July 30, 1999

Mr. James Knubel
Chief Nuclear Officer
Power Authority of the State of
New York
123 Main Street
White Plains, NY 10601

SUBJECT: JAMES A. FITZPATRICK NUCLEAR POWER PLANT - ISSUANCE OF AMENDMENT RE: THE ALLOWED OUTAGE TIME FOR AN EMERGENCY DIESEL GENERATOR SYSTEM (TAC NO. M94611)

Dear Mr. Knubel:

The Commission has issued the enclosed Amendment No. 253 to Facility Operating License No. DPR-59 for the James A. FitzPatrick Nuclear Power Plant. The amendment consists of changes to the Technical Specification (TS) which extend the emergency diesel generator (EDG) allowed outage time from 7 to 14 days. The TS changes also include revised requirements for EDG testing at power, and revised AC power requirements for cold shutdown and refueling modes. These changes are provided in response to your application dated January 25, 1996, as supplemented on April 26, 1996, September 12, 1996, March 17, 1997, September 9, 1997, December 30, 1998, and May 19, 1999.

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

Sincerely,

ORIGINAL SIGNED BY:

Guy S. Vissing, Sr. Project Manager, Section I
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-333

Enclosures: 1. Amendment No. 253 to DPR-59
2. Safety Evaluation

cc w/encls: See next page

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

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Docket No. 50-333

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James A. FitzPatrick Nuclear Power Plant

Mr. Gerald C. Goldstein
Assistant General Counsel
Power Authority of the State
of New York
1633 Broadway
New York, NY 10019

Resident Inspector's Office
U. S. Nuclear Regulatory Commission
P.O. Box 136
Lycoming, NY 13093

Mr. Harry P. Salmon, Jr.
Vice President - Engineering
Power Authority of the State
of New York
123 Main Street
White Plains, NY 10601

Ms. Charlene D. Faison
Director Nuclear Licensing
Power Authority of the State
of New York
123 Main Street
White Plains, NY 10601

Supervisor
Town of Scriba
Route 8, Box 382
Oswego, NY 13126

Mr. Eugene W. Zeltmann
President and Chief Operating
Officer
Power Authority of the State
of New York
99 Washington Ave., Suite No. 2005
Albany, NY 12210-2820

Charles Donaldson, Esquire
Assistant Attorney General
New York Department of Law
120 Broadway
New York, NY 10271

Regional Administrator, Region I
U.S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Mr. F. William Valentino, President
New York State Energy, Research,
and Development Authority
Corporate Plaza West
286 Washington Avenue Extension
Albany, NY 12203-6399

Mr. Richard L. Patch, Director
Quality Assurance
Power Authority of the State
of New York
123 Main Street
White Plains, NY 10601

Mr. Gerard Goering
28112 Bayview Drive
Red Wing, MN 55066

Mr. James Gagliardo
Safety Review Committee
708 Castlewood Avenue
Arlington, TX 76012

Mr. Arthur Zaremba, Licensing Manager
James A. FitzPatrick Nuclear
Power Plant
P.O. Box 41
Lycoming, NY 13093

Mr. Paul Eddy
New York State Dept. of
Public Service
3 Empire State Plaza, 10th Floor
Albany, NY 12223

Michael J. Colomb
Site Executive Officer
James A. FitzPatrick Nuclear Power Plant
P.O. Box 41
Lycoming, NY 13093

Mr. Eric Beckjord
2909 29th St. NW
Washington, DC 20008-3416

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

POWER AUTHORITY OF THE STATE OF NEW YORK

DOCKET NO. 50-333

JAMES A. FITZPATRICK NUCLEAR POWER PLANT

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 253
License No. DPR-59

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by the Power Authority of the State of New York (the licensee) dated January 25, 1996, as supplemented on April 26, 1996, September 12, 1996, March 17, 1997, September 9, 1997, December 30, 1998, and May 19, 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. DPR-59 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 253 and the Environmental Protection Plan contained in Appendix B are incorporated into Facility License No. DPR-59. The licensee shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

2. This license amendment is effective as of the date of its issuance, to be implemented within 60 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

S. Singh Bajwa, Chief, Section I
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: July 30, 1999

ATTACHMENT TO LICENSE AMENDMENT NO. 253

FACILITY OPERATING LICENSE NO. DPR-59

DOCKET NO. 50-333

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove Pages	Insert Pages
217	217
220	220
224	224
-----	258f

3.9 (cont'd)

3. From and after the time that one of the Emergency Diesel Generator Systems is made or found to be inoperable, continued reactor operation is permissible for a period not to exceed 14 days provided that the two incoming power sources are available and that the remaining Diesel Generator System is operable. At the end of the 14 day period, the reactor shall be placed in a cold condition within 24 hours, unless the affected diesel generator system is made operable sooner.

