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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 26 TO FACILITY OPERATING LICENSE NO. NPF-2

ALABAMA POWER COMPANY

JOSEPH M. FARLEY NUCLEAR PLANT, UNIT NO. 1

DOCKET NO. 50-348

Introduction

By letters dated May 28 and September 22, 1981, supplementing application for amendment dated December 15, 1980, and following discussions between NRC staff and the Alabama Power Company (APCo), licensee, APCo provided a comprehensive review of the present Unit 1 Technical Specifications (TSs). APCO proposed new Unit 1 Technical Specifications which, to the extent practicable, were consistent and uniform with the recently-licensed Unit 2 Technical Specifications.

At Farley site reactor operation and control is accomplished in a dual-type control room where controls and reactor operators for each unit are located. The plant design for both units is generally identical with some differences as described in the Final Safety Analysis Report for Joseph M. Farley Nuclear Plant. Consequently, consistency and uniformity between the Unit 1 and Unit 2 Technical Specifications to the extent appropriate, will minimize the potential for confusion and Technical Specification violations and allow a consistent basis for operating, maintenance, and surveillance procedures for both units.

In addition, during the period of our review and discussions with APCo of their proposed Unit 1 Technical Specifications, staff review was completed on several generic issues and plant-specific amendment requests. The results of our review for these items are discussed below. Technical Specifications associated with these issues have been incorporated into the associated license amendment.

Discussion and Evaluation

1. Proposed Changes to the Unit 1 Technical Specifications that have been Made Identical to the Unit 2 Technical Specifications

   We conducted a complete review of the changes proposed by APCo for the Unit 1 TSs. These changes are a verbatim incorporation of the Unit 2 TSs. In general, these changes involved clarification and wording changes of the present Unit 1 Technical Specifications. In some instances, these changes involved improvements in surveillance requirements and some added restrictions on Limiting Conditions for Operation (LCO) consistent with the Unit 2 Technical Specifications. In addition, the Technical

Specifications for NUREG 0737, "Clarification of TMI Action Plan Requirements" items included in the Unit 2 Technical Specifications at the time of licensing of Unit 2 have been incorporated in the proposed Unit 1 Technical Specifications.

We find these changes acceptable on the basis of the previous approval of the Unit 2 Technical Specifications and that identical considerations apply to Unit 1.

2. Appendix I Radiological Environmental TSs

By letter dated April 11, 1978 to "All Power Reactor Licensees" the NRC issued generic guidance on radiological environmental monitoring for nuclear power plants. APCo responded by letter dated November 27, 1978 advising of its plans to develop TSs concurrently for Units 1 and 2 during Unit 2 licensing. APCo provided other related information by letters of April 16 and July 11, 1979, and April 7, July 14 and 17 and September 2, 1980. We met with APCo representatives and held numerous discussions concerning this issue during the Unit 1 review as well as during the Unit 2 licensing review.

In conclusion, Technical Specifications were proposed by APCo by application dated October 10, 1979 and TSs were issued for Unit 2 as part of Operating License No. NPF-8. Technical Specifications for Unit 1 included herein are identical to those of Unit 2 except for some minor changes clarifying the current staff positions, and are acceptable.

3. Hydraulic and Mechanical Snubbers TSs

By letter dated November 20, 1980 from the NRC to "All Power Reactors Licensees" we proposed Revision 1 of the Inservice Surveillance Requirements for snubbers under Standard Technical Specifications (STS). The revision embodies several changes, clarifications and improvements based on recent operating experience. APCo responded by letter dated March 20, 1981, stating that work being done for IE Bulletin 79-14 has identified numerous changes to the TSs. These changes were included in APCo's proposed amendment supplement dated May 28, 1981.

APCo proposed to follow the Standard Technical Specifications (STS) closely with one minor deviation. It does not have the hands-on inspection of some snubbers in locations difficult to reach. However, a visual inspection of these relatively few snubbers will be performed and an appropriate sample of these snubbers will be included in the functional test sample of 88 snubbers being tested every 18 months. Thus, we agree that hands-on inspection of all of the snubbers will not be required. In addition, we have agreed with APCo's proposal relating to test equipment for snubbers above 50,000 lb. capacity. These snubbers will not be required to be tested until the refueling outage after a commercial in-place testing device is available. We find the minor deviations from Standard Technical Specifications acceptable.

