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O. W. DIXON, JR.
VICE PRESIDENT
NUCLEAR OPERATIONS

May 11, 1984

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Virgil C. Summer Nuclear Station
Docket No. 50/395
Operating License No. NPF-12
Spent Fuel Pool Rerack
Modification

Dear Mr. Denton:

On January 23, 1984, South Carolina Electric and Gas Company (SCE&G) requested approval for a proposed spent fuel pool rerack modification. During the review of this submittal, the NRC Staff had several questions concerning the radiological impact of this reracking effort. The following information is provided in response to those questions.

The first question deals with the activities involved in cleaning up the spent fuel pool and the ability to ensure that dose rates are kept as low as reasonably achievable (ALARA). The spent fuel pool at the Virgil C. Summer Nuclear Station has never been used to store irradiated fuel assemblies and contains only a minimal amount of contamination. Dose rates have been measured with thirty-six (36) thermoluminescent dosimeters at three (3) levels within the pool and a maximum dose rate of 0.5 mr/hr has been detected on the bottom of the pool. Because of these low dose rates, personnel exposure is expected to be minimal. However, the work to be accomplished in the spent fuel pool will be thoroughly reviewed with the personnel performing the job. A meeting will be held with the diving contractor to review the procedures for removing and installing the racks. All work in the spent fuel pool will be done under the radiation work permit program to ensure that doses are ALARA and personnel contamintation is minimized. Divers will be issued personnel dosimetry and any doses received will be carefully monitored.

Vacuums will be used to clean the floor of the spent fuel pool after the removal of the old racks. The spent fuel pool water does not contain a significant amount of radionuclides, therefore cleanup of the pool water prior to the modification is not planned. A list of the radionuclides found in the pool

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water and their associated concentrations is provided as an attachment to this letter.

The second question asks for the measures which will be taken to assure that the minimum depth of water will not be degraded during fuel transfer. Since the new fuel racks are approximately the same height as the old racks, the safety evaluation found in Section 9.1.3.3 of the Virgil C. Summer Nuclear Station Final Safety Analysis Report (FSAR) is still applicable.

The third question requests information on the three (3) dimensional shielding analysis that was performed on the spent fuel pool. The analysis was performed using the QADMOD-G point kernel gamma shielding code. The radiation source term was based on the core shutdown sources in FSAR Table 12.1-12, a radial peaking factor of 1.65 and a shutdown decay period of 100 hours. Assuming the pool is full to capacity, the gamma source volume (fuel assemblies, fuel racks and internal cooling water) is homogenized into one QADMOD-G composition and divided into a region with a 20x7x6 source volume array. Other regions in the model accounted for the external cooling and shielding water, concrete walls and floor, and air. Since most of the material between the source and the receiver points is concrete, the QADMOD-G library build-up factor for concrete was used. This assumption is conservative for a receptor point above the pool surface since the concrete gamma buildup factors are higher than those for water. For those materials in the source/shield model, the mass attenuation coefficients from the QADMOD-G library were used. As an additional conservatism, the pool's 1/4 inch stainless steel liner was not included in the QADMOD-G model.

The fourth question concerns dose rates found above the top tier of the racks. In discussions with the Staff about this question, SCE&G explained that this modification only involved a single tiered storage arrangement. SCE&G was then advised by the Staff that this question was therefore not applicable and did not require any further discussion.

The fifth question regards the plan for the removal and disposal of the existing racks. The present racks will be

unbolted and removed from the pool by divers and a temporarily installed crane. The old racks will receive an initial high pressure water spray in the decontamination pit to remove the majority of the surface contamination. The dose rate from this surface contamination is estimated to be less than 2 mr/hr while the dose rate from the racks themselves is presently estimated to be less than 0.5 mr/hr. Upon removal from the spent fuel pool, the racks will be temporarily stored in the west end of the fuel handling building in the truck bay area. Once the actual contamination level of the racks is established, SCE&G will determine how to best dispose of these racks. Presently, SCE&G is considering several options which include contractor removal, in-house decontamination and disposal, and in-house decontamination and storage on site for possible future use.

If there are any further questions, please advise.

Very truly yours,

O. W. Dixon, Jr.

AMM/OWD/gj
Attachment:

cc: V. C. Summer
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File

ATTACHMENT

Isotope	Net Activity (microCi/ml)
Xe-133	2.61E-07
Ce-144	1.96E-07
Tc-99m	1.38E-07
Ce-141	2.84E-07
Xe-135	4.74E-08
Np-239	1.70E-06
Cr-51	1.33E-06
I-131	2.60E-08
Zn-69m	4.91E-08
W-187	2.15E-07
I-133	8.88E-08
Ba-140	9.84E-07
As-76	1.86E-07
Cs-134	2.04E-07
Cs-137	2.26E-08
Mo-99	7.07E-07
Zr-97	9.44E-08
Zr-95	5.97E-08
Nb-95	1.44E-07
I-132	4.51E-07
Co-58	3.26E-05
Mn-54	3.60E-06
Ag-110m	1.02E-07
Zn-65	3.05E-08
I-135	5.63E-08
Fe-59	1.70E-07
Co-60	6.86E-06
Cu-64	4.19E-06
Na-24	4.06E-08