addressed in four subparts below.

- A. RAI 02.04.02-1 Figure 1 depicts the location within the site where a supercritical flow condition may occur. The area identified is the steep reach just upstream of the Storm Water Basin 3, which is outside the power block area (i.e. protected area) of Units 2 and 3 where the safety-related SSCs are located.

The peak flow velocities in the drainage paths of all the subbasins modeled, with the exception of the channel reach with supercritical flow condition, are smaller than 5 ft/s. Typical protection measures such as grass lining or gravel cover on the drainage channels and on the yard areas subject to sheet flow conditions are sufficient to withstand these small erosive forces. In the channel reach identified with potential supercritical flow conditions, the peak velocity is estimated to be about 11.8 ft/s. Properly sized and placed rip rap channel linings are able to withstand these velocities and greater (Reference 1).

The other areas that supercritical flow conditions may occur are on the natural hill slopes and the fill slopes at and downstream of the locations where storm water runoff is postulated to flow out of the site. These areas are shown as "Flow Exit Point" in Figure 1. These potential overflow areas will be protected by riprap or concrete structures designed to prevent a failure of the drainage features of the site and preclude degradation of any safety-related SSCs.

- B. A hydraulic jump may potentially form in the transition area where the drainage swale with supercritical flow enters the Storm Water Basin 3. The inlet to the Storm Water Basin 3 will be protected by riprap or concrete lining, designed to withstand the scouring effects associated with energy dissipations at the transition. This area is at a distance of over 1000 ft from the safety-related SSCs, sufficiently far away that it will not pose any risk to the safe functioning of the plant in the unlikely event that the drainage structures were to fail.
- C. No lateral-structure flow was simulated in the numerical model (HEC-RAS) as discussed in Section 2.4.2 of the FSAR.
- D. SCE&G has established a signed maintenance agreement per the requirements of South Carolina Department of Health and Environmental Control Storm Water Regulations. This agreement specifies general as well as specific preventative maintenance requirements that SCE&G must comply with post development. This includes, but is not limited to, corrective maintenance, periodic inspections

and implementing a maintenance schedule. Following is an outline listing of some of the key elements of the SCE&G post development maintenance agreement.

1. General Preventative and Corrective Maintenance Tasks
  - a. All storm water ponds, ditches, swales, pipes, inlets, flumes, pond inflow and outfall structures discharge pipes and all other components of the stormwater management system should be inspected as identified in the approved maintenance schedule.
  - b. Remove trash, litter, and debris from inlets, outlets, culverts, banks, water, pond or swale beds, trash racks, and all other components of the stormwater system.
  - c. Remove any sediment or silt that may inhibit flow. Make minor repairs as needed.
  - d. Mow or weed-eat banks and pond, ditch or swale bottom to maintain vegetative growth. Clippings may not be left on banks or in bed. Herbicide is not to be used to control growth of vegetation on banks or pond bottom except at inlet and outlet structures and to control exotic or nuisance vegetation.
  - e. Ensure that banks, slopes and pond bottom are vegetated with approved grasses.
  - f. Erosion in vegetated areas should be repaired immediately.
  - g. Erosion at inlets or outlets should be repaired.
  - h. Inspect all inlets, outfalls, trash racks, structures, piping.
2. Specific Preventative and Corrective Maintenance Tasks
  - a. General maintenance of detention or dry ponds.
  - b. General maintenance of ditches and swales.
  - c. General maintenance of infiltration devices.
  - d. Avoiding erosion or siltation to adjacent or off-site areas.
  - e. Verification of State/Local maintenance requirements.
3. Inspection and Maintenance Schedule – Activities are scheduled on intervals such as bi-weekly, monthly, quarterly (or after a rainstorm exceeding 1" of rainfall), semi-annually or annually.
4. Safety - General safety requirements are addressed.

**References:**

1. U.S. Army Corps of Engineers, *Hydraulic Design of Flood Control Channels*, EM 1110-2-1601, 1 July 1991/ 30 June 1994.

