



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

January 2, 2020

Ms. Pamela B. Cowan
Senior Vice President
and Chief Operating Officer
Holtec Decommissioning International, LLC
Krishna P. Singh Technology Campus
1 Holtec Blvd.
Camden, NJ 08104

SUBJECT: PILGRIM NUCLEAR POWER STATION – ISSUANCE OF AMENDMENT
NO. 251 RE: CHANGES TO THE EMERGENCY PLAN FOR PERMANENTLY
DEFUELED EMERGENCY PLAN AND EMERGENCY ACTION LEVEL
SCHEME (EPID L-2018-LLA-0221)

Dear Ms. Cowan:

The U.S. Nuclear Regulatory Commission (Commission) has issued the enclosed Amendment No. 251 to Renewed Facility License No. DPR-35 for the Pilgrim Nuclear Power Station, in response to your application dated August 1, 2018, as supplemented by letter dated November 8, 2018.

The amendment revises the site emergency plan and emergency action level scheme for the permanently shutdown and defueled condition.

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

Sincerely,

A handwritten signature in black ink that reads "Scott P. Wall".

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

Docket No. 50-293

Enclosures:

1. Amendment No. 251 to Renewed
License No. DPR-35
2. Safety Evaluation

cc: Listserv



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

HOLTEC DECOMMISSIONING INTERNATIONAL, LLC

HOLTEC PILGRIM, LLC

PILGRIM NUCLEAR POWER STATION

DOCKET NO. 50-293

AMENDMENT TO RENEWED FACILITY LICENSE

Amendment No. 251
Renewed License No. DPR-35

1. The Nuclear Regulatory Commission (NRC, the Commission) has found that:
 - A. The application for amendment filed by Entergy Nuclear Operations, Inc.,¹ dated August 1, 2018, as supplemented by letter dated November 8, 2018, 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.

¹ Effective August 26, 2019, Renewed Facility Operating License No. DPR-35 for the Pilgrim Nuclear Power Station (Pilgrim), including the general license for the Pilgrim Independent Spent Fuel Storage Installation, was transferred from Entergy Nuclear Operations, Inc. (ENOI) to Holtec Pilgrim, LLC as the licensed owner and to Holtec Decommissioning International, LLC (HDI) as the licensed operator for decommissioning. In a letter dated August 22, 2019, HDI requested that the NRC continue all ongoing regulatory actions and reviews currently underway for Pilgrim. HDI and Holtec Pilgrim, LLC have assumed responsibility for the continuation of these regulatory actions and reviews (Agencywide Documents Access and Management System Accession No. ML19234A357).

2. Accordingly, by Amendment No. 251, Renewed Facility License No. DPR-35 is hereby amended to authorize the revision to the Pilgrim Nuclear Power Station Emergency Plan and Emergency Action Level Scheme as set forth in application dated August 1, 2018, as supplemented by letter dated November 8, 2018, and as evaluated in the NRC staff's safety evaluation issued with this amendment.
3. This license amendment is effective 10 months following the permanent cessation of power operations and shall be implemented within 60 days of the effective date.

FOR THE NUCLEAR REGULATORY COMMISSION

A handwritten signature in black ink, appearing to read 'H. Nieh' followed by a stylized flourish.

Ho K. Nieh, Director
Office of Nuclear Reactor Regulation

Date of Issuance: January 2, 2020



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 251

TO RENEWED FACILITY LICENSE NO. DPR-35

HOLTEC DECOMMISSIONING INTERNATIONAL, LLC

HOLTEC PILGRIM, LLC

PILGRIM NUCLEAR POWER STATION

DOCKET NO. 50-293

1.0 INTRODUCTION

By application dated August 1, 2018 (Reference 1), as supplemented by letter dated November 8, 2018 (Reference 2), Entergy Nuclear Operations, Inc. (ENOI) requested changes to the site emergency plan and emergency action level (EAL) scheme for the Pilgrim Nuclear Power Station (Pilgrim).

The supplemental letter dated November 8, 2018, provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the U.S. Nuclear Regulatory Commission (NRC) staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on November 6, 2018 (83 FR 55571).

The proposed amendment would revise the Pilgrim Emergency Plan, referred to hereafter as the permanently defueled emergency plan (PDEP), and the Pilgrim EAL scheme based on the NRC staff's approval of exemptions. The licensee's letter dated August 1, 2018, contained a copy of the proposed PDEP and EAL scheme, including a description and evaluation of the proposed changes and a comparison to the EAL scheme provided in the Nuclear Energy Institute (NEI) document NEI 99-01, Revision 6, "Development of Emergency Action Levels for Non-Passive Reactors," issued November 2012 (Reference 3).

By letter dated July 3, 2018 (Reference 4), as supplemented by letters dated November 30 and December 4, 2018, and February 14 and February 18, 2019 (References 5, 6, 7, and 8, respectively), ENOI requested exemptions for Pilgrim from certain emergency preparedness/planning (EP) requirements contained in Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.47, "Emergency plans," and Appendix E, "Emergency Planning and Preparedness for Production and Utilization Facilities," to 10 CFR Part 50, based on the permanently shutdown and defueled condition of the Pilgrim reactor. The requested exemptions were granted and will be implemented no earlier than 10 months after the permanent cessation of power operations.

By letter dated November 16, 2018 (Reference 9), ENOI, on behalf of itself and Entergy Nuclear Generation Company (ENGCO) (to be known as Holtec Pilgrim, LLC), Holtec International (Holtec), and Holtec Decommissioning International, LLC (HDI, the licensee) (together, Applicants), requested that the NRC consent to: (1) the indirect transfer of control of Renewed Facility Operating License No. DPR-35 for Pilgrim, as well as the general license for the Pilgrim Independent Spent Fuel Storage Installation (ISFSI) (together, the Licenses), to Holtec; and (2) the direct transfer of ENOI's operating authority (i.e., its authority to conduct licensed activities at Pilgrim) to HDI. In addition, the Applicants requested that the NRC approve a conforming administrative amendment to the Licenses to reflect the proposed direct transfer of the Licenses from ENOI to HDI; a planned name change for ENGCO from ENGCO to Holtec Pilgrim, LLC; and deletion of certain license conditions to reflect satisfaction and termination of all ENGCO obligations after the license transfer and equity sale.

By Order dated August 22, 2019 (Reference 10), the NRC staff approved the direct and indirect transfers requested in the November 16, 2018, application. Additionally, on August 22, 2019, HDI informed the NRC (Reference 11) that:

HDI will assume responsibility for all ongoing NRC regulatory actions and reviews currently underway for Pilgrim Nuclear Power Station. HDI respectfully requests NRC continuation of these regulatory actions and reviews.

On August 26, 2019, ENOI informed the NRC that the license transfer transaction closed on August 26, 2019 (Reference 12). On August 27, 2019 (Reference 13), the NRC staff issued Amendment No. 249 to reflect the license transfer. Accordingly, HDI is now the licensee for decommissioning operations at Pilgrim. On October 28, 2019 (Reference 14), the NRC staff issued Amendment No. 250 to revise the license and technical specifications to reflect the permanently shutdown and defueled condition at Pilgrim.

2.0 Background

Pilgrim is located on the western shore of Cape Cod Bay, within the Commonwealth of Massachusetts. The facility site, approximately 517 acres, is in the Town of Plymouth, Massachusetts. The nearest major population centers to the site are Boston, Massachusetts (36 miles to the northwest), and Providence, Rhode Island (44 miles to the west).

By letter dated November 10, 2015 (Reference 15), pursuant to 10 CFR 50.82(a)(1)(i), ENOI certified to the NRC that it planned to permanently cease power operations at Pilgrim no later than June 1, 2019. ENOI permanently ceased power operations at Pilgrim on May 31, 2019. By letter dated June 10, 2019 (Reference 16), pursuant to 10 CFR 50.82(a)(1)(ii), ENOI certified to the NRC that the fuel was permanently removed from the Pilgrim reactor vessel and placed in the spent fuel pool (SFP) on June 9, 2019. Based on the docketing of these certifications for permanent cessation of operations and permanent removal of fuel from the reactor vessel, as specified in 10 CFR 50.82(a)(2), the 10 CFR Part 50 license for Pilgrim no longer authorizes operation of the reactor or emplacement or retention of fuel into the reactor vessel. Spent fuel is currently stored onsite at the Pilgrim facility in the SFP and in a dry cask ISFSI.

The licensee submitted the proposed Pilgrim PDEP and EAL scheme to the NRC in accordance with 10 CFR 50.54(q)(4), contingent on the NRC's prior approval of certain exemptions from specific requirements of 10 CFR 50.47 and Appendix E to 10 CFR Part 50.

By letter dated December 18, 2019 (Reference 17), the NRC staff granted the licensee exemptions from certain EP requirements in 10 CFR 50.47 and Appendix E to 10 CFR Part 50, in accordance with 10 CFR 50.12, "Specific exemptions," based, in part, on the low risks associated with the Pilgrim reactor in a permanently shutdown and defueled condition. In granting the requested exemptions, the NRC primarily relied on the Pilgrim site-specific analyses, which provided reasonable assurance that: (1) an offsite radiological release would not exceed the early phase protective action guides (PAGs) provided in the U.S. Environmental Protection Agency (EPA), EPA-400/R-17/001, "PAG Manual: Protective Action Guides and Planning Guidance for Radiological Incidents," dated January 2017 (Reference 18), at the site's exclusion area boundary (EAB) for the remaining design-basis accidents applicable to the Pilgrim facility in its permanently shutdown and defueled condition; and (2) in the highly unlikely event of a severe beyond-design-basis accident resulting in a loss of all cooling to the spent fuel stored in the Pilgrim SFP, there would be a significant amount of time between the initiating event and the possible onset of conditions that could result in a zirconium cladding fire. This time provides a substantial opportunity for event mitigation. Pilgrim is required to maintain effective strategies, sufficient resources, and adequately trained personnel to mitigate such an event. If State or local governmental officials determine that offsite protective actions are warranted, then sufficient time and capability would also be available for offsite response organizations to implement these measures using a comprehensive emergency management plan (CEMP) or "all-hazards" approach.¹

The Commission's approval of the requested exemptions is documented in a Staff Requirements Memorandum dated November 4, 2019 (Reference 20), responding to SECY-19-0078, "Request by Entergy Nuclear Operations, Inc. for Exemptions from Certain Emergency Planning Requirements for the Pilgrim Nuclear Power Station," dated August 9, 2019 (Reference 21). With the NRC's approval of the requested EP exemptions, the licensee stated that the proposed Pilgrim PDEP will continue to meet the remaining applicable planning standards in 10 CFR 50.47(b) and the requirements in Appendix E to 10 CFR Part 50.

In addition to the proposed changes in the Pilgrim PDEP, the licensee is proposing to change the entire EAL scheme to reflect the permanently shutdown and defueled condition of the Pilgrim reactor. In accordance with Section IV.B.2 of Appendix E to 10 CFR Part 50, the licensee must receive NRC approval before implementing a change to the entire EAL scheme. The licensee stated that the changes to the EAL scheme are consistent with the methodology recommended for permanently shutdown and defueled reactors, as provided in NEI 99-01, Revision 6.

¹ A CEMP in this context, also referred to as an emergency operations plan, is addressed in the Federal Emergency Management Agency (FEMA) Comprehensive Preparedness Guide 101, "Developing and Maintaining Emergency Operations Plans," Version 2.0, dated November 2010 (Reference 19).

