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DTE Energy

10 CFR 50.90

July 12, 2006
NRC-06-0040

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington D C 20555-0001

Reference: Fermi 2
NRC Docket No. 50-341
NRC License No. NPF-43

Subject: Proposed License Amendment Request to Extend the Completion Time for Technical Specification 3.8.1 for an Inoperable Emergency Diesel Generator

Pursuant to 10 CFR 50.90, Detroit Edison hereby proposes to amend the Fermi 2 Plant Operating License, Appendix A, Technical Specifications (TS) to extend the Completion Time associated with TS 3.8.1 Condition A from 7 days to 14 days for a single inoperable Emergency Diesel Generator (EDG). This proposal also creates a new Condition with a 3 day Completion Time for both EDGs inoperable in one division of onsite electrical power distribution and removes Required Actions for Combustion Turbine Generator 11-1 that are no longer necessary, as explained in Enclosure 1, from the revised Condition A.

An additional change is being proposed to remove the second Completion Times contained in TS 3.8.1 for one inoperable EDG and for one inoperable offsite circuit. This proposed change is in accordance with NRC approved TSTF-439, "Eliminate Second Completion Times Limiting Time From Discovery of Failure to Meet an LCO," as noted on the NRC letter of January 11, 2006, from Thomas H. Boyce, Chief Technical Specifications Branch, to the Technical Specifications Task Force, "Status of TSTF-439, Eliminate Second Completion Times Limiting Time From Discovery of Failure to Meet an LCO" (References 12 and 13).

The proposed changes would reduce EDG unavailability by allowing on-line performance of EDG maintenance activities in a single outage that are currently

A001

performed over multiple outages, or during refueling outages. The proposed changes also provide flexibility to resolve EDG deficiencies and avoid potential unplanned plant shutdown should a condition occur requiring EDG corrective maintenance.

The proposed Completion Time extension is based on Detroit Edison's deterministic engineering analysis and a risk analysis which was developed in accordance with the guidelines established in Regulatory Guide 1.177, "An Approach for Plant-Specific Risk-Informed Decision-making: Technical Specifications," and NRC Regulatory Guide 1.174, "An Approach for using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis.

Enclosure 1 provides an evaluation of the proposed license amendment, including an analysis of significant hazards consideration using the standards of 10 CFR 50.92. Enclosure 2 provides the marked up pages of the existing TS to show the proposed changes. Enclosure 3 provides a typed version of the affected TS page with the proposed changes incorporated. Enclosure 4 provides marked up pages of the existing TS Bases showing the proposed changes (for information only).

There are no new regulatory commitments associated with this proposed change.

Detroit Edison has reviewed the proposed change against the criteria of 10 CFR 51.22 for environmental considerations. The proposed change does not involve a significant hazards consideration, nor does it significantly change the types or significantly increase the amounts of effluents that may be released offsite. The proposed change does not significantly increase individual or cumulative occupational radiation exposures. Based on the foregoing, Detroit Edison concludes that the proposed change meets the criteria provided in 10 CFR 51.22(c)(9) for a categorical exclusion from the requirements for an Environmental Impact Statement or an Environmental Assessment.

Detroit Edison requests NRC approval of this license amendment by January 15, 2007, with an implementation period of within 30 days following NRC approval.

Should you have any questions or require additional information, please contact Mr. Ronald W. Gaston of my staff at (734) 586-5197.

Sincerely,

Enclosures

cc: D. H. Jaffe
C. A. Lipa
NRC Resident Office
Regional Administrator, Region III
Supervisor, Electric Operators,
Michigan Public Service Commission

I, Donald K. Cobb, do hereby affirm that the foregoing statements are based on facts and circumstances which are true and accurate to the best of my knowledge and belief.

D. K. Cobb
Assistant Vice President
Nuclear Generation

On this 12th day of July, 2006 before me personally appeared Donald K. Cobb, being first duly sworn and says that he executed the foregoing as his free act and deed.

Notary Public

KAREN M. REED
NOTARY PUBLIC, STATE OF MI
COUNTY OF MONROE
MY COMMISSION EXPIRES Sep 2, 2011
ACTING IN COUNTY OF Monroe

ENCLOSURE 1 to
NRC-06-0040

FERMI 2 NUCLEAR POWER PLANT

EVALUATION OF THE PROPOSED LICENSE AMENDMENT REQUEST

FERMI 2 NUCLEAR POWER PLANT

EVALUATION

SUBJECT: Proposed License Amendment Request to Extend the Completion Time for a single inoperable Emergency Diesel Generator

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1.0 DESCRIPTION

Pursuant to 10 CFR 50.90, Detroit Edison hereby proposes to amend the Fermi 2 Plant Operating License, Appendix A, Technical Specifications (TS) to extend the Completion Time associated with TS 3.8.1 Condition A from 7 days to 14 days for a single inoperable Emergency Diesel Generator (EDG). This proposal also creates a new Condition with a 3 day Completion Time for both EDGs inoperable in one division of onsite electrical power distribution and removes Required Actions where they are no longer necessary, for Combustion Turbine Generator (CTG) 11-1, from the revised Condition A.

An additional change is being proposed to remove the second Completion Times contained in TS 3.8.1 for one inoperable EDG and for one inoperable offsite circuit. This proposed change is in accordance with NRC approved TSTF-439, "Eliminate Second Completion Times Limiting Time From Discovery of Failure to Meet an LCO," as noted on the NRC letter of January 11, 2006, from Thomas H. Boyce, Chief Technical Specifications Branch, to the Technical Specifications Task Force, "Status of TSTF-439, Eliminate Second Completion Times Limiting Time From Discovery of Failure to Meet an LCO" (References 12 and 13).

2.0 PROPOSED CHANGE

A brief description of the proposed TS changes is provided below.

Technical Specification 3.8.1, "AC Sources-Operating"

Condition A

Condition A is revised to apply to only one EDG in one division inoperable and the Completion Time is revised from 7 to 14 days.

The Required Actions and Completion Times A.3 and A.5 for CTG 11-1 are removed. The Required Actions and Completion Times for CTG 11-1 were added to TS 3.8.1 as part of Amendment 119 which changed the Completion Time for one or two inoperable EDGs from 3 to 7 days. This proposed change is a 14 day Completion Time for a single EDG inoperable and the addition of a new Condition for both EDGs in one division inoperable, with a 3 day Completion Time. Restoration of the 3 day completion time for both EDGs in one division inoperable removes the need for CTG 11-1 to be included in TS 3.8.1.

The second Completion Time is removed in accordance with TSTF-439, as approved by the NRC.

Condition B

A new Condition B is added with a 3 day Completion Time for both EDGs inoperable in one division of onsite electrical power.

Condition C

The second Completion Time is removed in accordance with TSTF-439, as approved by the NRC.

Conditions Renumbered

With the addition of new Condition B, Conditions B thru F are renumbered.

In summary, this amendment request proposes TS changes which will extend the EDG Completion Time to 14 days for a single EDG inoperable, creates a new Condition for both EDGs in one division inoperable with a 3 day Completion Time, removes unnecessary actions for CTG 11-1, and implements NRC approved TSTF-439 for TS 3.8.1.

3.0 BACKGROUND

Description of Fermi 2 Offsite and Onsite AC Power

Fermi 2 Technical Specification 3.8.1 requires two physically independent circuits between the offsite transmission network and the onsite Class IE distribution system. Offsite power is available for the auxiliary power requirements of Fermi 2 and is comprised of two physically independent circuits supplied at two different voltage levels, 345kV and 120kV.

Three (3) transmission lines provide 120kV power to the 120kV Switchyard located at the Fermi 1 site. The 120kV Switchyard is an arrangement of buses, breakers, disconnects, transformers, and transmission lines which connect the four Combustion Turbine Generators (CTGs-located at Fermi 1) and Fermi 2 Division 1 Essential Safeguard Feature (ESF) and Balance of Plant (BOP) loads with the Electrical System. Only one (1) of the above redundant 120kV lines is required to comply with Fermi 2 Technical Specifications in supplying one of the two required physically independent offsite circuits.

Two (2) transmission lines provide 345kV power from the Electrical System to the 345kV Switchyard located at the Fermi 2 site. The 345kV Switchyard is an arrangement of buses, breakers, disconnects, transformers, and transmission lines which connect the Fermi 2 Main Turbine Generator (MTG-2) and Fermi 2 Division 2 ESF and BOP loads with the Electrical

System. Fermi 2 exports its generating capability via MTG -2, interconnecting via the 345 kV Switchyard to the Electrical System. Only one (1) of the above redundant 345 kV lines is required to comply with Fermi 2 Technical Specifications in supplying one of the two required physically independent offsite circuits.

The Fermi 2 Class IE distribution system consists of two physically and electrically independent and redundant power trains, Division 1 and Division 2, supplying electrical power to safety-related equipment. The ESF buses are divided into two (2) divisions, with different offsite power sources to each division, as discussed above. Each of the two (2) ESF divisions, Division 1 and 2, consist of two (2) separate buses. The loads on each ESF division are split between two (2) EDGs. Either Division 1 or Division 2 has the capability and the capacity to supply the ESF AC power loads required for safe shutdown.

