

February 24, 1999

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CNorsworthy	RBarrett
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Mr. Lew W. Myers
 Vice President - Nuclear, Perry
 FirstEnergy Nuclear Operating Company
 P.O. Box 97, A200
 Perry, OH 44081

SUBJECT: AMENDMENT NO.99 TO FACILITY OPERATING LICENSE NO. NPF-58 - PERRY
 NUCLEAR POWER PLANT, UNIT 1 (TAC NO. MA3537)

Dear Mr. Myers:

The U.S. Nuclear Regulatory Commission has issued the enclosed Amendment No.99 to Facility Operating License No. NPF-58 for the Perry Nuclear Power Plant, Unit 1. This amendment revises the Technical Specifications in response to your application dated September 3, 1998 (PY-CEI/NRR-2319L), as supplemented by submittals dated December 3 (PY-CEI/NRR-2342L), and December 9, 1998 (PY-CEI/NRR-2348L), and January 12 (PY-CEI/NRR-2355L), and January 26, 1999 (PY-CEI/NRR-2360L).

This amendment revises Technical Specification 3.8.1, "AC Sources - Operating," by extending the emergency diesel generator (EDG) Completion Time from 72 hours to 14 days for the Division 1 and 2 EDG and allows performance of the EDG 24-hour test run in Modes 1 and 2. The amendment also establishes Technical Specification 5.5.13.1, "Configuration Risk Management Program," an administrative program that assesses risk based on plant status.

A copy of the Safety Evaluation is also enclosed. Notice of Issuance will be included in the Commission's next biweekly Federal Register notice.

Sincerely,

Original signed by:
 Douglas V. Pickett, Senior Project Manager
 Project Directorate III-2
 Division of Licensing Project Management
 Office of Nuclear Reactor Regulation

Docket No. 50-440

- Enclosures: 1. Amendment No. 99 to
 License No. NPF-58
 2. Safety Evaluation

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DATE	02/18/99		02/24/99	01/29/99		02/11/99		02/19/99	

*See JCalvo to SRichards memo of 01/29/99

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**See previous concurrence

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 P PDR

OP1



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

February 24, 1999

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Sincerely,

A handwritten signature in black ink that reads "Douglas V. Pickett".

Douglas V. Pickett, Senior Project Manager
Project Directorate III-2
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-440

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License No. NPF-58
2. Safety Evaluation

cc w/encls: See next page

L. Myers
FirstEnergy Nuclear Operating Company

Perry Nuclear Power Plant, Units 1 and 2

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NAME	DPickett	EBarnhill <i>EB</i>	JCalvo*	CBarth**	SRichards <i>SR</i>
DATE	02/18/99	02/24/99	01/29/99	02/11/99	02/19/99

*See JCalvo to SRichards memo of 01/29/99 OFFICIAL RECORD COPY

**See previous concurrence



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

FIRSTENERGY NUCLEAR OPERATING COMPANY

DOCKET NO. 50-440

PERRY NUCLEAR POWER PLANT, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 99
License No. NPF-58

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by the FirstEnergy Nuclear Operating Company (the licensee, formerly The Cleveland Electric Illuminating Company, Centerior Service Company, Duquesne Light Company, Ohio Edison Company, OES Nuclear, Inc., Pennsylvania Power Company, and Toledo Edison Company) dated September 3, 1998, as supplemented by submittals dated December 3, and December 9, 1998, and January 12, and January 26, 1999, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
 - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
 - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
 - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
 - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.(2) of Facility Operating License No. NPF-58 is hereby amended to read as follows:

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P PDR

(2) Technical Specifications

The Technical Specifications contained in Appendix A and the Environmental Protection Plan contained in Appendix B, as revised through Amendment No. 99 are hereby incorporated into this license. The FirstEnergy Nuclear Operating Company shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of its date of issuance and shall be implemented within 90 days after issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Douglas V. Pickett, Senior Project Manager
Project Directorate III-2
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical
Specifications

Date of Issuance: February 24, 1999

ATTACHMENT TO LICENSE AMENDMENT NO. 99

FACILITY OPERATING LICENSE NO. NPF-58

DOCKET NO. 50-440

Replace the following pages of the Appendix "A" Technical Specifications with the attached pages. The revised pages are identified by Amendment number and contain vertical lines indicating the area of change.

