



**Consumers
Power
Company**

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October 1, 1984

Director,
Nuclear Reactor Regulation
US Nuclear Regulatory Commission
Washington, DC 20555

DOCKET 50-255 - LICENSE DPR-20 -
PALISADES PLANT - RESPONSE TO GENERIC LETTER 84-15 "PROPOSED STAFF ACTIONS TO
IMPROVE AND MAINTAIN DIESEL GENERATOR RELIABILITY"

Generic Letter 84-15 "Proposed Staff Actions to Improve and Maintain Diesel Generator Reliability" dated July 2, 1984 requests that licensees furnish certain information concerning: 1) their intended actions or current programs to avoid "cold fast start" surveillance testing of the emergency diesel generators (EDG); 2) the reliability of their emergency diesel generators; and, 3) their current programs, if any, to attain and maintain diesel generator reliability goals. Additionally, licensees were requested to comment on, and compare their existing or proposed program to an example diesel generator performance technical specification. These items are presented in detail in Attachment 1 to this letter, but major points have been summarized below.

Response to Item 1

Consumers Power Company does not subject the EDGs at the Palisades Plant to "cold fast starts". Supporting discussion is contained in the Attachment to this letter.

Response to Item 2

Surveillance test data for the last 20 and 100 tests is detailed in Attachment 1 to this letter.

Response to Item 3

The Palisades Plant maintains a proceduralized system for ensuring the reliability of the EDGs. A full discussion of the system is contained in the Attachment to this letter.

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Consumers Power Company does not believe a demonstrated need exists for an EDG performance technical specification such as that proposed by the NRC. With the demonstrated high reliability of the Palisades EDGs and the current programs to ensure maintenance of same, a requirement such as a proposed performance technical specification is not appropriate.

In response to the request in the subject Generic Letter, Consumers Power Company has compiled extensive comments on the proposed example technical specification. These are presented in detail in the attachment to this letter, but major points are presented below.

Comment 1

Consumers Power Company strongly opposes the treatment of emergency diesel generator (EDG) reliability as a generic issue. As noted in the subject Generic Letter, 75% of the EDGs currently in service have a reliability of .95/demand or greater, with the median value of reliability at operating plants being .98/demand. We do not support attempts to establish generic reliability goals, since acceptable reliability levels (and the corresponding probability of events leading to a core melt accident) are highly dependent on plant design. The creation of a generic requirement for new technical specifications that cover additional reliability actions, reporting requirements, and an EDG requalification program imposes an excessive administrative burden on all licensees. This is particularly true for those licensees with EDGs that have demonstrated high reliability and proven programs to assure maintenance of same.

The proposed technical specifications appears to be an attempt to prescribe analysis, evaluation and corrective actions than are already in the licensee's own best economic interest. We question the appropriateness of the promulgation of any requirements that are not clearly related to safety.

Comment 2

We have followed NRC concerns regarding EDG reliability and the associated issues of Station Blackout for some time. We concur with the Staff goal to increase EDG reliability (which should reduce the probability of events leading to a core melt accident). We do not agree, however, with the philosophy that increased surveillance testing would motivate licensees to maintain highly reliable EDGs. And, we cannot now concur with a requirement for a reliability program that 1) causes unwarranted additional wear on EDGs; and, 2) statistically precludes the requalification of most EDGs.

We are committed to maintaining highly reliable EDGs. We believe that existing technical specifications limiting conditions of operation (LCO) are reason enough for licensees to maintain high reliability by strictly limiting the maximum allowable times for EDG inoperability. EDGs that fail required surveillance testing must undergo investigation, evaluation and corrective

actions (requiring time), and then successful retesting, before being declared operable. Therefore, licensees with unreliable EDGs may affect plant availability (via LCO) by the time constraints imposed by the corrective action process and the additional retesting required prior to declaring the EDG operable.