Manually operated tie breakers are provided to cross-tie Division 1 and Division 2 ESF Buses. These tie breakers are normally maintained in the open and disconnected position. Administrative controls limit the operation of these breakers.

Four (4) EDGs, each connected to their respective ESF Buses, provide an emergency source of power upon loss of the offsite power sources. In the event of a loss of offsite power, each EDG will receive an automatic start signal. Load shedding and bus isolation will occur automatically. Following load shed and bus isolation, each EDG output breaker will automatically close, energizing the associated ESF Buses. Essential loads will then be automatically connected to their respective ESF Buses sequentially. Each EDG will receive a start signal on the following signals:

a. Loss of voltage
b. Degraded voltage
c. ESF actuation signal (High Drywell Pressure or Level 1-Low Reactor Water Level)
d. Manual start

Four (4) Combustion Turbine Generators (CTG) can be used to supply power to Division 1 ESF Buses when a loss of offsite and on-site power occurs (station blackout). Plant procedures provide for operation of the CTGs and the Electrical System under station blackout conditions. CTG 11-1 is the normal station blackout AC source with station blackout capability integrated within the unit. Additionally, a dedicated diesel generator can be manually aligned to provide station blackout power for starting CTG 11-2, 11-3, or 11-4, providing a backup station blackout AC source.

The Fermi 2 Electrical Power System is described in the Fermi 2 Updated Final Safety Analysis Report (UFSAR) Chapter 8. The safety related function of the EDGs is to provide an onsite standby source of AC electrical power to shut down and maintain the reactor in a safe condition under all conditions including a Loss of Coolant Accident (LOCA) coincident with a Loss of Offsite Power (LOOP) event.

In the event of a unit trip, the offsite supply to the ESF buses would not be interrupted. The design of the 345kV switchyard utilizes a "breaker-and-one-half" design such that a unit trip does not isolate auxiliary power from the ESF buses.

Regulatory Guide 1.155 EDG Reliability Program

Fermi 2 maintains an EDG reliability program based on Regulatory Guide (RG) 1.155, "Station Blackout." The program monitors and evaluates EDG performance and reliability consistent with guidance provided in NUMARC 87-00, "Guidelines for NUMARC Initiatives Addressing Station Blackout at Light Water Reactors." The program requires remedial actions when one or more established reliability "trigger values" are exceeded, a root cause evaluation be performed and corrective actions taken. Table 1 shows the status of the EDG Reliability Program as of May 2006.

	Failures in last 20 demands	Failures in last 50 demands	Failures in last 100 demands
EDGs	0	0	0

The EDG reliability program will not be negatively impacted by the proposed amendment because EDG testing frequencies are unaffected.

Maintenance Rule Program

The Maintenance Rule (MR) requires that an evaluation be performed when equipment covered by the MR does not meet its performance criteria.

The reliability and availability of the EDGs are monitored under the MR program. If the pre-established reliability or availability performance criteria are not achieved for the EDGs, they are considered for 10 CFR 50.65 (a)(l) actions. These actions would require increased management attention and goal setting in order to restore their performance to an acceptable level. The actual out of service time for the EDGs is minimized to ensure that the reliability and availability performance criteria are met. Fermi 2 EDG MR System Health was listed as 10 CFR 50.65 (a)(l) from April 8, 1997 to November 29, 2005. Actions taken to improve EDG MR System Health resulted in 10 CFR 50.65 (a)(2) classification on November 29, 2005.

Current TS Requirements and Limitations

TS 3.8.1 requires two qualified circuits between the offsite transmission network and the onsite ESF power distribution system and two EDGs per ESF division. The safety related function of the EDGs is to provide an onsite standby source of AC electrical power to shut down and maintain the reactor in a safe condition under all conditions including a Loss of Coolant Accident (LOCA) coincident with a Loss of Offsite Power (LOOP) event.

Planned EDG outages, including preventive maintenance to ensure EDG availability, elective maintenance activities, and surveillances, routinely require four to six days to complete. When more than half the Completion Time for an EDG outage is utilized for planned maintenance, there is less time available than desired for emergent maintenance and testing. Replacement of equipment such as bearings and pistons require significant run in time and surveillance testing, challenging our ability to complete maintenance activities within the current 7 day Completion Time. This undesirable situation occurred in February 2006, when Fermi 2 requested and was granted a one-time extension of the 7 day Completion Time in order to complete maintenance activities on an EDG (References 10 and 11).

When longer times are available for EDG outages, there is a reduction in unavailability time for performing protective tagging and untagging, system drain down and fill, placing an EDG into a standby lineup, and performing post maintenance testing and surveillance testing.

4.0 TECHNICAL ANALYSIS

This section provides the technical analysis of the proposed changes with regard to the principles that adequate defense-in-depth is maintained, sufficient safety margins are maintained, and the proposed increases in core damage frequency and risk are small and consistent with the guidance of RG 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Bases," dated November 2002 and RG 1.177, "An Approach for Plant- Specific, Risk-Informed Decisionmaking: Technical Specifications," dated August 1998 (References 1 and 2).

Current TS 3.8.1 for EDG Completion Time

Under the current TS, if one or both EDGs in one division is inoperable, action is taken to restore the EDG to operable status within 7 days, provided CTG 11-1 is operable. In this Condition, the two or three remaining operable EDGs and offsite to onsite paths are adequate to supply electrical power to the onsite ESF division. The 7 day Completion Time takes into account the capacity and capability of the remaining AC sources.

Proposed TS 3.8.1 Changes and Benefits

The proposed changes will allow, for a single inoperable EDG, a Completion Time of 14 days for EDG maintenance or testing activities. This will permit an additional 7 days beyond the current TS allowed Completion Time and avoid or minimize TS required plant shutdowns due to EDG maintenance or testing.

The extended TS Completion Time for EDGs improves effectiveness of the allowed maintenance period. A significant portion of on-line maintenance activities is associated with preparation and return to service activities, such as, tagging, fluid system drain down, fluid system fill and vent,

and cylinder block heat-up. The duration of these activities is relatively constant. Longer Required Action Completion Time durations allows more maintenance to be accomplished during a given on-line maintenance period and therefore, would improve maintenance efficiency. Thus, the total EDG unavailability is expected to be reduced with this proposed change.

This change will allow some maintenance activities to be performed on-line which would otherwise require performance during a refueling outage. On-line preventive maintenance and scheduled overhauls provide the flexibility to focus more quality resources on any corrective or elective diesel generator maintenance. For example, during refueling outages, resources are required to support many system outages; and during on-line maintenance, plant resources are focused on the EDG overhaul.

Performance of more EDG maintenance on-line will improve EDG availability during plant refueling outages. Performing EDG overhaul activities on-line should reduce the risk and synergistic effects on risk due to EDG unavailability occurring concurrently with other activities and equipment outages during a refueling outage.

If both EDGs in one division are inoperable, a 3 day Completion Time is proposed. In Amendment 119, Fermi 2 increased the Completion Time for the inoperability of one or both EDGs in one division, such that the CTG 11-1 Required Action was added to TS 3.8.1. Returning to a 3 day Completion Time, removes the need for the CTG 11-1 Required Actions.

Summary of Risk Impact Evaluation Results

An extension of the allowed Completion Time to 14 days for TS 3.8.1 will allow the required repairs and post-maintenance testing for a single EDG to be completed without requiring that this be performed in multiple shorter duration EDG outages or placing this workload into the Refueling outage scope.

The Incremental Conditional Core Damage Probability (ICCDP) and Incremental Conditional Large Early Release Probability (ICLERP) resulting from extending the EDG Completion Time to 14 days were computed in accordance with the definitions in Reference 1. These results were then compared with the risk significance guidance contained in Reference 2 for changes in the annual average Core Damage Frequency (CDF) and Large Early Release Frequency (LERF) and in Reference 1 for ICCDP and ICLERP. The values obtained for the ICCDP (1.6E-07) and ICLERP (9.5E-9) demonstrate that the proposed Completion Time change has only a small quantitative impact (less than the threshold values of 5.0E-7 for ICCDP and 5.0E-8 for ICLERP listed in Reference 1) on plant risk. This satisfies the risk criteria for permanent as well as for temporary changes for plant maintenance configurations.

In addition to examining the CDF and LERF from internal events, shutdown risk and external events were reviewed. The impacts on both shutdown risk contributions and external events were evaluated on a qualitative basis. Based on these quantitative and qualitative evaluations,

extending the Completion Time for an inoperable EDG to 14 days will have minimal effect on plant risk.

Evaluation of Risk Impact

The risk impact of the proposed EDG Completion Time has been evaluated and found to be acceptable per regulatory guidance for risk-informed permanent TS changes. The effect on risk of the proposed increase in Completion Time for restoration of an inoperable EDG has been evaluated using NRC's three-tier approach provided in RG 1.177 (Reference 1):

Tier 1 - PRA Capability and Insights;
Tier 2 - Avoidance of Risk-Significant Plant Configurations; and
Tier 3 - Risk-Informed Configuration Risk Management.

Tier 1: PRA Capability

Risk impacts due to internal events are assessed using the FermiV7 revision of the Level 1 and Level 2 PRA. Risk-informed support for this proposed change is based on PRA calculations performed to quantify the change in CDF and LERF resulting from the increased Completion Time for the EDGs.