<u>Remove</u>	<u>Insert</u>
3.8-2	3.8-2
3.8-3	3.8-3
3.8-11	3.8-11
5.0-15a	5.0-15a
—	5.0-15b

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	<p>A.2 Restore required offsite circuit to OPERABLE status.</p>	<p>72 hours</p> <p><u>AND</u></p> <p>24 hours from discovery of two divisions with no offsite power</p> <p><u>AND</u></p> <p>17 days from discovery of failure to meet LCO</p>
B. One required DG inoperable.	<p>B.1 Perform SR 3.8.1.1 for OPERABLE required offsite circuit(s).</p> <p><u>AND</u></p> <p>B.2 Declare required feature(s), supported by the inoperable DG, inoperable when the redundant required feature(s) are inoperable.</p> <p><u>AND</u></p>	<p>1 hour</p> <p><u>AND</u></p> <p>Once per 8 hours thereafter</p> <p>4 hours from discovery of Condition B concurrent with inoperability of redundant required feature(s)</p> <p>(continued)</p>

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. (continued)	<p>B.3.1 Determine OPERABLE DG(s) are not inoperable due to common cause failure.</p> <p style="text-align: center;"><u>OR</u></p> <p>B.3.2 Perform SR 3.8.1.2 for OPERABLE DG(s).</p> <p style="text-align: center;"><u>AND</u></p> <p>B.4 Restore required DG to OPERABLE status.</p>	<p>24 hours</p> <p>24 hours</p> <p>72 hours from discovery of an inoperable Division 3 DG</p> <p style="text-align: center;"><u>AND</u></p> <p>14 days</p> <p style="text-align: center;"><u>AND</u></p> <p>17 days from discovery of failure to meet LCO</p>
C. Two required offsite circuits inoperable.	<p>C.1 Declare required feature(s) inoperable when the redundant required feature(s) are inoperable.</p> <p style="text-align: center;"><u>AND</u></p> <p>C.2 Restore one required offsite circuit to OPERABLE status.</p>	<p>12 hours from discovery of Condition C concurrent with inoperability of redundant required feature(s)</p> <p>24 hours</p>

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
<p>SR 3.8.1.14 -----NOTES-----</p> <ol style="list-style-type: none"> 1. Momentary transients outside the load and power factor ranges do not invalidate this test. 2. Credit may be taken for unplanned events that satisfy this SR. <p>-----</p> <p>Verify each DG operating at a power factor ≤ 0.9 operates for ≥ 24 hours:</p> <ol style="list-style-type: none"> a. For ≥ 2 hours loaded ≥ 6800 kW and ≤ 7000 kW for Division 1 and 2 DGs, and ≥ 2860 kW for Division 3 DG; and b. For the remaining hours of the test loaded ≥ 5600 kW and ≤ 7000 kW for Division 1 and 2 DGs, and ≥ 2600 kW for Division 3 DG. 	<p>18 months</p>

(continued)

5.5 Programs and Manuals

5.5.12 Primary Containment Leakage Rate Testing Program (continued)

- BN-TOP-1 methodology may be used for Type A tests.
- The corrections to NEI 94-01 which are identified on the Errata Sheet attached to the NEI letter, "Appendix J Workshop Questions and Answers," dated March 19, 1996, are considered an integral part of NEI 94-01.

The peak calculated primary containment internal pressure for the design basis loss of coolant accident P_a , is 7.80 psig.

The maximum allowable primary containment leakage rate, L_a , shall be 0.20% of primary containment air weight per day at the calculated peak containment pressure (P_a).

Leakage rate acceptance criteria are:

- a. Primary containment leakage rate acceptance criterion is $\leq 1.0 L_a$. However, during the first unit startup following testing performed in accordance with this Program, the leakage rate acceptance criteria are $< 0.6 L_a$ for the Type B and Type C tests, and $\leq 0.75 L_a$ for the Type A tests;
- b. Air lock testing acceptance criteria are:
 - 1) Overall air lock leakage rate is ≤ 2.5 scfh when tested at $\geq P_a$.
 - 2) For each door, leakage rate is ≤ 2.5 scfh when the gap between the door seals is pressurized to $\geq P_a$.

The provisions of SR 3.0.2 do not apply to the test frequencies specified in the Primary Containment Leakage Rate Testing Program.

The provisions of SR 3.0.3 are applicable to the Primary Containment Leakage Rate Testing Program.

(continued)

5.5 Programs and Manuals (continued)

5.5.13.1 Configuration Risk Management Program

The Configuration Risk Management Program (CRMP) provides a risk-informed assessment to manage the risk associated with equipment maintenance activities. The program applies to those structures, systems, or components for which a Technical Specification risk-informed Completion Time has been granted. Specifically, this program applies to:

- Required Action B.4 of LCO 3.8.1, "AC Sources-Operating" from ≥ 72 hours after entering Condition B.

The program shall include the following:

- a. Provisions for the control and implementation of the Probabilistic Safety Assessment (PSA) model and methodology. The PSA model shall be capable of performing assessments evaluating the applicable plant configurations.
 - b. Provisions for performing assessments for preplanned risk-informed activities prior to entering the risk-informed Completion Time.
 - c. Provisions for performing an assessment after entering the risk-informed Completion Time for an unplanned entry into the risk-informed Completion Time.
 - d. Provisions for assessing the need for additional actions after the discovery of subsequent equipment out of service conditions while in the risk-informed Completion Time.
 - e. Provisions for considering other applicable risk significant contributors external to the preplanned activity such as weather conditions, qualitatively or quantitatively.
-



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 99 TO FACILITY OPERATING LICENSE NO. NPF-58

FIRSTENERGY NUCLEAR OPERATING COMPANY

PERRY NUCLEAR POWER PLANT, UNIT 1

DOCKET NO. 50-440

1.0

INTRODUCTION

By letter dated September 3, 1998, the licensee proposed changes to the plant's Technical Specifications (TS) which would allow a TS Completion Time of 14 days in lieu of the current 72-hour limit when the Division 1 or 2 emergency diesel generator (EDG) is inoperable in order to perform preventive maintenance (including disassembly of an EDG) during plant operation. Currently, extended EDG maintenance is only performed during plant shutdown. Another proposed change was to allow performance of the EDG 24-hour surveillance test in Modes 1 and 2 which is currently prohibited. Finally, the licensee proposed a new TS to establish a Configuration Risk Management Program.

