SAFETY EVALUATION BY

THE OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS

RELATED TO A REQUEST FOR EXEMPTIONS FROM

PORTIONS OF 10 CFR 50.47 AND 10 CFR PART 50, APPENDIX E

HOLTEC DECOMMISSIONING INTERNATIONAL, LLC,

HOLTEC INDIAN POINT 2, LLC, AND HOLTEC INDIAN POINT 3, LLC

INDIAN POINT ENERGY CENTER

DOCKET NOS. 50-003, 50-247, AND 50-286

1.0 INTRODUCTION

By letter dated February 8, 2017 (Reference 1), in accordance with Sections 50.4(b)(8) and 50.82(a)(1)(i) to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities," Entergy Nuclear Operations, Inc., Entergy Nuclear Indian Point 2, LLC, and Entergy Nuclear Indian Point 3, LLC (the IPEC licensees at that time, collectively, Entergy) notified the NRC that they had decided to permanently cease power operations at Indian Point Nuclear Generating Unit No. 2 (IP2) by April 30, 2020, and at Indian Point Nuclear Generating Unit No. 3 (IP3) by April 30, 2021.

IP1 permanently ceased generating on October 31, 1974, and all fuel was removed from the IP1 reactor vessel by January 1976. By June 19, 1980 (Reference 2), the Order Revoking Authority to Operate Facility was issued by the NRC for IP1. In 1996, the NRC issued an Order approving the safe-storage condition of IP1. In 2003, the NRC issued Amendment No. 52 to IP1's provisional operating license that changed the license's expiration date to be consistent with that of the IP2 license at that time (Reference 3). Pursuant to 10 CFR 50.82(a)(2), the IP1 license no longer authorizes operation of the reactor or emplacement or retention of fuel into the reactor vessel. Holtec Decommissioning International, LLC (HDI, the licensee), on behalf of Holtec Indian Point 2, LLC and Holtec Indian Point 3, LLC, which became the IPEC licensee on May 28, 2021 (Reference 4), states that there is no IP1 spent fuel in wet storage at the IPEC site; IP1 spent fuel is stored onsite in dry cask storage in an independent spent fuel storage installation (ISFSI) (Reference 5).

Pursuant to 10 CFR 50.82(a)(1)(ii), by letters dated May 12, 2020, and May 11, 2021 (References 6 and 7, respectively), Entergy certified to the NRC that the fuel had been permanently removed from the IP2 and IP3 reactor vessels and placed in the spent fuel pool (SFP). Upon the docketing of these certifications, under 10 CFR 50.82(a)(2), the IP2 and IP3 licenses no longer authorize operation of the reactors or emplacement or retention of fuel into the reactor vessels. The spent fuel will be stored in the SFP and in dry cask storage at the onsite ISFSI until it is shipped offsite.

By letter dated December 22, 2021 (Reference 8), as supplemented by letters dated February 1, 2022, February 2, 2022, and May 12, 2022 (References 9, 10 and 11, respectively), HDI requested exemptions from specific portions of 10 CFR 50.47, "Emergency plans," and Appendix E, "Emergency Planning and Preparedness for Production and Utilization Facilities,"

to 10 CFR Part 50 for the IPEC licenses. More specifically, HDI requested exemptions from certain planning standards in 10 CFR 50.47(b) regarding onsite and offsite radiological emergency preparedness (REP) plans for nuclear power reactors; from certain requirements in 10 CFR 50.47(c)(2) for establishment of plume exposure pathway and ingestion pathway emergency planning zones (EPZs) for nuclear power reactors; and from certain requirements in 10 CFR Part 50, Appendix E, Section IV, "Content of Emergency Plans."

HDI's requested exemptions would eliminate the requirements to maintain formal offsite[1] REP plans in accordance with 44 CFR, "Emergency Management and Assistance," Part 350, "Review and Approval of State and Local Radiological Emergency Plans and Preparedness," and would reduce the scope of the onsite Emergency Planning (EP) activities at IPEC, based on the reduced risks of an offsite radiological release at IPEC 15 months after permanent cessation of power operations. The exemptions would maintain the requirements for an onsite radiological emergency plan and would continue to ensure the capability to communicate and coordinate with offsite response authorities. The NRC staff found the application complete and found that HDI's associated technical justification provides a basis for the Commission's consideration of the requested exemptions.

In accordance with 10 CFR 50.12, "Specific exemptions," the licensee stated that this exemption request: (1) is authorized by law; (2) will not present an undue risk to the public health and safety; (3) is consistent with the common defense and security; and (4) meets the requirement for special circumstances in 10 CFR 50.12(a)(2).

2.0 DISCUSSION

The regulations governing EP for a nuclear power reactor are set forth in 10 CFR 50.47, 10 CFR 50.54(q), (s) and (t), and Appendix E to 10 CFR Part 50. Every nuclear power reactor licensee must establish and maintain emergency plans and preparedness in accordance with these regulations. The EP regulations for a nuclear power reactor include standards for both onsite and offsite emergency response plans. These regulations and the planning basis for EP are based upon an anticipated prompt response to a wide spectrum of events for an operating nuclear power reactor. However, for a nuclear power reactor that is no longer operating and is in decommissioning, the spectrum of accidents that can have significant offsite consequences is greatly reduced. At a decommissioning nuclear power reactor site, the only accident scenario that might lead to a significant radiological release is a highly unlikely, beyond-design-basis event resulting in a potential spent fuel zirconium cladding fire. This event involves a postulated major loss of water inventory from the SFP, where pre-planned SFP mitigation measures were unsuccessful, generating a significant heat up of the spent fuel to the point where substantial zirconium cladding oxidation and fuel damage can occur.

The amount of decay heat present in irradiated fuel in the SFP is directly related to the amount of time that has passed after the reactor is shut down. As such, the potential for the conditions needed for a zirconium cladding fire to occur continues to decrease as a function of the time since the reactor was permanently shutdown. However, current regulations do not reflect that: (1) considerably more time is available during decommissioning to respond to a postulated spent fuel pool coolant event than is available for many postulated operating power reactor

[1] The offsite standards are reproduced in the Federal Emergency Management Agency (FEMA) regulations at 44 CFR 350.5, "Criteria for review and approval of State and local radiological emergency plans and preparedness," and are based on the standards established by the Commission in 10 CFR 50.47.

accidents, and (2) comprehensive SFP mitigation measures and on-shift staff to implement these measures remain in place following the permanent cessation of power operations.

Since there are no explicit regulatory provisions distinguishing EP requirements for a nuclear power reactor that has permanently ceased operating from those for an operating nuclear power reactor, licensees transitioning to or already in the decommissioning phase usually seek to establish a level of EP commensurate with the risk of a radiological emergency at a decommissioning site. Exemptions from certain EP requirements are typically requested early in the decommissioning process. The NRC reviews each request on a case-by-case basis and grants exemptions only after conducting a thorough analysis of each request. Historically, given the significant reduction in radiological risk from a decommissioning site, the NRC has approved exemptions from EP requirements based on site-specific evaluations and considering the objectives of the regulations. Between 1987 and 1999, the NRC issued exemptions from certain EP requirements for ten licensees in decommissioning. More recently, exemptions from EP requirements during decommissioning have been granted for the Kewaunee Power Station, Crystal River Unit 3 Nuclear Generating Plant, San Onofre Nuclear Generating Station, Units 2 and 3, Vermont Yankee Nuclear Power Station, Fort Calhoun Station, Oyster Creek Nuclear Generating Station, Pilgrim Nuclear Power Station, the Three Mile Island Nuclear Station, and Duane Arnold Energy Center (References 12, 13, 14, 15, 16, 17, 18, 19 and 20 respectively).