The Fermi PRA model (FermiV7) used for the risk determinations is an upgrade to the Individual Plant Examination (IPE) submitted to the NRC (Reference 3) along with a revision (Reference 4). The NRC (by letter Reference 5) documented their conclusion that the Fermi 2 IPE submittal met the intent of Generic Letter 88-20.

The current PRA addresses internal events (including internal flooding) at full power. The model incorporates recent advances in PRA technology across many elements (through several upgrades) and is technically adequate to evaluate the risk impact of increased Completion Time for the EDGs. These elements include the proper characterization of initiating events involving LOOP, treatment of time dependant offsite power recovery, treatment of operator actions to implement bus ties and other Emergency Operating Procedures (EOPs), equipment success criteria calculations, data analysis of key parameters (such as EDG failure rates), maintenance unavailabilities, and common cause failure probabilities.

In the Level 2 analysis, Containment Fault Trees (CFTs) are developed to provide the link between the plant damage states associated with core damage mitigation and containment integrity with the possible radionuclide releases of varying timing and magnitudes. As required by Reference 8, the model considers the performance of the reactor building and sprays in the assessment of radionuclide mitigation. The spectrum of radionuclide releases that could result from the core damage condition is then calculated for the postulated discrete end states of the CFTs. The CFTs model the various potential radionuclide release paths to the environment and provide an estimate of their relative likelihoods. This process is an iterative one, requiring

technical feedback between the system fault trees, the CFTs, and the plant response evaluation. The purpose of containment fault trees is to provide estimates of the conditional probabilities of various radionuclide releases and timing given the core damage sequences defined in the Fermi Level 1 PRA. The LERF is represented by one of these linked CFTs. This approach to the LERF evaluation also supports realistic quantification of systematic contributions to containment isolation failures (bypass sequences that are actually linked to the Level 1 model).

The Fermi 2 internal events PRA (including Level 2) received a formal industry PRA Peer Review in 1997. The purpose of the Peer Review process is to provide a method for establishing the technical quality of a PRA for the spectrum of potential risk-informed plant licensing applications for which the PRA may be used. The PRA Peer Review process uses a team composed of PRA and system analysts, each with significant expertise in both PRA development and applications. This team provides both an objective review of the PRA technical elements and a subjective assessment, based on their experience, regarding the acceptability of the PRA elements. The team uses a set of checklists as a framework within which to evaluate the scope, comprehensiveness, completeness, and fidelity of the PRA products available. The peer review process for Fermi 2 resulted in 65 important (i.e., level 'A' or 'B') Fact & Observation (F&O) findings. There were 5 level 'A' and 60 level 'B' F&O findings identified during the review. Additionally, there were 3 'S' findings denoting a strength or superior modeling process. The important F&Os (i.e., level 'A' or 'B') were addressed as part of the 1999 through 2006 PRA model updates. Currently, there are no 'A' level items that are open. There are four 'B' F&O items dealing with documentation that remain open, but they have no impact on the EDG Completion Time extension results.

The scope, level of detail, and quality of the Fermi PRA is sufficient to support a technically defensible and realistic evaluation of the risk change for this proposed Completion Time extension. Significant improvements in quality of the Fermi PRA Model have been made since the 1997 peer review. These improvements include (but are not limited to):

1. A re-analysis of the Fermi Human Reliability Analysis (HRA) using the HRA Calculator software package.
2. A complete internal review of the Level 1 model top logic.
3. Improvements to address the aforementioned 'A' and 'B' Peer Review F&Os.
4. Re-evaluation and formal documentation of PSA thermal-hydraulic and electrical success criteria for the site implementation or the Mitigating System Performance Index (MSPI).
5. Development of an improved fault tree based Level 2 model.
6. An analysis of revised industry data to determine Fermi-specific Loss of Offsite Power (LOOP) frequencies.
7. Revision of basic event probabilities and initiating event frequencies to reflect revised plant and industry data.
8. Incorporation of plant modifications into the model.
9. Modifications to reflect revised plant operating procedures.

10. Enhanced risk monitoring capabilities for the performance of Maintenance Rule (a)(4) assessments.

It should be noted that since the one-time emergency license amendment (Reference 10) was granted on February 5, 2006 credit for the dedicated diesel generator which enables the starting capability of CTGs 11-2, 11-3, and 11-4 for station blackout support, has been added to the model.

Tier 1: PRA Insights

Risk Assessment for 14 Day Completion Time

The criterion for a permanent license basis change (RG 1.177, "An Approach for Plant-Specific Risk-Informed Decision-making: Technical Specifications") was followed to analyze the risk of this 14 day Completion Time request. This quantifies the risk increase for a single system or train being out of service while other systems have a nominal chance of unavailability. This approach allows the NRC to compare Fermi's request with recent submittals from other plants for EDG Completion Time extensions to 14 days as a permanent Tech Spec change.

Key Assumptions:

1. The "baseline" PRA model, FermiV7, is utilized to perform the assessment. This model represents normal plant operation at full power and includes nominal maintenance and failure terms for all systems, as well as nominal initiating event frequencies.
2. A single EDG is taken out of service and assumed to be returned to service 14 days from the initial LCO entry.
3. All calculations were performed with a 1E-9 truncation limit.
4. The model (FermiV7) includes credit for the blackstart diesel generator, which allows CTG 11-2, 11-3, and 11-4 to be used as a source of electrical power in the event of a loss of offsite power.
5. No credit is taken for the improved availability of each EDG due to the ability to schedule a single outage during a fuel cycle versus two shorter duration outages (with tagout, return to service ,and post maintenance testing required for each system outage).

Calculation of risk with EDG 14 unavailable for 14 days at full power

To determine the effect of the proposed 14-day Completion Time for restoration of an inoperable EDG, the guidance in RG 1.174 and 1.177 (References 1 and 2) was used.
The following table contains necessary data to perform risk significance calculations.[1]

ITEM	VALUE
Baseline CDF with nominal expected equipment unavailabilities.	1.05E-5/yr
Conditional CDF with EDG 14 failed and other equipment's nominal expected equipment unavailabilities.	1.47E-5/yr
Baseline LERF with nominal expected equipment unavailabilities.	3.01E-7/yr
Conditional LERF with EDG 14 failed and other equipment's nominal expected equipment unavailabilities.	5.48E-7/yr

In order to address Regulatory Guide 1.174 criteria the following risk metrics were used to evaluate the risk impacts of extending the EDG Completion Time from 7 days to 14 days:

DCDF = Change in the annual CDF due to the increased on-line maintenance unavailability of EDGs that could result from the increased Completion Time. This risk metric is used to compare against the criteria in RG 1.174 to determine whether a change in CDF is regarded as risk significant. These criteria are a function of the baseline annual core damage frequency.

DLERF = Change in the annual LERF due to any increased on-line maintenance unavailability of EDGs that could result from the increased Completion Time. RG 1.174 criteria were also applied to judge the significance of changes in this risk metric.

The increase in CDF and LERF with the future expected unavailabilities for the EDGs are considered to be "very small" if they are less than 1.0E-6/yr and 1.0E-7/yr, respectively. The current maintenance terms are based on actual plant data and reflect the on-line maintenance that is currently performed on each EDG. It should be noted that although the Completion Time may be relaxed, Fermi 2 does not intend to relax the EDG performance criteria established in response to Station Blackout (10CFR 50.63) and the maintenance rule (10CFR 50.65).

It is assumed for the purposes of this analysis that the Preventive Maintenance (PM) term will increase as a result of performing the 4 additional EDG major overhauls on line. The existing PM term is conservatively assumed to increase to account for a 14 day major overhaul once per refueling cycle for each EDG. The refueling cycle length is assumed to be 18 months with an

[1] Based on a sensitivity study, EDG 14 was found to be the most risk significant. Therefore, all numerical values are based upon having EDG 14 out of service for the duration of the Completion Time.

assumed total planned and unplanned outage duration of 30 days, which yields a cycle length of 518 days.

For comparison to RG 1.174 guidelines the following formulas were used to calculate DCDF and DLERF:

1. DCDF = [(conditional CDF with the subject equipment out of service) - (baseline CDF with nominal expected equipment unavailabilities)] (duration of additional OOS due to change)/Cycle length.

2. DLERF = [(conditional LERF with the subject equipment out of service) - (baseline LERF with nominal expected equipment unavailabilities)] (duration of additional OOS due to change)/Cycle length.

Therefore,

DCDF = [(1.47E-5/yr) – (1.05E-5/yr)] * (14 days) *(4 EDGs / 518 days)
= 4.5E-7/yr
DLERF = [(5.48E-7/yr) – (3.01E-7/yr)] * (14 days) *(4 EDGs / 518 days)
= 2.7E-8/yr

Therefore, the increases in CDF and LERF with the assumed unavailabilities for the EDGs are considered "very small" since they are less than 1E-6/yr and 1E-7/yr, respectively.

In order to address RG 1.177, the Incremental Conditional Core Damage Probability (ICCDP) and Incremental Conditional Large Early Release Probability (ICLERP) resulting from extending the EDG Completion Time to 14 days were computed in accordance with the definitions in RG 1.177.