In letters dated December 3, 1998, December 9, 1998, January 12, 1999, and January 26, 1999, the licensee provided supplemental information. The supplemental information contained clarifying information and did not change the initial no significant hazards consideration determination and did not expand the scope of the original application.

1.1

Background

The Perry Nuclear Power Plant is equipped with three Class 1E emergency diesel generators which supply an independent source of ac power to the 4.16 kV vital buses. Each division consists of a 4160 V switchgear, 480 V power centers and 480 V motor control center(s) and is normally powered from the offsite power systems via the startup transformer (preferred power source) through the interbus transformer. An alternate source of offsite power is available from a second startup transformer utilizing an interrupted manual transfer. Upon loss of the normal offsite source, each division is powered from its separate EDG. The Division 3 EDG can be manually cross-tied to Division 2 in order to power some Division 2 loads during a station blackout event.

2.0 EVALUATION

2.1 Emergency Diesel Generator Extended Outage

Currently, Required Action B.4 in TS Section 3.8.1 requires an inoperable EDG to be restored to operable status within 72 hours. In addition, it also requires an inoperable EDG to be restored to operable status within 6 days from the discovery of failure to meet the Limiting Condition for Operation (LCO). If either of these conditions cannot be met, the licensee must place the plant in Hot Standby within 12 hours and Cold shutdown within 36 hours. The licensee has proposed the following changes to the plant's TS to extend the Completion Time for an inoperable Division 1 or 2 EDG:

Change 1: In TS Section 3.8.1, under the Completion Time for Action A.2, delete "6 days from discovery of failure to meet LCO" and substitute "17 days from discovery of failure to meet LCO."

Change 2: In TS Section 3.8.1, under the Completion Time for Action B.4, delete "72 hours AND 6 days from discovery of failure to meet LCO" and substitute "72 hours from discovery of an inoperable Division 3 DG AND 14 days AND 17 days from discovery of failure to meet LCO."

Change 3: Add the following as new Section 5.5.13.1 under Section 5.0, "Administration Controls" and Section 5.5, "Programs and Manuals."

5.5.13.1 Configuration Risk Management Program

The Configuration Risk Management Program (CRMP) provides a risk-informed assessment to manage the risk associated with equipment maintenance activities. The program applies to those structures, systems, or components for which a Technical Specification risk-informed Completion Time has been granted. Specifically, this program applies to:

- Required Action B.4 of LCO 3.8.1, "AC Sources-Operating" from \geq 72 hours after entering Condition B.

The program shall include the following:

- a. Provisions for the control and implementation of the Probabilistic Safety Assessment (PSA) model and methodology. The PSA model shall be capable of performing assessments evaluating the applicable plant configurations.
- b. Provisions for performing assessments for preplanned risk-informed activities prior to entering the risk-informed Completion Time.

- c. Provisions for performing an assessment after entering the risk-informed Completion Time for an unplanned entry into the risk-informed Completion Time.
- d. Provisions for assessing the need for additional actions after the discovery of subsequent equipment out of service conditions while in the risk-informed Completion Time.
- e. Provisions for considering other applicable risk significant contributors external to the preplanned activity such as weather conditions, qualitatively or quantitatively.

Change 1

Change 1 increases the Completion Time from 6 to 17 days for any combination of required ac offsite power sources to be inoperable during any single continuous occurrence of failing to meet the LCO. This change is necessary to support Change 2 below and is considered editorial. On that basis it is considered acceptable.

CHANGE 2:

Change 2 allows a Division 1 or 2 EDG to be inoperable for up to 14 days in any mode of plant operation. Currently, the TS allow a Completion Time of 72 hours for one inoperable EDG. Correspondingly, the total time allowed to continuously not meet the LCO requirements due to being within multiple associated action conditions (Conditions A thru G) is increased from 6 days to 17 days. The 72-hour Completion Time for the Division 3 EDG remains unchanged. The staff evaluated the licensee's proposed change using both deterministic analysis and probabilistic risk analysis (PRA) methods as documented below.

The licensee, in Attachment 1 to their letter of September 3, 1998, provided a deterministic engineering evaluation based on the current staff guidance for risk-informed decision making. As a result of that evaluation, the licensee concluded that the defense-in-depth principle, in accordance with the current design and licensing basis, is maintained with the proposed TS Completion Time of 14 days per EDG.