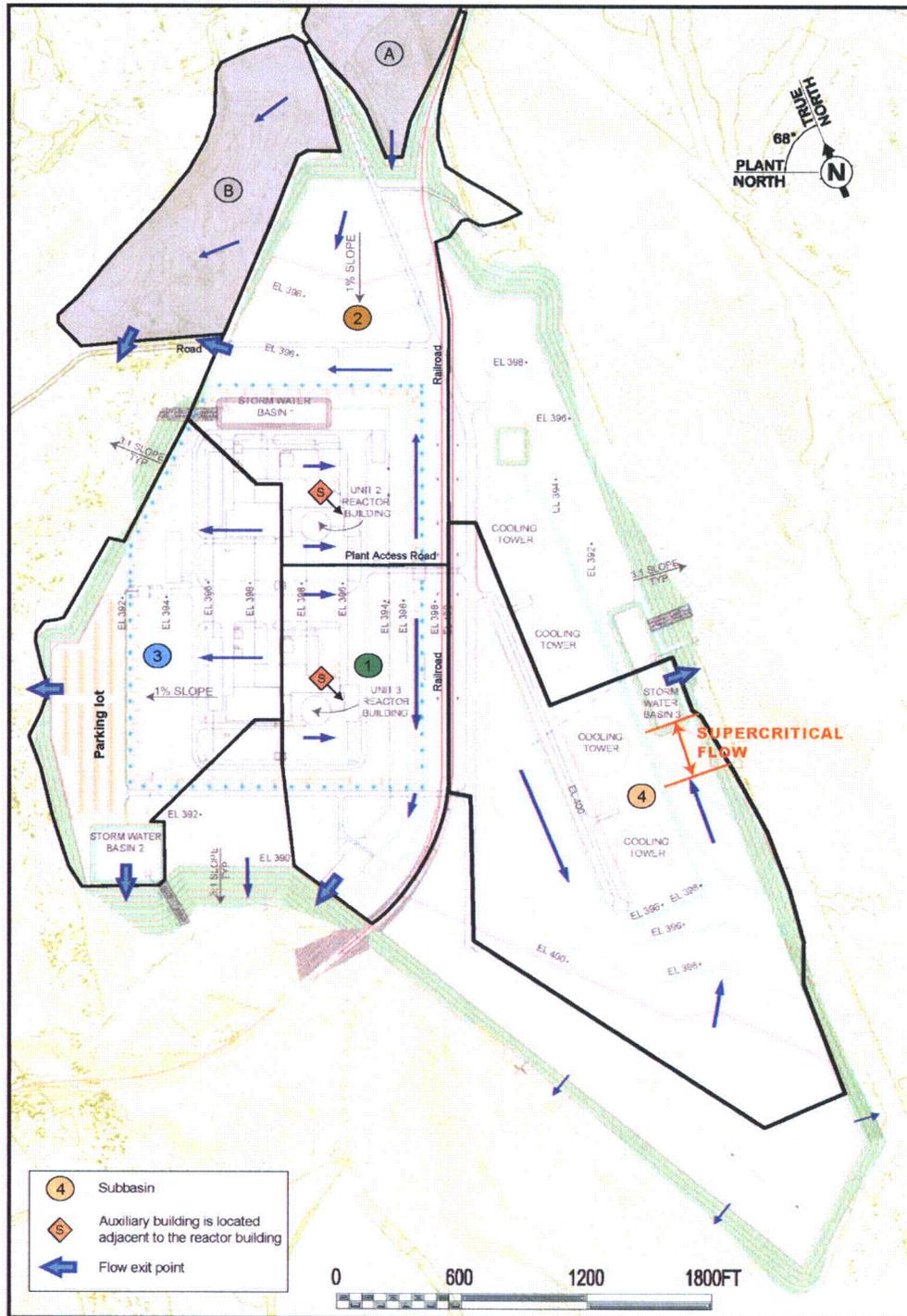
This response is PLANT SPECIFIC.

**ASSOCIATED VCSNS COLA REVISIONS:**

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

**ASSOCIATED ATTACHMENTS:**

RAI 02.04.02-1 Figure 1



RAI 02.04.02-1 Figure 1: Location of Supercritical Flow Region  
 (Modified from FSAR Figure 2.4-210)