Douglas R. Gipson
Senior Vice President
Nuclear Generation

Detroit Edison

Fermi 2
6400 North Dixie Highway
Newport, Michigan 48166
(313) 586-5249

April 19, 1996
NRC-96-0041

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555

References: 1) Fermi 2
NRC Docket No. 50-341
NRC License No. NPF-43

2) NRC Letter to Detroit Edison, "Technical Specification Change Request - Emergency Diesel Generator Allowed Outage Time Extension (TAC No. M94171)," dated March 22, 1996

3) Detroit Edison Letter to NRC, "Proposed Technical Specification Change (License Amendment) - Emergency Diesel Generator Action Statements, Surveillance Requirements and Report," NRC-95-0124, dated November 22, 1995

4) Detroit Edison Letter to NRC, "Request for Enforcement Discretion," NRC-96-0038, dated March 11, 1996

5) NRC Letter to Detroit Edison, "Notice of Enforcement Discretion for the Detroit Edison Company Regarding Fermi Unit 2 (NOED No. 96-3-001)," dated March 13, 1996

6) Detroit Edison Letter to NRC, "Response to Questions on Proposed Emergency Diesel Generator Technical Specification Change," NRC-96-0008, dated February 19, 1996

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7) NRC Staff Requirements Memorandum, "SECY-90-340 - "Diesel Generator Reliability," Resolution of Generic Safety Issue B-56 (COMJC-91-001/001-A)", dated June 26, 1991

Subject: Response to NRC Letter on Emergency Diesel Generator Allowed Outage Time Extension (TAC No. M94171)

This letter provides Detroit Edison's response to the questions asked in Enclosure 2 of Reference 2 and during an April 1, 1996 conference call. The questions pertain to Detroit Edison's request to increase the allowed out-of-service time for one onsite AC electrical power division (Reference 3). Responses to the questions in Enclosure 1 of Reference 2 have also been drafted and will be discussed during the upcoming

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onsite working level meeting on the probabalistic safety assessment (PSA) evaluation used to support the proposed Technical Specification Change or separately submitted.

The following commitment is being made by this letter, contingent upon approval of the proposed Technical Specification:

Detroit Edison will verify (by administrative check) that the Alternate AC source (AAC) is functional before removing an Emergency Diesel Generator (EDG) from service for a planned extended period (> 72 hours), such as for the 18 month inspection, during plant operation. This verification (by administrative check of breaker, AAC source, and line availability) will confirm that the AAC source is capable of supplying power to Division 1 loads if needed. The capability of the AAC source to be connected to Division 1 loads will also be verified every 8 hours (with up to 25% extension) thereafter during a planned extended EDG outage.

Detroit Edison sincerely hopes the responses in the enclosure to this letter will facilitate prompt completion of the NRC review of the proposed Technical Specification changes. If there are any additional questions, please contact Lynne Goodman at (313) 586-4097 promptly, so they can be expeditiously answered. Detroit Edison understands the NRC review could not be completed by March 31, 1996 as originally requested, however, completion by May 31, 1996 would be greatly appreciated.

Sincerely,

Enclosure

Attachment

cc: T. G. Colburn
M. J. Jordan
H. J. Miller
A. Vegel

RESPONSES TO REFERENCE 2, ENCLOSURE 2 QUESTIONS

NRC Question 1:

In your submittal of November 22, 1995, you proposed to extend the allowed outage time (AOT) from 3 days to 7 days for each emergency diesel generator (EDG) in order to perform preventive maintenance (PM) and corrective maintenance (CM). The extending EDG AOT for PM such as the 18-month manufacturer-recommended inspection could be beneficial as it involves teardowns or preplanned PM or modifications that could extend beyond the original AOT. However, it appears that the 3 day AOT has been adequate for CM (for example, an inoperable EDG) in the past. It is not clear now why the 7-day AOT time period is needed for CM. Please state your reason for extending your current CM for the EDG AOT. Your response should also include instances where your current AOT was insufficient to perform CM.

Detroit Edison Response:

In general, the 3 day allowed out-of-service time (AOT) has been adequate for corrective maintenance. However, in a recent case, which occurred after the proposed Technical Specification change was submitted, the AOT was insufficient (due to a fuel oil quality problem discovered after planned work was completed). Enforcement discretion was requested and received due to the circumstances described in References 4 and 5. There have been infrequent occasions in the past when maintenance, which would have improved reliability, was deferred because the AOT could have been challenged.

The main reason for not requesting separate AOTs for corrective maintenance and preplanned teardowns, preventive maintenance or modifications is the added complexity of having different AOTs for different circumstances. Separate AOTs would add to complexity in Technical Specifications, which could unduly challenge the plant operators.