3.0 REGULATORY EVALUATION

3.1 Emergency Plan

Section 50.47 of 10 CFR sets forth the emergency plan requirements for nuclear power reactors. The regulation in 10 CFR 50.47(a)(1)(i) states, in part, that:

no initial operating license for a nuclear power reactor will be issued unless a finding is made by the NRC that there is reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency.

Section 50.47(b) of the Commission's regulations establishes the standards that the onsite and offsite emergency response plans must meet for NRC staff to make a positive finding that there is reasonable assurance that the licensee can and will take adequate protective measures in the event of a radiological emergency.

Appendix E, Section IV, "Content of Emergency Plans," to 10 CFR Part 50 provides the requirements for the content of the emergency plans.

The EP regulations contained in 10 CFR 50.47(b) and Appendix E to 10 CFR Part 50, apply to both operating power reactors, and permanently shutdown and defueled power reactors. However, the EP regulations are silent with regard to the fact that once a power reactor permanently ceases operation and permanently removes fuel from the reactor vessel, the risks of credible emergency accident scenarios at the facility are greatly reduced. Therefore, the consistent practice for permanently shutdown and defueled power reactors has been for the licensees to request exemptions under 10 CFR 50.12, which allow changes to the facility's emergency plan, commensurate with the credible site-specific risks that are present during decommissioning. Such EP exemptions generally recognize the reduction in radiological risk as spent fuel ages and the preclusion of accidents that are strictly applicable to an operating nuclear power reactor.

The practice of granting exemptions from the Commission's EP regulations is a well-established part of the NRC regulatory process. This process allows licensees to address site-specific situations or to implement alternative approaches in response to circumstances that are not necessarily contemplated in regulations that are generally intended for operating power reactors. The exemption process, which allows the NRC to provide relief in appropriate circumstances where safety and security continue to be assured, is not unique to the decommissioning of power reactors or to the specific technical areas of EP. The Commission makes decisions on exemption requests on a site-specific, case-by-case basis, following an established process that includes the NRC staff's detailed technical assessment on individual exemption requests. According to 10 CFR 50.12, the Commission may grant exemptions from the requirements of its regulations, which are authorized by law, will not present an undue risk to the public health and safety, are consistent with the common defense and security, and present special circumstances.

The guidance in Revision 1 to NUREG-0654/FEMA-REP-1 (NUREG-0654), "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," issued November 1980 (Reference 22), provides an acceptable method for power reactor licensees to develop radiological emergency response plans. NUREG-0654 provides guidance for the format and content of an emergency plan, which

can be applied to the planning standards in 10 CFR 50.47(b). Attachment 1, "Staff Guidance for Evaluation of Permanently Defueled Emergency Plans," to Interim Staff Guidance (ISG) document NSIR/DPR-ISG-02, "Emergency Planning Exemption Requests for Decommissioning Nuclear Power Plants," dated May 11, 2015 (Reference 23), provides an acceptable method for the NRC staff's review of PDEPs for sites undergoing decommissioning and was developed from the remaining applicable evaluation criteria in Section II, "Planning Standards and Evaluation Criteria," to NUREG-0654.

3.2 Emergency Action Level Scheme

Paragraph 50.47(b)(4) of 10 CFR, as exempted for Pilgrim (exempted language indicated by strikeout and bolded text), requires that a licensee's emergency response plan contain:

A standard emergency classification and action level scheme, the bases of which include facility system and effluent parameters, is in use by the nuclear facility licensee, ~~and State and local response plans call for reliance on information provided by facility licensees for determinations of minimum initial offsite response measures.~~

This requirement emphasizes a standard emergency classification and action level scheme, assuring that implementation methods are relatively consistent throughout the industry for a given reactor and containment design, while simultaneously providing an opportunity for a licensee to modify its EAL scheme as necessary to address plant-specific design considerations or preferences.

Section IV.B of Appendix E to 10 CFR Part 50, as exempted for Pilgrim (exempted language indicated by strikeout and bolded text), states:

1. The means to be used for determining the magnitude of, and for continually assessing the impact of, the release of radioactive materials shall be described, including emergency action levels that are to be used as criteria for determining the need for notification and participation of local and State agencies, the Commission, and other Federal agencies, and the emergency action levels that are to be used for determining when and what type of protective measures should be considered within ~~and outside~~ the site boundary to protect health and safety. The emergency action levels shall be based on in-plant conditions and instrumentation in addition to onsite ~~and offsite~~ monitoring. ~~By June 20, 2012, for nuclear power reactor licensees, these action levels must include hostile action that may adversely affect the nuclear power plant.~~ The initial emergency action levels shall be discussed and agreed on by the applicant or licensee and state and local governmental authorities, and approved by the NRC. Thereafter, emergency action levels shall be reviewed with the State and local governmental authorities on an annual basis.
2. A licensee desiring to change its entire emergency action level scheme shall submit an application for an amendment to its license and receive NRC approval before implementing the change. Licensees shall follow the change process in § 50.54(q) for all other emergency action level changes.

The NRC staff's review is based upon a revision to the Pilgrim EAL scheme provided in the licensee's letter dated August 1, 2018, as supplemented by the letter dated November 8, 2018. As part of this review, the NRC staff assessed the site-specific modifications made by Pilgrim to the guidance provided by NEI 99-01, Revision 6. The NRC endorsed this methodology by letter dated March 28, 2013 (Reference 24), as an acceptable method for developing EALs required by 10 CFR 50.47(b)(4), Section IV.B.1 of Appendix E to 10 CFR Part 50, and the associated planning standard evaluation criteria in Section II.D of NUREG-0654. In addition, the methodology also provides guidance for permanently shutdown and defueled power reactors for the development of a site-specific emergency classification scheme.

4.0 TECHNICAL EVALUATION

4.1 Emergency Plan

Pursuant to Pilgrim's certifications of permanent cessation of operations and permanent removal of fuel from the reactor vessel under 10 CFR 50.82, "Termination of license," no reactor operations can take place and Pilgrim is prohibited from placing fuel in the reactor vessel. Consequently, the PDEP describes the licensee's response to emergencies that may arise at the Pilgrim facility while it is in a permanently shutdown and defueled configuration. Recognizing that there is no longer any credible design-basis accidents that would result in offsite dose consequences large enough to require offsite radiological emergency preparedness (REP) plans in accordance with 44 CFR Part 350, the PDEP no longer specifies the requirements for formal offsite REP planning. Additionally, the onsite EP activities contained in the Pilgrim PDEP are reduced in scope. The PDEP specifically implements the planning standards of 10 CFR 50.47(b) and the requirements in Appendix E to 10 CFR Part 50, as exempted by the NRC's letter to the licensee dated December 18, 2019.

This safety evaluation summarizes the NRC staff's technical evaluation of the Pilgrim PDEP, based on the planning standards of 10 CFR 50.47(b) and the requirements in Appendix E to 10 CFR Part 50, as exempted for Pilgrim, and using the remaining applicable evaluation criteria provided in NUREG-0654, as outlined in Attachment 1 to NSIR/DPR-ISG-02. The proposed changes, as exempted for Pilgrim, are shown with a strikethrough of the current wording associated with the regulations.

4.1.1 Assignment of Responsibility (Organizational Control)

Paragraph 50.47(b)(1) of 10 CFR, as exempted for Pilgrim, requires in a licensee's emergency plan that:

Primary responsibilities for emergency response by the nuclear facility licensee and by State and local organizations ~~within the Emergency Planning Zones~~ have been assigned, the emergency responsibilities of the various supporting organizations have been specifically established, and each principal response organization has staff to respond and to augment its initial response on a continuous basis.

The Control Room Supervisor position is staffed 24 hours a day, 7 days a week. This position is the senior management position at the facility during off-hours. This position is responsible for monitoring facility conditions and approving onsite activities. The position has the authority, management ability, and technical knowledge to classify and declare a facility emergency and

assume the Emergency Director role. This command and control position is responsible for ensuring the continuity of resources through an event.

In addition to the Control Room Supervisor, designated on-shift staff positions include a Non-Certified Operator and Radiation Protection (RP) Technician, along with security personnel. The Pilgrim Emergency Response Organization (ERO) is activated at the declaration of an Alert classification level and will augment the on-shift staff within approximately 120 minutes of the declaration of an Alert classification level. However, the ERO may be activated, in part or in whole, at any time at the discretion of the Control Room Supervisor/Emergency Director.

The normal on-shift complement provides the initial response to an emergency. This group is trained to handle emergency situations, including implementation of the Pilgrim PDEP and making initial accident assessments, emergency classifications, notifications, and protective action recommendations until ERO augmentation has occurred. The minimum staff required to conduct routine and immediate emergency mitigation is maintained at the facility. The designated on-shift personnel are those positions required to direct or perform site-specific mitigation strategies required for a catastrophic loss of SFP inventory.

Letters of Agreement are in place for those local offsite response organizations (OROs) that will provide ambulance services, treatment of contaminated and injured patients, fire support services, and law enforcement response, as requested by Pilgrim. The details of their responsibilities are described in Section 3.0, "Emergency Response Support and Resources," of the Pilgrim PDEP and are contained in the respective Letter of Agreement between each organization and Pilgrim. These letters are maintained on file in the Emergency Planning Department at Pilgrim.

OROs that may respond onsite as requested to a declared emergency at the Pilgrim facility include:

- Plymouth Police Department -- provides primary law enforcement;
- Plymouth Fire Department -- provides the primary fire and rescue support services;
- Plymouth Fire Department -- provides the primary coordination of emergency ambulance services including the transport of contaminated and injured personnel; and
- Beth Israel Deaconess Hospital (Plymouth) -- provides medical treatment to contaminated and injured personnel.

These OROs are capable of a 24-hour response and operation.

Based on the NRC staff's review of the Pilgrim PDEP as described above, the NRC staff finds that the proposed PDEP meets the applicable evaluation criteria of NUREG-0654, as outlined in Attachment 1 to NSIR/DPR-ISG-02, because the PDEP adequately describes the concept of operations for individuals and organizations responsible for responding to emergencies at the site, identifies the position of Control Room Supervisor/Emergency Director as the individual in charge of the emergency response, and identifies the minimum staff on duty at the plant during all shifts to provide emergency response. Additional personnel are available on an on-call basis to respond to plant emergencies. Based on this review, the NRC staff concludes that planning standard 10 CFR 50.47(b)(1), and the requirements of Sections IV.A.1, A.2, A.4, and A.7 of Appendix E to 10 CFR Part 50, as exempted for Pilgrim, pertaining to assignment of

responsibility (organization control), are addressed in an acceptable manner in the Pilgrim PDEP, considering the permanently shutdown and defueled status of the facility.

4.1.2 Onsite Emergency Organization

Paragraph 50.47(b)(2) of 10 CFR requires that a licensee's emergency response plan contain:

On-shift facility licensee responsibilities for emergency response are unambiguously defined, adequate staffing to provide initial facility accident response in key functional areas is maintained at all times, timely augmentation of response capabilities is available and the interfaces among various onsite response activities and offsite support and response activities are specified.

The Pilgrim facility has designated personnel on-shift at all times, including a designated Control Room Supervisor, Non-Certified Operator, and RP Technician, who would provide the initial response to an event. The Control Room Supervisor is the on-shift individual who declares the initial emergency classification and assumes the role of Emergency Director. The Control Room Supervisor has the authority to immediately and unilaterally initiate any emergency actions. The Pilgrim PDEP also specifies the non-delegable and delegable responsibilities of the Emergency Director.