In addition, a previous application from APCo dated October 15, 1979 submitted an administrative change to correct TS Table 3.7-4 errors. These errors included erroneous designation of single or double snubbers, erroneous snubber numbers, and snubbers omitted from the Table when Unit 1 was licensed. These errors have been corrected.

4. Degraded Grid Voltage TSs

By letter of August 30, 1977 we provided information to APCo relating to NRC staff generic concerns about degradation of the Offsite Power Systems. These concerns were described in events at Millstone Unit 2 during July 1976 in which equipment failed onsite during degraded grid conditions. Our letter dated March 9, 1981 provided our evaluation of APCo responses to the generic issues applicable to both Units 1 and 2. By supplemental application dated May 28, 1981, APCo proposed TSs for Unit 1. The TSs found acceptable during Unit 2 licensing review are now incorporated into the TSs for Unit 1 and are acceptable.

5. Auxiliary Feedwater Pump

By application dated February 28, 1980 APCo proposed changes to the TSs relating to automatic start of the motor driven auxiliary feed pumps. By our letter dated June 17, 1981 we provided an evaluation of the reliability of the AFW System for Unit 1. The evaluation referred to APCo's responses to our generic concerns and requirements forwarded by letter dated October 13, 1979. During the NRC staff Unit 2 licensing review the design of Farley Nuclear Plant (Units 1 and 2) AFW System was re-evaluated.

Technical Specifications issued on Unit 2 resolved the AFW issues and identical TSs are now included in the TSs for Unit 1 AFW system (identical to Unit 2 system) and are acceptable.

6. Definition of Operability TSs

By letter of April 10, 1980 to "All Power Reactor Licensees" the NRC staff provided clarification of the term OPERABLE as it applies to the single failure criterion for safety systems. By letter dated June 2, 1980 APCo proposed TS changes for Section 3.0.5.

We completed the review (applicable to both Units 1 and 2) of this item during the licensing review of Unit 2 and identical Technical Specifications are herein issued for Unit 1 as were issued for Unit 2 and are acceptable.

7. The Environmental Protection Plan and Four Special Environmental Reports

By letter of May 19, 1980 APCo proposed changes to the non-radiological Environmental TSs Appendix B. In response to this application and supplementary APCo letters of March 1, 1979, and July 13, 1981, an Environmental Protection Plan (EPP) was developed for Unit 2. We have included an EPP for Unit 1 which is the Appendix B in this license amendment. The attached Environmental Impact Appraisal addresses the non-radiological Technical Specifications deleted from the existing Unit 1 Technical Specifications.

8. Fire Protection Evaluation Supplement TS

On April 13, 1979, we issued Amendment No. 11 to Facility Operating License No. NPF-2 for Joseph M. Farley Nuclear Plant Unit No. 1. By the transmittal letter we requested APCo to provide TS's for completed modifications described in Tables 1, 2 and 3 of the safety evaluation included in our April 13, 1979 letter.

By letter dated January 8, 1980 APCo provided the TS for plant modifications completed to date which we find acceptable on the basis of the safety evaluation included in our April 13, 1979 letter.

9. TSs Notation for the Appendix J Exemption Granted on Unit 2 for Containment Airlock Leak Testing

By letter dated February 2, 1981, APCo requested an exemption for Farley Nuclear Plants, Units 1 and 2 from certain requirements of 10 CFR Part 50, Appendix J, paragraph III.D.2(b)(ii), which states:

> "Air locks opened during periods when containment integrity is not required by the plant's Technical Specifications shall be tested at the end of such periods at not less than Pa."

Our evaluation is contained in SER Supplement No. 5 dated March 1981 for Unit 2 and is directly applicable to Unit 1. TSs were issued for Unit 2 with the operating license for Unit 2. The TSs for Unit 1 are identical to the Unit 2 TSs and are acceptable.