The specification could also be subject to interpretation differences. For example, what if during an EDG test at the end of preventive maintenance, an unrelated problem was found necessitating corrective maintenance? The operators, as well as the plant staff could be confused as to the proper application of the Technical Specification. Detroit Edison believes a simple 7 day AOT would avoid unnecessary operator confusion.

Additionally, the majority of plants that have a 7 day AOT do not have separate AOTs for preventive and corrective maintenance. For these reasons, a single AOT for one division of onsite AC electrical power being inoperable was requested.

NRC Question 2:

The staff has recently granted an extension of an EDG AOT to a plant that has installed a weather-protected tie-line from a hydro station used as an alternate ac (AAC) source which will be substituted for the inoperable EDG during the extension. The extension was granted based on the licensee's commitment to meet the following conditions. Except as noted, provide a discussion of how you would address each condition listed below as related to Fermi 2.

a. The Technical Specification (TS) should include verification that the required systems, subsystems, trains, components, and devices that depend on the remaining EDGs as a source of emergency power are operable before removing an EDG for PM. In addition, positive measures should be provided to preclude subsequent testing or maintenance activities on these systems, subsystems, trains, components, and devices while the EDG is inoperable. This was described in Fermi's 2/19/96 letter.

b. The overall unavailability of the EDG should not exceed the value that was used in the probabilistic risk assessment (PRA) supporting the proposed AOT. Also, the EDG unavailability should be monitored and controlled in accordance with the maintenance rule performance goals. This discussion was provided in Fermi's 2/19/96 letter.

c. Before taking an EDG out for an extended period, the AAC source should be verified: (1) that it is functional: (2) that the power source is capable of being connected to the safety bus associated with the inoperable EDG; and (3) that this capability of being connected to the safety bus associated with the inoperable EDG is verified once every 8 hours (shift) thereafter.

d. Voluntary entry into a limiting condition for operation (LCO) action statement to perform PM should be contingent upon a determination that the decrease in plant safety is small enough and the level of risk to the plant will be acceptable for the period and is warranted by operational necessity, not by convenience.

e. Voluntary entry into an LCO action statement should not be abused by repeated entry into and exit from the LCO.

f. Removal from service of safety systems and important nonsafety equipment, including offsite power sources, should be minimized during the outage of the EDG for PM. This discussion was provided in Fermi's 2/19/96 letter.

g. Voluntary entry into an LCO action statement should not be scheduled when adverse weather is expected. This discussion was provided in Fermi's 2/19/96 letter.

Detroit Edison Response:

Detroit Edison's response will address Items c-e since Items a, b, f and g were previously addressed in Reference 6 as indicated in the NRC question.

As discussed in Reference 6, Detroit Edison personnel normally determine what other equipment is inoperable prior to removing an EDG from service. This includes checking that CTG 11-1, the AAC source, is available before intentionally removing a diesel generator from service for maintenance. This is an administrative check, not a specific test. CTG 11-1 is started monthly as required by Technical Specification 4.7.11.2, to ensure it remains operable.

Reference 6 also addressed that CTG 11-1 is capable of and proceduralized to supply all Division 1 safe shutdown loads. However, CTG 11-1 is a manually started unit and it cannot fulfill starting time and automatic loading functions of the EDGs.

To specifically address NRC Item c, Detroit Edison will commit to verify (by administrative check) that the AAC source is functional before removing an EDG from service for a planned extended period (> 72 hours), such as for the 18 month inspection, during plant operation. This verification (by administrative check of breaker, AAC source, and line availability) will confirm that the AAC source is capable of supplying power to Division 1 loads, if needed. The capability of the AAC source to be connected to Division 1 loads will be verified every 8 hours (with up to 25% extension) thereafter during a planned, extended EDG outage.

The difference between the above and the NRC request is that the AAC source will be checked to ensure that it is capable of being connected to Division 1 loads instead of being connected to the safety bus associated with the inoperable EDG. From a safety standpoint, adequate protection against station blackout will still be maintained for reasons described below:

> If a loss of offsite power occurs while a division of EDGs is out-of-service, the other division of EDGs will be able to supply the loads needed for safe shutdown and the AAC source would not be needed. If additional EDG failures occur, preventing the operable onsite AC power divisional EDGs from performing their function, resulting in station blackout, CTG 11-1 would be able to supply Division 1 loads to accomplish safe shutdown, regardless of which EDGs were originally inoperable.