The staff's review of the licensee's deterministic evaluation included the following:

1. The high pressure core spray (HPCS) EDG provides the availability of an alternate ac (AAC) power source which can be substituted for the inoperable EDG and includes the TS requirements to verify operability and connectability. During its station blackout (SBO) review, the staff required that permanent connections be provided between the HPCS Division 3 MCC and the Division 2 MCC to power necessary isolation valves and suppression pool makeup system valves.
2. TS requirements of verification that the required systems, subsystems, trains, components and devices that depend on the remaining EDG, are operable and positive measures provided

to preclude subsequent testing or maintenance activities on these systems, subsystems, trains, components and devices during extended EDG outages.

3. Component testing or maintenance on safety systems and important non-safety equipment would be avoided.

4. The scheduling of EDG preplanned maintenance would be avoided during adverse weather or degraded grid conditions.

The staff reviewed the above items and concluded that the licensee's responses were acceptable.

The staff also reviewed the proposal to determine whether the decrease in severe accident risk, achieved with the issuance of 10 CFR 50.63 (Station Blackout Rule), was being eroded. The staff also evaluated the proposal to ensure that the overall availability of the EDG's will not be reduced significantly as a result of increased on-line preventive maintenance activities. In order to determine that the decrease in severe accident risk achieved with the issuance of 10 CFR 50.63 is not eroded and the overall availability is not reduced, the staff used review guidelines/questions identified below. These guidelines are based on engineering judgment and it is the staff's view that conformance with these guidelines will ensure that a licensee is not significantly increasing the likelihood of a SBO event and the risk of a core damage accident by performing increased maintenance on the EDGs during power operations:

1. Decreased severe accident risk achieved with the implementation of 10 CFR 50.63 should not be eroded due to the 14-day EDG extended outage.

The licensee stated that the proposed EDG extended outage has no impact on the severe accident risk associated with 10 CFR 50.63 since adequate core cooling is provided by the Division 3 HPCS EDG. Additionally, the licensee will calculate a core damage frequency and verify its acceptability in accordance with the SBO scenario in the current licensing basis before an EDG enters the planned extended outage.

2. The EDG reliability and availability targets in the plant's SBO analyses/submittals should be met in light of the EDG extended outage.

The licensee established a new reliability performance criteria of no more than 4 functional failures (FFs) per two cycles for all three Emergency Diesel Generators (EDGs) combined (i.e., 5 FFs per two cycles moves the EDGs to the (a)(1) monitoring category of the maintenance rule (10 CFR 50.65)). Therefore, at the system level, this is more conservative than what other licensees typically use for a reliability performance criterion. For example, the other BWR/6 licensees establish EDG reliability performance criteria at less than 2 FFs per cycle for each EDG or less than 4FFs per two cycles for each EDG. At the system level for 3 EDGs, this would be equivalent to less than 12 FFs per two cycles for all 3 EDGs. In addition, the PNPP licensee evaluates moving each individual EDG to the (a)(1) monitoring category every time a maintenance preventable functional failure (MPFF) occurs.

The staff determined that the licensee should retain EDG train level performance measures to avoid the potential for masking individual EDG performance issues. The licensee maintains EDG train level performance measures through their commitment to NUMARC 93-01, "Industry Guidelines for Monitoring the Effectiveness of Maintenance." The staff found the proposed reliability performance measure acceptable to meet the monitoring requirements of the maintenance rule.

The licensee increased their unavailability performance criteria for each individual EDG to 0.027. The staff requested the actual hours used to establish the unavailability performance measure to more clearly justify the licensee's technical basis for increasing the performance criteria value. The licensee assumes, in their updated PRA for an 18-month cycle, a value of 0.027 or 322 hours for the fault tree maintenance surveillance testing out of service (MTOOS) basic event assuming 50 days is subtracted for being in modes 4 and 5 (for the 14-day Completion Time this equals $336/11940=0.028$). The staff's evaluation indicates that the increase in risk is within the acceptance guidance criteria of $5E-7$ for the incremental conditional core damage probability (ICCDP) and $5E-8$ for the incremental conditional large early release probability (ICLERP), respectively, outlined in RG 1.177. Since the maintenance rule allows licensees flexibility in establishing performance measures and the value chosen is closely linked to the updated unavailability assumptions in the PRA, the staff found the increase in the unavailability performance measure acceptable to meet the monitoring requirements of the maintenance rule.

3. Systems, subsystems, trains, components, and devices that depend on the remaining EDG as a source of onsite power should be verified to be operable before removing an EDG for extended maintenance. Positive measures must be taken to preclude subsequent testing or maintenance activities on these systems, subsystems, trains, components, and devices while an EDG is inoperable.

In their letter of September 3, 1998, the licensee stated that the required systems, subsystems, trains, components and devices that depend on the applicable EDG as a source of emergency power will be verified to be operable before removing the associated EDG from service for the extended outage. Also, positive measures will be taken to preclude subsequent testing or maintenance on systems, subsystems, trains, components, and devices that depend on the remaining operable EDG as a source of emergency power. In addition, the licensee proposed a Configuration Risk Management Program to support risk-informed Technical Specifications (see Change 3 evaluation below).