4. When both Emergency Diesel Generator Systems are made or found to be inoperable restore at least one system to operable status within two hours or place the reactor in the cold condition within the following 24 hours.

5. Deleted

4.9 (cont'd)

3. The emergency diesel generator system instrumentation shall be checked during the monthly generator test.

4. Once every 24 months, the conditions under which the Emergency Diesel Generator System is required will be simulated to demonstrate that the pair of diesel generators will start, accelerate, force parallel, and accept the emergency loads in the prescribed sequence.

5. While the reactor is being operated in accordance with Specification 3.9.B.3, the availability of the operable Emergency Diesel Generator System shall be demonstrated once within 8 hours by manual starting and force paralleling. The operability of the remaining Emergency Diesel Generator System need not be demonstrated if the affected Emergency Diesel Generator System became inoperable due to:

   a. Preplanned preventive maintenance or testing.

   b. An inoperable support system with no potential common mode failure for the remaining diesel generators, or

   c. An independently testable component with no potential common mode failure for the remaining diesel generators.

3.9 (cont'd)

c. From and after the time that only one fuel oil transfer pump in a Diesel Generator System is found to be operable, that Diesel Generator System shall be considered inoperable and continued reactor operation shall be in accordance with Specification 3.9.B.3 above.

3. Whenever the diesel fuel on site for each operable pair of Diesel Generators decreases to less than 64,000 gallons as a result of operation of the Diesel Generators "to meet Technical Specification requirements," Specification 3.0.C does not apply. 48 hours are allowed to restore fuel oil storage tank quantity to a minimum of 64,000 gallons.

D. AC Power Operability During Cold Shutdown or Refueling Modes

Whenever the reactor is in the cold shutdown or refueling mode, a minimum of one offsite power source and one Emergency Diesel Generator System, capable of supporting required emergency equipment, shall be operable whenever any work is being done which has the potential for draining the vessel, secondary containment is required, or a core or containment cooling system is required. When this condition is not met, initiate actions to suspend all work that could cause draining of the vessel, suspend core alterations and handling of irradiated fuel assemblies in the secondary containment, declare required core or containment cooling systems inoperable and immediately initiate actions to restore required AC power sources.

4.9 (cont'd)

D. Not Applicable

3.9 BASES (cont'd)

If an Emergency Diesel Generator System is not operable, the plant shall be permitted to operate at power for 14 days provided both sources of reserve power are operable. This is based on the following:

1. If one Emergency Diesel Generator System is not operable, the remaining Emergency Diesel Generator System is capable of carrying sufficient engineered safeguards and emergency core cooling system loads (at least one core spray system and one RHR pump) to mitigate all loss-of-coolant accidents.

2. The reserve (offsite) power is highly reliable.

3. When an Emergency Diesel Generator System is taken out of service, it is important to assure the impact on plant risk of this and other equipment simultaneously taken out of service can be assessed. The Configuration Risk Management Program evaluates the impact on plant risk of equipment out of service. A description of the Configuration Risk Management Program is in Section 6.21 (administrative section) of the Technical Specification.

C. Diesel Fuel

Minimum on-site fuel oil requirements are based on operation of the emergency diesel generator systems at rated load for 7 days.

Additional diesel fuel can be delivered to the site within 48 hours.

D. AC Power Operability During Cold Shutdown or Refueling Modes

One offsite power source and one Emergency Diesel Generator System ensure the availability of the required power to recover from postulated events when in the cold shutdown or refueling modes and when handling irradiated fuel.

E. Battery System

125 v DC power is supplied from two plant batteries each sized to supply the required equipment at design power following a loss-of-coolant accident with a concurrent loss of normal and reserve power. Each battery is provided with a charger sized to maintain the battery in a fully charged state while supplying normal operating loads.

F. LPCI MOV Independent Power Supplies

There are two LPCI MOV Independent Power Supplies each consisting of a charger, rectifier, inverter and battery. Each independent power supply charger-rectifier is normally fed from the emergency A-C power supply system to maintain the battery in a fully charged state. In the event of a LOCA each independent power supply is automatically isolated from the Emergency A-C power system. The battery and inverter have sufficient capacity to power the MOV's essential to the operation of the LPCI System. An alternate power source is provided for each LPCI MOV bus whereby in the event its independent power supply is out of service, the LPCI MOV bus may be energized directly from the Emergency A-C Power System.