NRC representatives asked whether CTG 11-1 can supply Division 2 loads through a cross tie. As discussed in Reference 6, the capability of CTG 11-1 to supply Division 2 loads has not been specifically evaluated or tested. As discussed in Reference 3, the operation of cross tie breakers are administratively controlled to be used in the shutdown condition only. In response to the NRC

question, a simple assessment has been performed based on the procedure for operation of the maintenance cross tie breakers and the equipment loading, as addressed in the Updated Final Safety Analysis Report. The conclusion reached was that CTG 11-1 could be used to supply some Division 2 equipment. However, a very detailed model and evaluation would be needed to determine whether all equipment could be supplied, since equipment starting currents, voltage drops and the response of the maintenance tie breaker to load changes would need to be evaluated. The current through the maintenance tie breaker is limited, which limits the loads that could be supplied. Based on this conclusion, a detailed engineering evaluation will not be performed. As addressed earlier, CTG 11-1 can supply Division 1 station blackout safe shutdown loads regardless of whether the Division 1 EDGs were out of service for maintenance or whether the Division 1 EDGs failed to operate when needed.

Voluntary entry into an LCO for key safety equipment, such as EDGs, is planned contingent upon a determination that the decrease in plant safety is small enough and level of risk is acceptable for the time period and is warranted by operational necessity, Technical Specification requirements, the need to maintain equipment reliability, or by a qualitative determination that the risk of performing a needed task on-line is not significantly greater than performing it while the plant is shutdown.

As discussed in Reference 3, performing the 18 month EDG inspection while the plant is on-line will significantly improve EDG availability during plant outages. This will help in reducing shutdown risk.

Normally, Detroit Edison does not voluntarily repeatedly enter and exit LCO action statements. Rare exceptions occur when information needs to be obtained to prepare for a task that can only be obtained by rendering the equipment temporarily inoperable or when advanced preparatory work needs to be performed.

NRC Question 3:

When an EDG is taken out of service, is it assumed that the whole engineered safety feature electrical power division is inoperable for the purpose of calculating the increase in CDF? If not, why not?

Detroit Edison Response:

No, the PSA evaluation for an EDG taken out-of-service considers the specific effects of the EDG being removed from service. The EDG remaining in that division could still supply the emergency power to safety related equipment that could be used if needed and this is what the PSA evaluation assumes. From a licensing basis standpoint, a division of onsite AC electrical power is inoperable if either EDG is not operable, since both EDGs are needed to supply the full safe shutdown loads in the division. However, the PSA evaluation is more practical. Additionally, the PSA is based on more realistic assumptions than licensing basis analyses and so more benefit is achieved from one EDG than would be assumed in licensing basis (e.g., 10CFR50, Appendix K) analyses. This was discussed in Section 3 of the Fermi 2 IPE report.

NRC Question 4:

Provide the current EDG reliability data and the major electrical component failure rates used in the PRA.

Detroit Edison Response:

Detroit Edison does not actually calculate a reliability number for the EDGs. Trigger values were established to monitor reliability. Trigger values compare the number of failures to the number of tests. If trigger values are not exceeded, the reliability targets are met. This methodology is based on NUMARC guidance.

Adoption of the trigger values was part of an industry wide initiative (No. 5A) to monitor the reliability of Emergency Diesel Generators. Considerable communication between NUMARC and the NRC on the trigger value concept was held in 1991 and the NRC's opinion was favorable (Reference 7).

Detroit Edison's trigger values are established to maintain a reliability of at least 95%. The EDGs at Fermi 2 currently meet the reliability target.

As discussed in Reference 6, future monitoring of EDG performance will be against Maintenance Rule performance criteria, which includes a conditional success probability of greater than 95%.

In a telephone conversation on April 1, 1996, NRC representatives asked that the conditional success probability for past EDG performance and for the PSA case with 1 week of added EDG out of service time per EDG per cycle be addressed in this letter.

Previously, conditional success probability was not calculated for the EDGs. Based on historical availability and functional failure information collected during preparation for Maintenance Rule implementation, Detroit Edison estimates that the conditional success probability has been greater than 95% per EDG per year.

The mean conditional success probability in the PSA cases performed assuming an additional week of out-of-service time per EDG per cycle was 92% using the IPE model and 92.8% using the current model, assuming no other EDGs have failed and all support is available. If during the scenario, other EDGs fail or status of other EDGs is unknown, the conditional success probability decreases due to the potential of a common cause failure.

Refer to the attached table for the major electrical component failure rates used in the Fermi 2 PSA.

Additional NRC Questions During April 1, 1996 Telephone Conversation

NRC Question:

With the 1.9% maintenance/testing unavailability applied to the total diesel failure rate, provide the actual values for calculated Core Damage Frequency (CDF) for all Station Blackout (SBO) sequences and for total CDF. (This question refers to Reference 6, response to NRC Question 3.)