4. The availability of offsite sources of electrical power prior to and during the extended EDG outage time has additional importance. Considerations should be given to defer extended maintenance when the offsite grid condition or configuration is degraded or when adverse/extreme weather conditions (e.g., high winds, lightning, icing conditions) are expected. Planning of the extended EDG maintenance should consider the time needed to complete the extended EDG maintenance and the ability to accurately forecast weather conditions that are expected to occur during the maintenance. Contingency plans should be developed to restore the inoperable EDG in the event of unanticipated adverse weather or degraded grid conditions which can significantly increase the probability of losing offsite electrical power.

The licensee stated that the preferred alternate AC power sources will be verified functional and capable of being connected to the safety bus associated with the inoperable EDG prior to entering the extended outage. This will be verified every shift thereafter. Also, appropriate precautions/limitations will be provided to caution against conducting any EDG outage during periods of inclement weather, unstable offsite grid conditions, or maintenance and test conditions that have an adverse effect on the extended outage.

5. The staff requested the licensee to provide a discussion of the frequency of loss of offsite power at the plant and compare it to industry data.

The licensee stated that the plant's loss of offsite power initiating event frequency was calculated utilizing input from NUREG-1032, "Evaluation of Station Blackout Accidents at Nuclear Power Plants," with the current calculated value of 6.09×10^{-2} . Also, the plant has had no loss of offsite power events to date.

PRA-Based Approach

In addition to the above deterministic analysis to evaluate Change 2, the staff also used a three-tiered PRA-based approach; as discussed in Regulatory Guide (RG) 1.177, "An Approach for Plant-Specific, Risk-Informed Decision Making: Technical Specifications;" to evaluate the risk associated with the proposed license amendment.

The licensee submitted PRA information in support of the proposed Change 2 for the extended Completion Time. The three-tiered approach documented in RG 1.177 was followed. The first tier includes the assessment of the risk impact of the proposed change for comparison to acceptance guidelines consistent with the Commission's Safety Goal Policy Statement, as documented in Regulatory Guide (RG) 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis." In addition, the first tier aims at ensuring that plant risk does not increase unacceptably during the period the equipment is taken out of service. The second tier addresses the need to preclude potentially high risk configurations which could result if equipment, in addition to that associated with the change, are taken out of service simultaneously. The third tier addresses the establishment of an overall configuration risk management program (CRMP) for identifying risk significant configurations resulting from maintenance or other operational activities and taking appropriate compensatory measures to avoid such risk significant configurations. The staff's evaluation of the licensee's risk assessment is discussed below. This evaluation also addresses PRA "quality" issues that could change the conclusions regarding the impact of the proposed change on plant risk.

Quality of the PRA Model and its Application to the Proposed Change

The licensee used its "living" Level 2 PRA model for internal events and internal flooding during power operation. This PRA model is an updated version of the original model developed as part of licensee's Individual Plant Examination (IPE) pursuant to Generic Letter 88-20. The original PRA model was updated to include various design and procedural changes to model the AC and DC electrical power systems in more detail and to incorporate comments from the "peer review certification" of the PRA conducted in May 1997. Although these changes caused a

slight increase in the core damage frequency (CDF) associated with loss of offsite power (LOOP) and SBO sequences, all the insights that were gained as a result of the IPE submittal remain valid.

The licensee submitted a list of important "peer review certification" findings related to the quality of the portion of the PRA models that are germane to the proposed EDG Completion Time extension. The licensee concludes, based on the "peer review certification" findings, that the PRA is of adequate quality to be used to evaluate potential changes in risk associated with the proposed change in the current allowed EDG Completion Time. The staff reached the same conclusion based on (1) applicable findings from the staff's review of the PRA developed as part of licensee's IPE, (2) applicable "peer review certification" findings, and (3) comparison of the licensee's LOOP/SBO accident sequence models to models used in PRAs of similar plants. The staff notes that while the peer review certification was useful for this application, more complete documentation of the peer review report may be necessary for broader scoped risk-informed applications.

In addition, information from sensitivity studies, performed by the licensee as part of its IPE, was reviewed by the staff to verify that there are no different sets of plausible assumptions (i.e., assumptions related to areas of significant uncertainty in models and/or data) which could change the conclusions regarding the impact of the proposed change on plant risk. It was concluded that no significant deviation (i.e., no deviation which would change the conclusions) would be expected when different sets of plausible assumptions are made.

Based on the above considerations, the staff finds that the Perry PRA models for internally initiated LOOP events occurring during power operation of the plant are of adequate quality for assessing the impact of the proposed change on plant risk. Furthermore, the staff concludes that the Perry PRA models for external events, such as fires and earthquakes, are of adequate quality to support the conclusion, discussed below, that any potential increases in CDF and large early release frequency (LERF) are dominated by internally initiated LOOP events.