Previously granted exemptions from EP regulations reduced the requirements for decommissioning power reactors to those consistent with these standards: (1) 10 CFR 50.47(d),[2] which states the requirements for a license authorizing only fuel loading and low power testing, and (2) 10 CFR 72.32(a),[3] which establishes the information required in an emergency plan for an ISFSI. Examples of previously granted exemptions from EP regulations for decommissioning power reactors include: setting the highest emergency classification level as an “Alert”; extending the timing requirements for notification of offsite authorities; requiring only onsite exercises with the opportunity for offsite response organization (ORO) participation; and only maintaining arrangements for OROs (i.e., law enforcement, fire and medical services) that might support the licensee’s response to onsite emergencies.[4] The EP exemptions also relieve the licensee from the requirement to maintain formal offsite REP plans, including the 10-mile plume exposure pathway and 50-mile ingestion pathway EPZs.

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[2] 10 CFR 50.47(d) states, in part, “Notwithstanding the requirements of paragraphs (a) and (b) of this section, and except as specified by this paragraph, no NRC or FEMA review, findings, or determinations concerning the state of offsite emergency preparedness or the adequacy of and capability to implement State and local or utility offsite emergency plans are required prior to issuance of an operating license authorizing only fuel loading or low power testing and training (up to 5 percent of the rated thermal power).”

[3] In the statement of considerations (SOC) for the Final Rule to 10 CFR Part 72, “Emergency Planning Licensing Requirements for Independent Spent Fuel Storage Facilities (ISFSI) and Monitored Retrievable Storage Facilities (MRS)” (60 *Federal Register* (FR) 32430; June 22, 1995), the Commission stated that “NUREG-1140 concluded that the postulated worst-case accident involving an ISFSI has insignificant consequences to public health and safety. Therefore, the final requirements to be imposed on most ISFSI licensees reflect this fact, and do not mandate formal offsite components to their onsite emergency plans.” The Commission also stated, “[B]ased on the potential inventory of radioactive material, potential driving forces for distributing that amount of radioactive material, and the probability of the initiation of these events, the Commission concludes that the offsite consequences of potential accidents at an ISFSI or a [monitored retrieval storage facility] would not warrant establishing Emergency Planning Zones” (60 FR 32435).

[4] The requirements for licensees to maintain agreements for fire-fighting and local law enforcement services exist outside of emergency planning requirements (i.e., the requirement for licensees to maintain a fire protection plan in 10 CFR 50.48, “Fire protection,” and physical security requirements in 10 CFR Part 73, “Physical Protection of Plants and Materials”).

However, licensees that have been granted EP exemptions must continue to maintain an onsite emergency plan addressing the classification of an emergency, notification of emergencies to licensee personnel and offsite authorities, and coordination with designated offsite government officials following an event declaration.

In evaluating the EP exemptions requested by HDI, specifically in relation to relieving the licensee from the requirement to maintain formal offsite REP plans, the NRC staff considered the conclusions from recent SFP studies completed since the publication of NUREG-1738, "Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants," dated February 2001 (Reference 21), which served as the technical basis for SECY-01-0100, "Policy Issues Related to Safeguards, Insurance, and Emergency Preparedness Regulations at Decommissioning Nuclear Power Plants Storing Fuel in Spent Fuel Pools" (Reference 22). In addition, the NRC staff considered enhancements put into place as a result of the events of September 11, 2001, and the accident at the Fukushima Dai-ichi site on March 11, 2011.

The studies, described in more detail below, helped to inform NRC staff positions that only a highly unlikely, beyond-design-basis event (e.g., extreme earthquake or large aircraft impact) would cause sufficient damage to the SFP structure to result in a rapid SFP water draindown and potential zirconium cladding fire. In addition, there would be a significant amount of time between the initiating event (i.e., the event that causes the SFP level to drop) and the possible onset of conditions that could result in a zirconium cladding fire. This time provides a substantial opportunity for event mitigation. Licensees are 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 be available for OROs to implement these measures using a comprehensive emergency management plan (CEMP) or "all-hazards," approach.[5]

2.1 Spent Fuel Pool Study Considerations

Following the permanent removal of spent fuel from the reactor vessel, the principal radiological risks are associated with the storage of spent fuel onsite. Generally, a few months after the reactor has been permanently shutdown there are no possible design basis events that could result in a radiological release exceeding 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 23), early phase protective action guide (PAG) limit of one roentgen equivalent man (rem) at the exclusion area boundary of the site.

The only potential accident that might lead to a significant radiological release at a decommissioning power reactor is a zirconium cladding fire. The zirconium cladding fire scenario is a postulated, but highly unlikely, beyond-design-basis accident (DBA) scenario that involves a major loss of water inventory from the SFP, resulting in a significant heat up of the spent fuel due to the loss of all cooling, and culminating in substantial zirconium cladding oxidation and fuel damage. The significance of spent fuel heat up scenarios that might result in a zirconium cladding fire depends on the decay heat of the irradiated fuel stored in the SFP. The amount of decay heat in the spent fuel is directly associated with the amount of time since the

[5] A CEMP or "all-hazards" approach in this context, also referred to as an emergency operations plan, is addressed in FEMA's Comprehensive Preparedness Guide (CPG) 101, "Developing and Maintaining Emergency Operations Plans," Version 2.0, dated November 2010 (Reference 24).

reactor permanently ceased power operations. Therefore, the probability of a zirconium cladding fire scenario continues to decrease as a function of the time that the decommissioning power reactor has been permanently shutdown and defueled.

The NRC staff assessed the risk of an SFP accident at decommissioning nuclear power plants in the late 1990s to support development of a risk-informed technical basis for review of exemption requests and creation of a regulatory framework for integrated rulemaking. The NRC's NUREG/CR-6451, "A Safety and Regulatory Assessment of Generic BWR [Boiling Water Reactor] and PWR [Pressurized Water Reactor] Permanently Shutdown Nuclear Power Plants," dated August 1997 (Reference 25), and NUREG-1738 confirmed that for permanently shutdown and defueled power reactors that are bounded by the assumptions and conditions in the report, the risk of an offsite radiological release is significantly less than for an operating power reactor.

The NRC staff's assessment, published in NUREG-1738, conservatively assumed that if the water level in the SFP did drop below the top of the spent fuel, a zirconium cladding fire involving the spent fuel would occur, and thereby bounded those conditions associated with air cooling of the fuel (including partial draindown scenarios) and fire propagation. The study used simplified and sometimes bounding assumptions and models to characterize the likelihood and consequences of beyond-design-basis SFP accidents. Even with these conservative assumptions, the study found the risk of an SFP fire to be low and well within the Commission's safety goals. The amount of time available after the fuel is completely uncovered, but before a zirconium cladding fire, depends on various factors, including decay heat rate, fuel burnup, fuel storage configuration, building ventilation rates and air flow paths, and fuel cladding oxidation rates. Although the NUREG-1738 assessment did not completely rule out the possibility of a zirconium fire, it did demonstrate that storage of spent fuel in a high-density configuration in SFPs is safe, and that the risk of accidental release of a significant amount of radioactive material to the environment is low.