10. Decay Heat Removal TS

By letter dated June 11, 1980 "To All Operating Pressurized Water Reactors" we requested changes to the TSs. These changes resulted from a number of events at operating facilities where decay heat removal capability has been degraded. The generic letter stated that the cause of degradation was inadequate administrative controls while in the shutdown mode. IE Bulletin 80-12 dated May 9, 1980 had requested immediate implementation of administrative controls. Our action in the June 11, 1980 letter was to provide for permanent long term assurance that redundancy in decay heat removal capability would be maintained.

By letter of September 10, 1980 APCo proposed that the Unit 1 TSs be implemented after Unit 2 TSs were issued with the operating license. Thus, this issue was resolved and implemented by the issuance of the TSs for the Unit 2 operating license. Identical considerations apply to Unit 1, and the Unit 1 Technical Specifications herein are identical to Unit 2 and are acceptable.

11. Containment Purge and Vent TSs

By letter dated June 20, 1979 APCo proposed TSs for containment purge and vent valves. Our Interim Position of October 1979 delayed action on the APCo application. However, during Unit 2 licensing review we issued TSs to include maintaining the 48-inch purge valves closed, operability of the 18-inch mini-purge valves, and associated surveillance checks. Identical considerations apply to Unit 1, thus, TSs for Unit 1 identical to Unit 2 TSs are included herein and are acceptable.

12. TSs for Organizational Changes Consolidating Nuclear Program Under One Executive Officer

By letter dated March 28, 1980 APCo proposed organizational changes to consolidate their nuclear program under one executive officer. Other facility (site) organizational changes were made to enhance the daily and long term operation of the plant. No positions were deleted by this change.

During the licensing review of Unit 2, the APCo organization, applicable to both Units 1 and 2, was evaluated by the NRC staff and found acceptable. The Unit 1 TSs included herein are identical to those of Unit 2 and are acceptable.

13. Heat Flux Hot Channel Factor Equation Change for Plugging First Row Steam Generator Tubes

By letter dated November 16, 1981, APCo proposed to plug the first row tubes of all steam generators on Farley Nuclear Plant (FNP) Unit 1 during the current outage. This plugging corresponds to a tube plugging level higher than that assumed in the FNP large break ECCS analysis currently on file with the NRC. Accordingly, APCo has performed an ECCS reanalysis. The results of this analysis show that a TS change to the F_Q limit is necessary to meet the ECCS acceptance criteria of 10 CFR 50.46.

APCo has submitted an ECCS re-analysis assuming 5% uniform plugging of the steam generator tubes (Ref. 1, 3). The analysis was performed with the approved version of the Westinghouse evaluation model (February 1978). The analysis assumed a limiting break discharge coefficient (C_D) of 0.4 an F_Q limit of 2.32 and a steam generator tube plugging level of 5%. This resulted in a peak cladding temperature (PCT) of 2182°F. The licensee also assessed the fuel rod burst and blockage model penalties against the above Farley plant ECCS analysis using NRC fuel rod models. The plant was shown to meet the acceptance criteria of 10 CFR 50.46 for the limiting break (C_D=0.4, steam generator tube plugging level of 5.0%) with a reduction of F_Q penalty of 0.16.

The effect of LOCA analysis results of using improved analytical and modeling techniques in the reactor coolant system blowdown calculation is being reviewed by the NRC staff. Since the review of this analysis

is not yet complete and the benefits associated with the model improvements varies with plant design the staff has established a credit that is acceptable for this interim period to help offset penalties resulting from application of the NRC fuel rod models. The credit for three loop plants is an increase in the LOCA peaking factor limit of 0.15.

The peaking factor limit adjustment for this interim period is determined from the difference of the ΔF_Q credit for model improvements minus the ΔF_Q penalty for the fuel rod burst and blockage. The F_Q adjustment is 0.15 - 0.16 = -0.01 and the F_Q = 2.32 used in the LOCA analysis must be reduced to 2.31. Thus a change to Technical Specification 3.2.2 is required to revise the F_Q limit from 2.32 to 2.31 for power above 50% of rated power and from 4.64 to 4.62 for power less than 50% of rated.

The heat flux hot channel factor $F_Q(Z)$ shall be limited by the following relationship:

$$F_Q(Z) \leq \frac{[2.31]}{P} [K(Z)] \text{ for } P > 0.5$$

$$F_Q(Z) \leq [4.62] [K(Z)] \text{ for } P < 0.5$$

where $P = \frac{\text{Thermal Power}}{\text{Rated Thermal Power}}$

and K(Z) is the function obtained from Figure 3.2-2 for a given core height location.

