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SUBJECT: Application for amends to Licenses NPF-10 & NPF-15, changing Tech Spec 3/4.8.1.1 re electrical power sys ac sources to reduce required number of fast cold start surveillance tests for diesel generators, per Generic Ltr 84-15. Fee paid.

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TITLE: OR Submittal: Fast Cold Starts of Diesel Generators GL-83-41 (GL-84-15

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March 17, 1986

Director, Office of Nuclear Reactor Regulation
Attention: Mr. George W. Knighton, Director
PWR Project Directorate No. 7
Division of PWR licensing - B
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Gentlemen:

Subject: Docket Nos. 50-361 and 50-362
San Onofre Nuclear Generating Station
Units 2 and 3

References: A) NRC Generic Letter 84-15, dated July 2, 1984

B) SCE (M. O. Medford) to NRC (D. G. Eisenhut) letter dated October 1, 1984.

By Reference A, the NRC requested information from all licensees of operating reactors regarding the reliability of their emergency diesel generators. Specifically, the items covered by Reference A were the following:

1. Licensees were requested to describe their current program to avoid cold fast start surveillance testing, or their intended actions to reduce cold fast start surveillance testing of the diesel generators.

2. Licensees were requested to furnish the current reliability data for each diesel generator at their plant(s), based on surveillance test data.

3. Licensees were requested to describe their program, if any, for attaining and maintaining a reliability goal for their diesel generators and to compare it with the model program contained in Reference A.

The above information was provided to the NRC by Reference B. Reference B also stated that, consistent with the requirements of Generic Letter 84-15, a Technical Specification change would be submitted to the NRC reducing the number of fast cold start surveillance tests of the diesel generators required by the technical specifications. The purpose of this letter is to submit proposed change NFP-10/15-192 (PCN-192) to the San Onofre Nuclear Generating Station Units 2 and 3 Technical Specifications. The proposed change would revise Technical Specification 3/4.8.1.1 "Electrical Power Systems, AC Sources" to reduce the required number of fast cold start surveillance tests for diesel generators. The proposed change also modifies diesel fuel oil testing requirements to more accurately determine the quality of the diesel fuel oil.

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Submittal of PCN-192 provides the remainder of the information requested by Generic Letter 84-15 and satisfies SCE's October 1, 1984 (Reference B) commitment to the NRC. In accordance with 10 CFR 170.12, enclosed is the required amendment application fee of $150.00. A formal request for this change will be included in our next formal amendment application.

If you have any questions regarding the enclosed information, please call me.

Very truly yours,

Enclosure

cc: Harry Rood, NRC Project Manager (to be opened by addressee only)
F. R. Huey, USNRC Senior Resident Inspector, Units 1, 2, and 3

Description of Proposed Change NPF-10/5-192, Rev 6
and Safety Analysis

This is a request to revise Technical Specification Section 3/4.8.1.1 Electrical Power Systems, A.C. Sources of the Technical Specifications for the San Onofre Nuclear Generation Station Units 2 and 3.

Existing Technical Specifications

Unit 2: See Attachment A
Unit 3: See Attachment C

Proposed Technical Specifications

Unit 2: See Attachment B
Unit 3: See Attachment D

Description

The proposed change revises Technical Specification 3/4.8.1.1 "Electrical Power Systems, AC Sources" to reduce the required number of fast cold start surveillance tests for diesel generators. The proposed change also modifies diesel fuel oil testing requirements to more accurately determine the quality of the diesel fuel oil.

The purpose of Technical Specification 3/4.8.1.1 is to ensure that sufficient power will be available to supply the safety related equipment required for (1) the safe shutdown of the facility and (2) the mitigation and control of accident conditions within the facility. The proposed change to the Technical Specification consists of the following parts:

(a) Technical Specification 3.8.1.1.a currently requires two physically independent circuits between the offsite transmission network and the onsite Class 1E distribution system. The proposed change would require two physically independent circuits between the offsite transmission network and each Class 1E 4kV bus. This change would also require that the following Action Statement "a" be entered on a bus by bus basis. The proposed change would also modify Technical Specification 4.8.1.1.1 to be consistent with T.S. 3.8.1.1.a. This would remove the existing requirement for cold start testing of a diesel generator on an unaffected bus, reducing the number of fast cold start tests of the diesel generators. This change is consistent with the intent of NRC Generic Letter 84-15.