Comment 3

As now written, the requalification process that requires completing 14 consecutive tests without a failure is extremely restrictive with a very low probability of success. Using a binomial distribution, the probability of a .95 reliable EDG (minimum desired reliability) having 14 consecutive failure free demands is only 0.49 ($P = (.95)^{14}$). Similarly, a .90 reliable (minimum acceptable reliability) generator would only have a 0.23 probability of 14 consecutive failure free demands. Following the recommendations of the proposed NRC program, the total probability of successfully completing the requalification program is 0.74 for a .95 reliable EDG, and 0.41 for a .90 reliable EDG. Supporting detail is contained in the attachment to this letter.

Comment 4

The introduction of new terminology in the proposed technical specification and guidelines (qualified, not qualified, not qualified for nuclear service) will only confuse the issue of equipment operability. As now written, an EDG can be both operable and disqualified.

Comment 5

We are concerned about the combination of reliability and operability programs in the NRC proposal. Each provides separate and distinct determinations of safety and its impact to continued operation. Contrary to the proposed NRC program, a reliability program should address preventative maintenance activities, inspections, long term corrective actions, and should remain separate from operability determinations.

Comment 6

We note the NRC proposal will not allow EDG testing more frequently than once every 24 hours during requalification. In discussion with your staff, we understand the intent of this proposed requirement is to allow the EDG time to return to ambient conditions. This conflicts with Item 1 of subject generic letter which is aimed at reducing the number of "cold fast starts." Additionally, this requirement poses the burden of additional down time, and will force licensees to propose significant increases in the technical specification maximum allowable times for inoperability.

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Consumers Power Company appreciates the opportunity to comment on the proposed requirements in Generic Letter 84-15. As can be seen, we have given this matter careful consideration and have tried to evaluate the benefits resulting from implementation of the proposed requirements objectively. We have concluded, as discussed in detail in the comments above and in the attachment to this letter, that the current technical specifications regarding EDG operability (other than fast cold start requirements) are sufficiently effective to ensure adequate EDG reliability. Any further reliability programs or guidelines should be the licensees' decision.



Brian D Johnson
Staff Licensing Engineer

CC Administrator, Region III, USNRC
NRC Resident Inspector - Palisades

Attachment

CONSUMERS POWER COMPANY
Palisades Plant
Docket 50-255 - License DPR-20

REPONSE TO GENERIC LETTER 84-15

At the request of the Commission and pursuant to the Atomic Energy Act of 1954 and the Energy Reorganization Act of 1974, as amended, and the Commission's Rule and Regulations thereunder, Consumers Power Company submits our response to Generic Letter 84-15 dated July 2, 1984, entitled, "Proposed Staff Actions to Improve and Maintain Diesel Generator Reliability." Consumers Power Company's response is dated October 1, 1984.

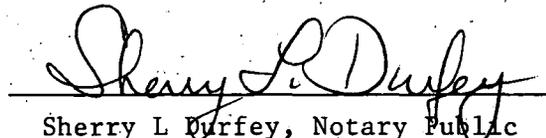
CONSUMERS POWER COMPANY

By



R B DeWitt, Vice President
Nuclear Operations

Sworn and subscribed to before me this 1st day of October 1984.



Sherry L. Durfey, Notary Public
Jackson County, Michigan

My commission expires November 5, 1986.

SHERRY LYNN DURFEY
Notary Public, Jackson County, Mich.
My Commission Expires Nov. 5, 1985

ATTACHMENT 1

Consumers Power Company
Palisades Plant - Docket 50-255

RESPONSE TO GENERIC LETTER 84-15
PROPOSED STAFF ACTIONS TO IMPROVE AND
MAINTAIN DIESEL GENERATOR RELIABILITY

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8 Pages

Item 1: Reduction in Number of Cold Fast Start Surveillance Tests for Diesel Generators

Item 1 of Generic Letter 84-15 requests that licensees describe their current programs to avoid cold fast start surveillance testing or their intended actions to reduce cold fast start surveillance testing for their diesel generators.

