



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

July 9, 2020

Mr. Frank R. Payne
Site Vice President
Energy Harbor Nuclear Corp.
Perry Nuclear Power Plant
P.O. Box 97, SB306
Perry, OH 44081-0097

SUBJECT: PERRY NUCLEAR POWER PLANT, UNIT NO. 1 – ISSUANCE OF
AMENDMENT NO. 190 REGARDING FIRE PROTECTION PROGRAM
LICENSING BASIS (EPID L-2019-LLA-0292)

Dear Mr. Payne:

The U.S. Nuclear Regulatory Commission (the Commission) has issued the enclosed Amendment No. 190 to Facility Operating License No. NPF-58 for the Perry Nuclear Power Plant, Unit No. 1 (PNPP). The amendment consists of changes to the PNPP Fire Protection Program (FPP) licensing basis. The amendment revises PNPP FFP licensing basis to abandon the general area heat detection system located within the drywell.

A copy of our related safety evaluation is also enclosed. The Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

/RA/

Scott P. Wall, Senior Project Manager
Plant Licensing Branch III
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-440

Enclosures:

1. Amendment No. 190 to NPF-58
2. Safety Evaluation

cc w/encls: Listserv



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

ENERGY HARBOR NUCLEAR CORP.
ENERGY HARBOR NUCLEAR GENERATION LLC
DOCKET NO. 50-440
PERRY NUCLEAR POWER PLANT, UNIT NO. 1
AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 190
License No. NPF-58

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment filed by FirstEnergy Nuclear Operating Company, et al.,^{1,2} dated December 18, 2019, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations as 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.

¹ Effective February 27, 2020, Facility Operating License No. NPF-58 was transferred from FirstEnergy Nuclear Generation, LLC and FirstEnergy Nuclear Operating Company to Energy Harbor Nuclear Generation LLC and Energy Harbor Nuclear Corp., as the licensed owner and operator, respectively. In a letter dated February 20, 2020, Energy Harbor Nuclear Corp. requested that the NRC continue the regulatory reviews and actions on the outstanding licensing actions and applications on Docket No. 50-440 (Agencywide Documents Access and Management System Accession No. ML20054B733).

² Energy Harbor Nuclear Corp. is authorized to act as agent for Energy Harbor Nuclear Generation LLC and has exclusive responsibility and control over the physical construction, operation, and maintenance of the facility.

2. Accordingly, by Amendment No. 190, Facility Operating License No. NPF-58 is hereby amended to authorize revision to the Perry Nuclear Power Plant, Unit No. 1, Updated Safety Analysis Report, as set forth in the licensee's application dated December 18, 2019, and evaluated in the NRC staff's safety evaluation enclosed with this amendment.
3. This license amendment is effective as of its date of issuance and shall be implemented within 120 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Nancy L. Salgado, Chief
Plant Licensing Branch III
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Date of Issuance: July 9, 2020



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 190 TO FACILITY OPERATING LICENSE NO. NPF-58
ENERGY HARBOR NUCLEAR CORP.
ENERGY HARBOR NUCLEAR GENERATION LLC
PERRY NUCLEAR POWER PLANT, UNIT NO. 1
DOCKET NO. 50-440

1.0 INTRODUCTION

By application dated December 18, 2019 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML19352E549), FirstEnergy Nuclear Operating Company (FENOC) requested an amendment to change the Perry Nuclear Power Plant, Unit No. 1 (PNPP) Fire Protection Program (FPP) licensing basis. Specifically, the licensee requested approval to abandon in place the general area heat detection system in the drywell.¹

By order dated December 2, 2019 (ADAMS Accession No. ML19303C953), the U.S. Nuclear Regulatory Commission (NRC or Commission) staff approved the direct and indirect transfers of several FENOC-owned and operated plants, including PNPP. By letter dated December 3, 2019 (ADAMS Accession No. ML19337B181), FENOC indicated that the entities taking control of the plants, which had previously been referred to as New Hold Co, OwnerCo, and OpCo would be named Energy Harbor Corp., Energy Harbor Nuclear Generation LLC, and Energy Harbor Nuclear Corp., respectively. Under this new set-up, Energy Harbor Corp. would indirectly own the plants as a parent company, Energy Harbor Nuclear Generation LLC would directly own the plants, and Energy Harbor Nuclear Corp. would have authority to operate the plants.