Detroit Edison Response:

The CDF for SBO sequences for the extended AOT (which corresponds to increased unavailability of 1.9%) was calculated to be 1.39 E-7 by the IPE model and 1.55 E-7 by the current model. The total CDF was calculated to be 5.77 E-6 by the IPE model and 6.56 E-6 by the current model, as modified by the extended out of service time.

Other NRC Questions

The answers to other NRC questions conveyed in the April 1, 1996 conference call are included in the answers to Questions 2 and 4 since the NRC questions addressed similar topics.

Attachment to
NRC-96-0041

Fermi 2 PSA Major Electrical Component Failure Rates

Variable	Description	Mean	Variance	5th%ile*	50th%ile	95th%ile
ZTBATD	130V DC BATTERY - FAILURE OF OUTPUT ON DEMAND	4.8352E-04	2.1450E-07	9.1672E-05	3.5796E-04	1.2345E-03
ZTBATR	130V DC BATTERY - FAILURE OF OUTPUT DURING OPERATION	7.5319E-07	1.0964E-12	7.7275E-08	4.2624E-07	1.9493E-06
ZTBCHR	BATTERY CHARGER - FAILURE DURING OPERATION	1.8605E-05	1.0685E-09	1.2163E-06	9.0545E-06	6.2769E-05
ZTBS1R	BUS - FAILURE DURING OPERATION	4.9752E-07	2.3726E-13	9.5593E-08	3.6527E-07	1.3040E-06
ZTCB1C	CIRCUIT BREAKER (600V AC AND ABOVE) - FAIL TO CLOSE ON	1.6099E-03	3.9385E-06	3.3457E-04	1.2228E-03	3.8859E-03
ZTCB1O	CIRCUIT BREAKER (600V AC AND ABOVE) - FAILURE TO OPEN O	6.4938E-04	6.5376E-07	7.8792E-05	4.1063E-04	1.8207E-03
ZTCB1T	CIRCUIT BREAKER (600V AC AND ABOVE)-TRANSFER OPEN DURIN	8.2841E-07	1.5747E-12	6.3695E-08	4.4185E-07	2.5834E-06
ZTCB2C	CIRCUIT BKR(AC OR DC,LT.600V) - FAILURE TO CLOSE ON DEM	2.2747E-04	2.3148E-07	9.4046E-06	1.0223E-04	8.1143E-04
ZTCB2O	CIRCUIT BKR(AC OR DC,LT. 600V) - FAILURE TO OPEN ON DEM	8.3901E-04	3.1493E-06	3.4690E-05	3.7708E-04	2.9930E-03
ZTCB2T	CIRCUIT BREAKER (AC OR DC, <600V) TRFR OPEN/CLOSED DUR.	2.6802E-07	8.2054E-14	2.9436E-08	1.5707E-07	1.0403E-06
ZTDGS1	DIESEL GENERATOR - FAILURE DURING FIRST HR OF OPERATICN	1.6932E-02	4.1141E-04	1.6398E-03	1.0570E-02	5.3106E-02
ZTDGS2	DIESEL GENERATOR - FAILURE TO RUN AFTER FIRST HOUR	2.5001E-03	7.7666E-06	3.0272E-04	1.7503E-03	6.9729E-03
ZTDGSS	DIESEL GENERATOR - FAILURE TO START ON DEMAND	2.1373E-02	4.0946E-04	3.3425E-03	1.4642E-02	6.5569E-02
ZTFU1R	FUSE - FAIL OPEN DURING OPERATION	9.2037E-07	4.0174E-12	3.7588E-08	3.4958E-07	3.2254E-06
ZTPS1R	POWER SUPPLY +5V DC,+24V DC RPS - FAIL DURING OPERATION	5.3271E-05	1.2696E-08	2.2025E-06	2.3942E-05	1.9003E-04
ZTRL1D	RELAY - FAILURE TO OPERATE ON DEMAND	2.4120E-04	1.4678E-07	1.9835E-05	1.3803E-04	8.2015E-04
ZTRL1R	RELAY - FAILURE DURING OPERATION	4.1977E-07	2.6723E-13	3.5141E-08	2.2405E-07	1.5586E-06
ZTXR1R	TRANSFORMER (LARGER THAN 4.16KV) - FAILURE DURING OPERA	3.7300E-06	2.2228E-11	6.3262E-07	1.9436E-06	1.6777E-05
ZTXR2R	TRANSFORMER (STN.SERVICE, 4.16KV TO 600V) - FAIL DURING	6.8693E-07	4.4859E-13	1.3778E-07	4.9471E-07	1.6550E-06

* %ile is an abbreviation for percentile