Per RG 1.177, the following formulas are to be used to calculate ICCDP and ICLERP:

1. ICCDP = [(conditional CDF with the subject equipment out of service) - (baseline CDF with nominal expected equipment unavailabilities)] (duration of single Completion Time under consideration).

2. ICLERP = [(conditional LERF with the subject equipment out of service) - (baseline LERF with nominal expected equipment unavailabilities)] (duration of single Completion Time under consideration).

Therefore,

ICCDP = [(1.47E-5/yr) – (1.05E-5/yr)] * (14 days) *(1 YR/365.25 days)
= 1.6E-7
ICLERP = [(5.48E-7/yr) – (3.01E-7/yr)] * (14 days) *(1 YR/365.25 days)
= 9.5E-9

Both of these results would qualify as "small", according to criteria for a permanent Technical Specification Completion Time change according to the RG 1.177, which states:

> "The licensee has demonstrated that the TS Completion Time change has only a small quantitative impact on plant risk. An ICCDP of less than 5.0E-7 is considered small for a single TS Completion Time change. An ICLERP of 5.0E-8 or less is also considered small."

In addition to the above analysis, a sensitivity study was performed to account for any potential inclement weather that may occur during the duration of the 14 day Completion Time (by increasing the loss of offsite power initiating event frequency by a factor of 2.0). The results of this analysis show that the calculated values are still below the RG 1.177 criteria (ICCDP = 2.4E-7 and ICLERP = 2.7E-8).

Required Actions for CTG 11-1 are proposed to be removed from the TS. If CTG 11-1 is inoperable at the same time that any single EDG is inoperable for the entire proposed 14 day period with no other equipment in maintenance, the risk remains within the RG 1.174 (Reference 2) threshold, for a "small" risk increase classification. Additionally, the calculated potential for core damage as a result of inoperability of CTG 11-1 has decreased since the CTG 11-1 Required Actions were added to TS 3.8.1 in Amendment 119. The decrease is due to:

1. The inclusion of blackstart capability for CTG Units 11-2, 11-3, and 11-4.
2. A more realistic Loss of Offsite Power (LOOP) frequency and recovery values, for both total and divisional LOOP, have been incorporated into the PRA, utilizing several sources of industry data.

<u>Tier 2: Avoidance of Risk-Significant Plant Configurations</u>

Maintenance and testing during the proposed Completion Time would be scheduled as warranted to minimize aggregate risk. This will specifically include:

1. Work performed on safety significant systems and their applicable support systems will be reviewed and rescheduled as necessary based upon routine and emergent Maintenance Rule 10 CFR 50.65 (a)(4) evaluations performed per MMR12 (the site risk management procedure).

2. No work will be performed that could potentially jeopardize the availability of the opposite division EDGs. This is ensured by restricting and/or controlling access to this equipment via controls provided in existing plant procedure MOP05, "Control of Equipment."
3. For two EDGs in the same division, the Completion Time will revert to the original (pre-Amendment 119) TS Completion Time of 3 days.

Tier 3: Risk-Informed Configuration Risk Management

While in the EDG Completion Time period, overall plant risk will be managed by the existing Maintenance Rule (a)(4) program. This program evaluates increases in risk posed by potential combinations of equipment out-of-service and potential increases in initiating event frequency and requires that risk recommendations be implemented as appropriate for a given plant configuration. The 10 CFR 50.65 (a)(4) program at Fermi fully satisfies the configuration risk management program requirements stated in Reference 1.

Other Risk Related Impacts

In addition to examining the CDF and LERF from internal events, shutdown risk and external events were reviewed. The impacts on both shutdown risk contributions and external events are evaluated on a qualitative basis. External events are evaluated based on a review of the Fermi Individual Plant Examination of External Events (IPEEE) submittal (Reference 6) and the Fermi 2 Safe-Shutdown Analyses.

Shutdown Risk

This change will allow some maintenance activities to be performed on-line which would otherwise be required to be performed during a refueling outage. On-line preventive maintenance and scheduled overhauls provide the flexibility to focus more resources on required or elective EDG maintenance. For example, during refueling outages, resources are required to support many system outages, but during on-line maintenance, plant resources can be more focused on the EDG overhaul. Performance of EDG maintenance on-line will maximize EDG availability during plant refueling outages. Performing EDG overhaul activities on-line should minimize the overall risk due to the synergistic effects on shutdown risk due to EDG unavailability occurring concurrently with other activities and equipment outages during a refueling outage.

Fire Risk

A qualitative impact on the Fermi fire risk due to the EDG Completion Time extensions was performed based on insights drawn from the Fermi IPEEE fire PRA results and the Fermi 2 Appendix R analyses.

The Fermi plant risk due to internal fires was evaluated in 1996 as part of the Fermi Individual Plant Examination of External Events (IPEEE) Submittal (Reference 6). The NRC in Reference 7 documented their conclusion that the Fermi 2 IPEEE submittal met the intent of Supplement 4 to Generic Letter 88-20. The EPRI FIVE Methodology and Fire PRA Implementation Guide screening approaches and data were used to perform the Fermi IPEEE fire PRA study. Consistent with the FIVE Methodology and the requests of the NRC IPEEE Program, the Fermi IPEEE fire PRA is an analysis that identifies the most risk significant fire areas in the plant using a screening process and by calculating conservative core damage frequencies for fire scenarios. As such, the accident sequence frequencies calculated for the Fermi fire PRA are not a best estimate calculation of plant fire risk and are not conducive to aggregation with the best estimate Fermi internal events PRA results for comparison with Regulatory Guide 1.174 (Reference 2) acceptance guidelines. Therefore, qualitative insights from this analysis are utilized for the Completion Time evaluation.

Safe-shutdown analyses were performed for Fermi 2 to evaluate compliance to 10 CFR 50, Appendix R, Section III.G. These analyses included safe-shutdown capability evaluations and associated circuits of concern (for example, common power supply, common enclosure, spurious operation, and high/low-pressure interfaces). For fires in most of the zones, safe shutdown is accomplished from the main control room using one of the divisions of safe shutdown equipment in accordance with the technical requirements of Section III.G.2 of Appendix R. For fires occurring in one of the dedicated shutdown areas of concern (Fire Zones 03AB, 07AB, 08AB, 09AB, 11AB, or 13AB), safe shutdown is accomplished from outside the main control room using the alternative shutdown system (including the dedicated shutdown panel) as described in UFSAR Section 7.5.2.5, in accordance with the technical requirements of Sections III.G.3 and III.L of Appendix R. This shutdown system does not rely on the EDGs, but instead relies on power provided by a Combustion Turbine Generator (CTG 11-1).

It is useful to identify (for further reference) a number of facts relative to a potential risk increase due to internal fires in light of the proposed TS Completion Time extension for the EDGs:

1. The extension of the TS Completion Time for the EDGs is an administrative change and does not have any significant impact on the likelihood of occurrence of fires at Fermi 2.
2. The purpose for the EDGs (relative to plant safety) is to start and run to provide onsite power to ESF equipment in the event that offsite power becomes unavailable.
3. Appendix R analyses are conservative since they assume a concurrent LOOP with the fire initiating event.
4. Even if one of the fires of concern occurs during the small fraction of the year in which an EDG is assumed to be unavailable for maintenance, the additional capability of non-fire affected AC sources would remain available.
5. Fermi 2 has three CTG Units in addition to CTG 11-1. These additional CTGs provide support for mitigation of fire scenarios but are not credited in the Appendix R and IPEEE

analyses. If they were credited in some of these fire scenarios, they would further reduce the risk significance of the EDG Completion Time extension.

Given Items 1 through 5 above, the additional plant risk from fire induced loss of offsite power was evaluated by considering the equipment which would be remaining for unscreened compartments identified in the Fermi IPEEE (Reference 7), and Appendix R analyses. Considering the impact of removing EDG 14 (the most risk significant EDG) from service, the impact on unscreened fire areas is as follows:

Fire Area	Challenge due to EDG 14 OOS	Reason
NE Quadrant Reactor Building	Negligible	Both divisions of offsite power are still available; therefore, EDGs are not required.
Relay Room	Negligible	The most risk significant scenarios depend on CTG 11-1 for AC Power rather than EDGs.
Division 1 Switchgear Room	Small	Division 2 offsite power and EDG 13 are still available.
2nd floor of Reactor Building	Negligible	Both divisions of offsite power are still available; therefore, EDGs are not required.
Control Room	Negligible	The most risk significant scenarios depend on CTG 11-1 for AC Power rather than EDGs.
3rd Floor of Auxiliary Building	Negligible	The most risk significant scenarios depend on CTG 11-1 for AC Power rather than EDGs.
Division 2 Switchgear Room	Negligible	The most risk significant scenarios have Division 2 equipment failed and therefore, success depends on Division 1 ECCS that is supported by Division 1 EDGs and CTG 11-1.

Based on this review of the IPEEE quantifications for unscreened compartments and Appendix R analyses, the Fermi internal fire risk due to the EDG Completion Time extension is considered small.