6.21 CONFIGURATION RISK MANAGEMENT PROGRAM

The Configuration Risk Management Program (CRMP) provides a proceduralized risk-informed assessment to manage the risk associated with equipment inoperability. The program applies to technical specification structures, systems, or components for which a risk-informed allowed outage time has been granted. The program is to include the following:

a. Provisions for the control and implementation of a Level 1 at-power internal events PRA-informed methodology. The assessment is to be capable of evaluating the applicable plant configuration.

b. Provisions for performing an assessment prior to entering the plant configuration described by the Limiting Conditions for Operation (LCO) Action Statement for preplanned activities.

c. Provisions for performing an assessment after entering the plant configuration described by the LCO Action Statement for unplanned entry into the LCO Action Statement.

d. Provisions for assessing the need for additional actions after the discovery of additional equipment-out-of-service conditions while in the plant configuration described by the LCO Action Statement.

e. Provisions for considering other applicable risk-significant contributors such as Level 2 issues and external events, 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. 253 TO

FACILITY OPERATING LICENSE NO. DPR-59

POWER AUTHORITY OF THE STATE OF NEW YORK

JAMES A. FITZPATRICK NUCLEAR POWER PLANT

DOCKET NO. 50-333

1.0 INTRODUCTION

On January 25, 1996, as supplemented on April 26, 1996, September 12, 1996, March 17, 1997, September 9, 1997, December 30, 1998, and May 19, 1999, the Power Authority of the State of New York (the licensee, also known as the New York Power Authority), requested Technical Specification (TS) changes for the James A. FitzPatrick Nuclear Power Plant. The proposed changes extend the allowed outage time (AOT) for a single emergency diesel generator (EDG) from 7 to 14 days. This proposal was subsequently revised on May 19, 1999, to provide a 14-day AOT for an EDG subsystem (2 EDGs providing power to a single emergency bus). The licensee provided additional information requested by the NRC staff on April 26, 1996, September 12, 1996, March 17, 1997, September 9, 1997, and December 30, 1998. The changes proposed on May 19, 1999, were reflected in the NRC staff's revised proposed finding of no significant hazards consideration published on June 30, 1999 (64 FR 36408), and encompass the additional information provided by the licensee.

The changes proposed on January 25, 1996, also included revised requirements for EDG testing at power, and revised AC power requirements for cold shutdown and refueling modes. The portions of the NRC staff's original proposed finding of no significant hazards consideration published on March 27, 1996 (61 FR 13532) addressing these changes was not affected by the additional information provided by the licensee.

The U.S. Nuclear Regulatory Commission (NRC) staff completed a comprehensive examination of surveillance requirements (SRs) in the TSs that required testing at power. The evaluation is documented in NUREG-1366, "Improvements to Technical Specifications Surveillance Requirements," dated December 1992. The staff found that although most testing at power is important, safety can be improved, equipment degradation decreased, and an unnecessary burden on personnel resources eliminated by reducing the amount of testing at power that is required by TS. Subsequently, the NRC issued Generic Letter (GL) 93-05, "Line-Item Technical Specifications Improvements to Reduce Surveillance Requirements for Testing During Power Operation." Additionally, the staff has allowed boiling-water reactor (BWR) licensees, such as the licensee, to make changes to their TS if the changes are consistent with

NUREG-1433, "Standard Technical Specifications, General Electric Plants, BWR 4," Revision 1, dated April 1995. NUREG-1433 was developed to improve the existing TSs at operating plants and to achieve a high degree of standardization and consistency throughout the nuclear industry.

The staff has also indicated a willingness to extend EDG AOT to accommodate extended maintenance for plants having a source of alternate AC power that meets or exceeds the standards established by the Nuclear Management and Resources Council (NUMARC) 8700, "Guidance and Technical Basis for NUMARC Initiatives for Addressing Station Blackout (SBO) at Light Water Reactors," as endorsed by NRC Regulatory Guide (RG) 1.155, "Station Blackout."

2.0 EVALUATION

The proposed changes to FitzPatrick's TSs are being requested to provide increased flexibility in scheduling maintenance activities and to implement recommendations contained in NRC GL 93-05 and NUREG-1433.

2.1 Changes related to GL 93-05 and NUREG-1433

2.1.1 Surveillance Requirement 4.9.B.5

TS 4.9.B.5 requires surveillance to ensure that the remaining EDG system is operable. In the event one EDG system is inoperable during power operation, the remaining diesel generators shall be demonstrated once within 8 hours my manual starting and force paralleling*.

Surveillance Requirement 4.9.B.5 is being changed from:

> Once within one hour and at least once per twenty-four hours thereafter while the reactor is being operated in accordance with Specifications 3.9.B.1, 3.9.B.2, or 3.9.B.3 the availability of the operable Emergency Diesel Generators shall be demonstrated by manual starting and force paralleling where applicable.

to:

> While the reactor is being operated in accordance with Specification 3.9.B.3, the availability of the operable diesel generators shall be demonstrated once within 8 hours by manual starting and force paralleling.* The operability of the remaining diesel generator system need not be demonstrated if the affected diesel generator or Emergency Diesel Generator System becomes inoperable due to:
>
> a. Preplanned preventive maintenance or testing.
>
> b. An inoperable support system with no potential common mode failure for the remaining diesel generators, or
>
> * Force paralleling only applies to the Emergency Diesel Generator System with two operable diesel generators.

c. An independently testable component with no potential common mode failure for the remaining diesel generators.