The licensee presented supplemental analysis (Ref. 2) addressing the elevation dependent peaking factor versus core height for the Unit 1 and 2 fuel cycle that support the validity of Figure 3.2-2 of the Farley Technical Specifications. F_Q x relative power was calculated as a function of height by imposing various load following transients. In all cases the calculated

values are maintained below the nuclear design operating envelope 2.31 x K(Z) where I(Z) is the normalized $F_Q(Z)$ function shown on Figure 3.2-2. Therefore, Figure 3.2-2 in the Technical Specifications remains valid for the 5% tube plugging limit and has been so annotated.

The licensee provided assurance that the limiting break remained the double ended cold leg guillotine (DECLG) with a discharge coefficient (C_D) of 0.4 by referring to previous sensitivity studies on other three loop plants (Ref. 4). For these plants tube plugging analysis for plugging levels ranging from 0% to 28% show that the worst break remains the DECLG with a C_D = 0.4. The licensee also did a reanalysis for a DECLG with a C_D = 0.6 which resulted in a lower peak cladding temperature.

Sensitivity studies performed by APCo indicate an approximate increase of 6.8°F in calculated peak clad temperature per percent of tube plugging for large breaks (due to steam binding occurring from reduced flow area in steam generator). Since current analyses indicate a 500°F margin between the limiting large break and the limiting small break the small breaks will not become the most limiting break and current small break analyses are still valid.

Since the reanalysis with an F_Q limit equal to 2.31 shows that the Farley Nuclear Plant Units 1 and 2 are in conformance with the ECCS Acceptance Criteria of 10 CFR 50.46 it is acceptable to plug the steam generators of both units to a level of 5%.

The licensee assessed the effect of the 5% proposed steam generator plugging level on their current non-LOCA transient analyses. Plugging the steam generator tubes to the 5% level was calculated to increase the core inlet temperature 1.6°F with an accompanying increase in the core average temperature. With this increase the core average temperature (T_{avg}) will remain below the design basis T_{avg} value used in the non-LOCA transients. The licensee states (Ref. 4) that the margin between the best estimate flow and the thermal design flow used in the safety analysis is conservative. The estimated flow reduction of 1.2% expected with 5% tube plugging still provides a 7% margin which exceeds the flow allotment for measurement and hydraulic inaccuracies. Therefore, the results of the non-LOCA transients are still valid and there is no change in the DNBR analyses due to steam generator plugging to a level of 5%.

We have concluded, based on the considerations discussed above, that proposed modification to the steam generators does not impose an undue risk to the health and safety of the public and the Technical Specification changes are acceptable as modified. We will issue the identical changes for Unit 2 in the future.

REFERENCES

1. Letter from F. L. Clayton, Jr., Alabama Power Company to S. A. Varga, NRC, dated November 16, 1981.

2. Letter from F. L. Clayton, Jr., Alabama Power Company to S. A. Varga, NRC, dated November 18, 1981.

3. Letter from F. L. Clayton, Jr., Alabama Power Company to S. A. Varga, NRC, dated November 23, 1981.

4. Letter from F. L. Clayton, Jr., Alabama Power Company to S. A. Varga, NRC, received December 4, 1981.

14. Modification to River Water System Action Statement for Specification 3.7.5

The river water system at Farley site consists of two trains with five pumps dedicated to each train. A total of ten river water pumps are available to serve the two-unit facility. The river water system feeds water to the service water pond. Pond water then enters the service water wet pit at one end of the pond. The service water wet pit is a common intake structure for the Unit 1 and Unit 2 service water systems.

The service water pond has been designed to Seismic Category I requirements. The pond is designed to serve as a closed cooling system for both units for at least 30 days without any river water makeup by recirculating service water to the common service water wet pit or to the pond.

For Technical Specifications purposes, the ten river water pumps are divided into two loops per unit with two operable river water pumps per loop and one backup river water pump per unit. Only one river water loop (i.e., two pumps) would be required to supply the service water needs for plant shutdown under accident conditions even assuming the loss of the Seismic Category 1 service water pond. For this case the river water is automatically diverted directly into the service water wet pit instead of into the pond.

