JUL 8 1981

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 20 TO FACILITY OPERATING LICENSE NO. NPF-2

AND TO AMENDMENT NO. 2 TO FACILITY OPERATING LICENSE NO. NPF-8

ALABAMA POWER COMPANY

JOSEPH M. FARLEY NUCLEAR PLANT, UNITS NO. 1 AND 2

DOCKET NO. 50-348 AND 50-364

Introduction

On May 8, 1981, at 5:17 p.m., while performing surveillance tests on diesel generator 1C it was determined that the jacket cooling water had been introduced into the number 10 cylinder. At this time, diesel generator 1C was declared inoperable and the 72 hour ACTION statement was invoked. After exceeding the 72 hour ACTION statement, both Units 1 and 2 must be placed in HOT STANDBY. Preliminary investigations revealed that an excess of 72 hours would be required to return diesel generator 1C to OPERABLE status. By letter dated May 10, 1981, the licensee requested a one time exception to permit plant operation up to 13 days to allow repair of diesel generator 1C without shutting down the Unit 1 facility.

The Technical Specifications also state that during the 72 hour period when a diesel generator is declared inoperable, the remaining diesels must be started every eight hours to verify their operability. Since this would amount to over 150 combined starts for the remaining diesels, the licensee has requested that the period be increased to 72 hours during this one time repair because accelerated wear and degradation might occur due to the large number of startups.

Discussion and Evaluation

Availability of Safety Trains

Three of the five Farley Plant diesel generators are designed as swing diesels capable of serving either unit. Diesel generator 1C is one of the swing diesels. The licensee has shown that for all combinations of loss of offsite power with and without a coincident LOCA at one of the units, there will be at least one train of safety related equipment available at each unit.

In addition, the staff has investigated the possibility of each unit experiencing a single failure of a remaining diesel generator coincident with loss of offsite power to both units and a LOCA occuring at one unit. But even under these postulated conditions, the flexibility of the diesels result in one safety train being available on each unit to supply power to the required loads.

Station Blackout

Station blackout is characterized by the loss of both offsite and emergency ac power for an extended period of time. Core melt can occur if the turbine-driven auxiliary feedwater system fails or if the reactor coolant pump seals fail subsequently because of lack of cooling.

The sequence probabilities noted in Table 1 represent estimates for the next 13 days of operation with only 4 diesels available. As indicated in Table 1, the total probability of a core melt associated with a Station Blackout during the next 13 days is approximately 3×10^{-5}. This one time risk is considered acceptable. An explanation of the core melt probabilities follows:

There has been one loss-of-offsite power event in 4 years of operation or a point estimate of 0.25/Reactor Year (RY) which is consistent with generic results. Since we are concerned about 13 days with only 4 diesels, the probability of loss of AC is $0.25 \times 13/360 = 0.009$ during the 13 days.

Based on Westinghouse analysis of loss of all feedwater, the core would begin to uncover in about 4000 seconds and would be completely uncovered in 5000 seconds. Thus, if offsite power is not restored in about 1-1/2 to 2 hours (assuming no emergency power), core melt could occur. An estimate of the probability of not recovering offsite power in 1-1/2 hours is 0.22/demand (D). Core melt would probably be well underway with the postulated conditions in about three hours. The probability of not restoring offsite power in three hours is estimated to be 0.15/D. Sufficient information is not available to estimate the time for RCP seal failure in the absense of any cooling.

While diesel generator 1C is out of commission, the emergency ac power supply consists of four diesel generators which power emergency buses for Units 1 and 2. Alabama Power Company's commitments concerning procedures for loading the diesels is discussed in another section of this report. A minimum of one emergency bus is required for each unit. A faulted condition resulting in the loss of 3 out of 4 of the diesel generators would result in one unit not having an emergency bus available.

Based on data obtained since March 1981 and during 1977 and 1978, the point estimate of diesels failing to start given a loss of offsite power is $16/148 = 0.11/D$. This unavailability is above generic experience. The common cause failure of a second diesel to start given the failure of one diesel is .05 to 0.16. We will assume 0.16/D. Similarly, we arbitrarily assumed the probability of a third diesel to start given the failure of two diesels is 0.3/D. Thus, the unavailability of 3 out of 4 diesels is $4 \times 0.11 \times 0.16 \times .3 = 0.20/D$ which is about 5 times higher than the probability of random failures of 3 out of 4 diesels.

The unavailability of the turbine-driven AFW pump is 0.06/D based on operating experience since 1977 (two failures out of 35 trials).

Diesel Testing

The reduced testing frequency requested is acceptable provided staggered testing of the four diesels is scheduled within the 72 hour time frame. During a telecon on May 11, 1981 between Mr. T. Novak (NRR) and Mr. O. Kingsley (APCO), we were advised of the following actions being taken:

1. APCO will modify plant procedures to assure operators are aware of the staggered diesel test frequency and proper bus loading procedures with diesel 1C out of commission.

2. APCO will assure that each Senior Reactor Operator briefs each oncoming shift and the Shift Technical Advisor.

3. APCO currently has a Task Force reviewing diesel failures.

Summary

The licensee has shown that for all combinations of loss of offsite power with and without a coincident LOCA at one of the units, there will always be power available to run at least one of the redundant safety trains at each unit. Staff analyses also showed that the inclusion of single failures of a remaining diesel generator at either or both units would not change this result.

The probability of core melt during the one-time 13 day Technical Specification change is acceptably low. Therefore, the proposed Technical Specification change is acceptable on a one-time only basis.

Environmental Consideration

We have determined that the amendment does not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that the amendment involves an action which is insignificant from the standpoint of environmental impact and, pursuant to 10 CFR §51.5(d)(4), that an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of this amendment.

Conclusion

We have concluded, based on the considerations discussed above, that: (1) because the amendment does not involve a significant increase in the probability or consequences of accidents previously considered and does not involve a significant decrease in a safety margin, the amendment does not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) regulations and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

The following staff members provided inputs to this safety evaluation report:

John Thoma, Farley 2 Project Manager
Edward Reeves, Farley 1 Project Manager
Douglas Pickett, Principal Reviewer - Operating Reactors Assessment Branch

TABLE 1

CORE MELT PROBABILITIES FOR STATION BLACKOUT FOR NEXT 13 DAYS

	Loss of AFW Sequence	Loss of RCP Seal Sequence
Probability of loss-of-offsite power - 13 days	0.009	0.009
Probability of failure to recover offsite power in 1-1/2 hours in 3 hours	0.22/D NA	NA 0.15
Probability of failure of emergency ac power 3 out of 4 DG given no offsite power	2×10^{-2}/D	2×10^{-2}/D
Probability of failure of turbine AFW train - given no ac power	0.06/D	NA
Probability of significant failure of RCP seal	NA 2×10^{-6}	1 3×10^{-5}