After the events of September 11, 2001, Sandia National Laboratories conducted studies (collectively referred to as the "Sandia studies"), which considered spent fuel loading patterns and other aspects for an SFP at a PWR and a BWR, including the role that the circulation of air plays in the cooling of spent fuel in the SFP. The Sandia studies indicated that there is a significant amount of time between the initiating event and the spent fuel assemblies becoming partially or completely uncovered. In addition, the Sandia studies indicated that for those hypothetical conditions where air cooling may not be effective in preventing a zirconium cladding fire, there is a significant amount of time between the spent fuel becoming uncovered and the possible onset of such a zirconium cladding fire, thereby providing a substantial opportunity for event mitigation. The Sandia studies, which account for relevant heat transfer and fluid flow mechanisms, also indicated that air cooling of spent fuel could be sufficient to prevent SFP zirconium fires at a point much earlier following fuel offload from the reactor than previously considered (e.g., in NUREG-1738). The findings of the Sandia studies are sensitive, security-related information and are not available to the public.[6]

In 2013, the NRC documented a regulatory analysis for expediting the transfer of spent fuel assemblies in COMSECY-13-0030, "Staff Evaluation and Recommendation for Japan Lessons-Learned Tier 3 Issue on Expedited Transfer of Spent Fuel" (Reference 27). In this analysis, the NRC staff concluded that SFPs are robust structures with large safety margins and recommended to the Commission that possible regulatory actions to require the expedited

[6] A redacted summary of the Sandia studies is publicly available (Reference 26).

transfer of spent fuel from SFPs to dry cask storage were not warranted. The Commission subsequently approved the NRC staff's recommendation in the Staff Requirements Memorandum to COMSECY-13-0030 (Reference 28).

In NUREG-2161, "Consequence Study of a Beyond-Design-Basis Earthquake Affecting the Spent Fuel Pool for a U.S. Mark I Boiling Water Reactor," dated September 2014 (Reference 29), the NRC evaluated the potential benefits of strategies required in 10 CFR 50.54(hh)(2) (now 10 CFR 50.155(b)(2)).[7] The study results for the analyzed severe earthquake at the reference plant are consistent with conclusions in past studies that SFPs are robust structures and likely to withstand severe earthquakes without leaking. The study showed the likelihood of a radiological release from the spent fuel, resulting from a severe earthquake at the reference plant, to be about one time in 10 million years or lower. If a radiological release were to occur, this study also shows that the individual cancer fatality risk for a member of the public is several orders of magnitude lower than the Commission's Quantitative Health Objective of 2 in 1 million ($2x10^{-6}$/year). As explained in NUREG-2161, successful implementation of mitigation strategies significantly reduces the likelihood of a release from the SFP in the event of a loss of cooling water. Additionally, the NRC found that the placement of spent fuel in a dispersed configuration in the SFP, such as the 1 x 4 pattern, more effectively used the heat capacity of the stored fuel and available cooling mechanisms to extend the heat up time and reduce the likelihood of a release from a completely drained SFP.

As part of informing its current integrated decommissioning rulemaking effort, the NRC staff conducted an applied research study, as documented in a memorandum entitled "Transmittal of Reports to Inform Decommissioning Plant Rulemaking for User Need Request NSIR-2015-001," dated May 31, 2016 (Reference 30), and concluded:

- The representative plant staff can reliably implement mitigation strategies to timely mitigate cask-drop events and prevent spent fuel heat up damage;

- Only the events causing a rapid SFP water draindown (e.g., extreme earthquake or large aircraft impact) would challenge successful mitigation of fuel heat up; and

- Even in the event of a highly unlikely beyond-DBA leading to a rapid draindown of the SFP and subsequent zirconium cladding fire, there may be an additional time margin, on the order of several hours beyond the 10-hour heat up time, during which protective actions can be taken to protect the public before the dose levels associated with the EPA early phase PAGs would be exceeded offsite.

In addition, for the hypothetical event sequence considered in the study above, i.e. the highly unlikely beyond-DBA leading to a rapid draindown of the SFP and subsequent zirconium cladding fire, acute fatal radiological effects offsite appear to be unlikely from the source term evaluated, provided that individuals can be relocated within a reasonable time after plume arrival, which in most cases was longer than 24 hours.

As previously stated, these SFP studies (NUREG-1738, the Sandia studies, NUREG-2161, COMSECY-13-0030, and studies supporting the decommissioning rulemaking efforts) support the NRC staff positions that:

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7 "Mitigation of Beyond-Design-Basis Events; Final Rule" (84 FR 39684; August 9, 2019).

- There would be sufficient time between an initiating event and the possible onset of conditions that could result in a zirconium cladding fire, which would provide a substantial opportunity for successful mitigation measures; and

- Only a highly unlikely, beyond-design-basis event (e.g., extreme earthquake or large aircraft impact) could cause sufficient SFP structural damage to uncover the fuel and potentially support development of a zirconium cladding fire and, even in such cases, the fuel may be air coolable following a complete draindown.

As such, the NRC staff believes that for all but the most unlikely events, any offsite protective actions would be taken by governmental officials as a precautionary measure. In the highly unlikely event of a beyond-DBA resulting in a loss of the SFP water inventory, there would be time to initiate appropriate SFP mitigation actions. If State or local governmental officials determine that offsite protective actions are warranted, then sufficient time and capability would be available for OROs to implement these measures using a CEMP approach.

2.2 Spent Fuel Pool Hostile Action-Based Event Considerations

Licensees develop strategies in order to protect against the NRC design basis threat (DBT)[8] for radiological sabotage and are required to maintain these strategies under the provisions of 10 CFR 73.55(b) until the termination of their 10 CFR Part 50 (or 10 CFR Part 52) license. In addition, other Federal agencies, such as the Federal Aviation Administration, the Federal Bureau of Investigation, and the Department of Homeland Security have taken aggressive steps to prevent terrorist attacks in the United States. Taken as a whole, these systems, personnel, and procedures provide reasonable assurance that public health and safety, the environment, and the common defense and security will be adequately protected (see 73 FR 46204 through 46207; August 8, 2008).

Numerous NRC regulatory activities and studies have reaffirmed the safety and security of spent fuel stored in pools and showed that SFPs are effectively designed to prevent accidents and minimize damage from malevolent attacks. In the wake of the terrorist attacks of September 11, 2001, the NRC took several actions to further reduce the possibility of a zirconium cladding fire in an SFP. The NRC issued Order EA-02-026, “Order for Interim Safeguards and Security Compensatory Measures,” dated February 25, 2002 (Reference 31), requiring licensees to immediately implement additional security measures, including increased patrols, augmented security forces and capabilities, and more restrictive site-access controls to, among other things, reduce the likelihood of an SFP accident resulting from a terrorist-initiated event. Through the NRC’s issuance of the “Power Reactor Security Requirements” final rule on March 27, 2009 (74 FR 13926), the agency codified generically applicable security requirements that had been previously issued by orders. Subsequently, by letter dated November 28, 2011 (Reference 32), the NRC partially rescinded Order EA-02-026. However, the requirements of Order EA-02-026 that were addressed by Interim Compensatory Measure (ICM) B.1.a involved operator training for specific security-initiated events that were not covered by the proposed or existing regulations and remained in effect after the NRC rescinded other parts of the Order.

[8] The DBT represents the largest threat against which a private sector facility can be reasonably expected to defend, with high assurance. The NRC’s Design Basis Threat rule was published in the *Federal Register* on March 19, 2007 (72 FR 12705).

2.3 Spent Fuel Pool Mitigative Action Considerations

The NRC Order EA-02-026 also established new requirements for licensees to have mitigating strategies for the potential loss of SFP water inventory and for large fires or explosions at nuclear power plants. In response, the Nuclear Energy Institute (NEI) provided detailed guidance in NEI 06-12, "B.5.b Phase 2 and 3 Submittal Guideline," Revision 2, dated December 2006 (Reference 33), which the NRC endorsed on December 22, 2006 (Reference 34). The NRC found the NEI guidance to be an effective means for mitigating the potential loss of large areas of the plant due to fires or explosions. In addition, these mitigative strategies enhanced the ability to cool the spent fuel and the potential to recover SFP water level and cooling prior to a potential SFP zirconium cladding fire, which further reduced the probability of a radiological release.

The 2009 security requirements final rule also added the requirement for licensees to implement mitigating measures to maintain or restore SFP cooling capability in the event of loss of large areas of the plant due to fires or explosions, which further decreases the probability of a zirconium cladding fire in an SFP. Specifically, under 10 CFR 50.155(b)(2), nuclear power reactor licensees are required to implement strategies such as those provided in NEI-06-12.[9] The IPEC mitigative strategies will continue to be maintained to satisfy the applicable license conditions of the Renewed Facility Operating License.