Members of the on-shift organization are trained on their responsibilities and duties in the event of an emergency and are capable of performing necessary response actions until the ERO arrives to augment on-shift staffing or the event is terminated. The on-shift staffing assignments include the roles and responsibilities for their emergency response functions. The relationship between normal and emergency response positions for the shift personnel is unchanged when an event occurs.

The on-shift positions, and the augmented positions that fulfill emergency staffing capabilities, are depicted in Table 2.1, "On-Shift and Emergency Response Organization Staffing Requirements," of the Pilgrim PDEP. This table, along with Figure 2.1, "On-Shift and Emergency Response Organization," provides a graphical representation of the functional responsibilities for designated on-shift positions and the augmented positions that fulfill emergency staffing capabilities.

The Pilgrim ERO augments the normal on-shift organization to respond to declared emergencies when activated. ERO personnel are trained and assigned to a position based on job qualifications or by being specifically trained to fill the position. The ERO is activated at the declaration of an Alert classification level or at the discretion of the Control Room Supervisor/Emergency Director. The designated on-shift and augmented ERO staff are capable of continuous (24-hour) operations for a protracted period. Upon the initial declaration of an emergency classification, the Control Room Supervisor assumes the responsibilities of the Emergency Director position. Mobilization of the ERO will be conducted under the direction of the Emergency Director, according to personnel assignments and telephone numbers maintained in various telephone directories. The minimum augmented staff is an RP Coordinator and a Technical Coordinator.

The PDEP further provides that in the event of an emergency declaration at Pilgrim requiring additional personnel and other support resources, the ERO can be augmented with manpower and equipment support from OROs, as previously discussed in Section 4.1.1 of this safety evaluation. Arrangements are in place through letters of agreement for ambulance services, treatment of contaminated and injured patients, fire support services, and law enforcement response, as requested by Pilgrim.

Based on the NRC staff's review of the Pilgrim PDEP as described above, the NRC staff finds that the proposed PDEP meets the applicable evaluation criteria of NUREG-0654, as outlined in Attachment 1 to NSIR/DPR-ISG-02, because the PDEP identifies: (1) the onsite ERO and its relationship to the normal shift complement; (2) that the on-shift individual responsible for emergency response is the Control Room Supervisor, who has the authority and responsibility to initiate the functional responsibilities for emergency response; (3) adequate staffing to provide initial facility accident response in key functional areas; (4) that timely augmentation of response capabilities is available; (5) that local services are identified with letters of agreement in place; and (6) arrangements for the treatment and transportation of contaminated injured personnel. Based on this review, the NRC staff concludes that planning standard 10 CFR 50.47(b)(2), and the requirements of Sections IV.A.1, A.2, A.4, A.9, and C.1 of Appendix E to 10 CFR Part 50, as exempted for Pilgrim, pertaining to the onsite emergency organization, are addressed in an acceptable manner in the Pilgrim PDEP, considering the permanently shutdown and defueled status of the facility.

4.1.3 Emergency Response Support and Resources

Paragraph 50.47(b)(3) of 10 CFR, as exempted for Pilgrim, requires that a licensee's emergency response plan contain:

Arrangements for requesting and effectively using assistance resources have been made, ~~arrangements to accommodate State and local staff at the licensee's Emergency Operations Facility have been made~~, and other organizations capable of augmenting the planned response have been identified.

The Emergency Director is authorized to request assistance as needed, including offsite fire, ambulance, and local law enforcement response. Letters of agreement are in place for those local agencies that would respond to the site if requested and for the local hospital that may be required to treat a contaminated injured individual from the site, as designated in the Pilgrim PDEP. These letters of agreement are discussed in Section 4.1.1 of this safety evaluation.

Based on the NRC staff's review of the Pilgrim PDEP as described above, the NRC staff finds that the proposed PDEP meets the applicable evaluation criteria of NUREG-0654, as outlined in Attachment 1 to NSIR/DPR-ISG-02, because the PDEP adequately describes the arrangements for requesting assistance from other organizations or individuals in an emergency, and that this assistance is supported by letters of agreement. Based on this review, the NRC staff concludes that planning standard 10 CFR 50.47(b)(3), and the requirements of Sections IV.A.6 and A.7 of Appendix E to 10 CFR Part 50, as exempted for Pilgrim, pertaining to emergency response support and resources, are addressed in an acceptable manner in the Pilgrim PDEP, considering the permanently shutdown and defueled status of the facility.

4.1.4 Emergency Classification System

Paragraph 50.47(b)(4) of 10 CFR, as exempted for Pilgrim, requires that a licensee's emergency response plan contain:

A standard emergency classification and action level scheme, the bases of which include facility system and effluent parameters, is in use by the nuclear facility licensee, ~~and State and local response plans call for reliance on information provided by facility licensees for determinations of minimum initial offsite response measures.~~

The Pilgrim PDEP identifies that the emergency classification system covers a spectrum of possible radiological and non-radiological emergencies at Pilgrim, considering the permanently shutdown and defueled status of the facility. A graded scale of response for distinct classifications of emergency conditions, actions appropriate for those classifications, and criteria for escalation to a more severe classification are provided. The revised EAL scheme categorizes accidents and/or emergency situations into one of two emergency classification levels (ECLs) depending on emergency conditions at the time of the incident. The ECLs applicable at Pilgrim, considering the permanently shutdown and defueled status of the facility, in order of increasing severity will be a Notification of Unusual Event (Unusual Event) and an Alert. Each of these ECLs requires notification to the Commonwealth of Massachusetts and the Town of Plymouth, as well as the NRC, as designated in the Pilgrim PDEP. The classification of emergencies up to an Alert is consistent with the regulations for an ISFSI in 10 CFR 72.32(a)(3) and the exemptions granted for Pilgrim, as described in the NRC's letter dated December 18, 2019.

The Pilgrim EAL scheme is based on NEI 99-01, Revision 6, as applied to a permanently shutdown and defueled power reactor with fuel stored onsite in the SFP and ISFSI, which specifies ECLs of an Unusual Event and Alert. When indications are available to on-shift personnel that an EAL threshold has been met, the event is assessed and the corresponding ECL is declared. Pilgrim maintains the capability to assess, classify, and declare an emergency condition within 30 minutes after the availability of indications that an EAL threshold has been reached. Emergency classifications are to be made as soon as conditions are present and recognizable for the classification in accordance with the applicable EALs, but within 30 minutes in all cases after the availability of indications to operators that an EAL threshold has been reached. The initiating conditions, their corresponding EALs, and the technical bases for each classifiable EAL threshold, are contained in Enclosure 2, "Permanently Defueled Emergency Action Level Technical Bases Document," to the licensee's letter dated August 1, 2018, as supplemented by the letter dated November 8, 2018.

Based on the NRC staff's review of the Pilgrim PDEP as described above, the NRC staff finds that the proposed PDEP meets the applicable evaluation criteria of NUREG-0654, as outlined in Attachment 1 to NSIR/DPR-ISG-02, because the PDEP adequately identifies: (1) that the emergency classification system covers a spectrum of possible radiological and non-radiological emergencies at Pilgrim; (2) a graded scale of response for distinct classifications of emergency conditions; (3) actions appropriate for those classifications; and (4) criteria for escalation to a more severe classification. The specific instruments, parameters, or equipment status are described for each emergency classification level in the EAL scheme. Based on this review, the NRC staff concludes that planning standard 10 CFR 50.47(b)(4), and the requirements of Sections IV.B.1, C.1, and C.2 of Appendix E to 10 CFR Part 50, as exempted for Pilgrim,

pertaining to the emergency classification system, are addressed in an acceptable manner in the Pilgrim PDEP, considering the permanently shutdown and defueled status of the facility.

4.1.5 Notification Methods and Procedures

Paragraph 50.47(b)(5) of 10 CFR, as exempted for Pilgrim, requires that a licensee's emergency response plan contain:

Procedures have been established for notification, by the licensee, of State and local response organizations and for notification of emergency personnel by all organizations; the content of initial and follow-up messages to response organizations ~~and the public has been established; and means to provide early notification and clear instruction to the populace within the plume-exposure pathway Emergency Planning Zone have been established.~~

The Pilgrim PDEP identifies the Emergency Director position, which is assumed by the Control Room Supervisor, who is responsible for initiating notification to the Commonwealth of Massachusetts, Town of Plymouth, and Federal officials, and initiating corrective and mitigative actions. Onsite staff in the facility's Protected Area are notified by announcements made from the Control Room over the plant public address system, office telephones, and/or wireless devices capable of receiving telephone calls and text messages. The plant public address system is also installed in the buildings outside the Protected Area. Site Security personnel may assist in the notification of all other personnel on Pilgrim facility property. In the event that personnel required to staff ERO positions are not onsite at the time an emergency is declared, they may be contacted by commercial telephone, including landlines and/or wireless devices capable of receiving telephone calls and text messages. Mobilization of the Pilgrim ERO will be conducted at the direction of the Emergency Director, according to personnel assignments and telephone numbers maintained in various telephone directories.

Notification to the responsible Commonwealth of Massachusetts and Town of Plymouth authorities is required within 60 minutes of the emergency classification. The commercial telephone network serves as the primary means to provide emergency notification to Commonwealth of Massachusetts and Town of Plymouth agencies. It is used to provide initial and updated notifications and for general information flow between these agencies. In the event the commercial telephone system is unavailable, wireless communications can be used to make emergency notifications. In addition, electronic means may be used to transmit the notification message.

The licensee, in coordination with the Commonwealth of Massachusetts, has established the contents of the initial emergency messages to be sent from Pilgrim in the event an emergency classification is declared. These messages contain the following information, if it is known and appropriate:

- Notification type (i.e., drill or actual event);
- Identity of caller and receiver of call;
- The date and time of classification and notification;
- Emergency classification;
- EAL identification and whether a release is in progress;
- Wind direction and speed;
- Response actions underway;

- Request for any needed onsite support by offsite organizations; and
- Prognosis for worsening or termination of event based on facility information.

The NRC Emergency Notification System (ENS) is a dedicated telephone system used to notify the NRC Operations Center of an emergency. The NRC will be notified as soon as possible after the Commonwealth of Massachusetts and the Town of Plymouth notifications and no later than one hour after Pilgrim declares an EAL per 10 CFR 50.72. In the event that the ENS fails, commercial phone lines will be used to notify the NRC. Notification to the NRC is the responsibility of the Emergency Director.

Based on the NRC staff's review of the Pilgrim PDEP as described above, the NRC staff finds that the proposed PDEP meets the applicable evaluation criteria of NUREG-0654, as outlined in Attachment 1 to NSIR/DPR-ISG-02, because the PDEP adequately describes the process for initiating notifications to the NRC and State/local officials, and the contents of the emergency messages to be sent. The licensee, in cooperation with the Commonwealth of Massachusetts, has established mutually agreeable methods and procedures for notification of OROs (as discussed above), consistent with the EAL scheme and the contents of the message form. Follow-up reports are provided as additional information describing the emergency situation becomes available, and on an as-needed basis, until such time that the emergency condition has been terminated. Based on this review, the NRC staff concludes that planning standard 10 CFR 50.47(b)(5), and the requirements of Sections IV.A.6, A.7, C.1, C.2, D1, and D.3 of Appendix E to 10 CFR Part 50, as exempted for Pilgrim, pertaining to notification methods and procedures, are addressed in an acceptable manner in the Pilgrim PDEP, considering the permanently shutdown and defueled status of the facility.