On February 20, 2020, FENOC informed the NRC (ADAMS Accession No. ML20054B733) that:

Upon completion of the license transfer, Energy Harbor Nuclear Corp. will adopt and endorse the outstanding commitments, licensing actions, applications, and similar items on the aforementioned docket numbers. Energy Harbor Nuclear Corp. requests NRC continuation of the regulatory reviews and actions on these items.

¹ The application referred to this system as the "heat detection system" rather than the "fire detection system," which the guidance documents use, because PNPP uses heat detectors within the drywell. When discussing only about the drywell detection system, this safety evaluation will adopt that convention and refer to the heat detection system. When discussing the relevant regulatory requirements and guidance, as well as PNPP's general systems, this safety evaluation will use fire protection system.

On February 27, 2020, Energy Harbor Nuclear Corp., informed the NRC that the transaction closed on February 27, 2020, and that it adopted and endorsed the outstanding commitments, licensing actions, applications, and similar items on dockets, submitted by FENOC on behalf of the licensees (ADAMS Accession No. ML20058D315). On February 27, 2020 (ADAMS Accession No. ML20030A440), the NRC staff issued Amendment No. 187 to reflect the license transfer. Accordingly, Energy Harbor Nuclear Corp. is now authorized to act as agent for Energy Harbor Nuclear Generation, LLC, and has exclusive responsibility and control over the physical construction, operation, and maintenance of the facility at PNPP.

2.0 REGULATORY EVALUATION

2.1 Program Description

The current fire protection licensing basis requirements are those stated in license condition 2.C.(6) of the PNPP Facility Operating License NPF-58:

Energy Harbor Nuclear Corp. shall comply with the following requirements of the fire protection program: Energy Harbor Nuclear Corp. shall implement and maintain in effect all provisions of the approved fire protection program as described in the Final Safety Analysis Report, as amended, for the Perry Nuclear Power Plant and as approved in the Safety Evaluation Report (NUREG-0887) dated May 1982 and Supplement Nos. 1 through 10 thereto, subject to the following provisions:

- a. Energy Harbor Nuclear Corp. may make changes to the approved fire protection program without prior approval of the Commission only if those changes would not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire.

NUREG-0800, "Standard Review Plan," Section 9.5.1, "Fire Protection Program," (ADAMS Accession No. ML070660454) (referred to as "Branch Technical Position (BTP) Chemical Engineering Branch (CMEB 9.5-1), "Guidelines for Fire Protection for Nuclear Power Plants") Section B.1, "Defense-in-Depth," states:

With respect to the fire protection program, the defense-in-depth principle is aimed at achieving an adequate balance in:

- a. Preventing fires from starting;
- b. Detecting fires quickly, suppressing those fires that occur, putting them out quickly, and limiting their damage; and
- c. Designing plant safety systems so that a fire that starts in spite of the fire prevention program and burns for a considerable time in spite of fire protection activities will not prevent essential plant safety functions from being performed.

BTP CMEB 9.5-1, Section C.6.a, "Fire Detection," states:

- (1) Detection systems should be provided for all areas that contain or present a fire exposure to safety-related equipment.

BTP CMEB 9.5-1, Section C.6.e, "Carbon Dioxide Suppression System," states:

Carbon dioxide extinguishing systems should comply with the requirements of [National Fire Protection Standard] NFPA 12, "Carbon Dioxide Extinguishing Systems

In NUREG-0887, "Safety Evaluation Report Related to the Operation of Perry Nuclear Power Plant, Units 1 and 2," dated May 1982 (ADAMS Accession No. ML17227A091), Section 9.5, "Fire Protection Systems," the NRC stated that BTP CMEB 9.5-1 contained the technical requirements of Appendix A to BTP ASB 9.5-1 and Appendix R to Title 10 of the Code of *Federal Regulations* (10 CFR), Section 50, "Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979."