Furthermore, other organizations, such as Sandia National Laboratories, as discussed previously under "Spent Fuel Pool Considerations," have confirmed the effectiveness of the additional mitigation strategies to maintain spent fuel cooling in the event that the pool is drained, and its initial water inventory is reduced or lost entirely.

In response to the Fukushima Dai-ichi Accident, the NRC implemented regulatory actions to further enhance reactor and SFP safety. On March 12, 2012, the NRC issued Order EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events" (Reference 35), which requires licensees to develop, implement, and maintain guidance and strategies to maintain or restore SFP cooling capabilities, independent of normal alternating current power systems, following a beyond-design basis external event.

In addition, on March 12, 2012, the NRC also issued Order EA-12-051, "Order Modifying Licenses with Regard to Reliable Spent Fuel Pool Instrumentation" (Reference 36), which requires that licensees install reliable means of remotely monitoring wide-range SFP levels to support effective prioritization of event mitigation and recovery actions in the event of a beyond-design-basis external event. Although the primary purpose of the Order was to ensure that operators were not distracted by uncertainties related to SFP conditions during accident response, the improved monitoring capabilities will likewise help in the diagnosis and response to potential losses of SFP integrity. These requirements ensure a more reliable and robust mitigation capability is in place to address degrading conditions in SFPs resulting from certain significant but highly unlikely events. Through the NRC's issuance of the "Mitigation of

[9] The guidance in NEI-06-12 specifies that portable, power-independent pumping capabilities must be able to provide at least 500 gallons per minute (gpm) of bulk water makeup to the SFP, and at least 200 gpm of water spray to the SFP. Recognizing that the SFP is more susceptible to a release when the spent fuel is in a non-dispersed configuration, the guidance also specifies that the portable equipment is to be capable of being deployed within two hours for a non-dispersed configuration.

Beyond-Design-Basis Events" final rule on August 9, 2019, the agency codified the generally applicable requirements in Order EA-12-049 and Order EA-12-051.

2.4 Spent Fuel Pool Offsite Radiological Emergency Preparedness Considerations

The NRC staff determined, based on the EP exemption evaluation criteria discussed in Section 3.0 of this safety evaluation, that in the event of a beyond-design-basis event impacting SFP integrity, or the ability to cool spent fuel, the licensee will maintain sufficient resources and adequately trained personnel available on-shift to promptly initiate mitigative actions without the support of OROs. In the highly unlikely event of a zirconium cladding fire in the SFP, due to a beyond-design-basis event that results in the loss of all spent fuel cooling, sufficient time would exist for offsite government officials to implement protective measures, if they deem warranted, using a CEMP approach. Therefore, the NRC staff concluded, consistent with previous similar exemption requests, that formal offsite REP plans, required under 10 CFR Part 50, are not necessary for permanently shutdown and defueled nuclear power reactor licensees once the evaluation criteria outlined in Section 5, "Evaluation of Exemptions to EP Regulations," of the Office of Nuclear Security and Incident Response (NSIR), Division of Preparedness and Response (DPR) Interim Staff Guidance (ISG) document NSIR/DPR-ISG-02, "Emergency Planning Exemption Requests for Decommissioning Nuclear Power Plants," dated May 11, 2015 (Reference 37), have been satisfied.

In addition, consistent with the December 7, 2015, "Memorandum of Understanding Between the Department of Homeland Security/Federal Emergency Management Agency and Nuclear Regulatory Commission Regarding Radiological Emergency Response, Planning and Preparedness" (Reference 38), by letter dated June 7, 2022 (ML22143A954) (Reference 39), the NRC staff documented the transmittal to FEMA, by electronic mail, a draft of the proposed SECY paper related to the IPEC request and offered the opportunity for FEMA to ask questions, obtain clarification, and comment on the draft SECY paper before the Commission received it for review. In a letter dated August 12, 2022 (ML22228A227) (Reference 40), FEMA provided comments.

Under the proposed EP exemptions, HDI would still be required to maintain an onsite emergency plan, which would provide for the notification of and coordination with OROs to an extent commensurate with the approved exemptions. Licensee requirements for offsite fire services and law enforcement responding onsite will continue to be maintained under the licensee's fire protection plan and physical security plan in accordance with 10 CFR 50.48 and 10 CFR Part 73, respectively. In the Staff Requirements Memorandum (SRM) to SECY-22-0102, "Request by Holtec Decommissioning International, LLC for Exemptions from Certain Emergency Planning Requirements for Indian Point Nuclear Generating Unit Nos. 1, 2, and 3," dated October 24, 2023 (Reference 41), the Commission approved HDI's requested EP exemptions as recommended by the NRC staff in SECY-22-0102 (Reference 42).

3.0 REGULATORY EVALUATION

The regulations in 10 CFR 50.12(a)(2)(ii) provide that the NRC may, upon application by a licensee or on its own initiative, grant exemptions from the requirements of the regulations in 10 CFR Part 50 in circumstances for which application of the regulation would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the

rule.[10] As discussed in the Statement of Considerations (SOC) for the Final Rule for EP requirements for 10 CFR Part 50 and 10 CFR Part 70 (45 FR 55402; August 19, 1980), the underlying purposes of the planning standards in 10 CFR 50.47(b), the requirements in 10 CFR 50.47(c)(2), and certain requirements of Section IV of Appendix E to 10 CFR Part 50, are to: (1) ensure that there is reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency, and (2) ensure that licensees maintain effective offsite and onsite radiological emergency response plans.

The NRC staff relied on past precedent to assess whether the HDI request for EP exemptions satisfied the underlying purposes of the EP regulations. As discussed previously, the exemptions requested by HDI for IPEC that eliminate requirements for formal offsite REP plans are consistent with those recently approved by the NRC for the Kewaunee Power Station, Crystal River Unit 3 Nuclear Generating Plant, San Onofre Nuclear Generating Station, Units 2 and 3, Vermont Yankee Nuclear Power Station, Fort Calhoun Station, Oyster Creek Nuclear Generating Station, the Pilgrim Nuclear Power Station, the Three Mile Island Nuclear Station, and the Duane Arnold Energy Center. Prior to these sites, the last approved exemption that eliminated the requirements for formal offsite REP planning was for the Zion Nuclear Power Station in 1999 (Reference 43).

The NRC staff recognizes that the planning standards in 10 CFR 50.47(b), the requirements in 10 CFR 50.47(c)(2), and certain requirements in Section IV of Appendix E to 10 CFR 50 were developed taking into consideration the risks associated with accidents that have the potential for significant offsite radiological dose consequences during operation of a nuclear power reactor at its licensed full-power level. As discussed previously, the NRC staff has concluded that after a reactor has permanently ceased power operations and removed all fuel from the reactor vessel to the SFP, the risks associated with accidents that have a potential for offsite radiological release are significantly reduced for those licensees that are reasonably aligned with the analyses presented in NUREG-1738. This position has been further informed by the recent spent fuel pool studies provided in NUREG-2161.

Based on the highly unlikely nature of postulated beyond-design-basis events resulting in a loss of SFP integrity or all cooling to the spent fuel that may result in significant offsite radiological consequences, the NRC staff considers that the special circumstances condition of 10 CFR 50.12(a)(2)(ii) can be met by demonstrating that IPEC satisfies the two criteria provided below. Specifically, the planning standards in 10 CFR 50.47(b), the requirements in 10 CFR 50.47(c)(2), and certain requirements in Section IV of Appendix E to 10 CFR Part 50, from which HDI has requested exemptions, would not serve, or be necessary to achieve, the underlying purpose of the EP regulations if the IPEC site-specific analyses demonstrate that:

1. An offsite radiological release from a design-basis accident will not exceed the EPA early phase PAGs of one rem at the exclusion area boundary (EAB)[11]; and

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[10] Notwithstanding the special circumstances of the exemption request, 10 CFR 50.12(a)(1) requires that the exemption must be authorized by law, not present an undue risk to the public health and safety, and be consistent with the common defense and security.