These changes are consistent with the following recommendations in GL 93-05:

> With an offsite circuit of the required ac electrical power sources inoperable...
>
> Delete the following requirement to test EDGs: "If either diesel generator has not been successfully tested within the past 24 hours, demonstrate its OPERABILITY by performing Surveillance Requirements 4.8.1.1.2.a.5 and 4.8.1.1.2.a.6 for each such diesel generator, separately, within 24 hours.
>
> and replace with: "if the diesel generator system became inoperable due to any cause other than an inoperable support system, an independently testable component, or preplanned preventive maintenance or testing, demonstrate the OPERABILITY of the remaining OPERABLE diesel generator by performing Surveillance Requirements 4.8.1.1.2.a.5 and 4.8.1.1.2.a.6 within 8 hours, unless the absence of any potential common mode failure for the remaining diesel generator is demonstrated.

This change is determined to be acceptable on the basis that the excess power available by one EDG System is adequate to mitigate the consequences in the event of a LOOP. The surveillance further ensures the operability of such a system in the event of the unavailability of the other system.

2.1.2 Technical Specification 3.9.D and Bases

Specification 3.9.D is being changed from:

> Whenever the reactor is in the cold shutdown or refueling modes, a minimum of one of the pairs of Emergency Diesel Generators, and all its associated emergency equipment shall be OPERABLE whenever any work is being done which has the potential for draining the vessel, secondary containment is required, or a core or containment cooling system is required.

to:

> Whenever the reactor is in the cold shutdown or refueling mode, a minimum of one offsite power source and one Emergency Diesel Generator System, capable of supporting required emergency equipment, shall be operable whenever any work is being done which has the potential for draining the vessel, secondary containment is required, or a core or containment cooling system is required. When this condition is not met, initiate actions to suspend all work that could cause draining of the vessel, suspend core alterations and handling of irradiated fuel assemblies in the secondary containment, declare required core or containment cooling systems inoperable and immediately initiate actions to restore required AC power sources.

The following will be added to the Bases:

> One offsite power source and one diesel generator system ensure the availability of the required power to recover from postulated events when in the cold shutdown or refueling modes and when handling irradiated fuel.

These changes to Specification 3.9.D are consistent with the recommendations in NUREG-1433. NUREG-1433 recommends that when a unit is in shutdown, the TS requirements should ensure that the unit has the capability to mitigate the consequences of postulated accidents. However, the assumption of a single failure and concurrent loss of all offsite or loss of all onsite power is not required. The rationale for this is based on the fact that many design-basis accidents (DBAs) that are analyzed in MODES 1, 2, and 3 have not been specifically analyzed in MODES 4 and 5. Worst-case bounding events are deemed not credible in MODES 4 and 5 because the energy contained within the reactor pressure boundary is significantly reduced or eliminated, and the consequences are minimal. The licensee's proposed change is to require that only one EDG system and one offsite source be available during MODES 4 and 5. The licensee has stated that these sources of power are adequate to ensure that the unit has the capability to mitigate the consequences of postulated accidents in MODES 4 and 5. The staff has determined this to be acceptable on the basis that these sources of power are adequate to ensure that the unit has the capability to mitigate the consequences of accidents during shutdown.

2.2 Changes Related to EDG AOT Extension

The FitzPatrick plant has two emergency AC power buses, each powered by two EDGs. Each bus supplies power to a core spray (CS) pump and two residual heat removal (RHR) pumps, with an RHR pump in each loop for low-pressure coolant injection (LPCI). Each of pair of EDGs is referred to as an EDG system.

The licensee is proposing to extend the current FitzPatrick EDG system AOT from 7 to 14 days on the basis of the availability of excess Class 1E EDGs. The current TS 3.9.B.3 allows an EDG system to be taken out of service for repair or maintenance for a period of up to 7 days.

The staff has indicated its willingness in the past to grant extended EDG AOTs on the basis of plants having a source of power that meets or exceeds the standards of an alternate AC (AAC) source as established in NUMARC 8700, and RG 1.155. The reasoning implicit to this special case is that if a licensee has an excess and diverse power source available to cope with a loss of offsite power (LOOP) event, (e.g., AAC power source) then this power source can be temporarily used to replace an EDG for extended maintenance. Subsequently, the staff has concluded that under certain controlled conditions it is acceptable to perform on-line maintenance to improve EDG reliability and availability.

2.2.1 Deterministic Evaluation of EDG AOT Extension

Presently, FitzPatrick is meeting the station blackout requirement by coping with dc power (i.e., batteries) and, therefore, does not have an AAC source. However, FitzPatrick is requesting to extend its current EDG AOT from 7 days to 14 days on the basis of an excess of emergency AC power (i.e., Class 1E EDGs).