Seismic Risk

The evaluation of seismic events performed as part of the IPEEE used the Electric Power Research Institute (EPRI) Seismic Margins Assessment methodology. All four trains of EDG were included in the list of components analyzed for safe shutdown following an earthquake. The RHR building where the EDGs are located was also analyzed. The evaluation provided adequate evidence of the ability of Fermi to resist a seismic event and initiate a safe shutdown of the unit. No significant seismic concerns were identified and it was concluded that the plant possesses significant seismic margin. During a design basis Safe Shutdown Earthquake (SSE), the plant switchyard is assumed to fail resulting in a loss of offsite power. The probability of an SSE occurring during the 14 day period that an EDG may be inoperable due to maintenance is very low. With all other EDG remaining operable and with the intradivisional crosstie capability between 4 kV buses, the proposed change to the EDG Completion Time has negligible effect on the seismic risk profile at Fermi.

Other External Events Risk

Evaluation of high winds, external floods and other external events in the Fermi IPEEE per NUREG-1407, "Procedural and Submittal Guidance for the Individual Plant Examination of External Events (IPEEE) for Severe Accident Vulnerabilities" (Reference 9), revealed no potential vulnerabilities. The proposed change to the EDG Completion Time has negligible effect on the risk profile at Fermi from these other external events.

Evaluation of Risk Impact Conclusion

Based on this evaluation, extending the Completion Time for an inoperable EDG from 7 to 14 days will have a "small" effect on plant risk. Therefore, an extension of the allowed Completion Time from 7 days to 14 days for TS 3.8.1 will not have significant impact to the safety of the public.

Industry Precedents

The NRC has recently approved requests to extend the Completion Times for Emergency Diesel Generators for Columbia Generating Station, Beaver Valley Power Station, D.C. Cook Nuclear Plant, and Seabrook Nuclear Power Plant.

5.0 REGULATORY ANALYSIS

5.1 No Significant Hazards Consideration

In accordance with 10 CFR 50.92, Detroit Edison has made a determination that the proposed amendment involves no significant hazards consideration. The proposed change to TS 3.8.1 does not involve a significant hazards consideration for the following reasons:

1. The proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

   This license amendment request proposes a change to extend the Technical Specification 3.8.1, "AC Sources-Operating," Completion Time. This change allows a single EDG to be inoperable for 7 days more than Technical Specification 3.8.1 currently provides. The Required Actions for CTG 11-1 are also removed from Condition A and TSTF-439 is implemented for TS 3.8.1, removing the second Completion Times.

   The EDGs are safety related components which provide backup electrical power supply to the onsite ESF power distribution system. CTG 11-1 provides backup electrical power to the Division 1 power distribution system. Neither the EDGs nor CTG 11-1 are accident initiators, thus these changes do not increase the probability of a previously evaluated accident.

   The plant ESF power distribution systems consist of two divisions for 100% redundancy. Accident analyses demonstrate that only one division is required for accident mitigation. Thus, with one division inoperable the other division is capable of performing the required safety function. Design basis analyses are not required to be performed assuming extended loss of all power supplies to the plant ESF power distribution system. Thus, this change does not involve a significant increase in the consequences of a previously analyzed accident.

   The proposed change also eliminates the second Completion Time from TS 3.8.1. These second Completion Times are not an initiator to any accident previously evaluated. As a result, the probability of an accident previously evaluated is not affected. The consequences of an accident during the revised Completion Times are no different than the consequences of the same accident during the existing Completion Times. As a result, the consequences of an accident previously evaluated are not affected by this change.

   Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. The proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

   The changes do not involve a physical alteration of the plant (i.e., no new or different type of equipment will be installed) or a change in the methods governing normal plant operation. The changes do not alter any assumptions made in the safety analysis.

Therefore, the proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. The change does not involve a significant reduction in the margin of safety.

This license amendment request proposes Technical Specification changes to extend the Technical Specification 3.8.1, "AC Sources-Operating," Completion Time for an inoperable EDG to 14 days. These changes allow an emergency diesel generator to be inoperable for 7 days more than TS 3.8.1 currently provides.

Deterministic and probabilistic risk assessments evaluated the effect of the proposed TS changes on the availability of an electrical power supply to the plant emergency safeguards features systems. These assessments concluded that the proposed TS changes do not involve a significant increase in the risk of power supply unavailability.

This license amendment request proposes TS changes to remove the Required Actions for CTG 11-1 from TS 3.8.1 Condition A. If CTG 11-1 is inoperable at the same time that any single EDG is inoperable for the entire proposed 14 day period with no other equipment in maintenance, the risk remains within RG 1.174 (Reference 2) thresholds for a "very small" classification.

The proposed change to delete the second Completion Time does not alter the manner in which safety limits, limiting safety system settings, or limiting conditions for operation are determined. The safety analysis acceptance criteria are not affected by this change. The proposed changes will not result in plant operation in a configuration outside of the design basis.

Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Based on the above, Detroit Edison has determined that the proposed license amendment does not involve a significant hazards consideration.

5.2 Applicable Regulatory Requirements / Criteria

1. 10 CFR 50.36, "Technical Specifications."

2. NUREG-1433, "Standard Technical Specifications General Electric Plants, BWR/4 Rev. 3."

3. 10 CFR 50, Appendix A, GDC 17, "Electric Power Systems."

6.0 Environmental Considerations

Detroit Edison has reviewed the proposed change against the criteria of 10 CFR 51.22 for environmental considerations. The proposed change does not involve a significant hazards consideration, nor does it significantly change the types or significantly increase the amounts of effluents that may be released offsite. The proposed change does not significantly increase individual or cumulative occupational radiation exposures. Based on the foregoing, Detroit Edison concludes that the proposed change meets the criteria provided in 10 CFR 51.22(c)(9) for a categorical exclusion from the requirements for an Environmental Impact Statement or an Environmental Assessment.

7.0 References

1. NRC Regulatory Guide 1.177, "An Approach for Plant-Specific Risk-Informed Decision-making: Technical Specifications," dated August 1998.
2. NRC Regulatory Guide 1.174, "An Approach for using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," dated November 2002.
3. NRC-92-0099, "Submittal of the Fermi 2 IPE Report," dated September 1 1992.
4. NRC-93-0075, "Revised Submittal of the Fermi 2 IPE Report," dated September 22 1993.
5. Letter from NRC, "Fermi 2 Generic Letter (GL) 88-20, Individual Plant Examination (IPE) Submittal – Internal Events – Completion of Staff Review" dated November 16, 1994.
6. NRC-96-0036, "Submittal of Detroit Edison Individual Plant Examination for External Events (IPEEE) Report- Response to Generic Letter 88-20, Supplement 4," dated March 29, 1996.
7. Letter from NRC, "Fermi 2 – Completion of Licensing Action For Generic Letter (GL) 88-20, Supplement 4, 'Individual Plant Examination for External Events (IPEEE) for Severe Accident Vulnerabilities,' June 28, 1991 (TAC No. M83621)" dated July, 5, 2000.
8. NUREG-1335, "Individual Plant Examination: Submittal Guidance" dated July 1989.
9. NUREG-1407, "Procedural and Submittal Guidance for the Individual Plant Examination of External Events (IPEEE) for Severe Accident Vulnerabilities", dated June 1991.
10. NRC-06-0010, "Emergency License Amendment Request for One-Time Extension of Allowed Outage Time for the Fermi 2 Emergency Diesel Generator 12," dated February 5, 2006.
11. NRC-06-0011, "Response to Request for Additional Information Regarding Emergency License Amendment Request for One-Time Extension of Allowed Outage Time for the Fermi 2 Emergency Diesel Generator 12," dated February 5, 2006.
12. TSTF-439, "Eliminate Second Completion Times Limiting Time From Discovery of Failure to Meet an LCO".

13. NRC letter from Thomas H. Boyce, Chief Technical Specifications Branch, to the Technical Specifications Task Force, "Status of TSTF 439, Eliminate Second Completion Times Limiting Time From Discovery of Failure to Meet an LCO," dated January 11, 2006.

ENCLOSURE 2
to NRC-06-0040

PROPOSED TECHNICAL SPECIFICATION CHANGE

Marked-Up Pages

3.8-1
3.8-2
3.8-2a
3.8-2b

3.8 ELECTRICAL POWER SYSTEMS

3.8.1 AC Sources– Operating

LCO 3.8.1 The following AC electrical power sources shall be OPERABLE:

a. Two qualified circuits between the offsite transmission network and the onsite Class 1E AC Electrical Power Distribution System; and

b. Two emergency diesel generators (EDGs) per division.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

NOTE

LCO 3.0.4.b is not applicable to EDGs.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One ~~or both~~ EDG~~s~~ ~~in one division~~ inoperable.	A.1	Perform SR 3.8.1.1 for OPERABLE offsite circuit(s).	1 hour AND Once per 8 hours thereafter
	AND		
	A.2	Declare required feature(s), supported by the inoperable EDG~~s~~, inoperable when the redundant required feature(s) are inoperable.	4 hours from discovery of an inoperable EDG concurrent with inoperability of redundant required feature(s)
	~~AND~~		
	~~A.3~~	~~Verify the status of CTG 11-1.~~	~~Once per 8 hours~~
	AND		
			(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. (continued)	A.~~4~~3.1	Determine OPERABLE EDG(s) are not inoperable due to common cause failure.	24 hours
	OR		
	A.~~4~~3.2	Perform SR 3.8.1.2 for OPERABLE EDG(s).	24 hours
	~~AND~~		
	~~A.5~~	~~Restore availability of CTG 11-1.~~	~~72 hours from discovery of Condition A concurrent with CTG 11-1 not available~~
	AND		
	A.~~6~~4	Restore ~~both~~ EDG~~s~~ the ~~in the division~~ to OPERABLE status.	~~7 days*~~ 14 days ~~AND~~ ~~10 days from discovery of failure to meet LCO~~