4.1.6 Emergency Communications

Paragraph 50.47(b)(6) of 10 CFR, as exempted for Pilgrim, requires that a licensee's emergency response plan contain:

Provisions exist for prompt communications among principal response organizations to emergency personnel ~~and to the public~~.

A number of communications systems are available for use among the principal response organizations. There are provisions for 24-hour per day notification to Commonwealth of Massachusetts and Town of Plymouth authorities, for activating the Pilgrim ERO personnel, and for periodic testing of the emergency communication systems. The Emergency Director is responsible for the notification of an emergency declaration to the Commonwealth of Massachusetts, Town of Plymouth, and Federal officials, and initiating corrective and mitigative actions, when an emergency declaration has been made by Pilgrim. Control Room personnel will assess facility conditions and perform notifications.

There are extensive and reliable communication systems installed at Pilgrim. Examples of the communications network include systems such as a paging system, commercial telephone system, federal telecommunications system (FTS), and portable radios. The onsite paging system (Gaitronics) provides a means of intra-plant communications. Stations on this system provide access to the Gaitronics and to intercom lines. These stations and speakers are placed throughout the facility, including the Control Room. The Gaitronics provides five Station channels, one of which is dedicated to operations/emergency use only. Personnel within the Protected Area are notified of an emergency declaration, escalation, or termination by alarms

and verbal announcements over the Gaitronics. Announcements include the response actions to be taken by site personnel.

The commercial telephone system, as discussed previously in Section 4.1.5 of this safety evaluation, is the primary communication means between Pilgrim, the Commonwealth of Massachusetts, and the Town of Plymouth, and is used to provide initial and follow-up notifications and for general information flow between these agencies. Additional methods of communication are available to Pilgrim staff to transmit information onsite and offsite during normal and emergency situations, to include wireless communications and electronic means. The telephone system can be used for in-facility as well as outside communications.

The telephone system is also the primary means to activate the Pilgrim ERO, as directed by the Emergency Director. In the event that personnel required to staff emergency positions are not onsite at the time an emergency is declared, they may be contacted by commercial telephone, including landlines and/or wireless devices capable of receiving telephone calls and text messages. Telephone numbers are maintained in various telephone directories. The telephone system includes many automated or programmable features that improve notification and allow flexibility. Portable radios may be utilized by facility personnel and ERO personnel during an emergency.

In addition, the NRC ENS utilizes the FTS telephone network for emergency communications. The FTS line exists between the NRC Operations Center in Rockville, Maryland, and the Pilgrim Control Room. Emergency notification, facility status information, and radiological information are communicated to the NRC via the ENS circuit.

Periodic testing of the emergency communications system is described in Section 14.2.6, "Communication Tests," of the Pilgrim PDEP.

Based on the NRC staff's review of the Pilgrim PDEP as described above, the NRC staff finds that the proposed PDEP meets the applicable evaluation criteria of NUREG-0654, as outlined in Attachment 1 to NSIR/DPR-ISG-02, because the PDEP adequately identifies that provisions exist for prompt communications among principal response organizations to emergency personnel. The communication methods provide a reliable primary and backup means of communication, and for plant-to-offsite communications with Federal, State, and local agencies. Based on this review, the NRC staff concludes that planning standard 10 CFR 50.47(b)(6) and the requirements of Sections IV.C.1, D.1, and D.3 of Appendix E to 10 CFR Part 50, as exempted for Pilgrim, pertaining to emergency communications, are addressed in an acceptable manner in the Pilgrim PDEP, considering the permanently shutdown and defueled status of the facility.

4.1.7 Public Education and Information

Paragraph 50.47(b)(7) of 10 CFR, as exempted for Pilgrim, requires that a licensee's emergency response plan contain:

~~Information is made available to the public on a periodic basis on how they will be notified and what their initial actions should be in an emergency (e.g., listening to a local broadcast station and remaining indoors); [T]he principal points of contact with the news media for dissemination of information during an emergency (including the physical location or locations) are~~

established in advance, and procedures for coordinated dissemination of information to the public are established.

As part of its normal corporate structure, the licensee maintains a Corporate Public Affairs Office that can be called upon to provide resources, as necessary. The spokesperson function would typically be performed by HDI Communications personnel. The spokesperson monitors media activity and coordinates with senior management to address rumors and disseminate information to the public. The spokesperson will participate in news conferences as appropriate with Federal, State, and local response organizations conducted onsite or at other locations, as necessary. The spokesperson is available for media inquiries and the positional duties include maintaining liaison with local media and coordinating with Federal, State, and local response organizations to disseminate appropriate information regarding an emergency at Pilgrim.

Based on the NRC staff's review of the Pilgrim PDEP as described above, the NRC staff finds that the proposed PDEP meets the applicable evaluation criteria of NUREG-0654, as outlined in Attachment 1 to NSIR/DPR-ISG-02, because the PDEP organization includes a communications position that would serve as the licensee's designated spokesperson should an emergency be declared at Pilgrim. The spokesperson is available for media inquiries, and the positional duties include maintaining liaison with local media and coordinating with Federal, Commonwealth, and local response organizations to disseminate appropriate information regarding an emergency at Pilgrim. Based on this review, the NRC staff concludes that planning standard 10 CFR 50.47(b)(7), and the requirements of Sections IV.A.7 and D.2 of Appendix E to 10 CFR Part 50, as exempted for Pilgrim, pertaining to public education and information, are addressed in an acceptable manner in the Pilgrim PDEP, considering the permanently shutdown and defueled status of the facility.

4.1.8 Emergency Facilities and Equipment

Paragraph 50.47(b)(8) of 10 CFR requires that a licensee's emergency response plan contain:

Adequate emergency facilities and equipment to support the emergency response are provided and maintained.

The Pilgrim PDEP identifies that, following the declaration of an emergency, the activities of the ERO are coordinated from the Control Room. Adequate emergency facilities and equipment to support emergency response are provided and maintained. During a declared emergency, command and control is maintained in the Control Room. Facility personnel assess conditions; evaluate the magnitude and potential consequences of abnormal conditions; initiate preventative, mitigating, and corrective actions, and perform onsite and offsite notifications. When activated, the Pilgrim ERO reports to the Control Room.

The licensee maintains and operates onsite monitoring systems needed to provide data that are essential for initiating emergency measures and performing accident assessment, including dose assessment and assessing the magnitude of a radiological release. This includes monitoring systems for radiological conditions, meteorological conditions, and fire hazards. Annunciator and computer alarms are provided for a variety of parameters including SFP level and temperature. The manner in which process monitors are used for accident recognition and classification is detailed in the Pilgrim EAL scheme, which reflects the permanently shutdown and defueled status of the facility.

Radiation monitors and monitoring systems provide continuous radiological surveillance. These monitors, which include Control Room readout and alarm functions, exist in order that appropriate action can be initiated to limit fuel damage and/or contain radioactive material. The system performs the following basic functions: warns personnel of potential radiological health hazards; gives early warning of certain equipment malfunctions that might lead to a radiological hazard or facility damage; and prevents or minimizes the effects of inadvertent releases of radioactivity. Plant instrumentation also provides Control Room personnel with gaseous and liquid effluent monitor readings, and area radiation levels necessary to perform dose assessment and determine the magnitude of a potential or actual radiological release.

In addition to installed monitoring systems, onsite portable radiation and contamination monitoring equipment are available. Radiological emergency kits, which include protective equipment, radiological monitoring equipment and emergency supplies, are located in the Control Room. Kits are also located in the Control Room, which include dosimetry, dosimeter chargers, and appropriate paperwork. Portable first-aid kits are available in various locations onsite.

Section 8.0, "Emergency Facilities and Equipment," of the Pilgrim PDEP identifies the general category of equipment and supplies that make up equipment available to assist with emergency response. Section 16.2, "Inventory and Maintenance of Emergency Equipment," of the Pilgrim PDEP discusses the inventory and maintenance of equipment.

Based on the NRC staff's review of the Pilgrim PDEP as described above, the NRC staff finds that the proposed PDEP meets the applicable evaluation criteria of NUREG-0654, as outlined in Attachment 1 to NSIR/DPR-ISG-02, because the PDEP adequately identifies that during a declared emergency, command and control is maintained in the Control Room. Adequate facilities, equipment and ERO personnel, which report to the Control Room, are available to assess conditions; evaluate the magnitude and potential consequences of abnormal conditions; initiate preventative, mitigating, and corrective actions; and perform onsite and offsite notifications. Based on this review, the NRC staff concludes that planning standard 10 CFR 50.47(b)(8), and the requirements of Sections IV.A and G of Appendix E to 10 CFR Part 50, as exempted for Pilgrim, pertaining to emergency facilities and equipment, are addressed in an acceptable manner in the Pilgrim PDEP, considering the permanently shutdown and defueled status of the facility.

4.1.9 Accident Assessment

Paragraph 50.47(b)(9) of 10 CFR, as exempted for Pilgrim, requires that a licensee's emergency response plan contain:

Adequate methods, systems, and equipment for assessing and monitoring actual or potential ~~offsite~~ consequences of a radiological emergency condition are in use.

Station procedures provide for preventative and/or corrective actions that mitigate the consequences of events. Instrumentation, control systems, and radiation monitoring systems provide indications related to the safe and orderly implementation of corrective actions. These systems provide indication of SFP storage inventory, temperature, cooling, and supporting systems.

The licensee maintains procedures and strategies for the movement of any necessary portable equipment that will be relied upon for mitigating the loss of SFP water. Events involving a loss of SFP cooling and/or water inventory can be addressed by implementation of SFP inventory makeup strategies required under 10 CFR 50.54(hh)(2). These capabilities are maintained as a license condition and in accordance with Pilgrim Technical Specifications. These diverse strategies provide defense-in-depth and ample time to provide makeup water or spray to the SFP prior to the onset of zirconium cladding ignition, when considering very low probability beyond-design-basis events affecting the SFP.

Emergency plan implementing procedures (EPIPs) utilize radiological instrumentation readings and meteorological data to provide a rapid method of determining the magnitude of a radioactive release during an emergency. The licensee is capable of performing dose assessment 24 hours a day, 7 days a week. Dose assessment is the responsibility of the Emergency Director. When augmented, the RP Coordinator assumes responsibility for dose assessment.

Meteorological data are available in the Control Room and are used to determine the projected radiological consequences in the event of an accidental release of radioactivity to the environment. In addition, the National Weather Service (NWS) operates on a 24-hour per day basis. Upon request, the NWS can provide the licensee with meteorological conditions associated with the Pilgrim site, including predicted temperature inversions, precipitation, wind patterns, and velocity.

Based on the NRC staff's review of the Pilgrim PDEP as described above, the NRC staff finds that the proposed PDEP meets the applicable evaluation criteria of NUREG-0654, as outlined in Attachment 1 to NSIR/DPR-ISG-02, because Section 9.0, "Accident Assessment," of the PDEP adequately identifies the onsite capabilities and resources available to provide initial and continuing information for accident assessment throughout the course of an event. Based on this review, the NRC staff concludes that planning standard 10 CFR 50.47(b)(9), and the requirements of Sections IV.A.4, B.1, C.2, and E of Appendix E to 10 CFR Part 50, as exempted for Pilgrim, pertaining to accident assessment, are addressed in an acceptable manner in the Pilgrim PDEP, considering the permanently shutdown and defueled status of the facility.