By supplementaty application dated May 28, 1981 APCo included a proposed change in allowable pump outage time from three to seven days. The basis for the change to TS 3.7.5 Action Statement allowable outage time is as follows:

(1) Only one river water loop is required for plant shutdown under accident conditions.

(2) The service water system acts as a closed cooling system in conjunction with the storage pond (ultimate heat sink) by taking suction from the storage pond and discharging to either the pond or the river as described in the Final Safety Analysis Report (FSAR) Section 9.2.

(3) The service water system is designed to Seismic Category 1 requirements, meets the single failure criteria, and operates independently of the river water system.

(4) The storage pond is designed to Seismic Category 1 requirements and is capable of providing sufficient cooling to both units for at least 30 days with no water makeup, including rainfall, as described in the FSAR Section 9.2.5. Procedures for assuring continued pond availability beyond the 30-day requirement are available in conformance with Regulatory Guide 1.27.

(5) The storage pond dam failure is the only accident case in which the plant is dependent on the river water system as the sole source of cooling water for plant shutdown. The possibility of a storage pond dam failure is extremely remote.

Thus, the Farley Nuclear Plant river/service water systems are unique. The service water pond and the river water system's ability to bypass the normal pond and discharge directly into the common service water wet pit essentially provides for two ultimate heat sinks at the Farley site. We believe that this additional conservatism included in the Farley site design justifies the change in the Action Statement from three to seven days. Therefore, the proposed change to the Action Statement of Specification 3.7.5 is acceptable.

15. Diesel Generator TSs

There are five diesel generators at the two unit Joseph M. Farley Nuclear Plant. Each unit has a large (4075 KW) dedicated diesel generator. In additional there are three diesel generators (one large 4075 KW and two small 2850 KW) capable of serving either unit.

The TSs regarding testing and surveillance of the diesel generators are different for the two units. This is because Unit 1 was licensed with an earlier version of the Standard TSs and Unit 2 was licensed with the NRC's more recent Standard TSs. Alabama Power Company has requested (References 1 and 2) that the TSs regarding diesel generators be revised so that both of the units would be identical. The proposed TSs are similar to the NRC's Standard TSs with modifications made to reflect the uniqueness of the Farley design. In addition, reductions in the amount of diesel generator testing have been made to reflect the manufacturer's concerns about over-testing.

The NRC's Standard TSs are intended for a single unit facility with two diesel generators. When one diesel generator becomes inoperable, it is implied that one of the two redundant safety related trains necessary for shutdown and LOCA loads becomes unavailable. Under these conditions, constant verification of the remaining diesel's operability is desirable. However, the five diesel generators at the Farley plant presents much greater flexibility than that assumed in the NRC's Standard TSs. At Farley, each of the five diesel generators has either an automatic or

manual capability to load one of the safety related shutdown or LOCA trains. Therefore credit, in terms of reduced surveillance and testing requirements, can be given to the Farley TSs due to the increased flexibility provided by this design.

The significant deviations from the NRC's Standard TSs are as follows:

Extending Diesel Generator Start Time From 10 to 12 Seconds

Currently the Farley TS requires that the diesel generators reach rated speed and voltage within 10 seconds after receiving a start signal. However, the FSAR assumes a minimum time of 12 seconds to start the diesels. Therefore, the licensee has proposed revising the start time from 10 to 12 seconds.

Since the licensee's proposal does not violate any of the FSAR analyses, we find the proposed change to be acceptable.

Revised Periodic Testing Schedule

The NRC's Standard TSs recommend the testing schedule given in Regulatory Guide 1.108 for routine periodic surveillance testing. This schedule relates the frequency of testing to the number of test failures at the station (i.e. all diesel generators). The test interval varies in four steps from 31 days to three days.

The licensee and the diesel manufacturer (Colt Industries) have proposed a different test schedule with intervals of 14 days and seven days. The proposal would continue to depend upon test failure experience but on a per diesel basis rather than per station.