The unavailability of one EDG during a LOOP event does not disable the entire associated AC bus, but results in one less RHR pump for the LPCI mode being automatically started upon a loss-of-coolant accident (LOCA) signal. The unavailability of one EDG during a LOOP event is similar to the unavailability of one RHR pump in the LPCI mode, which has a minimal impact on LOCA mitigation since the LPCI system was originally designed with sufficient flow rate margin

to accommodate the potential failure of one RHR pump. The RHR system configuration is such that long-term suppression pool and reactor shutdown cooling can be provided with any one of the four RHR pumps.

On April 26, 1996, the licensee responded to an NRC request for additional information (RAI), and stated that any two EDGs of the four (A, B, C, and D) can safely shut down the plant during DBA conditions, and any single EDG has the adequate capacity to power all the necessary LOOP loads. Additionally, the licensee stated that 10 CFR Part 50, Appendix K regulatory requirements for the emergency core cooling system (ECCS) are met with one CS pump and one RHR pump in LPCI MODE, or two CS systems and no LPCI pumps. Table 1 below identifies the emergency AC power system and ECCS systems available when two EDGs are inoperable at FitzPatrick.

Table 1: FitzPatrick EDG System Configuration and ECCS Systems Available

Out of service for maintenance and an additional EDG failed during a LOOP condition	Recirculation Discharge Line A Break	Recirculation Discharge Line B Break
Both EDGs in System A (bus 10500)	LPCI-D CS-B	LPCI-C CS-B
Both EDGs in System B (bus 10600)	LPCI-B CS-A	LPCI-A CS-A
EDG B or EDG D	LPCI-B LPCI-D CS-A CS-B	LPCI-A CS-A CS-B
EDG A or EDG C	LPCI-D CS-A CS-B	LPCI-A CS-A CS-B LPCI-C

As indicated in the above table, the FitzPatrick plant has a high degree of redundancy in its EDG configuration.

In cases where licensees do not have an AAC source but have excess AC power capacity, the staff has used the same guidance provided in NUMARC-8700, and NRC Regulatory Guide RG 1.155 to determine the availability and reliability of the proposed substitute source of AC power. In this case, the licensee is using excess Class 1E EDGs which exceed the standards set for

AAC sources in NUMARC-8700 and RG 1.155. Therefore, the staff concludes that the excess Class 1E EDGs at FitzPatrick are an acceptable source of substitute AC power for each EDG system in the event of a LOOP.

Additionally, the licensee has incorporated the following compensatory measures into the appropriate plant documents which will be used during the EDG AOT extension:

(1) The licensee will verify through TSs, procedures, and detailed analysis that the required systems, subsystems, trains, components, and devices that are required for mitigating the consequences of an accident are available and OPERABLE before removing an EDG from service for extended preventive maintenance (PM). In addition, controls will be provided to preclude subsequent testing or maintenance activities on these systems, subsystems, trains, components, and devices while the EDG is inoperable.

(2) When an individual EDG is removed from service for repair or planned maintenance for an extended 14-day AOT, the remaining EDG system must be operable. The remaining EDG will be available for manual operation.

(3) The removal from service of safety systems and important non-safety equipment, including offsite power sources, will be minimized during the extended 14-day AOT.

(4) Entry into this 14-day LCO ACTION statement will not be abused by repeated voluntary entry into and exit from the LCO. The primary intent of extending the EDG AOT from 7 days to 14 days is to perform preplanned EDG maintenance such as teardowns and modifications, that would otherwise extend beyond the current 7-day AOT.

(5) Voluntary entry into this LCO ACTION statement will not be scheduled if severe weather conditions are expected which could affect the offsite power sources.

(6) The overall unavailability of the EDG should not exceed the Maintenance Rule (10 CFR 50.65) performance criteria.

(7) Any component testing or maintenance that increased the likelihood of a plant transient should be avoided. Plant operation should be stable during the extended 14-day AOT.

2.3.2 Risk Evaluation of the EDG AOT Extension

To gain a risk perspective, the staff used a three-tiered approach to evaluate the risk associated with the proposed license amendment. The first tier evaluated the probabilistic risk assessment (PRA) model and the impact of the change on plant operational risk. The second tier addressed the need to preclude potentially high risk configurations, should additional equipment outages occur during the AOT period. The third tier evaluated the licensee's configuration risk management program (CRMP), to ensure that equipment removed from service immediately preceding or during the proposed AOT will be appropriately assessed from a risk perspective. Each tier and associated findings are discussed below. The approach taken by the licensee is consistent with that subsequently adopted in Regulatory Guide (RG) 1.177, "An Approach for Plant-Specific, Risk-Informed Decision Making: Technical Specifications," published in August 1998.