Response:

The emergency diesel generators at Palisades are not subjected to cold fast starts. Both diesel generators are equipped with lubrication oil and jacket water heaters that maintain the lubrication oil and jacket water at elevated standby temperatures. In addition, a pre-lubrication pump is employed to keep the lubrication oil circulating when the diesel is in standby. These standby conditions, which are manufacturer's recommendations, prevent the cold fast starts which may cause premature engine failure. (It should be noted that the Palisades technical specifications do not require fast starts from ambient conditions. Normally, fast starts are made from the standby condition only.)

Item 2: Diesel Generator Reliability Data

Item 2 of Generic Letter 84-15 requests that licensees furnish reliability data (based on surveillance tests) for each diesel generator at their plant for its last 20 and 100 demands, indicate whether they maintain a record of diesel generator demands and failures in accordance with Reg Guide 1.108 position C.3.a, and whether a yearly data report is maintained for each diesel generator's reliability. Our response to this request is given below.

Recognizing that operation of the Palisades Plant precedes Regulatory Guide 1.108 and its criteria, our definitions of successful starts, valid tests and failures differs from that of Regulatory Guide 1.108. At the Palisades Plant, a failure of the EDG to perform within surveillance test limits results in the test being declared a failure, investigation, corrective actions, repairs, and finally retesting. A piece of equipment must successfully demonstrate its capability to function prior to being declared operable.

Testing done as part of the trouble shooting a repair process is not considered as either a failure or success. This is in alignment with the intent of section C.2.e(7) of Reg Guide 1.108. At the completion of maintenance or repair activities, the shift supervisor determines those portions of the Technical Specification EDG surveillance procedure that must be performed to determine equipment operability and documents it on process control sheet. The process control sheet controls the testing to verify operability and return the equipment to operable status. These tests are not considered valid tests, regardless of success or failure. These tests do, however, result in an declaration of operability.

Response:

A review of the surveillance test results for the last 20 and 100 demands (through June 1984) yields the following results.

EDG 1-120 demands (through June 17, 1984)

During the time period from November 3, 1982 to June 17, 1984, twenty (20) surveillance tests were completed with zero (0) failures.

100 demands (through June 17, 1984)

During the time period from April 3, 1977 to June 17, 1984, one hundred (100) surveillance tests were completed with five (5) failures to start. The five failures occurred on February 2, 1982, June 2, 1981, November 2, 1979, October 3, 1979, and January 3, 1979. Calculated reliability is .95.

EDG 1-220 demands (through June 17, 1984)

During the time period from September 2, 1982 to June 17, 1984, twenty (20) surveillance tests were completed with one (1) failure. This failure occurred August 31, 1984.

100 demands (through June 17, 1984)

During the time period from May 11, 1976 to June 17, 1984, one hundred (100) surveillance tests were performed with two (2) failures. These failures occurred on August 31, 1983 and September 2, 1981. Calculated reliability is .98.

In addition, Enclosure 2 of Generic Letter 84-15 requested licensees to indicate if they maintain a record of demands and failures per diesel generator according to Regulatory Guide 1.108 position C.3.a. At this time no such consolidated record exists which provides this information.

No annual data report of each diesel generator reliability is maintained.

Item 3 Diesel Generator Reliability

Item 3 of Generic Letter 84-15 requests that licensees describe their diesel generator reliability improvement program for attaining and maintaining a reliability goal. Licensees are also requested to comment on and compare their existing or any proposed program with the proposed performance specification attached to Enclosure 3 of the generic letter.

Response

Consumers Power Company recognizes the need for highly reliable EDGs and has a proven program in place to ensure continued high reliability. The following section provides a description of the current program to ensure diesel generator reliability at the Palisades Plant.

Palisades Plant Diesel Generator Reliability Program

The Palisades Plant maintains a proceduralized system for ensuring the reliability and availability of the emergency diesel generators. This system consists of:

1. Performance of surveillance and periodic maintenance tests and procedures to collect data.
2. An evaluation and review of the data gathered in those tests and procedures.
3. The required actions to be initiated based on the results of the evaluations and reviews.
4. A system engineer from the Plant technical department who is assigned the responsibility for monitoring and evaluating the systems' performance.