Risk Impact of the Proposed Change (Tier 1)

An acceptable approach to risk-informed decision making is to show that the proposed change to the licensing basis meets several key principles (RG 1.174). One of these principles is to show that increases in risk, in terms of CDF and LERF, are small and consistent with the Commission's Safety Goal Policy Statement. Acceptance guidelines for meeting this principle are presented in RG 1.174.

The licensee used its "living" PRA model of the plant (for internal events and internal flooding) to calculate the following mean yearly increases in CDF and LERF due to the proposed change:

- The CDF would increase by about $7E-7/yr$
- The LERF would increase by about $2E-8/yr$

According to the acceptance guidelines of RG 1.174, when the estimated increases in CDF and LERF are less than $1E-6/yr$ and $1E-7/yr$, respectively, the proposed change will be considered

regardless of whether there is a calculation of the total CDF and the total LERF of the plant. Although no assessed values for the total (baseline) CDF and LERF of the plant (i.e., from both internal and external events at power as well as during shutdown operation) are reported in the licensee's submittal, there is no indication that such values are considerably higher than $1E-4$ and $1E-5$ per reactor year, respectively. On the contrary, there is good indication that the Perry plant meets the staff's safety goals (the CDF and LERF from internal events, including internal flooding, are $1.7E-5/yr$ and $1.1E-6/yr$, respectively, and no potential vulnerabilities to external events have been identified).

As mentioned above, the calculated increases in CDF and LERF are only for internal events and internal flooding occurring during power operation of the plant. Responding to the staff's concerns, the licensee states that the current Perry PRA model cannot combine results from both the internal events and the external events (i.e., Individual Plant Examination of External Events (IPEEE)) analyses. However, the licensee makes qualitative arguments to conclude that any potential increases in CDF and LERF due to the proposed change are dominated by internally initiated LOOP events. These arguments combine (1) the lower frequency of external events which would cause LOOP, as compared to the frequency of internally initiated LOOP events, (2) the fact that the IPEEE study did not identify any vulnerabilities, and (3) licensee provisions contained in the Configuration Risk Management Program (CRMP) which attempt to increase the awareness and sensitivity to potentially risk significant activities, such as those that increase the potential for a fire. The staff finds these arguments acceptable.

The licensee did not quantify the potential reduction in the shutdown risk of the plant due to the fact that a significant portion of the preventive and corrective maintenance, currently performed during shutdown, would be performed during operation at power. Another potential benefit, which was also not quantified, is the avoidance of multiple entries into a limiting condition for operation (LCO) to complete EDG maintenance.

In addition to changes in the mean values of CDF and LERF, the licensee assessed the incremental conditional core damage probability (ICCDP) and the incremental conditional large early release probability (ICLERP). These quantities are a measure of the increase in probability of core damage and large early release, respectively, during a single outage assumed to last for the entire duration allowed by the proposed change. The following values of ICCDP and ICLERP, associated with internal events and power operation only, were calculated by the licensee:

- ICCDP for Division 1 EDG: $3.5E-7$
- ICCDP for Division 2 EDG: $2.3E-7$
- ICLERP for Division 1 EDG: $1.9E-8$
- ICLERP for Division 2 EDG: $1.5E-8$

Qualitative arguments, similar to the ones made for CDF and LERF increases, are made to conclude that the ICCDP and ICLERP values are dominated by internally initiated LOOP events. These values indicate that the proposed increase in EDG completion time is within the acceptance guidance criteria of $5E-7$ for ICCDP and $5E-8$ for ICLERP, respectively, as outlined in RG 1.177. This shows that the plant risk will not increase unacceptably during an EDG

outage even when a Division 1 or 2 EDG is taken out of service for the entire proposed new allowed Completion Time.

Avoidance of High Risk Plant Configurations (Tier 2)

An underlying assumption of the risk assessment performed by the licensee, is that the entry into an extended EDG Completion Time will not be permitted if severe weather conditions are expected. In addition, it was assumed that when an EDG is planned to be taken out of service, the availability of other risk important components will be verified. The licensee committed to include precautions in the appropriate plant procedures to preclude high risk plant configurations during the planned EDG maintenance duration.

Analyses of the PRA results (cut sets and risk importance rankings), performed by the licensee, identified major contributors to potential high risk plant configurations when an EDG is taken out of service. Among the events that lead the list of these contributors are the loss of offsite power, the unavailability of the operable EDG, the unavailability of systems and components that depend on the operable EDG as a source of emergency power, and the unavailability of the alternate AC power sources.

The licensee used insights gained from the analyses of PRA results to identify several precautions, listed in page 16 (Attachment 1) of its letter of September 3, 1998, for preventing high risk plant configurations during the planned EDG maintenance duration. The licensee committed to include such precautions in the appropriate plant procedures prior to performing an extended EDG outage (3 to 14 days) and to the implementation of these precautions in conjunction with a configuration risk management program (CRMP). The staff finds that the proposed precautions, as well as the proposed implementation, are adequate for preventing the identified high risk plant configurations.