Tier 1: PRA Evaluation of AOT Extensions

The licensee used traditional PRA methodology to evaluate the requested AOT extension for the EDG systems. The Tier 1 staff review of the licensee's PRA involved two evaluations: (1) evaluation of the PRA model and application to the proposed AOT extension and (2) evaluation of PRA results and insights stemming from the application. The review did not warrant an assessment of any unconventional PRA practices or unique features that could significantly affect the PRA findings and conclusions.

(1) Evaluation of PRA Model and Application to the proposed AOT Extension

The staff's review focused on the capability of the licensee's PRA model to analyze the risk stemming from the proposed AOT changes for EDGs systems, and did not involve an in-depth review of the licensee's PRA. This review was based on the staff's initial screening process wherein the staff examined the licensee's internal events PRA results, recent operational experience regarding LOOP and EDG reliability and availability, and plant-specific features such as EDG configurations, offsite power sources, and other systems critical to mitigation of a LOOP event. The staff concludes that the licensee's PRA results are reasonable, and the scope and depth of the PRA analysis support such a finding. Recent data for EDG and offsite AC power reliability and availability did not indicate any adverse trends. Each of the four EDGs is fully capable of safely shutting down the plant given a LOOP. The staff notes that a more in-depth (step 2) review had been performed for portions of the licensee's IPE, including EDGs, and this review did not identify deficiencies in terms of the data and modeling of the EDGs. The staff notes that the level of redundancy of design and reasonableness of the PRA insights supports the proposed EDG system AOT extension from 7 to 14 days.

The licensee's PRA includes both a Level 1 and Level 2 analysis. FitzPatrick used a "small event tree, linked large fault tree" methodology to perform core damage analysis. The analysis modeled both generic and plant-specific initiators, including internal flooding, and dependencies that exist between initiating events and the associated mitigating systems. These initiators are consistent with those identified in previous PRAs. The licensee used both generic and plant-specific data. Generic data sources included accident sequence evaluation program (ASEP) data sources listed in NUREG/CR-4550 and in earlier PRAS; plant-specific data were incorporated into the model by updating generic data using Bayesian techniques. The licensee has updated the PRA, including use of an updated data base, a revised internal flooding analysis, and changes to fault tree models made to reflect modifications made since the original PRA. In particular, an already-completed modification to the fire protection system to provide EDG jacket cooling water supply directly through the crosstie of the emergency service water (ESW) system is included in the model. The staff believes the update will not impact this decision. The staff recognizes that the SBO contribution has decreased due to the crosstie.

Since the common-cause failure (CCF) of EDGs is potentially a dominant contributor to the plant SBO risk, the staff examined the licensee's CCF analysis. The licensee used the beta factor method and generic data for treating CCFs. The CCF probability of EDGs is reasonable and the beta factors used are consistent with those used in previous PRAs.

The plant core damage frequency (CDF) is dominated by long-term SBO sequences. One of the more sensitive areas is the battery depletion time assumed in the PRA. FitzPatrick has

batteries designed for 2-hour battery-life but the battery-life can be extended up to 8 hours during SBO by manually shedding DC loads, as demonstrated by the licensee's calculation. The licensee procedures dictate the implementation of load shedding. The uncertainty associated with battery depletion time was explicitly calculated in accordance with the Institute of Electrical and Electronic Engineers (IEEE) standards on battery depletion. In addition, FitzPatrick performed a sensitivity analysis to further investigate the impact of the uncertainty using battery depletion times of 4 and 6 hours, instead of the 8 hours originally assumed in the PRA. The 4- and 6-hour depletion times corresponded to CDF of 2.56E-6/year and 2.47E-6/year, respectively, as reported by the licensee.

The staff's evaluation of the data and modeling used in the licensee's PRA analysis supports the adequacy of the PRA use to evaluate the proposed AOT extension.

(2) Evaluation of PRA Results and Insights Stemming From the Application

The estimated plant CDF (1.92E-6/year, with 8-hour battery depletion time) for internal events at FitzPatrick is relatively small compared with other BWRs. The licensee's PRA identified SBO as the largest contributor (91.1 %) to the CDF relative to other contributors; however, the absolute contribution (1.75E-6/year) is still small due to each of the four EDGs' capability to safely shut down the plant given a LOOP event and a plant location that is less vulnerable to severe weather such as hurricanes. Among SBO sequences, the long-term sequences dominate the risk, with loss of coolant injection upon battery depletion being the largest contributor. For the short-term SBO sequences, the random failure of batteries dominates the risk.