Plant procedures require that all monthly surveillance tests results be reviewed by the Shift Supervisor and the shift engineer on whose shift the test is completed (both of who maintain SRO licenses), and the plant technical superintendent. The surveillance procedures contain ready reference to 1) acceptable operating limits for all parameters; 2) an alert range; and, 3) a required action range.

The alert range category was developed as an early indicator of possible diesel generator degradation. For any operating parameter that falls within the alert range, the supervisor responsible for the performance of the test (normally the Shift Supervisor) is responsible for generating a deviation report and consequent corrective action (maintenance orders, etc). An investigation into the root causes of the parameters falling within the alert range is conducted, and, based on this investigation and evaluation, additional corrective actions are prescribed. Parameters falling in the alert range are still within acceptable operating limits and do not result in a surveillance test failure. The alert range was developed only as an indicator of possible diesel generator problems.

The required action range indicates that the diesel generator performance is not acceptable. For any operating parameter falling in the required action range, the equipment is declared inoperable, an event report is initiated, and the surveillance test declared a failure. The event report requires a thorough investigation, evaluation, review by Palisades Corrective Action Review Board and subsequent corrective actions. Operational testing following maintenance procedures on the diesel generators is performed to insure all parameters are within normal limits prior to declaring the diesel generator operable.

The periodic preventive maintenance program has been established to insure manufacturer's recommended tests and maintenance are performed. These recommended manufacturer's tests monitor equipment performance and insure trends and/or potential problems are identified prior to becoming a problem. The recommended oil changes and inspections are performed to prevent or identify developing problems prior to adverse operation.

Consumers Power Company has compiled the following comments on the "Example of Diesel Generator Performance Technical Specification" presented as "Attachment to Enclosure 3" of Generic Letter 84-15. Consumers Power Company has reviewed and evaluated this example technical specification from two perspectives - the first being from the viewpoint of integration into the Palisades existing technical specifications which do not follow the format nor include all the level of detail in the standard technical specifications. These comments are presented in Section 1 below. Secondly, Consumers Power Company has evaluated this example technical specification from an editorial and administrative perspective as it interfaces with the standard technical specifications. These comments are presented in Section 2 below. Where applicable, comments have been structured in the same format and order as that of the Generic Letter.

Section 1 Comments on Integration or Applicability of Attachment to Enclosure 3 "Example of Diesel Generator Performance Technical Specification" for the Palisades Nuclear Plant

As stated in our general comments above, Consumers Power Company does not concur with staff actions to establish generic EDG reliability goals and requirements. The Palisades plant has highly reliable EDGs and programs to maintain their high reliability. Adequate incentives to maintain EDG performance are contained in existing LCOs.

Section 2 - Editorial and Administrative Review Comments of Attachment to Enclosure 3 "Example of Diesel Generator Performance Technical Specification"

Background

We note that NUREG-0933 states LER review demonstrates .94/demand average reliability whereas it is stated here the LER review indicates the median value to be .98/demand. This would seem to indicate the need for diesel generator reliability programs is not a generic issue of the importance once thought.

Reliability Program

1. Reliability Goals

The implication in this section as well as the introductory paragraph of the cover letter to Generic Letter 84-15 is that there is significant risk from station blackout events at all facilities and that implementation of reliability goals and actions with respect to diesel generators will have a substantial safety benefit. It is clear that these statements have been made generically without regard to unique plant specific design features which have an effect on the importance of the emergency power system. It would seem that the potential for loss of offsite power sources and the impact of the loss of the facility on the local grid also play a role on the importance of the emergency power system at a given facility. The goals as presented in this letter do not accommodate unique plant and electrical distribution design features.

In addition, it is not clear what the basis is for the selection of .95 as "the minimum desired level" of reliability (or the reliability action levels of .95 and .90). Consumers Power Company considers it undesirable to establish reliability goals on isolated pieces of equipment out-of-context with the integrated plant design. This option is particularly true when such goals are considered as limiting conditions for operation as suggested by Table 4.8-2.