4.1.10 Protective Response Actions

Paragraph 50.47(b)(10) of 10 CFR, as exempted for Pilgrim, requires that a licensee's emergency response plan contain:

~~A range of protective actions has been developed for the plume exposure pathway EPZ for emergency workers and the public. In developing this range of actions, consideration has been given to evacuation, sheltering, and, as a supplement to these, the prophylactic use of potassium iodide (KI), as appropriate. Evacuation time estimates have been developed by applicants and licensees. Licensees shall update the evacuation time estimates on a periodic basis. Guidelines for the choice of protective actions during an emergency, consistent with Federal guidance, are developed and in place, and protective actions for the ingestion exposure pathway EPZ appropriate to the locale have been developed.~~

The Pilgrim PDEP identifies the protective actions for station personnel, contractors, and visitors (members of the public) located onsite, and addresses:

- Site personnel accountability,
- Site egress control methods,
- Contamination control and decontamination capability,
- Use of protective equipment and supplies, and
- Medical and health support.

Accountability should be considered and used as a protective action whenever a sitewide risk to health and safety exists, and prudence dictates. If personnel accountability is required, at the direction of the Emergency Director, all individuals at the site (including non-essential employees, visitors, and contractor personnel) shall be notified by making announcements over the Gaitronics. When personnel accountability is directed, facility personnel are responsible for reporting to designated areas and aiding Security in the accountability process.

Accountability of all personnel on the site should be accomplished within 60 minutes of the accountability announcement. If personnel are unaccounted for, teams shall be dispatched to locate the missing personnel. Accountability may be modified or suspended if the safety of personnel may be jeopardized by a security event or other event hazardous to personnel. In these cases, accountability will be completed once safe conditions have been established.

All visitors and unnecessary contractors will be evacuated from the facility at the discretion of the Emergency Director. In the event of a suspected radiological release, personnel are monitored for radioactive contamination prior to leaving the Protected Area. Portable radiation survey meters are available to monitor for potential contamination.

Based on the NRC staff's review of the Pilgrim PDEP as described above, the NRC staff finds that the proposed PDEP meets the applicable evaluation criteria of NUREG-0654, as outlined in Attachment 1 to NSIR/DPR-ISG-02, because Section 10.0, "Protective Actions," of the PDEP adequately identifies the protective actions for onsite personnel, including station personnel, contractors, and visitors (members of the public), and provides that protective equipment and supplies are maintained to support an emergency response. The PDEP also describes that plant evacuees are monitored for radioactive contamination prior to leaving the Pilgrim Protected Area. Based on this review, the NRC staff concludes that planning standard 10 CFR 50.47(b)(10), and the requirements of Sections IV.C.1, E, and I of Appendix E to 10 CFR Part 50, as exempted for Pilgrim, pertaining to protective response, are addressed in an acceptable manner in the Pilgrim PDEP, considering the permanently shutdown and defueled status of the facility.

4.1.11 Radiological Exposure Control

Paragraph 50.47(b)(11) of 10 CFR requires that a licensee's emergency response plan contain:

Means for controlling radiological exposures, in an emergency, are established for emergency workers. The means for controlling radiological exposures shall include exposure guidelines consistent with EPA Emergency Worker and Lifesaving Activity Protective Action Guides.

The Pilgrim PDEP states that reasonable measures are taken to control the radiation exposure to emergency response personnel providing rescue, first aid, decontamination, emergency transportation, medical treatment services, or corrective or assessment actions within applicable limits specified in 10 CFR Part 20. The RP Coordinator will ensure Radiological Control Areas (RCAs) are established in response to the event. The RP Coordinator shall direct control of access to all RCAs unless immediate access control is authorized by the Emergency Director to protect personnel or facilitate emergency repairs.

Individuals authorized to enter RCAs are required to have dosimetry capable of measuring a dose received from external sources of ionizing radiation. Emergency workers are issued permanent reading dosimeters (e.g., dosimeter of legal record (DLR)) as a means of recording radiation exposure for permanent records prior to entering an RCA. Additionally, personnel are issued electronic alarming dosimetry capable of measuring dose and dose rate on a real time basis. These dosimeters indicate dose on a digital display and are programmed to provide an audible alarm at a pre-determined dose or dose rate limit. Dose records are maintained in accordance with facility procedures. Emergency workers are instructed to read self-indicating dosimeters frequently, and DLRs may be processed with increased periodicity during a response to an emergency. The capability exists for the emergency processing of DLRs on a 24-hour per day basis.

The Emergency Director is responsible for authorizing personnel to receive doses in excess of 10 CFR Part 20 limits, if necessary. This authorization is coordinated with the RP Coordinator when available. Table 11.1, "Emergency Exposure Criteria," of the Pilgrim PDEP contains the guidelines for emergency exposure criteria, which is consistent with Table 3-1, "Emergency Worker Guidelines," provided in the EPA PAG Manual.

During emergency conditions, normal facility decontamination and contamination control measures are maintained as closely as possible. However, these measures may be modified, by the Emergency Director, should conditions warrant. Contamination control measures are maintained to address access control, drinking water and food supplies, and the return of areas and items to normal use in accordance with proper radiation and contamination control techniques. Documentation surveys and decontamination activities shall be maintained in accordance with facility procedures.

Pilgrim's procedures establish requirements and specific action levels for decontamination of personnel, equipment, and areas, and for the release of the affected personnel, equipment, and areas from radiological controls. If personnel decontamination becomes necessary, decontamination is performed under the direction of the RP Coordinator.

Protective clothing is maintained in the Control Room, with additional sets also available. Monitoring and issuance of respiratory protection equipment will be conducted in accordance with facility procedures.

Based on the NRC staff's review of the Pilgrim PDEP as described above, the NRC staff finds that the proposed PDEP meets the applicable evaluation criteria of NUREG-0654, as outlined in Attachment 1 to NSIR/DPR-ISG-02, because Section 11.0, "Radiological Exposure Control," of the PDEP adequately identifies the means for controlling radiological exposures for emergency workers. Emergency worker dose limits are established for designated activities and under specific conditions. Based on this review, the NRC staff concludes that planning standard 10 CFR 50.47(b)(11), and the requirements of Section IV.E of Appendix E to 10 CFR Part 50, as exempted for Pilgrim, pertaining to radiological exposure control, are addressed in an

acceptable manner in the Pilgrim PDEP, considering the permanently shutdown and defueled status of the facility.

4.1.12 Medical and First Aid Support

Paragraph 50.47(b)(12) of 10 CFR requires that a licensee's emergency response plan contain:

Arrangements are made for medical services for contaminated injured individuals.

The Pilgrim PDEP identifies that Pilgrim maintains on-shift personnel and equipment to provide first aid for personnel working at the site. Medical supplies for emergency first-aid treatment are provided on the site at various locations. The PDEP further provides that if immediate professional medical help is needed, local ambulance services are available to transport seriously ill, injured, or radioactively contaminated injured personnel to a designated medical facility. Pilgrim is capable of maintaining communications with medical support facilities and the local ambulance service while transporting a patient. These capabilities are described in Section 6.2, "Communications with Medical Support Facilities," of the Pilgrim PDEP.

An agreement is in place with Beth Israel Deaconess Hospital (Plymouth) for medical treatment of patients from Pilgrim who have injuries complicated by radioactive contamination. The hospital has trained personnel and detailed procedures for handling radioactively contaminated patients from Pilgrim. Refer to Section 4.1.1 of this safety evaluation for a description of agreements made with respective OROs, which may be requested to respond onsite to Pilgrim in the event of an emergency.

Based on the NRC staff's review of the Pilgrim PDEP as described above, the NRC staff finds that the proposed PDEP meets the applicable evaluation criteria of NUREG-0654, as outlined in Attachment 1 to NSIR/DPR-ISG-02, because Section 12.0, "Medical and Health Support," of the Pilgrim PDEP adequately identifies that arrangements are maintained for hospital and medical services located in the vicinity of the station, and for prompt ambulance transport of persons with injuries involving radiological contamination to the designated hospital. The licensee also maintains onsite first-aid supplies and equipment necessary for the treatment of contaminated or injured persons. Based on this review, the NRC staff concludes that planning standard 10 CFR 50.47(b)(12), and the requirements of Sections IV.A.6, A.7, and E of Appendix E to 10 CFR Part 50, as exempted for Pilgrim, pertaining to medical and first-aid support, are addressed in an acceptable manner in the Pilgrim PDEP, considering the permanently shutdown and defueled status of the facility.

4.1.13 Recovery and Reentry

Paragraph 50.47(b)(13) of 10 CFR requires that a licensee's emergency response plan contain:

General plans for recovery and reentry are developed.

The Pilgrim PDEP identifies that planning for the recovery involves the development of general principles and an organizational capability that can be adapted to any emergency situation. Upon termination of an emergency and transition to the recovery phase, the Emergency Director assembles the recovery organization to address the specific emergency circumstances of the terminated event.

The Emergency Director directs the recovery organization and is responsible for:

- Ensuring the facility is maintained in a safe condition;
- Managing onsite recovery activities; and
- Keeping corporate support apprised of recovery activities and requirements.

The remainder of the recovery is accomplished using the normal facility organization and the Pilgrim ERO, as necessary, to provide radiological and technical expertise to the Emergency Director in order to restore the facility to normal conditions. The recovery organization's responsibilities include:

- Maintaining comprehensive radiological surveillance of the facility to assure continuous control and recognition of problems;
- Controlling access to the area and exposure to workers;
- Decontaminating affected areas and/or equipment;
- Conducting clean-up and restoration activities;
- Isolating and repairing damaged systems; and
- Documenting all proceedings of the event and reviewing the effectiveness of the emergency organization in reducing public hazard and plant damage.

When plant conditions allow a transition from the emergency phase to the recovery phase, the Emergency Director conducts a plant emergency management meeting to discuss the recovery organization. The actions taken by this organization concerning termination of the emergency proceeds in accordance with a recovery plan developed specifically for the accident conditions.

Based on the NRC staff's review of the Pilgrim PDEP as described above, the NRC staff finds that the proposed PDEP meets the applicable evaluation criteria of NUREG-0654, as outlined in Attachment 1 to NSIR/DPR-ISG-02, because Section 13, "Recovery," of the Pilgrim PDEP adequately identifies the general goals for plant recovery and the organizational structure responsible for coordinating response and recovery from emergency conditions at the facility. The licensee's recovery organization will be based on the Pilgrim ERO. Based on this review, the NRC staff concludes that planning standard 10 CFR 50.47(b)(13), and the requirements of Section IV.H. of Appendix E to 10 CFR Part 50, as exempted for Pilgrim, pertaining to recovery and reentry, are addressed in an acceptable manner in the Pilgrim PDEP, considering the permanently shutdown and defueled status of the facility.

4.1.14 Exercises and Drills

Paragraph 50.47(b)(14) of 10 CFR requires that a licensee's emergency response plan contain:

Periodic exercises are (will be) conducted to evaluate major portions of emergency response capabilities, periodic drills are (will be) conducted to develop and maintain key skills, and deficiencies identified as a result of exercises or drills are (will be) corrected.