The licensee and diesel manufacturer believe that for the diesel units involved a test interval of 31 days is too infrequent to provide reasonable assurance of the diesel's capability to start and provide emergency power. At the other end of the spread, testing every three days on a routine basis is too frequent. The licensee also believes that the test schedule should not be such that failures experienced on a particular diesel adversely affect other diesel units due to additional testing.

The NRC has long been interested in optimizing the testing schedule for emergency diesel generators. Revision 1 of Regulatory Guide 1.108 was published in 1977 and was an effort to improve the test schedule by relating test frequency to failure rate experience. At that time the optimal test interval was believed to be between 31 and three days. We view the licensee/manufacturer's proposal as a more refined optimization. While long term operating experience is not fully available, engineering

judgment based upon experience to date indicates that routinely test starting diesel generators every three days may generate adverse conditions that outweigh the benefits of such an accelerated test frequency. We concur with the concern of excessive testing. We cannot disagree with the manufacturer's recommendation for a maximum test interval of 14 days and see no harmful affects. Further, we agree in general that failures of one diesel generator should not force increased testing of other diesel units. As is discussed further below, after certain immediate plant safety concerns are resolved, there is no safety or reliability advantage to continue testing other units on an accelerated frequency.

In summary, the NRC staff concludes that the optimization of the routine testing schedules proposed by the licensee and diesel manufacturer are positive improvements to diesel reliability. These changes are, therefore, acceptable.

Elimination of the Overload Test

The NRC's Standard TSs require that once every 18 months the diesel generators be run for two hours at the 2-hour rating followed by 22 hours at the 2000-hour rating. The purpose of this test is to verify diesel operability at overload conditions.

Plants that are designed to operate their diesel generators at the 2-hour rating need to perform this test. However, as stated in the FSAR, the diesel generators at the Farley plant will not exceed the 2000-hour rating even under worst case conditions.

Both the diesel manufacturer and the licensee (Reference 3) state that routine overload testing is undersirable and accelerates wear thus promoting detrimental long-term effects on the reliability of the diesel generators. The architectural engineer has stated that automatic loads have been conservatively calculated to fall below the 2000-hour rating of the diesel generators. To further prevent overloading, the licensee's plant procedures prohibit operator action from manually loading the diesel generators above the 2000-hour rating. Therefore, the licensee proposed to run the diesels for 24 hours at the 2000-hour rating but to eliminate overload testing.

We agree with the licensee that overload testing of the diesel generators accelerates wear and will not promote long-term diesel generator reliability. Since the licensee has indicated that there will not be an occasion to operate the diesel generators above the 2000-hour rating, we concur with the licensee that verification of overload operation is not necessary. Therefore, we find the licensee's proposal to be acceptable.

Load Rejection Tests

The present TSs require two different load rejection tests to be performed every 18 months to confirm the capability of the diesel unit to ride through such transients without tripping. One test involves the rejection of the single largest load; the other, the full load.

The licensee proposed to conduct only the single-largest-load rejection test. The licensee's basis for deleting the requirement for the full-load rejection test was that this capability had been demonstrated during previous testing and that the need for periodic reconfirmation was not evident.

In our discussions with the licensee, we indicated that the probability of a single load rejection during diesel operation could not be considered infrequent. The licensee then agreed to demonstrate every 18 months that, if a load rejection approximating the largest single load during a postulated LOCA (i.e., 1000 KW) were to occur, the speed will not encroach the overspeed trip setpoint and the voltage will remain within $\pm$ 10%.

In our discussion we also indicated that we were aware of recent operating experience at a nuclear station where a load rejection greater than the single greatest load has occurred and caused loss of safety-related equipment due to voltage surges. The licensee agreed that in view of this experience a load rejection test to confirm that downstream safety equipment is not lost is worthwhile. It was agreed that such an occurrence is not as likely as loss of a single load; a five-year frequency was agreed upon. This frequency is comparable to the battery total-discharge tests and is appropriate for electrical equipment and for rather infrequent service conditions. As the TSs are presently written, the full-load rejection test is performed by tripping the diesel generator output breaker. Conducting the test in this manner confirms that the diesel does not trip on overspeed but inherently isolates plant safety equipment from the generator's voltage surge. The licensee has devised a test that, by manually tripping two circuit breakers (leaving the diesel generator output breaker closed), a load approaching 50% of rating is rejected and most of the safety-related Motor Operated Valves (MOV's) and inverters are subjected to the generator's voltage surge. The load rejected in this test is the largest practical value. The MOV's and inverters may be the equipment most sensitive to voltage surges. The licensee's analysis indicates that no loss (tripped breaker or blown fuse) should occur; the test will be confirmatory in that sense. We believe that testing of this type is a technical improvement needed to accommodate operating experience and the licensee agrees with the desirability of such testing with regard to overall plant safety.

