

UNITED STATES NUCLEAR REGULATORY COMMISSION WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION RELATED TO AMENDMENT NO. 7 TO FACILITY OPERATING LICENSE NO. DPR-80

AND AMENDMENT NO. 5 TO FACILITY OPERATING LICENSE NO. DPR-82

PACIFIC GAS AND ELECTRIC COMPANY

DIABLO CANYON NUCLEAR POWER PLANT, UNIT NOS. 1 AND 2

DOCKET NOS. 50-275 AND 50-323

INTRODUCTION

By letter dated February 14, 1986, Pacific Gas and Electric Company (the licensee) made application to revise Technical Specification 5.3.1 "Fuel Assemblies", of the Diablo Canyon Power Plant, Units 1 and 2, to increase the reload maximum fuel enrichment from 3.5 to 4.5 weight percent U-235. To support this application the licensee submitted Report 55-161," Criticality Safety Analysis of the New Fuel Storage Vault in the Diablo Canyon Power Plant with Fuel of 4.5% Enrichment".

DISCUSSION AND EVALUATION

The fresh fuel storage vault at Diablo Canyon consists of 70 storage locations. Each location consists of four 2"x2"x1/4" stainless steel "L" channels which support the assembly. These locations are arranged in two 5x7 arrays with a center to center spacing of 22 inches between assemblies. Assemblies are stored dry in the vault with the concrete walls of the vault at least 24 inches from the center of the nearest assembly.

Calculations of the k-effective value of the racks were performed for full density water moderation and as a function of water density down to five percent of full density. For the full density case an infinite array was assumed. At the low density values the actual vault geometry was used in order to account for leakage effects. Calculations were performed with the AMPX-KENO code package using the 123 group cross-section set with the NITAWL treatment of the U-238 resonance absorption. This code package has been extensively verified by Southern Science (the performers of the analysis) and is the most widely used tool for fuel pool criticality calculations. Its use is acceptable for this application.

8605300309 860513 PDR ADOCK 05000275 PDR ADOCK 05000275 The nominal values of the k-effective for the racks are 0.921 for the full density case and 0.866 for the low density (7.5-8 percent full density) case. The calculational bias is nil for the full density case and 0.002 for the low density case. Uncertainties in the bias, statistical uncertainties in the Monte-Carlo calculation, mechanical tolerances, and fuel enrichment and density tolerances were combined to obtain the total uncertainty. The result was 0.013 for the full density case and 0.012 for the low density case when the uncertainties were computed at the 95% probability, 95% confidence level. Combining the nominal value, calculational bias and uncertainties yields a final k-effective value of 0.934 for the full density case and 0.880 for the low density case and 0.98 for the low density case and are acceptable.

For other accident configurations (e.g., dropping an assembly between storage locations-) assumption of the presence of water is not required and the k-effective values are very low (less than 0.7).

In summary we conclude that the analysis of the k-effective value of the fresh fuel racks is acceptable, and that fresh fuel having an enrichment less than or equal to 4.5 weight percent U-235 may be safely stored in the racks. This conclusion is based on the following:

- 1. Approved calculational methods and techniques which have been verified by comparison with experiment were used.
- Calculational and mechanical uncertainties have been evaluated and are included in the final result.
- 3. The effect of accidents has been considered, and
- The results meet the staff's acceptance criteria for k-effective in fresh fuel racks.

The proposed change in Technical Specification 5.3.1 is acceptable for storage of 4.5 weight percent U-235 assemblies in the fresh fuel storage vault. Storage of this fuel in the spent fuel pool is the subject of a separate license amendment.

ENVIRONMENTAL CONSIDERATION

These amendments involve a change in the installation or use of the facilities components located within the restricted areas as defined in 10 CFR 20. The staff has determined that these amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that

these amendments involve no significant hazards consideration and there has been no public comment on such finding. Accordingly, these amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of these amendments.

CONCLUSION

We have concluded, based on the considerations discussed above, 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 will 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.

Dated: May 13, 1986

PRINCIPAL CONTRIBUTOR:

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