Section 14.0, "Exercises and Drills," of the Pilgrim PDEP identifies periodic exercises and drills that will be conducted to evaluate major portions of emergency response capabilities and to develop and maintain key emergency response skills. Biennial exercises shall be conducted to test the timing and content of implementing procedures and methods, and to ensure that emergency personnel are familiar with their duties. The OROs are offered the opportunity to participate to the extent assistance would be expected during an emergency declaration.

The Pilgrim PDEP also identified the following periodic drills and tests, which can be performed as part of any drill or exercise:

- Medical drills will be conducted annually, involving a simulated contaminated injury. The local ambulance service and Beth Israel Deaconess Hospital (Plymouth) will be invited to participate.
- Accountability drills will be conducted annually. This drill shall include identifying the locations of all personnel onsite.
- Health physics drills will be conducted semi-annually and involve a response to, and the analysis of, simulated, elevated in-facility airborne and liquid samples with elevated levels of activity.
- An off-hour, unannounced augmentation drill will be conducted semi-annually to estimate ERO personnel response times. No actual travel is required. Participants provide an estimated time of arrival to their designated ERO position.
- Fire drills and security drills will be conducted in accordance with the respective station plans and procedures.
- Communications tests will be conducted, including a monthly test of the ENS used to communicate with the NRC, and a semi-annual functional test of the ERO notification system.

Other communication systems, as detailed in Section 6.2 of the Pilgrim PDEP, are used on a frequent basis; therefore, periodic testing of these systems is not necessary.

An Exercise/Drill Coordinator is responsible for the overall development of the scenario packages. A scenario development team is assembled (if needed) by the Exercise/Drill Coordinator to create the various segments of the scenario which include, but are not limited to, the following:

- Objective(s);
- Date, time period, place, and participating organizations;
- Simulation lists;
- Timeline of real and simulated events;
- Narrative summary; and
- List of controllers and participants.

The final scenario shall be approved by a designated member of senior facility management, and scenario confidentiality maintained.

Pilgrim will conduct critiques to evaluate the participants' performance during a drill or exercise and the ability of participants to self-evaluate weaknesses and identify areas of improvement. As soon as possible following the conclusion of each drill or exercise, a critique, including participants, controllers, and evaluators, is conducted to evaluate the ability of the participants to meet the performance objectives. Deficiencies are identified and entered into the corrective action system. A written report is prepared including the evaluation of designated objectives. The report evaluates and documents the participants' response to the emergency situation. The report will also contain reference to corrective action and recommendations resulting from the drill or exercise.

Based on the NRC staff's review of the Pilgrim PDEP as described above, the NRC staff finds that the proposed PDEP meets the applicable evaluation criteria of NUREG-0654, as outlined in Attachment 1 to NSIR/DPR-ISG-02, because Section 14.0 of the PDEP adequately identifies the general goals for exercises and drills, the intent of exercise scenarios, and that exercise and drill performance objectives are evaluated against measurable demonstration criteria. Based on this review, the NRC staff concludes that planning standard 10 CFR 50.47(b)(14), and the requirements of Sections IV.E.9 and F of Appendix E to 10 CFR Part 50, as exempted for Pilgrim, pertaining to exercises and drills, are addressed in an acceptable manner in the Pilgrim PDEP, considering the permanently shutdown and defueled status of the facility.

4.1.15 Radiological Emergency Response Training

Paragraph 50.47(b)(15) of 10 CFR requires that a licensee's emergency response plan contain:

Radiological emergency response training is provided to those who may be called on to assist in an emergency.

Per Section 15.0, "Radiological Emergency Response Training," of the Pilgrim PDEP, radiological emergency response training is provided to those who may be called on to assist in an emergency. The training program for ERO personnel is based on applicable requirements of Appendix E to 10 CFR Part 50 and position-specific responsibilities as defined in the PDEP. Pilgrim management is responsible to ensure that members of the ERO receive the required initial training and continuing training.

Shift Managers/Emergency Directors, Technical Coordinators, and RP Coordinators shall have training conducted such that proficiency is maintained on the following topics. These topics should be covered, as a minimum, on an annual basis:

- EAL classification;
- Dose assessment;
- Federal, Commonwealth of Massachusetts, and local notification procedures;
- ERO augmentation;
- Emergency exposure control;
- Mitigating strategies for a catastrophic loss of SFP inventory; and
- Recovery.

Pilgrim personnel available during emergencies to perform emergency response activities as an extension of their normal duties will receive duty-specific training. This includes facility on-shift maintenance, RP, and security personnel. Personnel assigned to liaison with offsite fire

departments are trained in accordance with the Fire Protection Program, including mitigating strategies required for a catastrophic loss of SFP inventory.

General employee training provides initial training and annual requalification training on the basic elements of the Pilgrim PDEP for all personnel working at Pilgrim. These elements include:

- Station emergency alarms and their meaning;
- Assembly areas;
- Site evacuation procedure;
- Special precautions and limitations during an emergency;
- Purpose of the Pilgrim PDEP;
- Role of the worker during an emergency; and
- Related industry events.

Training is offered annually to offsite organizations which may be requested to respond onsite and provide specialized services during an emergency at Pilgrim (fire-fighting, medical services, transport of contaminated and/or injured personnel, etc.). The training shall be structured to meet the needs of that organization with respect to the nature of its support. Topics of event notification, site access and orientation, basic radiation protection, and interface activities are included in the training.

On-shift emergency medical personnel (individuals qualified as emergency medical technicians, registered nurses, first responders, and paramedics) are trained to respond to medical emergencies per Pilgrim procedure 5.5.3, "Medical Emergency Response Procedure."

Based on the NRC staff's review of the Pilgrim PDEP as described above, the NRC staff finds that the proposed PDEP meets the applicable evaluation criteria of NUREG-0654, as outlined in Attachment 1 to NSIR/DPR-ISG-02, because Section 15.0 of the PDEP adequately identifies the level and depth of the emergency preparedness training program to which individuals are to be trained. Based on this review, the NRC staff concludes that planning standard 10 CFR 50.47(b)(15), and the requirements of Section IV.F of Appendix E to 10 CFR Part 50, as exempted for Pilgrim, pertaining to radiological emergency response training, are addressed in an acceptable manner in the Pilgrim PDEP, considering the permanently shutdown and defueled status of the facility.

4.1.16 Emergency Plan Development and Review

Paragraph 50.47(b)(16) of 10 CFR requires that a licensee's emergency response plan contain:

Responsibilities for plan development and review and for distribution of emergency plans are established, and planners are properly trained.

Per Section 16.0, "Responsibility for the Planning Effort: Periodic Review and Distribution of Emergency Plans," of the Pilgrim PDEP, senior plant leadership is responsible for the implementation of actions required to periodically exercise the PDEP and the EIPs, and for maintaining an effective ERO staff. Senior plant leadership is also responsible for the final approval of PDEP and the EIPs used for emergency classification, and for maintaining an effective emergency response capability at Pilgrim.

The Manager, Emergency Planning, is responsible for the development, administration, and maintenance of the PDEP and EIPs, including the review and approval of all EIP changes, planner training, the overall development and implementation of the Pilgrim ERO Training and Qualification Program, and coordination of emergency planning activities with offsite emergency organizations.

The Pilgrim PDEP, Permanently Defueled EAL Technical Bases, and the EIPs included in Appendix A to the PDEP, are reviewed annually and updated as needed. All proposed changes will be reviewed in accordance with 10 CFR 50.54(q) to ensure that the change would not compromise the effectiveness of any other EIPs or degrade the effectiveness of the PDEP. The Manager, Emergency Planning, is responsible for forwarding approved changes to the plan to appropriate organizations and individuals with responsibility for implementation of the plan.

Letters of Agreement with support agencies shall be reviewed annually. Agreements will be revised or recertified. Recertification may include a recertification letter/memorandum, purchase order, e-mail, documented telephone conversation, or other correspondence. Designated Pilgrim management has the authority to enter into these agreements with outside organizations.

The emergency classification system and the EALs are reviewed with the Commonwealth of Massachusetts and the Town of Plymouth on an annual basis.

The Pilgrim Emergency Telephone Directory will be maintained in specified locations and updated quarterly.

Periodic inventory, testing, and calibration of emergency equipment and supplies are conducted in accordance with approved facility procedures. Emergency equipment and instrumentation shall be inventoried, inspected, and operationally checked periodically as indicated by the procedure and after each use. Sufficient reserves of equipment and instrumentation are stocked to replace emergency equipment and instrumentation removed from service for calibration and/or repair.

Based on the NRC staff's review of the Pilgrim PDEP as described above, the NRC staff finds that the proposed PDEP meets the applicable evaluation criteria of NUREG-0654, as outlined in Attachment 1 to NSIR/DPR-ISG-02, because Section 16.0 of the PDEP adequately identifies responsibility for the issuance, control, and revision/updating of the PDEP, EIPs, and support documents. Based on this review, the NRC staff concludes that planning standard 10 CFR 50.47(b)(16), and the requirements of Section IV.G of Appendix E to 10 CFR Part 50, as exempted for Pilgrim, pertaining to emergency plan development and review, are addressed in an acceptable manner in the Pilgrim PDEP, considering the permanently shutdown and defueled status of the facility.

4.2 Emergency Action Level Scheme

The licensee currently utilizes an EAL scheme based on NEI 99-01, Revision 6, with site-specific modifications due to design issues and/or licensee preference. The licensee is revising its current EAL scheme using the guidance in Section 8, "Independent Spent Fuel Storage Installation (ISFSI) ICs [Initiating Conditions] and EALs," and Appendix C, "Permanently Defueled Station ICs/EALs," of NEI 99-01, Revision 6, as applied to a permanently shutdown and defueled power reactor with fuel stored onsite in the Pilgrim SFP and in an ISFSI located at the Pilgrim facility, with site-specific modifications due to design issues and/or licensee preference.

As discussed in the NRC staff's safety evaluation associated with the exemptions granted to Pilgrim from certain EP planning standards of 10 CFR 50.47 and requirements of Appendix E to 10 CFR Part 50, there are no longer any design-basis accidents at Pilgrim that can result in a radiological release exceeding the EPA early phase PAGs at the exclusion area boundary. Therefore, the NRC staff's assessment of the risks and consequences of a radiological release at Pilgrim, based on its permanently shutdown and defueled condition of the facility, concluded that the risks and consequences are insufficient to warrant a Site Area Emergency or General Emergency classification levels. As a result, the only ECLs applicable to Pilgrim are an Unusual Event or an Alert.

In its letter dated August 1, 2018, the licensee submitted the proposed EAL scheme for Pilgrim to reflect a permanently shutdown and defueled condition, along with its technical basis and the EAL numbering scheme. The proposed EAL scheme is unique to Pilgrim, as it contains site-specific designations and descriptions.

The NRC staff verified that the proposed EAL scheme is consistent with the guidance provided in Section 8 and Appendix C to NEI 99-01, Revision 6, to ensure that the EAL scheme meets the standards of 10 CFR 50.47(b)(4) and requirements of Section IV.B of Appendix E to 10 CFR Part 50, as exempted, for a permanently shutdown and defueled power reactor with spent fuel stored onsite in the Pilgrim SFP and in an ISFSI at the Pilgrim facility. The NRC staff reviewed the proposed EAL scheme, technical basis, comparison matrix, and all additional information provided and found that the proposed EAL scheme has site-specific modifications from the NEI 99-01, Revision 6, guidance due to specific plant designs and licensee preference.