Insert new Conditions B

~~*The 7 day allowed outage time of Technical Specification 3.8.1 Condition "A", Required Action A.6, which was entered on January 30, 2006, at 0200 hours, may be extended one time by an additional 7 days to complete repair and testing of EDG 12.~~

Insert 1

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. Both EDGs in one division inoperable.	B.1	Perform SR 3.8.1.1 for OPERABLE offsite circuit(s).	1 hour AND Once per 8 hours thereafter
	AND		
	B.2	Declare required feature(s), supported by the inoperable EDGs, inoperable when the redundant required feature(s) are inoperable.	4 hours from discovery of the inoperable EDGs concurrent with inoperability of redundant required feature(s)
	AND		
	B.3.1	Determine OPERABLE EDG(s) are not inoperable due to common cause failure.	24 hours
	OR		
	B.3.2	Perform SR 3.8.1.2 for OPERABLE EDG(s).	24 hours
	AND		
	B.4	Restore one EDG in the division to OPERABLE status	3 days

ACTIONS

	CONDITION	REQUIRED ACTION	COMPLETION TIME
C	~~B.~~ One or both EDGs in both divisions inoperable.	~~B.1~~ C Restore both EDGs in one division to OPERABLE status.	2 hours
D	~~C.~~ One offsite circuit inoperable.	~~C.1~~ D Perform SR 3.8.1.1 for OPERABLE offsite circuit. AND	1 hour AND Once per 8 hours thereafter (continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
D ~~C.~~ (continued)	~~C.~~2 D Declare required feature(s) with no offsite power available inoperable when the redundant required feature(s) are inoperable.	24 hours from discovery of no offsite power to one division concurrent with inoperability of redundant required feature(s)
	AND	
	~~C.~~3 D Restore offsite circuit to OPERABLE status.	72 hours ~~AND~~ ~~10 days from discovery of failure to meet LCO~~
E ~~B.~~ Two offsite circuits inoperable.	~~B.~~1 E Declare required feature(s) inoperable when the redundant required feature(s) are inoperable.	12 hours from discovery of Condition D concurrent with inoperability of redundant required feature(s)
	AND	
	~~B.~~2 E Restore one offsite circuit to OPERABLE status.	24 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
F ~~E~~. One offsite circuit inoperable. AND One or both EDGs in one Division inoperable.	----------NOTE---------- Enter applicable Conditions and Required Actions of LCO 3.8.7, "Distribution Systems - Operating," when Condition ~~E~~ F is entered with no AC power source to one or more 4160 V buses 64B, 64C, 65E or 65F. ----------	
	~~E~~ F.1 Restore offsite circuit to OPERABLE status.	12 hours
	OR	
	~~E~~ F.2 Restore both EDGs in the Division to OPERABLE status.	12 hours
G ~~F~~. Required Action and Associated Completion Time of Condition A, B, C, ~~D or E~~ D, E or F not met.	~~F~~ G.1 Be in MODE 3.	12 hours
	AND	
	~~F~~ G.2 Be in MODE 4.	36 hours

ENCLOSURE 3
to NRC-06-0040

PROPOSED TECHNICAL SPECIFICATION CHANGE

Revised Pages

3.8-1
3.8-2
3.8-2a
3.8-2b

3.8 ELECTRICAL POWER SYSTEMS

3.8.1 AC Sources-Operating

LCO 3.8.1 The following AC electrical power sources shall be OPERABLE:

a. Two qualified circuits between the offsite transmission network and the onsite Class 1E AC Electrical Power Distribution System; and

b. Two emergency diesel generators (EDGs) per division.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

NOTE
LCO 3.0.4.b is not applicable to EDGs.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One EDG inoperable.	A.1	Perform SR 3.8.1.1 for OPERABLE offsite circuit(s).	1 hour AND Once per 8 hours thereafter
	AND		
	A.2	Declare required feature(s), supported by the inoperable EDG, inoperable when the redundant required feature(s) are inoperable.	4 hours from discovery of an inoperable EDG concurrent with inoperability of redundant required feature(s)
	AND		
	A.3.1	Determine OPERABLE EDG(s) are not inoperable due to common cause failure.	24 hours
	OR		(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. (continued)	A.3.2	Perform SR 3.8.1.2 for OPERABLE EDG(s).	24 hours
	AND		
	A.4	Restore the EDG to OPERABLE status.	14 days
B. Both EDGs in one division inoperable.	B.1	Perform SR 3.8.1.1 for OPERABLE offsite circuit(s).	1 hour AND Once per 8 hours thereafter
	AND		
	B.2	Declare required feature(s), supported by the inoperable EDGs, inoperable when the redundant required feature(s) are inoperable.	4 hours from discovery of the inoperable EDGs concurrent with inoperability of redundant required feature(s)
	AND		
	B.3.1	Determine OPERABLE EDG(s) are not inoperable due to common cause failure.	24 hours
	OR		
	B.3.2	Perform SR 3.8.1.2 for OPERABLE EDG(s).	24 hours
	AND		
	B.4	Restore one EDG in the division to OPERABLE status.	3 days

(continued)

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
C. One or both EDGs in both divisions inoperable.	C.1	Restore both EDGs in one division to OPERABLE status.	2 hours
D. One offsite circuit inoperable.	D.1	Perform SR 3.8.1.1 for OPERABLE offsite circuit.	1 hour AND Once per 8 hours thereafter.
	AND		
	D.2	Declare required feature(s) with no offsite power available inoperable when the redundant required feature(s) are inoperable.	24 hours from discovery of no offsite power to one division concurrent with inoperability of redundant required feature(s)
	AND		
	D.3	Restore offsite circuit to OPERABLE status.	72 hours
E. Two offsite circuits inoperable.	E.1	Declare required feature(s) inoperable when the redundant required feature(s) are inoperable.	12 hours from discovery of Condition E concurrent with inoperability of redundant required feature(s)
	AND		
	E.2	Restore one offsite circuit to OPERABLE status.	24 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
F. One offsite circuit inoperable. AND One or both EDGs in one Division inoperable.	----------NOTE---------- Enter applicable Conditions and Required Actions of LCO 3.8.7, "Distribution Systems - Operating," when Condition F is entered with no AC power source to one or more 4160 V buses 64B, 64C, 65E or 65F. ---------- F.1 Restore offsite circuit to OPERABLE status. OR F.2 Restore both EDGs in the Division to OPERABLE status.	 12 hours 12 hours
G. Required Action and Associated Completion Time of Condition A, B, C, D, E, or F not met.	G.1 Be in MODE 3. AND G.2 Be in MODE 4.	12 hours 36 hours

ENCLOSURE 4
to NRC-06-0040

PROPOSED TECHNICAL SPECIFICATION BASES CHANGES

Revised Pages

B.3.8.1-5
B.3.8.1-5a
B.3.8.1-6
B.3.8.1-7
B.3.8.1-7a
B.3.8.1-7b
B.3.8.1-7c
B.3.8.1-7d
B.3.8.1-7e
B.3.8.1-8

BASES

ACTIONS

A Note prohibits the application of LCO 3.0.4.b to an inoperable EDG. There is an increased risk associated with entering a MODE or other specified condition in the Applicability with an inoperable EDG and the provisions of LCO 3.0.4.b, which allow entry into a MODE or other specified condition in the Applicability with the LCO not met after performance of a risk assessment addressing inoperable systems and components, should not be applied in this circumstance.

A.1

To ensure a highly reliable power source remains with one ~~or both~~ EDG~~s~~ ~~in one division~~ inoperable, it is necessary to verify the availability of the OPERABLE offsite circuits on a more frequent basis. Since the Required Action only specifies "perform," a failure of SR 3.8.1.1 acceptance criteria does not result in a Required Action being not met. However, if a circuit fails to pass SR 3.8.1.1, it is inoperable. Upon offsite circuit inoperability, additional Conditions must then be entered.

A.2

Required Action A.2 is intended to provide assurance that a loss of offsite power, during the period that one ~~or both~~ EDG~~s~~ ~~in one division~~ is inoperable, does not result in a complete loss of safety function of critical systems. These features are designed with redundant safety related divisions (i.e., single division systems are not included). Redundant required features failures consist of inoperable features associated with a division redundant to the division that has an inoperable EDG.

The Completion Time is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." In this Required Action the Completion Time only begins on discovery that both:

a. An inoperable EDG exists; and

b. A required feature on the other division (Division 1 or 2) that is redundant to a feature supported by the inoperable EDG(s) is inoperable.

BASES

ACTIONS (Continued)

If, at any time during the existence of this Condition (one ~~or both~~ EDG~~s in one division~~ inoperable), a required feature subsequently becomes inoperable, this Completion Time begins to be tracked.