The licensee evaluated the potential increase in risk resulting from increasing the AOT for an EDG system from 7 to 14 days. This analysis assumes that maintenance on other systems could proceed if that activity is permitted by the TS. This evaluation is expected to bound actual EDG outages because the licensee plans to remove only one EDG from service at a time, leaving the other EDG in that EDG system available for the operators' use to mitigate potential problems. The single EDG is capable of supporting 2600 kW load. The licensee evaluated the risk effect for each EDG system. The results of this evaluation are:

EDG Combination	Change in CDF per year	Conditional Core Damage Probability for 7-day AOT	Conditional Core Damage Probability for 14-day AOT
93EDG-A, 93EDG-C	4.18E-6	8.02E-8	1.60E-7
93EDG-B, 93EDG-D	4.23E-6	8.11E-8	1.62E-7

The change in CDF per year represents the calculated CDF increase if the associated EDG system is out of service for an entire year. The conditional core damage probabilities represent the calculated probability of core damage during the designated AOT interval.

The licensee states that their evaluation demonstrates that the extended EDG system AOT does not significantly increase risk. The staff agrees that the increased conditional core damage probability for the 14-day AOT vs. the 7-day AOT is not significant.

The licensee had originally calculated the increase in CDF from the base case assuming a single EDG is taken out of service is estimated to be approximately 8E-8/year. The incremental conditional core damage probability (ICCDP) associated with a single EDG AOT of 14 days is calculated to be approximately 3E-9, which is much smaller than that expected for most other operating reactors. Since the licensee does not expect to have both EDGs within an EDG system simultaneously unavailable, this estimated change in risk is expected to more closely reflect actual operating conditions.

The low risk is directly attributable to both the redundancy of EDGs and the low failure probability data associated with the equipment needed for successful mitigation of LOOP events. Studies indicate that the CDF at FitzPatrick is relatively insensitive to larger changes in EDG maintenance unavailability due to EDG redundancy.

The licensee's analysis of a single EDG out of service for 14 days also addressed the Level 2 risk in terms of an increase in large early release frequency (LERF). The FitzPatrick (Mark 1) conditional large containment failure probability for all core-damage events was estimated to be about 0.41, and the corresponding LERF was reported as 6.03E-7/year. With the 14-day AOT in place, the LERF would increase to 6.11E-7/year, a change of approximately 8E-9/year. This LERF is not expected to be significantly affected by an EDG system being out of service for 14 days.

On the basis of the Tier 1 review above, the staff concludes that the PRA model used for the proposed AOT extension for an EDG system is reasonable, and that the risk impact of the change is very small and supports the AOT extension.

Tier 2: Avoidance of Risk-Significant Plant Configurations

The licensee offered reasonable assurance that risk significant plant equipment outage configurations will not occur while the plant is subjected to the extended EDG AOT. The licensee developed a risk-informed set of tables and other guidance to evaluate plant risk associated with various maintenance activities. The licensee has committed to keeping the required systems, subsystems, trains, components, and devices to mitigate the consequences of an accident available and OPERABLE before entry into the proposed 14-day EDG AOT. This practice has been incorporated into the licensee's Administrative Procedures (i.e., AP-10.02, "13-Week Rolling Schedule," and AP-05.13, "Maintenance During LCOs") governing maintenance activities and TS requirements. The work control process incorporates risk information and insights in combination with deterministic approach into plant maintenance decisions. The administrative procedures contain a set of tables that present a level of risk for various configurations. In addition, the extended AOT will not be abused by repeated entry, and the licensee will not schedule voluntary entry into the proposed extended AOT if severe weather conditions are expected that could affect the reliability of the offsite power sources. FitzPatrick also committed to keeping the remaining three EDGs operable and available when an EDG is removed from service at power. The current TS also governs this commitment when additional EDGs are unavailable.

The staff recognizes the licensee has controls in place to reduce the likelihood of risk significant plant configurations during the proposed AOT. The review did not identify the need for any additional enhancements or compensatory actions that, if implemented, would avoid or reduce the probability of a risk-significant configuration.

Tier 3: Risk-Informed Plant Configuration Management

The staff finds that the licensee's work control process, mentioned in Tier 2 discussion, encompasses the requirements for Tier 3 based on the following: The process includes provisions for performing a proceduralized risk-informed assessment of the risk associated with both planned and unplanned maintenance activities. The process dictates either management approval or the PRA group involvement given an "indeterminate" configuration that is potentially risk significant. The use of explicit quantitative risk measures, combined with deterministic defense-in-depth considerations, such as risk achievement worth, and Fussell-Vesely importance, and ICCDP are used for evaluation. The process also takes into account containment performance, personnel safety, fire protection and severe weather, besides the Level 1 internal risk. The licensee also stated that the more risk significant the maintenance is, the more planning steps are taken to reduce the AOT and to review potentially conflicting activities.

The CRMP originally proposed by the licensee on September 9, 1997, differed somewhat from the model CRMP eventually incorporated into RG 1.177. Therefore, on November 5, 1998, the NRC staff requested that the licensee provide a CRMP consistent with the RG 1.177 model, explain why the CRMP originally proposed by the licensee fulfilled the criteria established by RG 1.177, or provide an alternative that ensured appropriate controls would be maintained. The licensee elected to revise its amendment request to provide a CRMP consistent with RG 1.177. This revision was submitted on December 30, 1998.

