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February 2, 1994
Refer to: RC-94-0024

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

Attention: Mr. G. F. Wunder

Gentlemen:

Subject: VIRGIL C. SUMMER NUCLEAR STATION (VCSNS)
DOCKET NO. 50/395
OPERATING LICENSE NO NPF-12
TECHNICAL SPECIFICATION CHANGE - TSP 930017
FUEL STORAGE

Pursuant to a telephone conversation with Mr. G. Wunder on January 25, 1994, South Carolina Electric & Gas Company (SCE&G) hereby submits a revised Basis for No Significant Hazards Determination for the above referenced Technical Specification change request (letter no. RC-93-0304) dated December 13, 1993. This revision consists of editorial changes to the wording of the three points which are then explained in the evaluation.

The revision was requested as the original wording was not specific that the determination was per 10 CFR 50.92. There was no change to the evaluation, and as such, this change is deemed to be editorial only. This revised Basis for No Significant Hazards Determination supersedes the previously performed evaluation that was attached to the above referenced letter.

I declare that these statements and matters set forth herein are true and correct to the best of my knowledge, information, and belief.

Should you have any questions concerning this issue, please call Mr. Philip A. Rose at (803) 345-4052 at your convenience.

Very truly yours,

John L. Skolds

PAR/JLS/nkk
Attachments

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SIGNIFICANT HAZARDS EVALUATION FOR INCREASING THE FUEL ENRICHMENT LIMIT AT THE VIRGIL C. SUMMER NUCLEAR STATION TO 5.0 W/O U-235

Description of Amendment Request

Virgil C. Summer Nuclear Station (VCSNS) Technical Specifications 5.3, "Reactor Core," and 5.6,"Fuel Storage," currently limit fuel in the core, the spent fuel pool, and the new fuel storage racks to a maximum enrichment of 4.25 w/o U-235. In addition, Technical Specification 3.9.12, "Spent Fuel Assembly Storage," places restrictions on the cumulative fuel burnup as a function of initial enrichment, up to 4.25 w/o U-235, in Regions 2 and 3 of the VCSNS spent fuel pool. In order to design fuel cycles which produce more energy to support shorter refueling outages, increased capacity factors, and a potential core power uprate to 2900 MWt, and to minimize the impact of discharged fuel assemblies on available spent fuel storage, it is necessary to increase fuel enrichments above the 4.25 w/o limit and to revise the Technical Specification limits. It should be emphasized, however, that approval is not being sought at this time for operation above the currently licensed core power of 2775 MWt.

The proposed amendment is also necessary to revise the restrictions on fuel storage in Regions 1 and 2 of the spent fuel pool to ensure that the design basis for preventing criticality outside the reactor is preserved in the presence of absorber panel shrinkage and gaps. This has been accomplished by requiring integral fuel burnable absorbers in fresh fuel assemblies with enrichments above 4.0 w/o U-235 in Region 1 and revising the minimum burnups for fuel assemblies in Region 2. Integral fuel burnable absorbers consist of neutron absorbing material which is a non-removable or integral part of the fuel assembly once it is manufactured.

With this Technical Specification change request, South Carolina Electric & Gas Company (SCE&G) is proposing to:

1. Revise Specification 5.3.1 to allow uranium dioxide fuel with maximum nominal enrichments up to 5.0 w/o U-235 to be used as fuel material. SCE&G is also proposing to modify Specification 5.3.1 to conform to the example provided by the NRC in Generic Letter 90-02, Supplement 1, to accommodate limited fuel reconstitution based on NRC-approved topical reports. Note that the proposed revision deletes the reference, currently in the VCSNS Technical Specifications, to "vacancies" as a substitute for fuel rods. This is necessary since vacancies are not addressed in WCAP-13060-P-A, "Westinghouse Fuel Assembly Reconstitution Methodology."

2. Extend the restrictions in Specification 3.9.12 on cumulative fuel burnup as a function of initial enrichment for fuel stored in Regions 2 and 3 of the spent fuel pool to 5.0 w/o U-235. The burnups required for storage in Region 2 have also been revised to account for the presence of absorber panel shrinkage and gaps, as described in Attachment IV. (Region 3 does not contain absorber panels.) Note however that the use of the measured 95/95 minimum B-10 loading of 0.0033 gm/cm^2 in the Region 2 absorber panels in the attached criticality re-analysis rather than a minimum .0015 gm/cm^2

used in the previous criticality analysis (Reference 1) resulted in a net decrease in the required burnups.