2. Reliability Level Remedial Actions

The example states "the reliability of each diesel generator is based on the number of failures in the last 100 valid demands." We note that Table 4.8.1 "Diesel Generator Test Schedule" of Appendix A and Table 4.8-2 "Additional Reliability Actions" both reference the number of failures in the last 20 valid demands, and require subsequent action based on these figures.

The Reliability Improvement Program Report that would be required if there are three (3) failures in the last 20 valid tests or six (6) failures in the last 100 tests is an intrusion of regulatory requirements into a licensee's discretionary areas. The consequences of an EDG having high failure rates (increased surveillance testing, wear, repairs, etc) are penalty enough. We question the appropriateness of requirements (reports) that are not clearly related to a direct increase in safety margin.

Table 4.8-2 "Additional Reliability Actions" utilizes the terminology "Declare the diesel generator inoperable" for failure rates of 5/20 and 11/100. We understand (in discussions with your staff) this to mean that the EDG is disqualified (and therefore subject to the requalification program requirements of Attachment 2 to Table 4.8-2). However, after one subsequent successful surveillance test is performed, the diesel generator is considered operable for the purpose of technical specifications LCOs. We encourage the NRC to more explicitly define the term "disqualified" and its use.

The EDG requalification program, then, appears to have no commonality with the term "operable" and the limiting conditions for operability that are of concern to licensees. Indeed, we gather that the requalification program is a "stand alone" effort to bring about improvements in the reliability of EDG's without impacting the LCO's.

The sentence "The diesel generator would remain inoperable from the time of the last failure through the period required for corrective action and until the first subsequent valid successful test is completed" should be clarified so that "the period for corrective action" is not construed or interpreted as meaning the requalification program.

3. Surveillance Test Frequency

We are concerned about the requirement to maintain the seven-day test frequency until seven consecutive failure free demands have been performed and the number of failures in the last 20 demands reduced to one or less, as described in the footnote to proposed Table 4.8.1 "Diesel Generator Test Schedule". From a probability standpoint, even a .95 reliable EDG

would only have a 0.70 probability of having seven consecutive failure free demands ($P = (.95)^7 = 0.70$). Additionally, two adjacent test failures that are a result of a common cause failure result in the need for 19 consecutive successful tests (to reduce the number of failures in the last 20 valid demands to one or less) before the surveillance test frequency would revert to a monthly basis. If analysis and/or repairs are made that eradicate the common cause failure, it seems inappropriate that 19 additional tests that further degrade the EDG be performed. The probability of a .95 reliable EDG successfully passing these 19 consecutive tests is only $P = (.95)^{19} = 0.38$

4. Remedial Action Criteria

We note the use of the terminology "should" in "the licensee should within 14 days..." whereas the term "shall" is used in Attachment 1 to Table 4.8-2 "Reporting Requirements". We also note the disparity between this section and Attachment 1 to Table 4.8-2 in regard to NUREG/CR-0660 recommendations. This section describes a report which includes "...the implementation of NUREG/CR-0660 recommendations" whereas Table 4.8-2 requires the evaluation of the recommendations of the NUREG with respect to their applicability to the plant.

5. Requalification Criteria

Using a binominal distribution, even a .95 reliable diesel generator would have less than a .50 probability of having 14 consecutive failures free demands. Following the recommendations of Attachment 2 to Table 4.8-2:

Probability of Successfully Completing Requalification Program

	Diesel Reliability	
Diesel testing history following repair	.95	.90
14 consecutive success	.49	.23
14 consecutive success following one failure in 1st seven tests	.15	.12
14 consecutive success following one failure in 2nd seven tests	.10	.06
Total probability of success	.74	.41

The likelihood of having to shut the plant down following the suggested requalification program is nearly 60% given a marginally reliable diesel generator (.90) and over 25% if the diesel meets the proposed goal (.95).

As stated above, we understand the term "disqualified" does not affect the "operability" of the EDGs if one successful surveillance test has been performed. However, we understand that if the second attempt to achieve the acceptable requalification test series fails, the EDG would then be declared inoperable for nuclear service. In this instance, what actions would be required for a licensee to bring the EDG back to operable status? The requirements to return the EDG to operable status after the second failure during the requalification program are not clear.

