



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 21 TO FACILITY OPERATING LICENSE NO. NPF-2
AND TO AMENDMENT NO. 3 TO FACILITY OPERATING LICENSE NO. NPF-8

ALABAMA POWER COMPANY

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

DOCKET NOS. 50-348 AND 50-364

Introduction

On July 30, 1981, at 12:50 a.m., while performing surveillance tests on diesel generator 1C it was determined that the jacket cooling water had been introduced into the number 11 cylinder. At this time, diesel generator 1C was declared inoperable and the existing Technical Specification 72 hour ACTION statement was invoked. After exceeding the 72 hour ACTION statement, both Units 1 and 2 must be placed in HOT STANDBY. Investigations revealed that an excess of 72 hours would be required to return diesel generator 1C to OPERABLE status. By letter dated July 31, 1981, the licensee requested a one time exception to permit plant operation up to six days in addition to the three days allowed by the Technical Specifications (nine days total) to allow repair of diesel generator 1C without shutting down the Unit 1 and Unit 2 facilities.

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 approximately 120 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 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 occurring at one unit. But even under these postulated conditions, the flexibility of the diesels circuitry results in one safety train being available on each unit to supply power to the required loads.

This event is similar to the event of May 8, 1981 when water was introduced to the number 10 cylinder of diesel generator 1C. The problem at that time was diagnosed as being a failure of the O-ring seal allowing cooling water to enter the cylinder. The 1C diesel engine was disassembled and repairs were made to the seals.

Upon disassembling diesel generator 1C for the most recent event, the licensee observed that the upper piston wrist pin and bushing had experienced excessive wear. The wrist pin, joining the connecting rod and the piston, allowed nonsymmetrical forces between the piston and the liner. The liner sleeve was scored by the wobbling of the piston head thus generating excessive heat loads. The licensee has thus postulated that this excessive heat input caused the premature failure of the rubber O-ring seal. In addition, the licensee now believes that excessive wrist pin and bushing wear was the precursor of the May 8, 1981 O-ring seal failure.

Both the licensee and the diesel generator manufacturer, Colt Industries of Fairbanks Morse Division, are investigating the cause of the wrist pin and bushing wear. This type of problem has not been identified as a generic problem by the vendor. The current investigation will be centered on the following areas:

1. Record of Operation and Maintenance

The vendor has recommended in April 1981 a overhaul and inspection of each diesel generator during refueling outages. The licensee has now accepted the recommendation which will be implemented at subsequent outages.

2. Mill Search

A search of the castings and material used which will be done due to this recent failure and may explain why diesel 1C has had recurring problems.

3. Installation

Improper installation could be a contributor to the excessive wear. The licensee is reviewing this matter.

4. Number of Starts

The plant's Technical Specifications require that, due to previous test failures, diesel generator 1C be started every three days to prove operability per Regulatory Guide 1.108. The licensee is presently evaluating this matter.

We agree with the licensee's approach. However, we feel that because of the two recent failures of the 1C diesel, APCo should provide a Special Report to the NRC staff as soon as the diesel investigation is completed. The report should include not only the results of the investigation described above but also the recent Task Group Study done by APCo. We understand the study is completed and recommendations of the APCo group are currently being implemented.

During the current repair of diesel generator 1C, the licensee plans to inspect the wrist pins and bushings for all 12 upper cylinders. Any assemblies that exhibit excessive wear will be replaced. This action should minimize additional failures similar to the two failures which have occurred to diesel 1C.

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 if no corrective actions are taken.

In the staff's evaluation found in License Amendment No. 20 for Unit 1 and No. 2 for Unit 2, an estimate was made of the core melt probabilities assuming that diesel generator 1C would be inoperable for a total of 13 days. Since the licensee has only requested a nine day outage for diesel generator 1C, the probabilities can be assumed to be less than that previously reported* and found to be acceptably low.

Diesel Testing

The reduced testing frequency requested is acceptable provided staggered testing of the four diesels is scheduled within the 72 hour time frame. The following actions are being taken during recovery from this event:

1. Plant procedures will assure operators are aware of the staggered diesel test frequency and proper bus loading procedures with diesel 1C out of commission.
2. Each Senior Reactor Operator will brief each oncoming shift and the Shift Technical Advisor.

* However, even if these outages would have occurred over a continuous 19 day period, the risk for the accident scenario is not substantially changed.

Work performed by the Diesel Generator Task Force has resulted in recommendations that has increased the reliability of the diesel generators. This is shown by a reduction in the numbers of test failures since May 10, 1981.

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 nine day Technical Specification change is acceptably low. Therefore, the proposed Technical Specification change is acceptable on a one-time only basis.

Although this diesel generator failure follows a similar event that occurred on May 8, 1981, we believe the combination of the licensee's upgraded maintenance program, the current overhaul and inspection of diesel generator 1C, and the joint licensee-diesel vendor study of the excessive wear problem justifies this Technical Specification change.

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 environment impact. Having made this determination, we 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 of 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 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.

Date: July 31, 1981