Discovering one required EDG inoperable coincident with one or more inoperable redundant required support or supported features, or both, that are associated with the OPERABLE EDGs results in starting the Completion Time for the Required Action. Four hours from the discovery of these

BASES

ACTIONS (continued)

events existing concurrently is acceptable because it minimizes risk while allowing time for restoration before subjecting the unit to transients associated with shutdown.

The remaining OPERABLE EDGs and offsite circuits are adequate to supply electrical power to the onsite Class 1E Distribution System. Thus, on a component basis, single failure protection for the required feature's function may have been lost; however, function has not been lost. The 4 hour Completion Time takes into account the component OPERABILITY of the redundant counterpart to the inoperable required feature. Additionally, the 4 hour Completion Time takes into account the capacity and capability of the remaining AC sources, reasonable time for repairs, and low probability of a DBA occurring during this period.

~~A.3~~

~~To minimize the impact of operation with an inoperable EDG, it is necessary to periodically ensure the availability of CTG 11-1. The verification of the status of CTG 11-1 is performed by an administrative check of breaker and line availability, and the CTG 11-1 ability to supply Division I loads. Since this Required Action only specifies "verify the status," even when CTG 11-1 is not available it does not result in this Required Actions being not met. However, upon discovery that CTG 11-1 is unavailable, the limitations of Required Action A.5 are imposed.~~

A.~~4~~3.1 and A.~~4~~3.2

Required Action A.~~4~~3.1 provides an allowance to avoid unnecessary testing of OPERABLE EDGs. If it can be determined that the cause of the inoperable EDG~~1s~~ does not exist on the OPERABLE EDGs, SR 3.8.1.2 does not have to be performed. If the cause of inoperability exists on other EDG~~s~~, they are declared inoperable upon discovery, and Condition B or C of LCO 3.8.1 may be entered. Once the failure is repaired, and the common cause failure no longer exists, Required Action A.~~4~~3.1 is satisfied. If the cause of the initial inoperable EDG cannot be confirmed not to exist on the remaining EDG~~s~~, performance of SR 3.8.1.2 suffices to provide assurance of continued OPERABILITY of those EDGs.

In the event the inoperable EDG~~s~~ are restored to OPERABLE status prior to completing either A.~~4~~3.1 or A.~~4~~3.2, the plant

BASES

ACTIONS (continued)

corrective action program will continue to evaluate the common cause possibility. This continued evaluation, however, is no longer under the 24 hour constraint imposed while in Condition A.

According to Generic Letter 84-15 (Ref. 7), 24 hours is a reasonable time to confirm that the OPERABLE EDGs are not affected by the same problem as the inoperable EDG.

~~A.5 and A.6~~ A.4

Insert A.4

~~According to Regulatory Guide 1.93 (Ref. 6), operation may continue with no OPERABLE EDGs to one division for a period that should not exceed 72 hours. With one or both EDGs in one division inoperable, the remaining OPERABLE EDGs and offsite circuits are adequate to supply electrical power to the onsite Class 1E Distribution System. Required Action A.5 imposes this 72 hour Completion Time from the discovery of the non-availability CTG 11-1. However, if CTG 11-1 is available to supply Division I loads (determined by administrative check of breaker, line availability, and CTG 11-1 status) Required Action A.5 would be met and Required Action A.6 would allow the restoration time of 7 days.~~

~~The 72 hour Completion Time to restore to at least one EDG in the division in OPERABLE status takes into account the capacity and capability of the remaining AC sources, reasonable time for repairs, and low probability of a DBA occurring during this period. The 7 day Completion Time to restore all EDGs to OPERABLE status takes into account the capacity and capability of the remaining AC Sources, as well as the additional reliability afforded by the availability of CTG 11-1.~~

~~The second Completion Time for Required Action A.6 establishes a limit on the maximum time allowed for any combination of required AC power sources to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition A is entered while, for instance, an offsite circuit is inoperable, and that circuit is subsequently restored OPERABLE, the LCO may already have been not met for up to 72 hours. This situation could lead to a total of 10 days, since initial failure of the LCO, to restore the EDG. At this time, an offsite circuit could again become inoperable, the EDG restored OPERABLE, and an additional 72 hours (for a total of 13 days) allowed prior to complete restoration of the LCO. The 10 day Completion Time provides a limit on the time allowed in a specified~~

TS Bases Insert for Condition A.4

In Condition A with one EDG inoperable, the remaining OPERABLE EDGs and offsite circuits are adequate to supply electrical power to the onsite Class 1E Distribution System. The 14 day Completion Time to restore the EDG to OPERABLE status takes into account the capacity and capability of the remaining AC sources, reasonable time for repairs, and low probability of a DBA occurring during this period.

TS Bases Insert for new Condition B

B.1

To ensure a highly reliable power source remains with both EDGs in one division inoperable, it is necessary to verify the availability of the OPERABLE offsite circuits on a more frequent basis. Since the Required Action only specifies "perform," a failure of SR 3.8.1.1 acceptance criteria does not result in a Required Action being not met. However, if a circuit fails to pass SR 3.8.1.1, it is inoperable. Upon offsite circuit inoperability, additional Conditions must then be entered.

B.2

Required Action B.2 is intended to provide assurance that a loss of offsite power, during the period that both EDGs in one division are inoperable, does not result in a complete loss of safety function of critical systems. These features are designed with redundant safety related divisions (i.e., single division systems are not included). Redundant required features failures consist of inoperable features associated with a division redundant to the division that has an inoperable EDG.

The Completion Time is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." In this Required Action the Completion Time only begins on discovery that both:

a. Both EDGs in one division are inoperable; and

b. A required feature on the other division (Division 1 or 2) that is redundant to a feature supported by the inoperable EDGs is inoperable.

If, at any time during the existence of this Condition (both EDGs in one division inoperable), a required feature subsequently becomes inoperable, this Completion Time begins to be tracked.

Discovering both EDGs in one division inoperable coincident with one or more inoperable redundant required support or supported features, or both, that are associated with the OPERABLE EDGs results in starting the Completion Time for the Required Action. Four hours from the discovery of these events existing concurrently is acceptable because it minimizes risk while allowing time for restoration before subjecting the unit to transients associated with shutdown.

The remaining OPERABLE EDGs and offsite circuits are adequate to supply electrical power to the onsite Class 1E Distribution System. Thus, on a component basis, single failure protection for the required feature's function may have been lost; however, function has not been lost. The 4 hour Completion Time takes into account the component OPERABILITY of the redundant counterpart to the inoperable required

feature. Additionally, the 4 hour Completion Time takes into account the capacity and capability of the remaining AC sources, reasonable time for repairs, and low probability of a DBA occurring during this period.

B.3.1 and B.3.2

Required Action B.3.1 provides an allowance to avoid unnecessary testing of OPERABLE EDGs. If it can be determined that the cause of the inoperable EDGs does not exist on the OPERABLE EDGs, SR 3.8.1.2 does not have to be performed. If the cause of inoperability exists on other EDGs, they are declared inoperable upon discovery, and Condition C of LCO 3.8.1 may be entered. Once the failure is repaired, and the common cause failure no longer exists, Required Action B.3.1 is satisfied. If the cause of the initial inoperable EDGs cannot be confirmed not to exist on the remaining EDGs, performance of SR 3.8.1.2 suffices to provide assurance of continued OPERABILITY of those EDGs.

In the event the inoperable EDGs are restored to OPERABLE status prior to completing either B.3.1 or B.3.2, the plant corrective action program will continue to evaluate the common cause possibility. This continued evaluation, however, is no longer under the 24 hour constraint imposed while in Condition B.

According to Generic Letter 84-15 (Ref. 7), 24 hours is a reasonable time to confirm that the OPERABLE EDGs are not affected by the same problem as the inoperable EDG.

B.4

According to Regulatory Guide 1.93 (Ref. 6), operation may continue with no OPERABLE EDGs to one division for a period that should not exceed 72 hours. With both EDGs in one division inoperable, the remaining OPERABLE EDGs and offsite circuits are adequate to supply electrical power to the onsite Class 1E Distribution System. Required Action B.4 imposes this 72 hour Completion Time.

The 72 hour Completion Time to restore one EDG in the division in OPERABLE status takes into account the capacity and capability of the remaining AC sources, reasonable time for repairs, and low probability of a DBA occurring during this period.

BASES

ACTIONS (continued)

~~condition after discovery of failure to meet the LCO. This limit is considered reasonable for situations in which Conditions A and C are entered concurrently. The "AND" connector between the 7 day and 10 day Completion Times means that both Completion Times apply simultaneously, and the more restrictive must be met.~~

~~As in Required Action A.2, the Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This exception results in establishing the "time zero" at the time that the LCO was initially not met, instead of the time that Condition A was entered.~~

Insert new Condition B

~~B.1~~ C.1

With one or both EDGs on both divisions inoperable, there may be no remaining standby AC source. Thus, with an assumed loss of offsite electrical power, insufficient standby AC sources are available to power the minimum required ESF functions. Since the offsite electrical power system is the only source of AC power for a significant percentage of ESF equipment at this level of degradation, the risk associated with continued operation for a very short time could be less than that associated with an immediate controlled shutdown. (The immediate shutdown could cause grid instability, which could result in a total loss of AC power.) Since any inadvertent unit generator trip could also result in a total loss of offsite AC power, however, the time allowed for continued operation is severely restricted. The intent here is to avoid the risk associated with an immediate controlled shutdown and to minimize the risk associated with this level of degradation.