For Modes 1, 2, 3 and 4, existing Technical Specification 3.8.1.1 requires that if a diesel generator has become inoperable, it be restored to operable status within 72 hours or the plant be brought to cold shutdown within the next 36 hours. However, the existing Technical Specifications do not provide any limit on the frequency of diesel inoperability or the total number of days lost due to inoperability over a given period of time.

Consistent with Generic Letter 84-15, this proposed change provides a limit of 800 hours on the combined out of service time available to the two diesel generators in one year (365 consecutive days). Should additional time be needed in a specific situation, the proposed change requires that the NRC be notified of the circumstances. Having thus established a minimum availability goal, this proposed change then, consistent with Generic Letter 84-15, increases the existing 72 hour individual out of service limit to 7 days (168 hours), thereby permitting greater flexibility in handling diesel generator malfunction and/or servicing needs without recourse to plant shutdown. Both of these proposed limits are considered applicable to Modes 1, 2, 3 and 4 only. The 800 hour annual limit is based on the following:

Assuming a reliability of 0.95 per diesel engine and 50 starts per year (365 consecutive days) per engine,

Number of failures per year per engine = 0.05 x 50 = 2.5.

Assuming 3 days average repair time required per failure,

Total time lost per diesel per year due to failure
= 7.5 days

Assuming an average of 4 days lost per quarter per diesel for preventive maintenance (PM) and/or contingencies,

Time lost per year per diesel due to PM and/or contingencies
= 16 days
Total time lost per year per diesel = 16 days + 7.5
24 days (approx.)

Total time lost per year for 2 diesels = 48 days = 1152 hours

Assuming that the plant has operated in Modes 1, 2, 3 and/or 4 for 70% of the time (365 days), total time lost per year in Modes 1, 2, 3 and/or 4 = 1152 x 0.70 = 800 hours (approx.).

(b) Technical Specification 3.8.1.1 Action Statements (a) and (b) require the diesel generators to be demonstrated operable by fast cold start testing within one hour and once per 8 hours thereafter when either one offsite A.C. circuit and/or diesel generator is

inoperable. This proposed change would reduce the number of diesel generator fast cold start tests by requiring only one test of the diesel generators within 24 hours when one diesel generator or one offsite AC circuit is inoperable. This change is consistent with the intent of NRC Generic Letter 84-15.

(c) Technical Specification 3.8.1.1 Action Statement (d) requires that with two offsite AC sources inoperable, two diesel generators must be demonstrated operable by fast cold start testing within one hour and once per 8 hours thereafter. The proposed change would modify this action statement by requiring the two diesel generators to be verified operable by start testing within 8 hours unless the diesels are already operating. This reduces the number of fast cold start tests of the diesel generators consistent with the intent of NRC Generic Letter 84-15.

(d) Technical Specification 4.8.1.1.2.a.4 currently requires the diesel generators to be verified operable by fast cold start testing in accordance with the frequency specified in Table 4.8.1. This testing requires the diesel generators to start from ambient condition and accelerate to 900 rpm in less than or equal to 10 seconds. Additionally, the generator voltage and frequency are required to be at 4,360 $\pm$ 436 volts and 60 $\pm$ 1.2 Hz within 10 seconds. The proposed change requires a fast cold start from ambient conditions only once per 18 months. For all other surveillance starts, the proposed change would allow the diesel generators to be started in accordance with the manufacturers recommendations regarding engine prelube and warmup procedures and allow the diesel generator to be gradually loaded. The proposed change would also specify that the diesel generators are to be started for the purpose of surveillance testing by the following signals only: (1) manual, (2) simulated loss of offsite power by itself and (3) simulated loss of offsite power in conjunction with an ESF actuation test signal. This change is consistent with the intent of NRC Generic Letter 84-15.

(e) Technical Specification Table 4.8-1 prescribes the test frequency for diesel generators based on the number of failures in the last 100 valid tests. The proposed change would revise the diesel generator test base from the last 100 valid demands to the last 20 valid demands. The proposed change would also delete the last two tiers of test frequency reducing the most frequent diesel generator testing from 3 days to 14 days. Fourteen days is used in place of 7 days as recommended by NRC Generic Letter 84-15 because this doubles the testing frequency from 30 days to 14 days when the

failure rate doubles from 1 failure to 2 failures in the last 20 valid diesel generator tests. This change is consistent with the intent of Generic Letter 84-15 as it reduces the number of diesel generator fast cold starts.