- In Section 9.5.1.5.1, "Fire Detection Systems," the NRC concluded that based upon licensee commitments and NRC staff review, the PNPP fire detection systems conformed with the guidelines of BTP CMEB 9.5-1, Section C.6.a.
- In Section 9.5.1.5.4, "Carbon Dioxide Suppression System," the NRC concluded that the carbon dioxide extinguishing systems meet the guidelines of BTP CMEB 9.5-1, Section C.6.e.
- In Supplement 8 to NUREG-0887, dated January 1986 (ADAMS Accession No. ML091320307), the NRC concluded that the PNPP fire protection program, with approved deviations, meets BTP CMEB 9.5-1 and Appendix A to 10 CFR 50, "General Design Criteria for Nuclear Power Plants" (GDC) 3, "Fire protection."

2.2 Licensee's Proposed Changes

The licensee proposed to revise the PNPP FPP licensing basis by deviating from BTP CMEB 9.5-1, Section C.6.a(1), by abandoning the general area heat detection system located within the drywell.

2.3 Regulatory Requirements

The regulation under 10 CFR 50.48(a)(1) requires that each holder of an operating license have an FPP that satisfies GDC 3. Appendix A to 10 CFR Part 50, GDC 3, states that:

Structures, systems, and components important to safety shall be designed and located to minimize, consistent with other safety requirements, the probability and effect of fires and explosions. Noncombustible and heat resistant materials shall be used wherever practical throughout the unit, particularly in locations such as the containment and control room. Fire detection and fighting systems of appropriate capacity and capability shall be provided and designed to minimize the adverse effects of fires on structures, systems, and components important to safety. Firefighting systems are designed to assure that their rupture or inadvertent operation does not significantly impair the safety capability of these structures, systems, and components.

3.0 TECHNICAL EVALUATION

In the December 18, 2019, application, the licensee requested approval to abandon the general area fire detection system located within the drywell. The licensee stated that the drywell

general area heat detection system is degraded and has been declared non-functional. According to the licensee, the high drywell temperature degraded the detector cabling, resulting in electrical grounds. The licensee also stated that due to the location of the conduits and heat detectors, repair or replacement is infeasible.

The licensee stated that a fire protection evaluation was completed to support the proposed deviation and the evaluation determined that the proposed FPP deviation reduces the level of defense in depth associated with the FPP. The licensee also stated that as a result, it adversely affects the ability to achieve and maintain safe shutdown in the event of a fire and therefore, NRC approval of the proposed change is required.

The licensee stated that the drywell is a cylindrical structure, located within the containment, that encloses the reactor pressure vessel. It has an outside diameter of 83 feet and a height of approximately 86 feet with a removable steel head cover approximately 32 feet in diameter, which when removed permits access to the reactor pressure vessel. The lower part of the drywell wall is submerged in the suppression pool. The area that comprises the inside of the drywell, including the reactor pressure vessel but excluding the area directly beneath the reactor pressure vessel, is labeled as fire zone 1RB-1c.

The licensee provided the basis for the request, including a defense in depth evaluation. The licensee stated that, with regard to the FPP, the defense in depth principle is aimed at achieving an adequate balance in:

- Prevention
- Detection and suppression, and
- Maintenance of safe shutdown capabilities.

3.1 Prevention

The licensee stated that the fire loading within fire zone 1RB-1c is approximately 52,000 British thermal units per square foot (BTU/ft²) and that cable insulation is a significant contributor of combustible material throughout the fire zone. However, the majority of this cable is routed in conduit.