It is stated, "The diesel generator unit would not be tested more frequently than once in any 24 hour interval." We understand the intent of this requirement is to allow the EDG time to return to ambient conditions. This requirement would seem to be in conflict with Item 1 of this Generic Letter which is aimed at reducing the number of "cold fast starts", and also poses the additional burden of excessive down time. This will require that licensees propose significant increases in the maximum allowable times in the technical specifications for inoperability. For example, a failure occurs during surveillance testing of the diesel. If, repairs are affected within two hours, twenty-two hours must pass before the diesel can be retested. This time (22 hours) will have to be taken into account when determining the maximum allowable time the EDG may be inoperable (LCO 3.8.1.1).

6. Failure to Requalify a Diesel Generator

As stated in 2 and 5 above, we understand this to mean that after two (2) unsuccessful requalification attempts, the EDG would be declared inoperable for technical specification limiting conditions of operation (LCO) purposes. How would a licensee take action to bring the EDG back to operable status after the second failure during the requalification program?

7. Diesel Generator Inoperability

As mentioned in 5 above, the 24 hours between surveillance tests requirements will necessitate a significant increase in the allowable out-of-service period from that which would be proposed if the requirement for 24 hours between tests is deleted.

8. Valid Demands and Failures

There are several concerns regarding the criteria of R.G. 1.108. In general, the criteria indicate that only surveillance tests could be counted as successes. However, failures occurring at other times would be counted against the surveillance test data base. This would appear to be an invalid use of the data (i.e., it loads the surveillance test data base with failures which did not occur as a result of that specific testing).

9. Reliability Records

A clarification is needed between Attachment 1 to Table 4.8.2 of Appendix A and the recommended record keeping of Reg Guide 1.108. We believe it is

intended that Reliability Improvement Program reports as required in Table 4.8.2 be included in Reg Guide 1.108 recommended log.

Comments on Appendix A Typical Technical Specifications

- LCO 3.8.1.1 Action b - We believe an incorrect citation exists and that the asterisked (*) statement attending this LCO should read "satisfies the requirements of Surveillance Requirement 4.8.1.1.2(a)4 Electric Power Systems".
- LCO 3.8.1.1 Action e - The last sentence of the action statement says "With one diesel generator unit restored, follow Action Statement b and d." The requirement to follow action statement 'd' is not understood.

Table 4.8.1 Diesel Generator Test Schedule

See 3 above for comments.

Table 4.8-2 Additional Reliability Actions

See 2 above for need to clarify use of terms inoperable and disqualified.

Attachment 1 to Table 4.8-2 Reporting Requirement

See 2 above for discussion pertaining to this proposed requirement. Additionally, this section states "...submit a yearly data report on the diesel generator reliability". It is not clear as to whom or in what detail this is to be submitted.

Attachment 2 to Table 4.8-2 Diesel Generator Requalification Program

Item 4 states that "Following the second failure during the requalification test program be in at least HOT STANDBY during the next..." This is in disagreement with item 6 above "Failure to Requalify a Diesel Generator" that states "...the action statement in the plant technical specifications for one diesel generator inoperable should be followed immediately." The action statement in the Standard Technical Specifications allows for additional repair time prior to proceeding to Hot Standby and Cold Shutdown.

Item 5 discusses 24 hour intervals between test frequencies. See 7 above for comments.

Item (c) addresses the "placement of failures" within the last 20 or 100 demand series and allows that further requalification testing will not be required provided the number of failures is not increasing. We believe this same approach should be used in the "Diesel Generator Test Schedule Table 4.8.1." As now stated, two or more failures that occur in the latter part of 20 valid demands, will necessitate weekly surveillance testing for perhaps as long as 19 weeks. (See 3 above for example.) This increased test frequency will result in increased wear on the EDGs - and could not be justified when corrective actions are taken that eliminate the cause of the problem.