(f) Technical Specification 4.8.1.1.2.c requires that diesel fuel oil be tested for water and sediment content, viscosity, and insolubles once every 92 days and from new fuel prior to addition to the fuel storage tanks. The proposed change would upgrade the testing methods to be consistent with current industry practice and would replace the current test for insolubles with a more accurate and effective test. The basis for these changes are as follows:

(1) Fuels in storage should be tested periodically to detect degradation. Only those parameters that can change during storage need to be tested.

(2) Periodic testing for particulates formed in storage should concentrate on the actual particulate contamination. The accelerated oxidation stability test (ASTM D2274-70) is currently required to be performed for new fuel and every 92 days for stored fuel. This test provides a rough prediction of the tendency of the fuel to oxidize and form particulates during storage. It does not indicate actual particulate contamination. In addition, ASTM D975-81 states "Correlations (of Model D2274 results) with fuel suitability are tenuous." Finally, the ASTM D2274-70 test involves significant costs and a significant administrative burden.

In lieu of the accelerated oxidation stability test, a test for actual particulate contamination, ASTM D2276-83, is proposed. This test would be performed every 92 days for fuel in storage. Since formation of particulates during storage at ambient temperatures (Note that San Onofre Units 2 and 3 storage tanks are underground) is a relatively slow process, the 92 day test will ensure early detection of particulates.

Additionally, the proposed change would replace the fuel sampling standard, ASTM D270-1975, with ASTM D4057-81 and replace ASTM D975-77 with D975-81 as these standards are the current revisions of the standards in industry use.

The petroleum industry manufactures diesel fuel to ASTM D975 specifications. Although distribution methods frequently preclude the supplier from providing a certificate of compliance, a low risk of having non-compliant fuel added to the diesel fuel oil storage can be obtained by testing the fuel before addition to the storage tank with a program designed to disclose fuel contamination which might have taken place during the transmission and distribution process. The water and sediment test and the kinematic viscosity test will ensure that the new fuel is clean diesel fuel oil.

(g) This proposed change would modify the Technical Specification Bases to be consistent with the proposed configuration of the diesel generator systems.

NRC Generic Letter 84-15 contains several recommendations to improve and maintain the reliability of the emergency diesel generators, which, as noted in the generic letter, is one of the main factors affecting the risk from station blackout. One of the recommendations is to reduce excessive testing which causes incremental wear and degradation of the diesel engines. To accomplish this, Generic Letter 84-15 provides an example of an acceptable Technical Specification (TS). Consistent with this example TS, the changes described in (a), (b), (c), (d) and (e) above would eliminate all repetitive action statement and surveillance starts of the diesel generators except the initial start to verify the operability of the remaining diesel generator(s). These proposed changes do not affect the surveillance requirements pertaining to the offsite circuits. The change described in (f) above provides for replacing a fuel oil test with a test that is more effective in detecting unsatisfactory fuel thus increasing the reliability of the diesel generators. The change described in (g) above provides for consistency between the proposed plant configuration and the bases.

Safety Analysis

The proposed changes discussed above will be deemed to involve a significant hazards consideration if there is a positive finding in any of the following areas:

1. Will operation of the facility in accordance with these proposed changes involve a significant increase in the probability or consequences of any accident previously evaluated?

   Response: No

   (a) Surveillance Starts

   As noted under Description, this proposed change affects only the surveillance requirements pertaining to the diesels and not those pertaining to the offsite circuits. Upon loss of required AC power, only one surveillance start is deemed necessary to confirm the operability of a diesel generator. By eliminating the repeat diesel surveillance starts as presently required at $\leq$ 8 hour intervals, this proposed change will prevent premature diesel engine degradation and contribute to enhanced plant safety over the long term. Whereas the existing Technical Specifications require demonstration of diesel generator operability within one hour of the initial power loss, this proposed change permits a delay of up to 24 hours after losing one source and 8 hours after losing two sources. These new time limits conform to Generic Letter 84-15 and are consistent with the philosophy to minimize wear on the diesel engine parts. These limits will permit the inoperable power source(s) to be repaired and restored if possible while avoiding an unscheduled

diesel start. Although the new limits are a relaxation from the existing surveillance requirements, it is not considered a significant relaxation, in light of the requirement to test the offsite circuits within 1 hour of the initial power loss and every 8 hours thereafter for the duration of the loss. If the inoperable power source cannot be restored to service within the specified time interval, the Technical Specifications require plant shutdown within the next 36 hours.

By emphasizing both long term diesel reliability and immediate plant safety requirements under different loss situations, a decrease in the probability or consequences of an accident is obtained.