The licensee stated that fire zone 1RB-1c is inaccessible during normal operation. When the drywell is open, administrative procedures are utilized to control transient combustibles and hot work that may occur in the fire zone. Administrative controls are in place to ensure the drywell is clear of debris, tools, and other unnecessary materials before the drywell is closed, or the remaining items have been properly evaluated by engineering. According to the licensee, these administrative controls are being maintained.

The licensee also stated that if a fire was detected in the drywell during normal full power operation, it is estimated to take approximately six hours to shut down the plant and enter the drywell to investigate. The licensee also stated that given the short burn time associated with the combustibles present in the drywell (approximately 39 minutes), the fire would burn out before drywell entry was achieved. According to the licensee, this action (shutting down the plant and entering the drywell to investigate) is no different than the present operational response if the drywell general heat detectors were still in service.

Based on the above, the NRC staff finds that no fire protection administrative controls concerning the drywell nor operational response procedures to investigate the drywell if a fire

was detected are impacted by the proposed amendment.

3.2 Detection

The licensee stated that there are two fire protection heat detection systems located within fire zone 1RB-1c. One system is used for fire warning and fire suppression system activation associated with the two reactor recirculation pumps. This detection system is not affected by this proposed FPP change. The second system is for general area heat detection and is used for fire warning, but is not credited in the safe shutdown analysis for this fire zone. The proposed FPP change will abandon this general area heat detection system in place.

The licensee stated that the drywell has a cooling system whose function is to provide cooling for the drywell and is designed as non-safety-related. The licensee also stated that this system includes 21 dual-element thermocouple temperature detectors mounted in the system ductwork and in the drywell to monitor the temperature within the drywell. The detectors actuate alarms in the control room if the drywell ambient temperature exceeds the setpoint limits.

The licensee stated that also located in the drywell are temperature detectors associated with the containment atmosphere monitoring system (CAMS). The function of CAMS is to detect and to monitor the containment to determine if an accident has occurred. The CAMS temperature-monitoring function in the drywell is designed as safety-related. The licensee stated that there are seven resistance temperature detectors (RTDs) located within drywell fire zone 1RB-1c. Six RTDs are arranged in two divisions, each division having three detectors. The divisions are located on opposite sides of the drywell. Temperature signals from the RTDs are recorded in the control room. Each division has a high average drywell temperature alarm in the control room. The seventh RTD provides indication on a remote shutdown panel recorder, which is located outside of the control room.

The licensee stated that if a heat detector setpoint is exceeded, an alarm signal is sent to the control room. If the alarm was associated with a drywell general area detector and cannot be reset, the control room operators would monitor drywell temperature values using the CAMS, and monitor the affected area and system or component parameters in the area until access into the drywell could be accomplished or adequate time had elapsed with no abnormal temperature increases.

Based on the above, the NRC staff finds the availability of various heat detection and monitoring systems in the drywell serving as defense in depth measures meet the intent of BTP CMEB 9.5-1, Section C.6.a.

3.3 Suppression

The licensee stated that in accordance with the off-normal instruction for fire actions, if the alarm was in a reactor recirculation pump area, then control room operators would open the containment isolation valve for the carbon dioxide system to ensure the discharge of carbon dioxide. This system remains intact and is not affected by this proposed FPP change.

The licensee also stated that there are no fire suppression systems associated with the drywell general area heat detection system. Hence, the proposed FPP change which abandons the drywell general area heat detection system has no impact upon the suppression aspect of the FPP defense in depth principles.

Based on the above, the NRC staff finds that the carbon dioxide extinguishing systems will continue to meet the guidelines of BTP CMEB 9.5-1, Section C.6.e.

3.4 Maintenance of Safe Shutdown Capabilities

In the December 18, 2019, application the licensee gave a description of the two independent methods used to achieve and maintain safe shutdown. The licensee termed these two methods, Method A and Method B. The licensee stated that equipment used for each safe shutdown method is located within fire zone 1RB-1c. The licensee also described features to ensure that one of the two methods of safe shutdown will be maintained should a fire occur in fire zone 1RB-1c. The licensee stated that separation of circuits and components for the redundant safe shutdown methods through distance or structural features that function as radiant energy shields provide adequate protection for this zone.