The licensee's request to delete the requirement for a full-load rejection test is acceptable. Such a confirmatory test has been completed during the plant pre-operational tests. The confidence gained from testing of loss of the single largest load every 18 months and testing of loss of half the rated load every five years is sufficient to provide reasonable assurance on a continuing basis that the diesel generator will not be lost due to a load rejection situation. The necessity of full-load rejection test no longer remains. Further, the performance of the hot restart test confirms that, should a diesel trip on monentary overspeed, it could be reset and restarted promptly.

Surveillance While in Action Statements

The present TS provide that, if one of the redundant offsite power circuits is inoperable or if one of the redundant onsite diesel generators is inoperable, the licensee goes into an Action Statement, which requires, in part, that special surveillance actions be taken when in this degraded mode. This Action Statement requires that every diesel generator be test started immediately (i.e., within one hour) and every eight hours thereafter.

The licensee had proposed that no special test starts of the diesels be conducted if they each had been successfully tested within seven days. The basis was the manufacturer's statement that more frequent testing, on a routine basis, would be excessive and could cause adverse effects on long-term reliability considerations.

In our discussions with the licensee and the diesel manufacturer, we conveyed two plant safety considerations that indicate a need for special test starts. When one source of electrical power is no longer available, one needs strong assurance that at least one diesel generator (per Unit) will provide emergency power is it is needed. If the lost source is a diesel generator, one would like to be assured that other diesels are not going to be lost for the same reason, i.e., rule out common failure modes. Secondly, the largest contributor to diesel unreliability is starting problems. If the diesel can start and settle out, it will most likely do everything else it is required to do, such as accept loads. The licensee agreed that these conditions are not routine surveillance and long-term reliability considerations are not the primary concern. The diesel manufacturer and the licensee agreed to conduct special test starts. The licensee contended however, that such tests need not be performed on an emergency basis, i.e., all diesels within one hour. We concurred. It was then agreed that two diesels would be tested promptly (i.e., within 12 hours). The two would be selected so as to demonstrate that at least one redundant electrical division in each Unit could be energized by the remaining diesels. The 12 hours would also allow for additional time for inspection of the diesels prior to test starting them.

In the case of one of the offsite power sources being inoperable we agreed with the diesel manufacturer that, since a diesel failure is not involved and hence the two concerns discussed above are not applicable, exc[illegible]ve testing is a consideration. If the diesels have been successfully tested within the past seven days, there would be little additional assurance gained through immediate special test starts, we agreed that when an offsite circuit is lost it is not necessary to conduct special starts to maintain reasonable assurance that the diesel generators at this station will provide their safety function.

With regard to periodic testing throughout the duration of the Action Statement, once the two concerns discussed above have been resolved initially, there is little additional reliability assurance to be gained from increasing the testing frequency beyond that for routine surveillance. As discussed above, the diesels are tested every seven or 14 days. In consideration of the adverse effects that could arise from testing more often than every seven days, we do not believe that the testing frequency should be increased.

Extensions of Limiting Conditions of Operation

With one diesel generator inoperable, the NRC's Standard TSs require that the diesel generator be returned to operable status within three days or the plant must be shut down.

Each of the four safety trains at the two unit Farley plant are powered from separate diesel generators. The fifth diesel, which normally operates river water pumps, can be manually diverted to run a safety train. The licensee has shown that for all combinations of losing one diesel generator coincident with loss of offsite power and/or a LOCA at either unit, at least one of the safety related trains will be automatically powered at each unit. In addition, manual transfer can restore power to trains that may not be actuated automatically. Thus, loss of a single diesel generator at Farley is not as critical as at a station with only two diesel generators.