(b) Out of Service Time Limits

Increasing the individual out of service limit from 72 hours to 7 days does not involve a significant increase in the probability or consequences of an accident previously evaluated, considering that

1. The safety requirement to be in cold shutdown within 36 hours if the out-of-service limit has been exceeded and the inoperable power source remains inoperable is unchanged. (In practice, it takes only about 12 hours to achieve cold shutdown from Mode 1 temperature conditions.)

2. The annual limit will insure that the actual out-of-service time is in all cases within reasonable limits and unnecessary diesel out of service time is avoided.

3. In the history of San Onofre Units 2 and 3, the switchyard has never been completely de-energized. Presently, eight offsite transmission circuits serve San Onofre, whereas only two circuits are required by the Technical Specifications.

The proposed 800 hour limit on the total annually allowed diesel out of service time in Modes 1, 2, 3 and 4 instead of an unlimited number of 72 hour outages currently allowed will serve as an incentive in scheduling and completing all diesel maintenance in such a manner that diesel availability remains high. If downtime in excess of the 800 hour limit is needed, the Technical Specifications require notification to the NRC instead of requiring plant shutdown. This provision is based on the recognition that exceeding the 800 hour limit in itself does not represent an unsafe condition but each individual case should be evaluated in the light of all the relevant factors and concerns. Based on the above, it is concluded that the introduction of an 800 hour annual out of service limit will not result in the probability or consequences of an accident previously evaluated being increased.

(c) Basis to Technical Specification 3.8.1.1

The changes to the Basis are only for the purposes of updating and clarifying the text to be consistent with the proposed configuration of the diesel generator systems.

(d) Diesel Fuel Oil Testing Requirements

By substituting the current diesel fuel oil testing requirements with those that are in current industry use and that more accurately determine fuel oil quality, the probability of degraded fuel is reduced. Therefore, the probability or consequences of previously evaluated accidents are not increased.

2. Will operation of the facility in accordance with the proposed changes create the possibility of a new or different kind of accident from any accident previously evaluated?

   Response: No

   These proposed changes do not change the configuration of the plant, or its manner of operation but rather, for sake of prolonging diesel engine life and providing better diesel maintenance, these changes reduce the amount of diesel testing and increase the time allowed for diesel repair and maintenance in individual cases. The safety requirement to complete cold shutdown within 36 hours if a limiting condition for operation is not met remains in place. Based on these considerations, these proposed changes do not create the possibility of a new or different kind of accident from any previously evaluated.

3. Will operation of the facility in accordance with these proposed changes involve a significant reduction in a margin of safety?

   Response: No

   The proposed changes affect only the surveillance requirements requiring fast cold starts of the diesel engines and fuel oil testing. The proposed changes will reduce premature diesel engine degradation and increase assurance of fuel oil quality and thus increase the overall reliability of the diesel generators. Therefore, operation in accordance with these proposed changes will not involve a reduction in a margin of safety.

The Commission has provided guidance concerning the application of standards for determining whether a significant hazards consideration exists by providing certain examples (48 FR 14870) of amendments that are considered not likely to involve a significant hazards consideration. Example (i) relates to a change that is purely administrative in nature, for example, a change to achieve consistency throughout the technical specifications, correction of an error, or a change in nomenclature. Example (vi) relates to a change that may

result in some increase to the probability or consequences of a previously-analyzed accident or may reduce in some way a safety margin, but where the results of the change are clearly within all acceptable criteria with respect to the system or component specified in the Standard Review Plan: for example, a change resulting from a small refinement of a previously used calculational model or design method. The proposed changes described in part a, b, c, d and e above are representative of Example (vii) in that they are provided in response to NRC Generic Letter 84-15 and involves only a reduction of repeated fast cold starts of diesel generators following the initial start. The proposed change described in part (f) above is representative of Example (vi) in that it replaces the current fuel oil oxidation stability test with a test for fuel oil particulates. The proposed change described in part (g) above is representative of Example I in that the proposed change is for maintaining consistency throughout the technical specifications.

Safety and Significant Hazards Determination

Based on the above Safety Analysis it is concluded that: (1) the proposed changes do not involve a significant hazards consideration as defined by 10 CFR 50.92; (2) there is reasonable assurance that the health and safety of the public will not be endangered by the proposed changes; and (3) this action will not result in a condition which significantly alters the impact of the station on the environment as described in the NRC Final Environmental Statement.

CEW:3864F

ATTACHMENT A