The licensee stated that a safe shutdown analysis evaluated fire zone 1RB-1c against Appendix R to 10 CFR 50, Section III.G, "Fire protection of safe shutdown capability." As stated above, this fire zone contains components and circuits for both Method A and Method B safe shutdown systems. The licensee stated that the evaluation concluded that if a fire occurred in this fire zone, either Method A or Method B, would be available to achieve and maintain safe shutdown, meeting the intent of 10 CFR 50, Appendix R, Section III.G. The licensee also stated that the installation of a general area heat detection system and an automatic fire suppression system (10 CFR 50, Appendix R, Section III.G.2., Item e), is not credited in this fire zone to protect safe shutdown components and circuits.

Based on the above, the NRC staff concludes the proposed change has no adverse impact on the post-fire safe shutdown capability.

3.5 NRC Staff Evaluation Conclusion

The NRC staff evaluated the proposed change to the PNPP FPP against the recommended guidelines in BTP CMEB 9.5-1, Section C.6.a and Section C.6.e, and finds abandoning the drywell general area heat detection system acceptable because:

- there are two other systems capable of detecting abnormal temperature increase within the drywell, thus defense in depth is maintained;
- there are no changes to the fire protection administrative controls, and the off-normal procedures remain the same for an investigation of a heat detector alarm in the drywell; and
- the abandoned in place general area heat detection system is not credited in this fire zone to protect safe shutdown components and circuits.

Therefore, the NRC staff concludes that the change to the PNPP FPP has minimal impact on the three echelons of defense-in-depth: preventing fires from starting; quickly detecting and suppressing fires to limit their damage; and not preventing essential plant safety functions from being performed despite a fire of considerable time laid out in BTP CEMB 9.5-1. Thus, PNPP's FPP still satisfies defense-in-depth principles. Consequently, the staff finds that the proposed change to the PNPP FPP is acceptable because analyses and evaluations demonstrate that the safety functions of the FPP will continue to be accomplished, consistent with the requirements of 10 CFR 50.48(a)(1).

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the State of Ohio official was notified of the proposed issuance of the amendment on May 29, 2020. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

The amendment changes requirements with respect to the installation or use of facility components located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendment involves 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 a proposed finding that the amendment involves no significant hazards consideration, which was published in the *Federal Register* on February 11, 2020 (85 FR 7792), and there has been no public comment on such finding. Accordingly, the 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 the amendment.

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) there is reasonable assurance that 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: R. Vettori, NRR
T. Dinh, NRR

Date of issuance: July 9, 2020

SUBJECT: PERRY NUCLEAR POWER PLANT, UNIT NO. 1 – ISSUANCE OF AMENDMENT NO. 190 REGARDING FIRE PROTECTION PROGRAM LICENSING BASIS (EPID L-2019-LLA-0292) DATED JULY 9, 2020

DISTRIBUTION:

PUBLIC

RidsNrrPMPerry Resource
 RidsACRS_MailCTR Resource
 RidsRgn3MailCenter Resource
 RidsNrrDraAplb Resource
 RidsNrrDorLpl3 Resource
 RidsNrrLASRohrer Resource
 RidsAcrs_MailCTR Resource
 RVettori, NRR

ADAMS Accession No.: ML20154K700

***via e-mail**

****via memo**

OFFICE	NRR/DORL/LPL3/PM*	NRR/DORL/LPL3/LA*	NSIR/DSS/APLB/BC**
NAME	SWall	SRohrer	JWhitman
DATE	06/04/2020	06/02/2020	5/18/20
OFFICE	OGC - NLO*	NRR/DORL/LPL3/BC*	NRR/DORL/LPL3/PM*
NAME	NMertz	NSalgado (RKuntz for)	SWall
DATE	06/23/2020	06/26/2020	07/09/2020

OFFICIAL RECORD COPY