[11] Use of EPA early phase PAGs as a threshold is consistent with the planning basis for the 10-mile EPZ provided in NUREG-0396 (EPA 520/1-78-016), "Planning Basis for the Development of State and Local Government Radiological Emergency Response Plans in Support of Light Water Nuclear Power Plants," dated December 1978 (Reference 44), and endorsed by the Commission in a policy statement published on October 23, 1979 ("Planning Basis for Emergency Responses to Nuclear Power Reactor Accidents," 44 FR 61123).

2. In the highly unlikely event of a beyond-design-basis event, resulting in a loss of all modes of cooling for the spent fuel stored in the SFP, there is a minimum of 10 hours for the hottest fuel assembly to reach 900 degrees Celsius (°C), which is the critical temperature threshold for a self-sustained oxidation of zirconium cladding in air. This time provides a substantial opportunity for event mitigation. Licensees are required to maintain effective strategies, sufficient resources, and adequately trained personnel to mitigate such an event.

Previously granted exemptions from EP regulations reduced the level of EP requirements consistent with the regulations for a licensee authorized for fuel loading and low power testing only, as specified in the standards of 10 CFR 50.47(d), and are consistent with the information requirements for an ISFSI emergency plan, as required by 10 CFR 72.32(a). Examples of the reduced EP requirements include: setting the highest emergency classification level as an "Alert"; extending the timing requirements for notification of offsite authorities; requiring only onsite exercises with the opportunity for ORO participation; and only maintaining arrangements for the OROs (i.e., law enforcement, fire, and medical services) that may respond to onsite emergencies. No formal offsite REP plans, in accordance with 44 CFR Part 350, were required after the exemptions were granted for these licensees.

As part of the review of HDI's exemption request, the NRC staff used NSIR/DPR-ISG-02, the EP regulations in 10 CFR 72.32, and the NUREG-2215, "Standard Review Plan for Spent Fuel Dry Storage Systems and Facilities," dated April 2020 (Reference 45), as references to ensure consistency between specific-licensed and general-licensed ISFSIs. Furthermore, the licensee addressed the Industry Decommissioning Commitments (IDCs) and Staff Decommissioning Assumptions (SDAs)[12] that formed the basis of the analyses presented in NUREG-1738.

4.0 TECHNICAL EVALUATION

The following NRC staff evaluation verifies that HDI provided the analyses described in Section 5 of NSIR/DPR-ISG-02. These analyses meet the criteria in the ISG to justify elimination of the requirements on the licensee to maintain the 10-mile plume exposure pathway, the 50-mile ingestion pathway EPZs, and formal offsite REP plans. The discussion that follows lists each ISG criterion, followed by the NRC staff's evaluation of the licensee's consistency with that ISG criterion for IPEC.

4.1 The licensee has performed an analysis indicating that any radiological release from the applicable remaining DBAs would be within the dose limits of 10 CFR 50.67, "Accident source term," and dose acceptance criteria in Regulatory Guide 1.183, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors" (Reference 48). The licensee evaluated the maximum 2-hour total effective dose equivalent (TEDE) to an individual located at the EAB, and the 30-day TEDE to an individual at the outer boundary of the low population zone and the control room. The resulting doses would not approach the EPA early phase PAGs recommendation for protection of the public.

[12] NEI proposed IDCs in a letter to the NRC dated November 12, 1999 (Reference 46). The NRC identified several additional SDAs through the NRC staff's risk assessment and evaluation of the safety principles for decommissioning plants in Regulatory Guide 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," Revision 2, dated May 2011 (Reference 47). The IDCs and SDAs are summarized in Table 4.2-1 and Table 4.2-2 to NUREG-1738.

Evaluation: HDI states that the irradiated fuel will be stored in the IP2 and IP3 SFPs and an ISFSI. HDI further states, and the NRC staff agrees, that while spent fuel remains in the SFPs, the only postulated DBAs that would remain applicable to the permanently defueled IPEC facility that could contribute a significant dose would be: (1) a fuel handling accident (FHA) in the fuel storage buildings (FSBs); (2) an accidental release of waste gas; and (3) an accidental release-recycle of waste liquid.

Fuel Handling Accident

The NRC staff previously approved the revised DBA radiological analysis in License Amendments No. 294 (Reference 49) for IP2 and License Amendment No. 270 (Reference 50) for IP3. In the information provided to support these license amendment requests (LARs), and, in the information provided as part of this exemption request, the licensee analyzed the FHA and found that the dose at the EAB following a FHA that occurred 30 days following permanent cessation of power operations is 0.47 rem, without crediting mitigation by any active safety systems or components.

Based on the permanent shutdown of IP3 on April 30, 2021, 15-month decay time elapsed on August 1, 2022. The NRC staff notes that the doses from an FHA are dominated by relatively short-lived isotopes such as Iodine-131. After 15 months of decay, the thyroid dose from an FHA would be negligible. With 15 months of decay, the only isotope remaining in significant amounts, among those postulated to be released in a DBA FHA, would be Krypton-85. Because Krypton-85 primarily decays by beta emission, the calculated skin dose from an FHA release would make an insignificant contribution to the TEDE, which is the parameter of interest in the determination of the EPA early phase PAGs for sheltering or evacuation.

Accidental Release of Waste Gas

HDI performed an analysis that includes the determination of the dose consequences for a waste gas decay tank rupture accident using a 50,000 curie (Ci) dose equivalent Xe-133 waste gas tank activity limit. The waste gas decay tanks receive the radioactive gases from the radioactive liquids from the various laboratories and drains processed by the waste disposal system.

The calculated radiological consequences following a waste gas decay tank rupture without credit for any mitigating systems, or the primary auxiliary building ventilation system post shutdown are as follows:

- In either control room – a whole body dose of 0.77 rem, which is under the limit of 5 rem;
- At the EAB – a whole body dose of 0.30 rem, which is under the limit of 0.5 rem; and
- At the LPZ – a whole body dose of 0.11 rem, which is under the limit of 0.5 rem.

HDI reevaluated the dose from an accidental release of waste gas to reflect the removal of the waste gas decay tank(s) from operation and to reevaluate the dose at 15 months after the shutdown of IP3. Based on the revised analysis, the radiological consequences of a postulated waste gas decay tank rupture was determined to be negligible because the tanks are removed from operation and depressurized and vented to atmosphere.

Accidental Release-Recycle of Waste Liquid

Section 6.4, “Accidental Release-Recycle of Waste Liquid,” of the IP2 and IP3 Defueled Safety Analysis Reports (DSARs) (Reference 51 and 52, respectively) addresses the accidental release of waste liquid by stating that the hazard from these releases is derived only from any volatized components. The tanks containing significant radioactive liquids such as the volume control tanks, and gas decay tanks are located where any potential liquid release will be retained in the building or sumps and only volatilized components would be released to the environment. Thus, the release of liquid waste was evaluated in the analysis for an accidental release of waste gas. Since the assumed 50,000 Ci dose equivalent Xe-133 for the waste gas decay tank bounded the normal operation limits and since the waste gas decay tank collects the waste gas from other tanks, the waste gas decay tank release for normal operation would bound the dose to the control room and the public from liquid tank ruptures. Since the dose to the control room operators and the public were below the 5 rem and 1 rem limits, respectively, the staff found the results of a potential liquid waste tank failure to be acceptable.