The NRC staff verified that the instrumentation and setpoints derived for the proposed EAL scheme are consistent with the overall EAL scheme development guidance, address the plant-specific implementation strategies provided, and are consistent with a standard EAL scheme.

Although the EALs must be plant-specific, to ensure consistency and regulatory stability, the NRC staff reviewed the proposed EAL scheme with respect to the key characteristics listed below of an effective EAL scheme found in the NRC-endorsed guidance of NEI 99-01, Revision 6.

- Consistency, including standardization of intent, if not in actual wording (i.e., the EALs would lead to similar decisions under similar circumstances at different plants).
- Human factors engineering and user friendliness.
- Potential for emergency classification level upgrade only when there is an increasing threat to public health and safety.
- Ease of upgrading and downgrading the ECL.
- Thoroughness in addressing and disposing of the issues of completeness and accuracy raised in Appendix 1 to NUREG-0654 (i.e., the EALs are unambiguous and are based on site-specific indicators).

- Technical completeness for each ECL.
- Logical progression in classification for multiple events.
- The use of objective and observable values.

The Pilgrim EAL technical basis document is an integral part of the EAL scheme. The material in this document supports proper emergency classification decision-making by providing background and development information in a readily accessible format, which can be referred to in training situations and when making an actual emergency classification, if necessary. The document is also useful for establishing configuration management controls for EP-related equipment and explaining an emergency classification to offsite authorities.

To aid in understanding the nomenclature used in this safety evaluation, the proposed EAL scheme for Pilgrim includes two ECLs: Unusual Event (U), and Alert (A). Initiating conditions (ICs) for entry into each of the two ECLs are specified for conditions relating to:

- Abnormal Radiation Levels/Radiological Effluent (PD-A);
- Hazards and Other Conditions Affecting Plant Safety (PD-H);
- System Malfunction (PD-S), based on the permanently shutdown and defueled status of the facility with spent fuel stored onsite in an SFP; and
- Hazards and Other Conditions Affecting ISFSI (E-H).

This safety evaluation uses the numbering system from the proposed plant-specific EAL scheme, which is consistent with the numbering system from the generic EAL scheme development guidance contained in NEI 99-01, Revision 6. The NRC staff verified that the numbering, sequencing, formatting, logical progression, and ease of upgrading/downgrading for these EALs are consistent with the overall EAL scheme development guidance and address the plant-specific implementation strategies provided, and are, therefore, consistent with a standard EAL scheme, as required by 10 CFR 50.47(b)(4).

For each IC, specific EAL threshold values are identified that would require the declaration of an ECL. The EAL scheme is intended to provide multiple and diverse threshold values for an Unusual Event and Alert to ensure accurate classification and timely declaration.

Pilgrim made the following changes to the generic EAL scheme, throughout the proposed EAL scheme, as follows:

- Changed "Notification of Unusual Event" to "Unusual Event" to maintain continuity with the previous Pilgrim EAL scheme;
- Removed operating mode applicability as it does not apply in a permanently defueled condition;
- Removed "Example" from EALs as they are no longer examples;

- Removed "SAFETY SYSTEM" as the term is not applicable in the permanently shut down and defueled condition; and
- Added site-specific basis information.

The NRC staff determined that these changes are administrative in nature and, as such, acceptable, since they do not impact the overall EAL scheme.

An evaluation of the acceptability of the proposed EAL scheme is provided in the following sections.

4.2.1 Category "PD-A": Abnormal Radiation Levels/Radiological Effluent

4.2.1.1 EAL PD-AU1, "Release of gaseous or liquid radioactivity greater than 2 times the Offsite Dose Calculation Manual (ODCM) limits for 60 minutes or longer"

This EAL addresses a potential or actual decrease in the level of safety of the plant, as indicated by a low-level radiological release that exceeds regulatory commitments for an extended period of time (e.g., an uncontrolled release). It includes any gaseous or liquid radiological release, monitored or unmonitored, including those for which a radioactivity discharge permit is normally prepared.

The NRC staff verified that the Pilgrim implementation of this EAL, except for the site-specific changes identified below, is consistent with the guidance provided in Appendix C to NEI 99-01, Revision 6.

The licensee made the following site-specific changes to the generic EAL scheme:

- Inserted reference to the ODCM as the site-specific effluent release controlling document.
- Included Table A-1, "Effluent Monitor Classification Thresholds," to provide effluent monitor description and threshold values, and show escalation path.
- Replaced "2 times the alarm setpoint established by a current radioactivity discharge permit" with "2 X HI-HI Alarm".
- Added Pilgrim specific basis information.
- Replaced the term "plant" with "facility".
- Added additional site-specific information regarding radiation monitors and annunciator panels and references for the information added.

For the site-specific change to reference the ODCM, the NRC staff verified that Pilgrim implemented the developer notes for identifying the site-specific effluent release controlling document identified in NEI 99-01, Revision 6, as the basis for this specific EAL. The site-specific changes to the generic EAL scheme are administrative and do not affect the applicability of the EAL.

Based on the above, the NRC staff concludes that the plant-specific implementation method for this EAL is in alignment with the key characteristics of an effective EAL scheme (identified in Section 3.2 of this safety evaluation) and meets the planning standard of 10 CFR 50.47(b)(4) and the requirements of Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

4.2.1.2 EAL PD-AA1, "Release of gaseous or liquid radioactivity resulting in offsite dose greater than 10 mRem [millirem] TEDE [total effective dose equivalent] or 50 mRem thyroid CDE [committed dose equivalent]"

This EAL addresses a release of gaseous or liquid radioactivity that results in projected or actual offsite doses greater than or equal to 1 percent of the EPA early phase PAGs. It includes both monitored and unmonitored releases. Releases of this magnitude represent an actual or potential substantial degradation of the level of safety of the plant as indicated by a radiological release that significantly exceeds regulatory limits (e.g., a significant, uncontrolled release).

The NRC staff verified that Pilgrim's implementation of this EAL, except for the site-specific changes identified below, is consistent with the guidance provided in Appendix C to NEI 99-01, Revision 6.

The licensee made the following site-specific changes to the generic EAL scheme:

- Provided additional site-specific information regarding radiation monitors and annunciator panels, as well as references for the added information.
- Included Table A-1 to provide effluent monitor description and threshold values and show escalation path.
- Replaced the term "plant" with "facility".
- Added "site boundary" as the site-specific dose receptor point.

The site-specific changes to the generic EAL scheme are administrative and do not affect the applicability of the EAL.

Based on the above, the NRC staff concludes that the plant-specific implementation method for this EAL is in alignment with the key characteristics of an effective EAL scheme (identified in Section 3.2 of this safety evaluation) and meets the planning standard of 10 CFR 50.47(b)(4) and the requirements of Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

4.2.1.3 EAL PD-AU2, "UNPLANNED rise in facility radiation levels"

This EAL is based upon site-specific indications of increased plant radiation levels caused by a decrease in water level above irradiated (spent) fuel. The increased radiation levels are indicative of a minor loss in the ability to control radiation levels within the plant. This condition is a potential degradation in the level of safety of the plant.

The NRC staff verified that Pilgrim's implementation of this EAL, except for the site-specific changes identified below, is consistent with the guidance provided in Appendix C to NEI 99-01, Revision 6.

The licensee made the following site-specific changes to the generic EAL scheme:

- Replaced the term "plant" with "facility".
- Added site-specific level indications and site-specific basis information, instrumentation and documented references.

The site-specific changes to EAL PD-AU2 are in accordance with the guidance provided in NEI 99-01, Revision 6, for this specific EAL. The developer notes in NEI 99-01, Revision 6, provide that the site-specific indications may include instrumentation values, such as water level, area radiation monitoring readings, and personnel reports. These indications are installed plant equipment with indications in the control room that provide timely indication for classifying this EAL. Therefore, the SFP low-level alarm monitors are acceptable site-specific indications of increased plant radiation levels caused by a decrease in water level above irradiated (spent) fuel. The licensee provides that besides a water level loss being primarily determined by indications from available level instrumentation, other sources of level indications may include reports from plant personnel or video camera observations (if available). A significant drop in the water level may also cause an increase in the radiation levels of adjacent areas that can be detected by monitors in those locations.

Based on the above, the NRC staff concludes that the plant-specific implementation method for this EAL is in alignment with the key characteristics of an effective EAL scheme (identified in Section 3.2 of this safety evaluation) and meets the planning standard of 10 CFR 50.47(b)(4) and the requirements of Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

4.2.1.4 EAL PD-AA2, "UNPLANNED rise in plant radiation levels that impedes plant access required to maintain spent fuel integrity"

This EAL addresses increased radiation levels that impede necessary access to areas containing equipment that must be operated manually or that require local monitoring in order to maintain systems needed to maintain spent fuel integrity. As used here, "impede" includes hindering or interfering, provided that the interference or delay is sufficient to significantly threaten necessary plant access. As such, it represents an actual or potential substantial degradation of the level of safety of the plant.

The Alert classification level for this EAL is primarily intended to ensure that the Pilgrim ERO is activated to support on-shift personnel in removing the impediment to normal access to maintaining spent fuel integrity.

The NRC staff verified that Pilgrim's implementation of this EAL, except for the site-specific changes identified below, is consistent with the guidance provided in Appendix C to NEI 99-01, Revision 6.

The licensee made the following site-specific changes to the generic EAL scheme:

- Replaced the term "plant" with "facility".
- Reworded the EAL #2 to provide better guidance concerning access to areas.
- Added site-specific areas and site-specific basis information, instrumentation and documented references.

For the site-specific changes to EAL PD-AA2, the developer notes in NEI 99-01, Revision 6, provide that the list should include all areas requiring continuous occupancy to maintain control of radioactive material or operation of systems needed to maintain spent fuel integrity. The list that Pilgrim provided includes four facility areas that are needed to maintain control of radioactive material or operation of systems needed to maintain spent fuel integrity.

The replacement of the term "plant" with "facility" and the rewording of EAL #2 are administrative and do not affect the applicability of the EAL.

Based on the above, the NRC staff concludes that the plant-specific implementation method for this EAL is in alignment with the key characteristics of an effective EAL scheme (identified in Section 3.2 of this safety evaluation) and meets the planning standard of 10 CFR 50.47(b)(4) and the requirements of Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

4.2.2 Category "PD-H": Hazards and Other Conditions Affecting Plant Safety

4.2.2.1 EAL PD-HU1, "Confirmed SECURITY CONDITION or threat"

This EAL is based upon any security-related event listed in the approved Pilgrim Physical Security Plan that constitutes a threat/risk to site personnel or a potential degradation to the level of safety of the plant.

The NRC staff verified that Pilgrim's implementation of this EAL, except for the site-specific changes identified below, is consistent with the guidance provided in Appendix C to NEI 99-01, Revision 6.

The licensee made the following site-specific changes to the generic EAL scheme:

- Station Security Force is provided as the site-specific security shift supervision.
- Replaced the term "plant" with "facility".
- Added Pilgrim site-specific basis information, and documented references.