The staff believes that the licensee's risk-informed CRMP will allow an evaluation of the risk associated with both scheduled and unscheduled plant activities when performing the EDG maintenance at power. The proposed CRMP is consistent with the guidance and recommendations of RG 1.177, and is therefore acceptable.

3.0 CONCLUSION

3.1 Changes Related to GL 93-05

The staff has completed a comprehensive examination of surveillance requirements in TSs that require testing during power operation. The results of this work are reported in NUREG-1366, "Improvements to Technical Specifications Surveillance Requirements," dated December 1992. In performing this study, the staff found that, while the majority of the testing at power is important, some testing can be eliminated. The staff encourages licensees who are planning to adopt suggested line-item TS improvements in GL 93-05 to propose TS changes that are consistent with the guidance in the GL.

The staff has reviewed the proposed changes and found them consistent with the guidance and recommendations in GL 93-05. The surveillances proposed ensures the operability of one EDG system in the event of the unavailability of the other system. Therefore, the changes are found to be acceptable.

3.2 Changes Related to NUREG-1433

This NUREG contains the improved Standard Technical Specifications (STS) for General Electric (GE) BWR/4 plants. The NUREG has been developed to improve TS at operating facilities and to achieve a high degree of standardization and consistency throughout the nuclear industry. Licensees have been encouraged to upgrade their TSs to be consistent with the NUREG. The NRC is considering changes regarding shutdown risk which could impact future requirements for shutdown TS. However, this NUREG presently sets the requirements for TS at operating nuclear facilities and is the guidance followed by the staff at this time.

The staff has reviewed the proposed changes related to NUREG-1433 and found them to be consistent with the guidance and recommendations of the NUREG. In the case of FitzPatrick, the sources of power are adequate to ensure that the unit has the capability to mitigate the consequences of accidents during shutdown. Therefore, the changes are found to be acceptable.

3.3 Changes Related to the EDG AOT Extension

The NRC staff has indicated a willingness in the past to grant extended EDG AOTs on the basis of plants having a source of AC power that meets or exceeds the requirements of an AAC source as established by NUMARC 8700, and NRC RG 1.155. The reasoning implicit to this special case is that if a licensee has an excess and diverse power source available to cope with a LOOP event, (e.g., excess AAC power sources) then such a power source can be temporarily used to replace an EDG during extended maintenance. Subsequently, the staff has concluded that under certain controlled conditions it is acceptable to perform on-line maintenance to improve EDG reliability and availability.

The staff has reviewed the proposed EDG AOT extension at FitzPatrick and concludes that the excess EDGs at FitzPatrick are a highly reliable source of AC power and exceed the standards set by NUMARC 8700 for AAC sources. Additionally, the compensatory measures being taken by the licensee during the extended AOT will ensure that the safe shutdown capability is available. The staff also evaluated the AOT extension from a risk perspective and concludes that the AOT extension will not result in a significant increase in plant risk. On the basis of the three-tiered approach, the staff finds the following:

- The proposed AOT modifications have only a minimal quantitative impact on plant risk. The calculated incremental conditional core-damage probability (ICCDP) for an EDG system is very small, primarily because of the redundancy in EDG configuration and other robust plant design features.

- The licensee has controls in place to reduce the likelihood of risk-significant plant configurations during the proposed AOT. The review did not identify the need for any additional enhancements or compensatory actions that, if implemented, would avoid or reduce the probability of a risk significant configuration.

- The licensee has implemented a risk-informed plant CRMP to assess the risk associated with the removal of equipment from service during the AOT. The program provides the necessary assurances that appropriate assessments of plant risk configurations using a set of tables and associated guidance, augmented by appropriate engineering judgment, are sufficient to support the proposed AOT extension request for an EDG system.

On the basis of this evaluation, the staff finds the proposed EDG system AOT extension at FitzPatrick from 7 to 14 days to be acceptable.

4.0 STATE CONSULTATION

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

5.0 ENVIRONMENTAL CONSIDERATION

The amendments change requirements with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes the surveillance requirements. The NRC staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued proposed findings that the amendments involve no significant hazards consideration, and there has been no public comment on such findings (61 FR 13532 and 64 FR 36408). Accordingly, the amendments meet 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 the amendments.

6.0 CONCLUSION

The Commission 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 the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributors: M. Pratt
I. Jung
J. Williams

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AMENDMENT NO. 253 TO FACILITY OPERATING LICENSE NO. DPR-59-FITZPATRICK

Docket File
PUBLIC
PDI-1 R/F
S. Bajwa
S. Little
J. Williams
OGC
G. Hill (2), T-5 C3
W. Beckner, 013/H15
I. Jung
ACRS
J. Rogge, Region I
R. Scholl (e-mail SE only)

cc: Plant Service list