SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING DUKE POWER COMPANY'S

APRIL 16, 1976, CHANGE REQUEST FOR

OCONEE NUCLEAR STATION TECHNICAL

SPECIFICATIONS

DUKE POWER COMPANY

OCONEE NUCLEAR STATION, UNITS 1, 2 AND 3

DOCKET NOS. 50-269, 50-270 AND 50-287

Introduction

The staff, after a review of the design of the High Capacity Fuel Assembly Storage Racks, approved their use for Oconee Unit 3 spent fuel pool by NRC letter dated December 22, 1975. This approval was based on the assumption that the racks and fuel assemblies would be submerged in water.

By letter dated April 16, 1976, the Duke Power Company requested a change in the Technical Specifications of Licenses No. DPR-38, DPR-47, and DPR-55 for the Oconee Nuclear Station, Units 1, 2 and 3. The proposed amendments would allow the storage of new (i.e., unirradiated) fuel assemblies, which have a specified maximum nuclear fuel content (39 grams of U-235 per axial centimeter of assembly) in a checkerboard pattern (i.e., no more than one fuel assembly in every two storage locations with no two fuel assemblies in locations with abutting sides) in Unit 3 spent fuel pool storage racks which are presently not submerged in water (i.e., dry storage).

7912300262

Discussion

The Unit 3 spent fuel pool is presently dry and undergoing modifications as authorized in our letter of December 22, 1975. Four of the ten new-design fuel storage modules, each of which can accomodate 48 fuel assemblies, have been completed and are installed in the Unit 3 pool and are capable of storing new fuel assemblies. Completion of the remaining work in the pool is not anticipated until July 1976, at the earliest. The common pool for Units 1 and 2 presently contains two batches of spent fuel assemblies and one batch of new assemblies. Due to this inventory, a full core discharge from either Unit 1 or Unit 2 reactors cannot be accomodated. In order to provide for this capability, Duke Power Company has proposed that the new fuel assemblies stored in Units 1 and 2 spent fuel pool be relocated and stored dry in the four new fuel storage modules in the Unit 3 pool.

Evaluation

Since the fuel assemblies proposed to be stored in the Unit 3 dry storage racks are unirradiated there is no after heat to dissipate. Also, the only emanating radiation will be that from "tramp" uranium and any contamination that may have been picked up while stored in the spent fuel pool. This would be relatively small and easily accomodated by standard radiation protection procedures.

These racks are designed to absorb neutrons in the stainless steel in the racks and in the water between the fuel assemblies so that the neutron multiplication will be below .95 in any conceivable situation when the racks are submerged in water. If the water is removed from the intercell space without removing it from the fuel assembly itself, the neutron multiplication will increase. When the fuel assembly is full of water it is slightly undermoderated so that taking water out of the fuel assembly will reduce the neutron multiplication. As a consequence the situation that would cause the greatest neutron multiplication is one where the fuel assemblies are filled with water but where there is no water or only a small amount in the intercell space between the fuel assemblies.

For this situation the applicant has assumed that a large volume of water from fire fighting apparatus, a pipe break, or some other source hits the funnels at the top of each storage location in such a manner that most of the water is directed to the interior of the storage box, i.e., into a fuel assembly. For this situation the licensee postulates that the interior of the storage box becomes completely filled with water, with a density of approximately 1 gm/cm^3, while the density of the water in the intercell regions is only .02 gm/cm^3. The calculated neutron multiplication for this situation is .84 when the fuel assemblies are in every other storage location, i.e., a checkerboard pattern. Since this is the accident which would result in the highest credible neutron multiplication, we find the critical analysis of this proposal acceptable.

Conclusion

When fuel assemblies which have no more than 39 grams of U-235 per axial centimeter of assembly (i.e., no more than 2.9% U-235 enrichment) are loaded into a checkerboard pattern in the dry (unsubmerged) storage racks, the calculated .84 neutron multiplication for the worst conceivable accident is well below the NRC limit of .95.

On this basis we conclude that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (2) such activities can be conducted in compliance with the Commission's regulations and the issuance of these amendments will not be inimical to the common defense and security or to the health and safety of the public.