The NRC staff reviewed the consequences of a FHA, waste gas release accident, and liquid tank failure accident in detail during the review of the previously approved LARs and found them to be acceptable. Since this information has not changed for this exemption request the NRC staff relied on these previous LARs to conduct the review of this exemption request. The NRC staff notes that while the applicant continues to rely on the information from the previously approved LARs, the calculated doses would be expected to be lower when the exemption is implemented, due to additional decay time beyond the time assumed for the approved LARs. Since the dose at the EAB will not exceed the 1 rem limit, the NRC staff finds it acceptable to support approval of the exemption request.

4.2 The licensee has performed an analysis demonstrating that after the spent fuel has decayed for 15 months, with a complete loss of SFP water inventory with no heat loss (i.e., adiabatic heat up), a minimum of 10 hours would be available before any fuel cladding temperature reaches 900°C from the time all cooling is lost.

Evaluation: The NRC staff evaluates the ability to mitigate beyond-design-basis events considering the time available to implement measures to maintain the fuel cool or, if necessary, implement an appropriate emergency response. The NRC staff uses an assessment of the adiabatic heat-up to determine the available time because adiabatic heat up is generally the limiting condition. The heat up time is calculated as the time to reach a temperature of 900°C, which correlates to 1,652 degrees Fahrenheit (°F) and the temperature where “runaway oxidation” (zirconium cladding fire) is expected to occur, as defined in NUREG1738 (Reference 18).

The 10-hour criterion, conservatively, does not consider the time to uncover the fuel and assumes instantaneous loss of cooling to the fuel. The 10-hour time period is also not intended to represent the time that it would take to repair all key safety systems or to repair a large SFP breach. The 10-hour criterion is a conservative period of time in which pre-planned mitigation measures to provide makeup water or spray to the SFP can be reliably implemented before the onset of a zirconium cladding ignition. In addition, in the unlikely event that a release is projected to occur, 10 hours would provide sufficient time

for offsite agencies, if deemed warranted, to take appropriate action to protect the health and safety of the public.

An analysis was performed by HDI which shows that 15 months after shutdown the spent fuel stored in the SFP will have decayed to the extent that the requested exemptions may be implemented at the IPEC without any additional compensatory actions. Given the permanent shutdown date of IP3 of April 30, 2021, and the fuel decay time of 15 months, the period in which the spent fuel could heat up to clad ignition temperature within 10 hours under adiabatic conditions ended on August 1, 2022. This analysis, "Holtec Spent Fuel Pool Heat Up Calculation Methodology Topical Report, Revision 2," dated December 22, 2021 (ML21357A005 [non-public]) was submitted by HDI in support of the exemptions from certain EP requirements requested by letter dated December 22, 2021. HDI provided further information in Enclosure 1, "Indian Point Unit Nos. 2 and 3 Spent Fuel Pool Heat Up Calculations," to HDI's supplemental letter dated February 1, 2022 (ML22032A117 [non-public]). The analysis determined the decay time necessary to ensure at least a 10-hour heat up time considering the thermal capacity of the portion of the fuel assembly that heats uniformly and the decay heat rate of the fuel. The HDI analysis shows that after the spent fuel has decayed for 15 months, for beyond-design-basis events where the SFP is drained and air cooling is not possible, at least 10 hours would be available from the time spent fuel cooling is lost until the hottest fuel assembly reaches a temperature of 900°C. This 10-hour minimum threshold provides sufficient time for the licensee to take mitigative actions, or if government officials deem warranted, for offsite protective actions to be initiated using a comprehensive approach to EP.

The NRC staff reviewed the calculation to verify that important physical properties of materials were within acceptable ranges and that the results were accurate. The staff determined that physical properties were appropriate and completed independent confirmatory calculations that produced similar results. Therefore, the staff found that after 15 months of decay, at least 10 hours would be available before a significant offsite release could begin. The staff concluded that the adiabatic heat up calculation provided an acceptable method for determining that a minimum of 10 hours would be available before any fuel cladding temperature reaches 900°C from the time all cooling is lost.

4.3 The licensee has performed an analysis for a loss of SFP water inventory resulting in radiation exposure at the EAB and the control room, which indicates that any release would be less than EPA early phase PAGs at the EAB.

Evaluation: NUREG-0586, "Final Generic Environmental Impact Statement on Decommissioning of Nuclear Facilities," Supplement 1 (Reference 53), Section 4.3.9, "Radiological Accidents," identifies that a SFP drain down event is beyond-design-basis. The SFP water and the concrete pool structure serve as radiation shielding. A loss of water shielding above the fuel could increase the offsite radiation levels because of the gamma rays streaming up out of the pool and being scattered back to a receptor at the site boundary. The radiation that is scattered due to interactions with air is sometimes referred to as sky-shine.

Therefore, HDI analyzed the bounding radiological consequences of a postulated complete loss of SFP water from the IP2 and IP3 SFPs as a function of time after shutdown of IP2 and IP3. The primary purpose of this calculation is to determine the dose rates as a function of time at the EAB and in the control room due to loss of

shielding for an event in which the spent fuel assemblies are uncovered following drain down. The dose rates determined by this calculation are due to direct and indirect radiation from spent fuel assemblies and does not consider a potential fire in the SFP for reasons discussed in the previous section above.

The analysis considered limiting distances from both SFPs to both control rooms and the EAB and a combination of IP3 fuel in the IP2 SFP, to bound both units. The SFP water and the concrete SFP structures serve as radiation shielding. Therefore, a loss of water shielding above the fuel could increase the offsite radiation levels because of the gamma rays streaming up out of the SFP and being scattered back to a receptor at the site boundary. The analysis determined that the gamma radiation dose rates at the EAB from a loss of water shielding at the IP2 or IP3 SFPs would be less than the EPA PAGs.

Based on an annual analysis, HDI determined that the dose rate to a receptor at the EAB and the limiting dose rate in the IP2 and IP3 control rooms at one year after permanent shutdown are less than 11.55 millirem/hour and 0.0259 millirem/hour, respectively. HDI concluded that the extended time required to exceed the integrated EPA PAG limit of 1 rem TEDE would allow sufficient time to develop and implement onsite mitigative actions and provide confidence that additional offsite measures could be taken without pre-planning if efforts to reestablish shielding over the fuel are delayed.

The NRC staff notes that while the direct dose rate above the unshielded fuel would be high, radiation protection personnel would restrict access to ensure that no one was subjected to the direct dose from the unshielded fuel. Therefore, the primary concern becomes the dose rate from gamma and neutron radiation that is scattered from interactions with the air above the IP2 and IP3 SFPs. The licensee used appropriate methods to evaluate the effects of this source of radiation at the EAB and in the IP2 and IP3 control rooms. The analysis assumed one year of radioactive decay following operations. This is conservative and acceptable because it will be more than one year following shutdown of both units when the exemption is implemented.

The NRC staff reviewed the licensee's analysis description, performed an independent evaluation and agrees that appropriate methods were used to evaluate the effects of this source of radiation at the control room and the EAB. Therefore, the NRC staff concludes that the dose consequence from sky-shine emitted from the SFP due to a loss of SFP normal cooling would not exceed a level that would warrant protective actions under the EPA early phase PAGs.

4.4 Considering the site-specific seismic hazard, the licensee has performed either an evaluation demonstrating high confidence of a low probability (less than 1×10^{-5} per year) of seismic failure of the SFP storage structure, or an analysis demonstrating the fuel has decayed sufficiently that natural air flow in a completely drained pool would maintain peak cladding temperature below 565˚C (the point of incipient cladding damage).