Configuration Risk Management Program (Tier 3)

The intent of a configuration risk management program (CRMP) is to ensure that plant safety is maintained and monitored during an extended outage. This program is proposed as an extension of the maintenance rule with respect to on-line maintenance for risk-informed Technical Specifications (TS Section 5.5.13.1, regarding the CRMP, specifically applies to situations when an EDG is taken out of service for periods greater than 72 hours). The implementation of the CRMP will allow the licensee to make decisions and take appropriate actions to control risk when performing on-line maintenance.

The licensee has been using PRA to assess the impact of daily planned activities on plant risk. The risk assessment submitted by the licensee in support of its EDG completion time extension request is based on the assumption that no other risk-significant components will be taken out of service concurrently with an EDG during an extended EDG outage (3 to 14 days). The CRMP will be used to ensure the validity of this assumption. The staff believes that the proposed CRMP provides adequate assurance that risk-significant configurations resulting from maintenance or other operational activities will be avoided during extended EDG outages at Perry.

Conclusions Regarding the Licensee's Risk Assessment

The staff reviewed the risk assessment performed by the licensee to support its EDG completion time extension request. This assessment is based on the three-tiered approach documented in RG 1.177. The major findings of the staff's review are summarized below:

- The staff finds that the Perry PRA model is of adequate quality to be used to evaluate potential changes in risk associated with the proposed change in the current allowed EDG completion time.
- The risk assessment indicates that the proposed change results in an increase in risk, in terms of CDF and LERF, which is small and consistent with the Commission's Safety Goal Policy Statement. The CDF would increase by about $7E-7$ /yr and the LERF would increase by about $2E-8$ /yr.
- The risk assessment indicates that the proposed change would not unacceptably increase the plant risk during an EDG outage even when a Division 1 or 2 EDG is taken out of service for the entire proposed new allowed completion time. The increase in risk during the outage is within the acceptance guidance criteria of $5E-7$ for ICCDP and $5E-8$ for ICLERP, respectively, outlined in RG 1.177.
- The licensee used PRA to identify major contributors to potential high risk plant configurations, when an EDG is taken out of service, and proposes to include precautions in the appropriate plant procedures to preclude such configurations during the planned EDG maintenance duration.
- The licensee proposes to implement a risk-based CRMP which provides adequate assurance that risk-significant configurations resulting from maintenance or other operational activities will be avoided during extended EDG outages at Perry.

The staff expects the licensee to implement the proposed TS change in accordance with the three-tiered approach described above. Also, the licensee will monitor EDG performance in relation to the maintenance rule performance criteria. Application of these implementation and monitoring strategies will help to ensure that the proposed extension of the EDG completion time does not degrade operational safety over time and that the risk expected when an EDG is taken out of service is minimized. The staff concludes that the results and insights of the risk analysis supports the proposed EDG AOT extension from 72 hours to 14 days.

On the basis of the information presented above, the staff finds Change 2 acceptable.

CHANGE 3:

Change 3 encompasses a new Configuration Risk Management Program (CRMP) which is intended to proceduralize risk-informed assessment to manage the risk associated with equipment inoperability. As stated in the evaluation of the Tier 3 portion of Change 2 above, the

staff believes that the proposed CRMP will provide adequate assurance that risk-significant configurations resulting from maintenance or other operational activities will be avoided during extended EDG outages. On the basis discussed under Change 2, the staff finds Change 3 acceptable.

2.2 Emergency Diesel Generator 24-Hour Load Test

Currently, TS Surveillance Requirement (SR) 3.8.1.14 requires that the operability of each EDG be demonstrated every 18 months by operating each EDG for 24 hours in parallel with the offsite power system. This current TS restricts this surveillance from being performed while the plant is in Mode 1 or 2. The licensee has requested that this restriction be deleted from the TS as a change which will reduce the complexity of activities during refueling outages and probably shorten the duration of those outages as well as reduce human performance errors while not impacting the margin of safety. The licensee states that the electrical lineup for performing this SR will be the same as the lineup necessary for performance of SR 3.8.1.3 (i.e., the monthly one-hour operability run). The difference between these two SRs is in the duration of the Surveillances. SR 3.8.1.3 requires that the EDG be tested in parallel with offsite power for ≥ 60 minutes, whereas SR 3.8.1.14 requires the parallel operation for 24 hours. Specifically, the licensee proposed the following change to the plant's TS SR 3.8.1.14:

Delete "This Surveillance shall not be performed in MODE 1 or 2," from Note 2.

The diesel generator for each division is automatically started upon receipt of three auto start signals: a LOCA, an undervoltage signal, and a degraded voltage signal at the associated division bus. The staff reviewed the postulated events associated with the EDG start signals in relation to the proposed change to the EDG 24-hour surveillance. The events to be discussed are: (1) LOCA, (2) loss of offsite power (LOOP), and (3) LOCA coincident with LOOP.