3. Revise Specification 5.6 to make the appropriate changes, described in Attachment I, to restrictions on fuel storage in the spent fuel pool and the new fuel storage racks to extend the maximum allowable fuel enrichment to 5.0 w/o U-235 and to account for the presence of absorber panel shrinkage and gaps in Regions 1 and 2 of the spent fuel pool. This includes the addition of a limit on the maximum reference K_∞ for fuel assemblies to be placed in Region 1.

Basis For No Significant Hazards Consideration Determination

SCE&G has evaluated the proposed changes to the VCSNS Technical Specifications described above against the Significant Hazards Criteria of 10CFR50.92 and has determined that the changes do not involve any significant hazard for the following reasons:

1. The change will not involve a significant increase in the probability or consequences of an accident previously evaluated.

   There is no increase in the probability of an accident because the physical characteristics of a fuel assembly are not changed when fuel enrichment is increased. Fuel assembly movement will continue to be controlled by approved fuel handling procedures.

   There is no increase in the consequences of an accident because fuel cycle designs will continue to be analyzed with NRC-approved codes and methods to ensure the design bases for VCSNS are satisfied. The double contingency principle of ANSI/ANS 8.1-1983 can be applied to any postulated accident in the spent fuel pool which could cause reactivity to increase beyond the analyzed conditions. As shown in Attachment IV, the level of boron in the VCSNS spent fuel pool is sufficient to maintain Keff less than or equal to 0.95. There is no postulated accident which could cause reactivity to increase beyond the analyzed conditions in the new fuel rack.

   The radiological consequence analyses (Reference 2) performed to support the installation of replacement steam generators at VCSNS included the development of source terms which bound fuel enrichments up to 5.0 w/o U235 and average discharge burnups up to 65,730 MWD/MTU, which bounds the currently licensed burnup for fuel at VCSNS. These source terms were used to calculate offsite doses for accidents that are postulated to result in the release of fission products to the environment, including the fuel handling accident. In all cases, the dose results are within 10CFR100 limits.

2. The change will not create the possibility of a new or different kind of accident from any accident previously evaluated.

   The proposed Technical Specification changes do not involve any physical changes to the plant or any changes to the method in which the plant is operated. They do not affect the performance or qualification of safety related equipment. Therefore the possibility of a different type of accident or malfunction than previously considered is not created.

3. The change does not involve a significant reduction in a margin of safety.

   Criticality analyses (Attachment IV) have been performed for the spent fuel pool to allow for storage of fuel assemblies with enrichments up to 5.0 w/o U-235. The proposed Technical Specification changes include those necessary to maintain Keff less than or equal to 0.95, including conservative allowances for uncertainties and biases, when the pool is flooded with unborated water.

   The new fuel racks have been previously analyzed (Reference 1) for storage of fuel assemblies with enrichments up to 5.0 w/o U-235. For the flooded condition Keff does not exceed 0.95 including conservative allowances for uncertainties and biases. For the normally dry condition Keff does not exceed 0.98 for the low density optimum moderation condition. However, the proposed Technical Specification changes require fuel assemblies with enrichments above 4.0 w/o U-235 to contain integral fuel burnable absorbers such that the maximum reference fuel K_∞ is less than or equal to 1.460 in unborated water at 68° F due to restrictions on spent fuel storage.

   Since the proposed changes ensure that the design basis for preventing criticality in the fuel storage areas is preserved and since fuel cycle designs will continue to be analyzed with NRC-approved codes and methods to ensure the design bases for VCSNS are satisfied, there is no significant reduction in the margin of safety.

References

1. Letter from SCE&G [D. A. Nauman to DCD, "Technical Specification Change - Fuel Storage", dated March 8, 1988].

2. Letter from SCE&G [John L. Skolds to DCD, "Completed Safety Analysis Results to Support Steam Generator Replacement (REM 6000-7)", dated April 30, 1993].