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Alabama Power
the southern electric system

F. L. CLAYTON, JR.
Senior Vice President

Docket No. 50-348 May 5, 1980

Joseph M. Farley Nuclear Plant - Unit 1
Environmental Qualification Study for
Short Term Lessons Learned
NUREG 0578 2.1.6.B

Director, Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Mr. Darrell G. Eisenhut

Dear Mr. Eisenhut:

As requested by your staff, Alabama Power Company has completed its study to determine the effect of post accident dose rates on components located in areas outside the containment from systems processing primary coolant and containment sump fluids. The following is a discussion and summarization of the results of that study.

Discussion of Analysis

Based on the calculated dose rates, the total integrated doses over periods of one day, ten days, and thirty days were calculated for the various Class 1E component locations, and compared to the qualification or radiation tolerance levels for those components.

Five major areas have been determined to be affected by post-accident high radiation fluids outside the containment. These are as follows:

1) Containment Spray Pump Rooms
2) RHR/LHSI Pump Rooms
3) RHR Heat Exchanger Room
4) Charging/HHSI Pump Rooms
5) Piping Penetration Rooms

The source term used in producing the dose rates calculated in our analysis includes 50% halogens, 1% fuel, and the RCS inventory diluted by the RWST and Safety Injection tanks. The dose rate for each component was calculated as follows: (1) The piping systems surrounding the component for a distance of approximately 25 feet were broken down into a number of straight-line elements. (2) Each element was categorized according to the pipe diameter and distance from the component. It was

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originally intended to consider each elemental pipe length in the calculation; however, in order to simplify the calculation, and the number of dose-rate graphs required, and at the same time provide additional conservatism, all pipe elements were considered to be infinitely long. (3) The source rate contribution for each element was determined from an appropriate dose rate graph based on Bechtel Power Corporation computer program "CYLSO." The total dose rate for the component is the arithmetical sum of all contributors. (4) The integrated dose for periods of one day, ten days, thirty days, and 180 days was determined by integrating the dose rates for the appropriate times, taking into consideration the decay rates of the various fission products.

Results of Analysis

As was expected, the highest dose rates occur in the RHR Heat Exchanger Room (Room 128) due to the size of the heat exchangers. The highest dose rate was found to be 1.5×10^5 R/hour. This results in a thirty-day integrated dose of 2.4×10^6 Rads.

A total of 97 safety related components were identified in the affected areas and for which dose rate calculations were made. Each component's radiation qualification level was compared to the calculated radiation level for that component's location.

Of the 97 items addressed, there were none whose documented radiation qualification level was less than the calculated thirty-day dose. It should be recognized that the dose rates which were calculated are overly conservative. For example, the heat exchanger was treated as a 30" pipe, of infinite length. If the cross section of the heat exchanger (HX) tubing is treated as a single pipe which has an equivalent cross section, the dose rate is reduced by a factor of almost two. Also, no credit is taken for the shielding provided by the HX shell, or the HX tubing. If these factors are taken into consideration, the calculated level would be considerably lower.

Conclusion

It is Alabama Power Company's position that the requirements for radiation qualification of components per section 2.1.6.B of NUREG 0578 have been satisfied.

If you have any questions regarding this study, please advise.

Yours very truly,

F. L. Clayton, Jr.

TLC/rt

cc: Mr. R. A. Thomas
Mr. G. F. Trowbridge

References: (1) NRC Task Force - TMI Lessons Learned. Short Term requirements - NUREG 0578.

(2) NRC Harold Denton letter dated October 30, 1979. Subject: Discussion of Lessons Learned Short Term Requirements.