- (1) Upon accident signal, the EDG being tested will be separated from its associated bus and the offsite source. If offsite power is available, the EDG continues to run in the standby mode. If offsite power is not available, the EDG continues to run, but its corresponding bus is deenergized when the offsite feeder breakers open on undervoltage. The isolation of the bus then allows the EDG's output breaker to reclose, thus energizing the bus and carrying the accident loads for that load group. Operation of a single EDG in parallel with the offsite power supply will not affect the LOCA response. LOCA load sequence timers are reset by a loss of the bus voltage or by reset of the initial LOCA signal. The transition of the LOCA initiation logic from reset to initiate status results in proper LOCA sequencing. The failure of the output breaker of the EDG under test to open would not affect LOCA load sequencing. LOCA response loads will be connected to the bus and the total load distributed between the EDG and the offsite power supply. The EDG breaker can be opened manually or EDG load adjustment can be made if the breaker can not be opened manually.
- (2) If the EDG is operating in parallel with the offsite power supply when a LOOP is detected, the LOOP logic will isolate the bus from the offsite power supply by tripping the offsite supply isolation breakers but the EDG will remain connected to the bus. If the offsite supply isolation breaker fails to open in response to loss of voltage condition, the

EDG under test will be incapable of maintaining the bus voltage above the degraded voltage relay dropout setpoint and the EDG associated output breaker will be tripped. The voltage regulator and governor shifts from droop mode to isochronous mode. The failure of the offsite supply isolation breaker will not impact the LOOP response capability of redundant divisions.

- (3) If the EDG is operating in parallel with the offsite power supply when a coincident LOCA-LOOP is detected, the EDG will be immediately isolated from the bus upon receipt of a LOCA signal. The EDG will continue to run disconnected from the bus until the offsite supply breakers are opened in response to the LOOP signal. The EDG will then reconnect to the bus. The impact of single failures on the division under test such as failure of the offsite supply isolation breakers to open or the failure of the EDG output breaker to open or reclose will not affect the proper response of the redundant divisions.

Therefore, when performing TS SR 3.8.1.14 for a 24-hour period, the staff concludes that the EDGs will adequately respond within the time necessary to mitigate anticipated operational occurrences or design basis accidents.

The licensee has committed to install provisions/limitations that will be taken to manage the performance of the EDG 24-hour test during Modes 1 and 2. These provisions/limitations are:

1. Only one EDG will be tested at a time in parallel to the offsite grid.
2. Appropriate precautions/limitations will be provided that caution against conducting the 24-hour test during periods of inclement weather, unstable offsite grid conditions, or maintenance and test conditions that have an adverse effect on the test.
3. No additional maintenance or testing will be performed on required safety systems, subsystems, trains, components, and devices that depend on the remaining EDG's as sources of emergency power.

The precautions listed above will be included in the appropriate plant procedures and will be followed prior to performing the 24-hour test (TS SR 3.8.1.14) in either Mode 1 or 2.

Based on the above, the staff concludes that it is acceptable to perform the 24-hour load test in Modes 1 or 2.

Commitments Necessary to Support Acceptable Findings

As noted in the above evaluations, the licensee has made the following regulatory commitments:

Emergency Diesel Generator Extended Outage

The precautions listed below will be included in the appropriate plant procedures and will be followed prior to performing an extended EDG outage (3-14 days) in accordance with the Configuration Risk Management Program.

1. The required systems, subsystems, trains, components and devices that depend on the operating EDG as a source of emergency power will be verified to be operable before removing the associated EDG for a planned extended outage.
2. Positive measures will be taken to preclude subsequent testing or maintenance activities on those systems, subsystems, trains, components and devices that depend on the operable EDG as a source of emergency power.
3. The alternate AC power sources will be verified to be functional and capable of being connected to the safety bus associated with the inoperable EDG. This will be verified every shift thereafter.
4. Based on the current PSA model, a CDF will be calculated and verified acceptable.
5. Scheduling of EDG outages will be in accordance with the overall EDG unavailability, which will be tracked and controlled via the maintenance rule program pursuant to 10 CFR 50.65 requirements.
6. Appropriate precautions/limitations will be provided that caution against conducting any EDG outage during periods of inclement weather, unstable offsite grid conditions, or maintenance and test conditions that may have an adverse effect on the outage.

Emergency Diesel Generator 24-Hour Load Test

The precautions listed below will be included in the appropriate plant procedures and will be followed prior to performing the 24-hour test (TS SR 3.8.1.14) in either Mode 1 or 2.

1. Only one EDG will be tested at a time in parallel to the offsite grid.
2. Appropriate precautions/limitations will be provided that caution against conducting the 24-hour test during periods of inclement weather, unstable offsite grid conditions, or maintenance and test conditions that may have an adverse effect on the test.
3. No additional maintenance or testing will be performed on required safety systems, subsystems, trains, components, and devices that depend on the remaining EDGs as sources of emergency power.

3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Ohio State official was notified of the proposed issuance of the amendment. The State official had no comments.

4.0 ENVIRONMENTAL CONSIDERATION

This amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 or changes a surveillance requirement. The staff has determined that the amendment involves no significant

increase in the amounts, and no significant change in the types, of any effluent that may be released offsite and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that this amendment involves no significant hazards consideration and there has been no public comment on such finding (63 FR 56261). Accordingly, this amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of this amendment.

5.0 CONCLUSION

The staff has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

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