Evaluation: In 2012, the licensee of the IPEC (Entergy) conducted a seismic evaluation in response to an NRC letter to all power reactor licensees, "Request for Information Pursuant to Title 10 of the *Code of Federal Regulations* 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," dated March 12, 2012 (Reference 54). This evaluation provided an assessment of earthquake probabilities at potentially damaging

accelerations. The NRC accepted the results of this assessment indicating that the low seismic hazard screening criteria had been satisfied at IP2 and IP3 by letters dated March 20, 2014 and March 6, 2014 (Reference 55 and ML14065A272 [non-public], respectively).

HDI developed an analysis demonstrating successful completion of the Enhanced Seismic Checklist provided in NUREG-1738 for the IP2 and IP3 SFPs demonstrating a high confidence of a low probability (less than 1×10^{-5} per year) of seismic failure of the SFP structures. This analysis is summarized in Table 6, "Seismic Checklist for Commercial Nuclear Power Plants During Decommissioning," of the enclosure to HDI's letter dated December 22, 2021 (Reference 5)

Therefore, the NRC staff found reasonable assurance that Criterion 4 of NSIR/DPR-ISG-02 is satisfied with respect to demonstrating a high confidence in a low probability of seismic failure for the IPEC FSBs, including the SFP structures.

4.5 If the licensee is storing fuel in an SFP for a decommissioning site, the licensee should address the risk reduction measures identified in NUREG-1738 as IDCs and SDAs. The IDCs and SDAs are a set of design characteristics and operational capabilities that either help prevent a substantial loss of SFP coolant inventory or increase the likelihood of recovery from such an event.

Evaluation: In accordance with the safety analysis in NUREG-1738, the beyond-design-basis event sequences that dominate risk at a decommissioning nuclear power reactor are large earthquake and cask-drop events. This is an important difference relative to an operating nuclear power reactor, where typically a large number of different initiating events make significant contributions to risk.

Assurance that the results of the NUREG-1738 analysis are representative of the plant specific conditions at IPEC can be established by assessing the facility against certain design and operational characteristics that were assumed in the NUREG-1738 analysis. These characteristics were identified in the NUREG-1738 study as recovery, mitigation, and emergency response activities assumptions that were relied on to evaluate the likelihood of success in event sequences. In Section 5.4, "Comparison to NUREG-1738 Industry Decommissioning Commitments and Staff Decommissioning Assumptions," of the enclosure to its letter dated December 22, 2021, HDI described the conformance of the IPEC facility and operations with the IDCs and the SDAs. In its discussion of the IDCs and SDAs, HDI addressed measures in place to minimize the potential risk from event sequences that dominate risk at a decommissioning reactor with fuel stored in an SFP (e.g., those IDCs and SDAs related to fuel cask handling activities and seismic events).

The NRC staff evaluation focused on the licensee's conformance with IDCs and SDAs that are related to the design and operation of structures, systems, and components associated with the IPEC SFP. A summary of the NRC staff's findings, which are based on an assessment of the licensee's IDC and SDA items, is included below:

IDC #1: Cask-drop analyses will be performed or single failure-proof cranes will be used for handling of heavy loads (i.e., phase II of NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants: Resolution of Generic Technical Activity A-36," dated July 1980 (Reference 56), will be implemented).

Evaluation: HDI states that the IP2 and IP3 crane designs meet the intent of this IDC. IP2 and IP3 both have single-failure-proof cranes designed to meet the requirements of American Society of Mechanical Engineers NOG-1-2004, “Rules for Construction of Overhead and Gantry Cranes (Top Running Bridge, Multiple Girder),” Appendix C of NUREG-0612 and NUREG-0554, “Single-Failure-Proof Cranes for Nuclear Power Plants” (Reference 57). These single-failure-proof cranes are used to support spent fuel cask handling activities at IP2 and IP3.

Because the cranes are single-failure-proof, an accidental load drop is considered not to be a credible event such that condition 5.1.2(1) of NUREG-0612 is satisfied and analysis of cask-drop accidents in accordance with condition 5.1.2(4) of NUREG-0612 is not required. Therefore, the NRC staff finds that HDI satisfies NUREG-1738 IDC #1.

IDC #2: Procedures and training of personnel will be in place to ensure that onsite and offsite resources can be brought to bear during an event.

Evaluation: HDI maintains IPEC procedures to ensure onsite and offsite resources can be brought to bear during an event. These procedures (or equivalent) are required by NRC regulations and will be implemented as necessary depending on the type of event. The procedures and associated training will be updated as necessary to reflect the permanently shutdown and defueled condition.

HDI states that following permanent shutdown and permanent removal of fuel from the IP2 and IP3 reactor vessels, the on-shift plant operators, including Shift Managers (qualified as Certified Fuel Handlers (CFHs)) and Non-Certified Operators, will continue to be appropriately trained on the relevant procedures and on the various actions needed to provide makeup to the SFP based on a systematic approach to training. Following permanent cessation of power operations, maintaining SFP inventory would be the highest priority activity. Therefore, the personnel needed to perform these actions will be available at all times. The IPEC CFH training program was approved by the NRC by letter dated December 18, 2019 (Reference 58). Periodic Emergency Plan drills and exercises are conducted with opportunities for ORO participation, to maintain proficiency in response to a plant event.

Therefore, the NRC staff concludes that HDI has adequate procedures and training of personnel will be in place to ensure that onsite and offsite resources can be brought to bear during an event to satisfy the conditions assumed in the NUREG-1738 analysis.

IDC #3: Procedures will be in place to establish communication between onsite and offsite organizations during severe weather and seismic events.

Evaluation: HDI maintains IPEC procedures that provide guidance to establish and maintain communications between onsite and offsite organizations during severe weather and seismic events. These procedures provide direction for additional actions and communications with onsite and offsite stakeholders if the event does not reach the threshold for entry into an emergency classification. If the severity of the event requires entry into an emergency classification, communications with onsite and offsite organizations will be directed by the IPEC Emergency Plan and associated procedures.

The procedures (or equivalent) will be updated as necessary to reflect the permanently shutdown and defueled condition. These procedures will be implemented as necessary depending on the type of event. Communications are described in the procedures for onsite and offsite communications, they are not specifically referenced in the existing IPEC Emergency Plan. Therefore, it is not necessary for the communications procedures to be specifically referenced in the Emergency Plan. Equipment requirements are specified in the pertinent procedures.

Therefore, the NRC staff concludes that HDI has adequate procedures that provide guidance to establish and maintain communications between onsite and offsite organizations during severe weather and seismic events to satisfy the conditions assumed in the NUREG-1738 analysis.

IDC #4: An offsite resource plan will be developed which will include access to portable pumps and emergency power to supplement onsite resources. The plan would principally identify organizations or suppliers where offsite resources could be obtained in a timely manner.

Evaluation: HDI states that the IPEC has procedures in place to ensure that onsite and offsite resources can be brought to bear during an event. Once the IPEC is permanently shut down and defueled, the on-shift plant operators, including CFHs and non-certified operators, will be appropriately trained on the relevant procedures and on the various actions needed to provide makeup to the SFP based on a systematic approach to training. Following the permanent cessation of power operations, maintaining SFP inventory would be the highest priority activity. Therefore, the personnel needed to perform these actions will be available at all times.

HDI maintains IPEC procedures that provide guidance to establish and maintain communications between onsite and offsite organizations during severe weather and seismic events. The IPEC has multiple portable pumps and portable emergency generators that meet the Extensive Damage Mitigation Guidelines. In addition, the IPEC Emergency Plan provides guidance for communicating with and obtaining offsite resources.

HDI 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 50.155(b)(2), “Mitigation of beyond-design-basis events.” These capabilities are maintained as a license condition. These diverse strategies provide defense-in-depth and ample time to provide makeup water or spray to the SFPs prior to the onset of zirconium cladding ignition when considering very low probability beyond-design-basis events affecting the SFPs. This portable equipment can be used as required by abnormal procedures and event-based procedures may be used to support mitigation strategies for SFP damage and water supply.