Based on the above, the NRC staff concludes that the plant-specific implementation method for this EAL is in alignment with the key characteristics of an effective EAL scheme (identified in Section 3.2 of this safety evaluation) and meets the planning standard of 10 CFR 50.47(b)(4) and the requirements of Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

4.2.2.2 EAL PD-HA1, "HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat within 30 minutes"

This EAL addresses the occurrence of a hostile action within the Owner Controlled Area or notification of an aircraft attack threat. This event will require rapid response and assistance due to the possibility of the attack progressing to the protected area, or the need to prepare the plant and staff for a potential aircraft impact.

The NRC staff verified that Pilgrim's implementation of this EAL, except for the site-specific changes identified below, is consistent with the guidance provided in Appendix C to NEI 99-01, Revision 6.

The licensee made the following site-specific changes to the generic EAL scheme:

- Station Security Force is identified as the site-specific security shift supervision.
- Replaced the term "plant" with "facility".
- Provided additional information for each of the two site-specific EALs.

Based on the above, the NRC staff concludes that the plant-specific implementation method for this EAL is in alignment with the key characteristics of an effective EAL scheme (identified in Section 3.2 of this safety evaluation) and meets the planning standard of 10 CFR 50.47(b)(4) and the requirements of Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

4.2.2.3 EAL PD-HU2, "Hazardous event affecting equipment necessary for spent fuel cooling"

This EAL is based upon the effect that natural and destructive hazards may have on at least one train of a safety system needed for spent fuel cooling. The damage must be of sufficient magnitude that the system(s) train cannot, or potentially cannot, perform its design function. This condition reduces the margin to a loss or potential loss of the fuel clad barrier and, therefore, represents a potential degradation of the level of safety.

The NRC staff verified that Pilgrim's implementation of this EAL, except for the site-specific changes identified below, is consistent with the guidance provided in Appendix C to NEI 99-01, Revision 6.

The licensee made the following site-specific changes to the generic EAL scheme:

- Removed "SAFETY SYSTEM" as the term is not applicable in the permanently shut down and defueled condition.
- Replaced the term "plant" with "facility".
- Added low bay level as site-specific hazard. Figure H-1, "Screenhouse Bay Water Levels," added to basis to support bay level impact.

The licensee provided that this IC addresses a hazardous event that causes damage to at least one train of equipment needed for spent fuel cooling. The damage must be of sufficient magnitude that the system(s) train cannot, or potentially cannot, perform its intended function. This condition reduces the margin to a loss or potential loss of the fuel clad barrier and, therefore, represents a potential degradation of the level of safety of the facility.

The term "SAFETY SYSTEM" was removed, as the term is not applicable in the permanently shutdown and defueled condition. The IC language continues to focus on a hazardous event affecting equipment necessary for spent fuel cooling.

The licensee added two "seawater bay level" criteria as a site-specific hazard, which is consistent with the developer notes in NEI 99-01, Revision 6, that the EAL developers should consider other significant site-specific hazards (e.g., a seiche).

Based on the above, the NRC staff concludes that the plant-specific implementation method for this EAL is in alignment with the key characteristics of an effective EAL scheme (identified in Section 3.2 of this safety evaluation) and meets the planning standard of 10 CFR 50.47(b)(4) and the requirements of Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

4.2.2.4 EAL PD-HU3, "Other conditions exist which in the judgment of the Emergency Director warrant declaration of an Unusual Event"

This EAL is based upon providing EALs to consider when the decision-maker's judgment deems an emergency declaration is warranted, based on the definition and intent of the ECL.

The NRC staff verified that Pilgrim's implementation of this EAL, except for the site-specific changes identified below, is consistent with the guidance provided in Appendix C to NEI 99-01, Revision 6.

The licensee made the following site-specific changes to the generic EAL scheme:

- Removed the term "safety" as the term is not applicable in the permanently shutdown and defueled condition and added "needed to maintain spent fuel cooling".
- Replaced the term "plant" with "facility".

Based on the above, the NRC staff concludes that the plant-specific implementation method for this EAL is in alignment with the key characteristics of an effective EAL scheme (identified in Section 3.2 of this safety evaluation) and meets the planning standard of 10 CFR 50.47(b)(4) and the requirements of Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

4.2.2.5 EAL PD-HA3, "Other conditions exist which in the judgment of the Emergency Director warrant declaration of an Alert"

This EAL is based upon providing EALs to consider when the decision-maker's judgment deems an emergency declaration is warranted, based on the definition and intent of the ECL.

The NRC staff verified that Pilgrim's implementation of this EAL, except for the site-specific changes identified below, is consistent with the guidance provided in Appendix C to NEI 99-01, Revision 6.

The licensee made the following site-specific change to the generic EAL scheme:

- Replaced the term "plant" with "facility".

Based on the above, the NRC staff concludes that the plant-specific implementation method for this EAL is in alignment with the key characteristics of an effective EAL scheme (identified in Section 3.2 of this safety evaluation) and meets the planning standard of 10 CFR 50.47(b)(4) and the requirements of Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

4.2.3 Category "PD-S": System Malfunction

4.2.3.1 EAL PD-SU1, "UNPLANNED spent fuel pool temperature rise"

This EAL is based upon a loss of the ability to maintain SFP cooling, and addresses a condition that is a precursor to a more serious event and represents a potential degradation in the level of safety of the facility. If uncorrected, boiling could occur and result in a loss of water inventory and increased radiation levels.

The NRC staff verified that Pilgrim's implementation of this EAL, except for the site-specific change identified below, is consistent with the guidance provided in Appendix C to NEI 99-01, Revision 6.

The licensee made the following site-specific change to the generic EAL scheme:

- Added site-specific temperature of "125°F".

Based on the above, the NRC staff concludes that the plant-specific implementation method for this EAL is in alignment with the key characteristics of an effective EAL scheme (identified in Section 3.2 of this safety evaluation) and meets the planning standard of 10 CFR 50.47(b)(4) and the requirements of Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

4.2.4 Category "E": ISFSI Malfunction

4.2.4.1 E-HU1, "Damage to a loaded cask CONFINEMENT BOUNDARY"

This EAL addresses an event that results in damage to the confinement boundary of a storage cask containing spent fuel. It applies to irradiated fuel that is licensed for dry storage, beginning at the point that the loaded storage cask is sealed. The issues of concern are the creation of a potential or actual release path to the environment; degradation of one or more fuel assemblies due to environmental factors, and configuration changes, which could cause challenges in removing the cask or fuel from storage.

A spent fuel storage license contains technical requirements and operating conditions (fuel specifications, cask leak testing, surveillance, and other requirements) for the ISFSI and specifies what the licensee is authorized to store at the site.

The NRC staff verified that Pilgrim's implementation of this EAL, except for the site-specific changes identified below, is consistent with the guidance provided in Section 8 to NEI 99-01, Revision 6.

The licensee made the following site-specific changes to the generic EAL scheme:

- Included the site-specific technical specification values.
- Added Pilgrim site-specific basis information and documented references.
- Figure E-1, "HI-STORM 100," added to basis to provide a visual aid of inlet and outlet ducts and the general arrangement of the storage cask overpack.

The licensee provided the values that are two times the site cask-specific technical specification allowable radiation level. The developer notes in NEI 99-01, Revision 6, provide that the existence of "damage" is determined by radiological survey. The technical specification multiple of "2 times", which is also used in Recognition Category A, IC AU1, is used here to distinguish between non-emergency and emergency conditions.

Based on the above, the NRC staff concludes that the plant-specific implementation method for this EAL is in alignment with the key characteristics of an effective EAL scheme (identified in Section 3.2 of this safety evaluation) and meets the planning standard of 10 CFR 50.47(b)(4) and the requirements of Section IV.B of Appendix E to 10 CFR Part 50. Therefore, the NRC staff finds this EAL acceptable.

4.3 Conclusions

4.3.1 Emergency Plan Conclusions

Based on the NRC staff's review of the proposed Pilgrim PDEP, as described in Section 3.1 of this safety evaluation, the NRC staff finds that the proposed PDEP meets the planning standards in 10 CFR 50.47(b) and the requirements in Appendix E to 10 CFR Part 50, as exempted, and provides reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency at the facility. Therefore, the NRC staff concludes that the licensee's proposed Pilgrim PDEP, as provided in Enclosure 1 to the licensee's letter dated August 1, 2018, and as supplemented by the letter dated November 8, 2018, is acceptable.

4.3.2 Emergency Action Level Scheme Conclusions

The NRC staff has reviewed the technical basis for the proposed EAL scheme for Pilgrim in the permanently shutdown and defueled condition, the modifications from NEI 99-01, Revision 6, and the licensee's evaluation of the proposed changes. The licensee chose, in part, to modify its EAL scheme from the generic EAL scheme development guidance provided in NEI 99-01, Revision 6, in order to adopt a format more in alignment with its currently approved EAL scheme, as well as alignment with licensee-specific writer's guides and preferences. The NRC staff determined that these modifications are administrative in nature and do not alter the intent of any specific EAL within an EAL, EAL category, or within the entire EAL scheme as stated in NEI 99-01, Revision 6.

The NRC staff determined that the proposed EAL scheme uses objective and observable values, is worded in a manner that addresses human factors engineering and user friendliness concerns, follows logical progression for escalating events, and allows for event downgrading and upgrading based upon the potential risk to the public health and safety. Risk assessments were appropriately used to set the boundaries of the emergency classification levels and ensure that all EALs that trigger emergency classification are in the same range of relative risk.

Based on the above, and the NRC staff's review, as described in Section 3.2 of this safety evaluation, the NRC staff has determined that the proposed changes meet the guidance in NEI 99-01, Revision 6, the planning standard of 10 CFR 50.47(b)(4), and the requirements in Section IV.B to Appendix E of 10 CFR Part 50, as exempted for Pilgrim. Therefore, the NRC staff concludes that the proposed EAL scheme, as provided in Enclosure 2 of the licensee's letter dated August 1, 2018, and as supplemented by the letter dated November 8, 2018, is acceptable, and provides reasonable assurance that the licensee can and will take adequate protective measures in the event of a radiological emergency.

5.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Commonwealth of Massachusetts official was notified of the proposed issuance of the amendment on November 5, 2019. The Commonwealth of Massachusetts official provided comments on November 21, 2019 (Reference 25).

6.0 ENVIRONMENTAL CONSIDERATION

The amendment relates, in part, to changes in recordkeeping, reporting, or administrative procedures or requirements. The amendment also relates, in part, to changing requirements with respect to the installation or use of facility components located within the restricted area as defined in 10 CFR Part 20 because the amendment approves an acceptable EAL scheme which is required for operation of the facility. 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, and there has been no public comment on such finding published in the *Federal Register* on November 6, 2018 (83 FR 55571). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9) and 51.22(c)(10). 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.

7.0 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.

8.0 REFERENCES

1. Halter, M. K., Entergy Nuclear Operations, Inc., letter to U.S. Nuclear Regulatory Commission, "License Amendment Request to Revise the Pilgrim Nuclear Power Station Emergency Plan and Emergency Action Level Scheme to Address the Permanently Defueled Condition," dated August 1, 2018 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18218A173).
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Principal Contributor: Richard Kinard, NSIR/DPR

Date: January 2, 2020

SUBJECT: PILGRIM NUCLEAR POWER STATION – ISSUANCE OF AMENDMENT
NO. 251 RE: CHANGES TO THE EMERGENCY PLAN FOR PERMANENTLY
DEFUELED EMERGENCY PLAN AND EMERGENCY ACTION LEVEL
SCHEME (EPID L-2018-LLA-0221) DATED JANUARY 2, 2020

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