The three-day action statement has been found by the licensee to be too short a time to allow for proper trouble-shooting, repairs and preoperational testing of the diesel generators. In each of the previous emergency TS changes granted by the NRC, the licensee stated that insufficient time was available to properly service the diesels. Therefore, the licensee has proposed that the three-day LCO be extended 18 days. The licensee's experience indicates that 18 days is necessary for major repairs of a diesel generator.

Similar to the case when a diesel generator becomes inoperable, the present TSs require that a plant be shutdown within three days if one of the two offsite power sources cannot be returned to operability. Using the same reasoning regarding flexibility of diesel generators and time needed to repair or replace transformers, the licensee has proposed extending the LCO from three to seven days.

The staff has evaluated the increase in risk of continued plant operation at Farley with one of the sources of a.c. power no longer available. The evaluation concluded that the increase in risk from allowing operations to be extended from three to 17 days while one diesel generator is inoperable is acceptably small. The risks associated with 18 days of operation are comparable and hence also acceptable. Similarly, if one of the redundant offsite sources is no longer available, the increase in risk from allowing plant operations to be extended from three to seven days is acceptably small at this station. Therefore, on a probablistic risk assessment basis, we find the licensee's proposed limits on the duration of the Action Statements to be acceptable.

Conclusion

Previous surveillance testing and subsequent repair of the Farley diesel generators revealed that the TSs found in Section 3/4.8.1.1 were excessively restrictive. Whenever a diesel generator failed a routine surveillance test and required extensive repairs, the licensee would be forced to return the diesel to operable status or shut the plant down within three days. When one of the three swing diesels was affected, both units would fall into the same Action Statement and would require shut down of both plants. Because of these problems, several emergency Technical Specification change requests have been initiated by Alabama Power Company and approved by the NRC. These emergency changes were on a one-time basis for a limited duration of time, primarily for an extension of the three-day LCO for periods up to 17 days.

As discussed earlier, the NRC's Standard TSs, as approved for Farley Unit 2, are based upon a single unit facility with two diesel generators. The TSs, which require increasing the frequency of periodic surveillance testing when failures start to occur, also require multiple verification testing of all operable diesel generators when one diesel becomes inoperable. The flexibility of having the five diesel generators at the Farley plant needs to be considered in their TSs requirements. Another consideration is the assertion made by both the licensee and the diesel manufacturer that frequent testing is detrimental to the diesel generators and can adversely affect the long term reliability.

Our experience with Alabama Power Company has shown that they are extremely concerned with both the operability and reliability of the diesel generators. Reference 4 details the extensive trouble-shooting, repairs and testing performed by the licensee over the past several months when repeated failures occurred with one of their diesel generators. Reference 5 reports on a special licensee Diesel Generator Task Force. This task force, formed in response to the repeated diesel generator failures, addressed all action items in NUREG CR-0660 (Enhancement of On-Site Emergency Diesel Generator Reliability) and recommended 25 design changes and nine operational changes.

The proposed revisions to the Farley TSs, which have the full endorsement of the diesel generator manufacturer, reduce unnecessary testing and allow ample time for the licensee to investigate diesel generator failures before being forced to shut the plant down. Based on our review we believe that the uniqueness of the Farley five-diesel generator design justifies the proposed TSs changes. Therefore we conclude that the proposed TSs changes are acceptable.

References

1. Letter from Alabama Power Company to USNRC (F. L. Clayton to Director, NRR) dated October 28, 1981.

2. Letter from Alabama Power Company to USNRC (F. L. Clayton to Director, NRR) dated November 6, 1981.

3. Letter from Alabama Power Company to USNRC (F. L. Clayton to Director, NRR) dated December 18, 1981.

4. Letter from Alabama Power Company to USNRC (F. L. Clayton to Director, NRR) dated October 23, 1981.

5. Letter from Alabama Power Company to USNRC (F. L. Clayton to Director, NRR) dated October 14, 1981.

Environmental Consideration

On the basis of the foregoing analysis, it is concluded that there will be no significant environmental impact attributable to the proposed action. Having made this conclusion, the Commission has further concluded that no environmental impact statement for the proposed action need be prepared and that a negative declaration to this effect is appropriate.

Safety 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) such activities will be conducted in compliance with the Commission's 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.

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