According to Regulatory Guide 1.93 (Ref. 6), with both divisions with EDGs inoperable, operation may continue for a period that should not exceed 2 hours.

~~C.1~~ D.1

To ensure a highly reliable power source remains with one offsite circuit inoperable, it is necessary to verify the availability of the remaining required offsite circuit on a more frequent basis. Since the Required Action only specifies "perform," a failure of SR 3.8.1.1 acceptance criteria does not result in a Required Action not met. However, if a second required circuit fails SR 3.8.1.1, the second offsite circuit is inoperable and Condition ~~D~~ E for two offsite circuits inoperable, is entered.

BASES

ACTIONS (continued)

~~C.2~~ D.2

Required Action ~~C~~ D.2, which only applies if the division cannot be powered from an offsite source, is intended to provide assurance that an event with a coincident single failure of the associated EDG does not result in a complete loss of safety function of critical systems. These features are designed with redundant safety related divisions (i.e., single division systems are not included). Redundant required features failures consist of inoperable features associated with a division redundant to the division that has no offsite power.

The Completion Time for Required Action ~~C~~ D.2 is intended to allow time for the operator to evaluate and repair any discovered inoperabilities. This Completion Time also allows an exception to the normal "time zero" for beginning the allowed outage time "clock." In this Required Action, the Completion Time only begins on discovery that both:

a. The division has no offsite power supplying its loads and

b. A required feature on the other division is inoperable.

If, at any time during the existence of this Condition (one offsite circuit inoperable) a required feature subsequently becomes inoperable, this Completion Time would begin to be tracked.

Discovering no offsite power to one 4160 V ESF bus of the onsite Class 1E Power Distribution System coincident with one or more inoperable required support or supported features, or both, that are associated with any other ESF bus that has offsite power, results in starting the Completion Times for the Required Action. Twenty-four hours is acceptable because it minimizes risk while allowing time for restoration before the unit is subjected to transients associated with shutdown.

The remaining OPERABLE offsite circuit and EDGs are adequate to supply electrical power to the onsite Class 1E Distribution System. Thus, on a component basis, single failure protection may have been lost for the required feature's function; however, function is not lost. The 24 hour Completion Time takes into account the component OPERABILITY of the redundant counterpart to the inoperable

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ACTIONS (continued)

required feature. Additionally, the 24 hour Completion Time takes into account the capacity and capability of the remaining AC sources, a reasonable time for repairs, and the low probability of a DBA occurring during this period.

~~C.3~~ D.3

According to Regulatory Guide 1.93 (Ref. 6), operation may continue in Condition ~~C~~ D for a period that should not exceed 72 hours. With one offsite circuit inoperable, the reliability of the offsite system is degraded and the potential for a loss of offsite power is increased, with attendant potential for a challenge to the plant safety systems. In this condition, however, the remaining OPERABLE offsite circuit and EDGs are adequate to supply electrical power to the onsite Class 1E Distribution System.

The 72 hour Completion Time takes into account the capacity and capability of the remaining AC sources, reasonable time for repairs, and the low probability of a DBA occurring during this period.

~~The second Completion Time for Required Action C.3 establishes a limit on the maximum time allowed for any combination of required AC power sources to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition C is entered while, for instance, an EDG is inoperable, and that EDG is subsequently returned OPERABLE, the LCO may already have been not met for up to 7 days. This situation could lead to a total of 10 days, since initial failure to meet the LCO, to restore the offsite circuit. At this time, an EDG could again become inoperable, the circuit restored OPERABLE, and an additional 7 days (for a total of 17 days) allowed prior to complete restoration of the LCO. The 10 day Completion Time provides a limit on the time allowed in a specified condition after discovery of failure to meet the LCO. This limit is considered reasonable for situations in which Conditions A and C are entered concurrently. The "AND" connector between the 72 hour and 10 day Completion Times means that both Completion Times apply simultaneously, and the more restrictive Completion Time must be met. As in Required Action C.2, the Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This exception results in establishing the "time zero" at the time the LCO was initially not met, instead of at the time that Condition C was entered.~~

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ACTIONS (continued)

~~D~~E.1 and ~~D~~E.2

Required Action ~~D~~E.1 addresses actions to be taken in the event of inoperability of redundant required features concurrent with inoperability of two offsite circuits. Required Action ~~D~~E.1 reduces the vulnerability to a loss of function. The Completion Time for taking these actions is reduced to 12 hours from that allowed with one division without offsite power (Required Action ~~C~~D.2). The rationale for the reduction to 12 hours is that Regulatory Guide 1.93 (Ref. 6) allows a Completion Time of 24 hours for two required offsite circuits inoperable, based upon the assumption that two complete safety divisions are OPERABLE. When a concurrent redundant required feature failure exists, this assumption is not the case, and a shorter Completion Time of 12 hours is appropriate. These features are designed with redundant safety related divisions, (i.e., single division systems are not included in the list). Redundant required features failures consist of any of these features that are inoperable because any inoperability is on a division redundant to a division with inoperable offsite circuits.

The Completion Time for Required Action ~~D~~E.1 is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." In this Required Action, the Completion Time only begins on discovery that both:

a. All required offsite circuits are inoperable and

b. A required feature is inoperable.

If, at any time during the existence of this Condition (two offsite circuits inoperable), a required feature subsequently becomes inoperable, this Completion Time begins to be tracked.

According to Regulatory Guide 1.93 (Ref. 6), operation may continue in Condition ~~D~~E for a period that should not exceed 24 hours. This level of degradation means that the offsite electrical power system does not have the capability to effect a safe shutdown and to mitigate the effects of an accident; however, the onsite AC sources have not been

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degraded. This level of degradation generally corresponds to a total loss of the immediately accessible offsite power sources.

Because of the normally high availability of the offsite sources, this level of degradation may appear to be more severe than other combinations of two AC sources inoperable that involve one or more EDGs inoperable. However, two factors tend to decrease the severity of this degradation level:

a. The configuration of the redundant AC electrical power system that remains available is not susceptible to a single bus or switching failure and

b. The time required to detect and restore an unavailable offsite power source is generally much less than that required to detect and restore an unavailable onsite AC source.

With both of the required offsite circuits inoperable, sufficient onsite AC sources are available to maintain the unit in a safe shutdown condition in the event of a DBA or transient. In fact, a simultaneous loss of offsite AC sources, a LOCA, and a worst case single failure were postulated as a part of the design basis in the safety analysis. Thus, the 24 hour Completion Time provides a period of time to effect restoration of one of the offsite circuits commensurate with the importance of maintaining an AC electrical power system capable of meeting its design criteria.

According to Regulatory Guide 1.93 (Ref. 6), with the available offsite AC sources two less than required by the LCO, operation may continue for 24 hours. If two offsite sources are restored within 24 hours, unrestricted operation may continue. If only one offsite source is restored within 24 hours, power operation continues in accordance with Condition ~~C~~D

~~E~~.1 and ~~E~~.2.

Pursuant to LCO 3.0.6, the Distribution System ACTIONS would not be entered even if all AC sources to it were inoperable, resulting in de-energization. Therefore, the Required Actions of Condition ~~E~~F are modified by a Note to indicate that when Condition ~~E~~F is entered with no AC source to any ESF bus, ACTIONS for LCO 3.8.7, "Distribution Systems -

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ACTIONS (continued)

Operating," must be immediately entered. This allows Condition ~~E~~ to provide requirements for the loss of the offsite circuit and one EDG without regard to whether a division is de-energized. LCO 3.8.7 provides the appropriate restrictions for a de-energized division.

According to Regulatory Guide 1.93 (Ref. 6), operation may continue in Condition ~~E~~ for a period that should not exceed 12 hours. In Condition ~~E~~ individual redundancy is lost in both the offsite electrical power system and the onsite AC electrical power system. Since power system redundancy is provided by two diverse sources of power, however, the reliability of the power systems in this Condition may appear higher than that in Condition ~~D~~ (loss of both required offsite circuits). This difference in reliability is offset by the susceptibility of this power system configuration to a single bus or switching failure. The 12 hour Completion Time takes into account the capacity and capability of the remaining AC sources, reasonable time for repairs, and the low probability of a DBA occurring during this period.

G ~~F~~.1 and G ~~F~~.2

If the inoperable AC electrical power sources cannot be restored to OPERABLE status within the associated Completion Time, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit must be brought to at least MODE 3 within 12 hours and to MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

SURVEILLANCE REQUIREMENTS

The AC sources are designed to permit inspection and testing of all important areas and features, especially those that have a standby function, in accordance with 10 CFR 50, GDC 18 (Ref. 8). Periodic component tests are supplemented by extensive functional tests during refueling outages (under simulated accident conditions). The SRs for demonstrating the OPERABILITY of the EDGs are based on the recommendations of Regulatory Guide 1.9 (Ref. 3), Regulatory Guide 1.108 (Ref. 9), and Regulatory Guide 1.137 (Ref. 10), as addressed in the UFSAR.

Where the SRs discussed herein specify voltage and frequency tolerances, the following summary is applicable. The minimum steady state output voltage of 3740 V is 90% of the nominal 4160 V output voltage. This value, which is