Therefore, the NRC staff concludes that HDI has adequate procedures regarding effective use of onsite and offsite resources to respond to events affecting the SFPs to satisfy the conditions assumed in the NUREG-1738 analysis.

IDC #5: Spent fuel pool instrumentation will include readouts and alarms in the control room (or where personnel are stationed) for SFP temperature, water level, and area radiation levels.

Evaluation: HDI states that the IP2 and IP3 designs meet the intent of this IDC.

IP2 SFP water level is monitored via two independent level channels that were added to meet the NRC's post-Fukushima requirements. LS-6500A and LS-6500B indicate remotely in the IP2 fan house. High and low SFP water level is indicated by LC-650 and alarmed in the IP2 control room. The high-low alarm is a float switch assembly set for plus or minus 6 inches of the normal level, which is 93 feet-9 inches. The IP2 SFP temperature is locally indicated by TIC-651 and high temperature is alarmed by TIC-651 in the IP2 control room at 125 ºF.

IP3 SFP water level is monitored via two independent level channels that were added to meet the NRC's post-Fukushima requirements. LS-6500A and LS-6500B indicate remotely in the IP3 plant auxiliary building (PAB) 67-foot elevation. LC-650 actuates the SFP level alarm in the IP3 control room. Determination of the alarm condition (i.e., high or low SFP level) is accomplished locally. The high-low alarm is a float switch assembly set for 10 inches from the top of the SFP for the high-level alarm and 22 inches from the top of the SFP for the low-level alarm. The IP3 SFP temperature is locally indicated by TIC-651. TIC-651 also actuates the SFP high temperature alarm at 135 ºF in the IP3 control room.

Additionally, area radiation monitors are located in each of the IP2 and IP3 FSBs and the IP2 PAB. Audible alarms are provided in each respective control room.

Therefore, the NRC staff concludes that HDI will maintain adequate SFP monitoring instrumentation to satisfy the conditions assumed in the NUREG-1738 analysis regarding monitoring events affecting the SFP.

IDC #6: Spent fuel pool seals that could cause leakage leading to fuel uncovery in the event of seal failure shall be self-limiting to leakage or otherwise engineered so that drainage could not occur.

Evaluation: HDI states that neither SFP (IP2 or IP3) has gates with seals that could lead to fuel uncovery. However, a gate isolates the SFPs from the fuel transfer canal at each unit. The canal is connected to the fuel transfer tube to the vapor containment (VC). The fuel transfer tube to the VC for IP2 has been filled with concrete and the fuel transfer tube for IP3 is seal welded with a blank flange on the VC side and a locked gate valve on the SFP side. Therefore, if the SFP gates were to leak by, there is no path for SFP leakage into the VC. Although the top of the fuel racks at both units are higher than the bottom of the fuel transfer canal slot, if the transfer gate seals were to fail, the volume of the transfer canal is significantly smaller when compared to the SFP such that following the loss of the gate seal, the SFP would only lose enough water volume to lower the pool level by less than 4 feet. Therefore, failure or leakage of a SFP gate seal in either unit would not lead to fuel uncovery.

The NRC staff finds that the described design features that limit the potential for drainage through the fuel transfer system and SFP cooling system are consistent with the assumptions used in the analysis presented in NUREG-1738.

IDC #7: Procedures or administrative controls to reduce the likelihood of rapid drain down events will include (1) prohibitions on the use of pumps that lack adequate siphon protection, or (2) controls for pump suction and discharge points. The functionality of anti-siphon devices will be periodically verified.

Evaluation: HDI states that design features and administrative controls that reduce the likelihood of rapid draindown events are in place for the IP2 and IP3 SFPs. The technical specification minimum SFP level is greater than or equal to 23 feet above the top of the fuel assemblies seated in the storage racks, which is at 92 feet-2 inches for IP2 and 91 feet-8 inches for IP3, and there are two alarms that would annunciate in the event of a SFP draindown at either unit. The top of the fuel storage rack is at 69 feet-8¼ inches at IP2 and 69 feet-7½ inches at IP3. The lowest drain point with available alignment to installed pumps is the SFP cooling return line in both units, which is equipped with an anti-siphon hole, although it is not functionally tested. If unmitigated draining were to occur through this line, the lowest pool level that could be reached would still be above the technical specification minimum level for each unit and well above the top of the fuel assemblies in the fuel storage racks. If draining were to occur in the SFP, it would be signaled by two level alarms that annunciate in each respective control room.

The IP2 DSAR Section 3.3.3.2.2 “Spent Fuel Pit Cooling Loop” states in part: “In the unlikely event of the cooling loop of the spent fuel pit being drained, the spent fuel storage pit itself cannot be drained and no spent fuel is uncovered since the spent fuel pit cooling connections enter near the top of the pit.” The IP3 DSAR Section 3.5 “Fuel Handling System” reads in part:

> Loss of water in the spent fuel pit and the resultant uncovering of the spent fuel by way of drains and permanently connected system cannot take place for the following reasons:
>
> 1) The suction of the spent fuel pit pump is taken from a point approximately six (6) feet below the top of the pool wall; therefore, this pump cannot be used to uncover the fuel, even accidentally;
> 2) The spent fuel pit pump discharge pipe terminates in the pool at elevation 74’ – 4 ¾”. This elevation is approximately five (5) feet above the top of the spent fuel assemblies; therefore, this pipe could not accidentally become a siphon to uncover the fuel;
> 3) The skimmer pump takes suction from, and discharges to the surface of the spent fuel pit; therefore, it could not accidentally or otherwise uncover the spent fuel;
> 4) There are no drains on the bottom or side walls of the spent fuel pit. Draining would have to be done deliberately by a temporary pump, and
> 5) The spent fuel pit cooling loop was designed to seismic Class II/III and the cleanup equipment loop was designed to seismic Class III criteria; however, their failure could not result in the uncovering of the spent fuel, as explained above.

The NRC staff concludes that the physical configuration of inlet and outlet connections and use of anti-siphon devices provide adequate control to minimize the potential for rapid drainage through permanent systems and are consistent with the assumptions used in the analysis presented in NUREG-1738.

IDC #8: An onsite restoration plan will be in place to provide repair of the SFP cooling systems or to provide access for makeup water to the SFP. The plan will provide for remote alignment of the makeup source to the SFP without requiring entry to the refueling floor.

Evaluation: HDI states that repairs to equipment designated for the SFPs will be performed using the normal online work management system (or equivalent). Onsite procedures will remain in place to provide guidance for filling the SFPs in both normal and emergency conditions. Sources of makeup to the IP2 and IP3 SFPs include the primary water storage tank (PWST) water, fire water inside the SFP buildings, and fire water using a temporary diesel pump from outside of the SFP buildings.

Procedures will remain in place to perform filling and loss of cooling recovery of the SFPs during an abnormal loss of cooling or level, as well as filling the SFPs in the event that access to the SFP floor is inaccessible. HDI states that there are multiple ways to add makeup water to the IP2 and IP3 SFPs with or without entry to the refuel floors. Sources of makeup to the IP2 and IP3 SFPs include the PWST water, fire water inside the SFP buildings, and fire water using a temporary diesel pump from outside the SFP buildings.

The NRC staff finds that the planned SFP cooling and makeup water capability, with access to numerous sources of makeup inventory, conforms to the capabilities assumed for the NRC staff analysis presented in NUREG-1738.

IDC #9: Procedures will be in place to control SFP operations that have the potential to rapidly decrease SFP inventory. These administrative controls may require additional operations or management review, management physical presence for designated operations, or administrative limitations such as restrictions on heavy load movements.

Evaluation: HDI states that IP2 procedure 2-DCS-009-GEN, “MPC Transfer & HI-STORM Movement,” requires the 110 ton gantry crane to pass a pre-use inspection per procedures 2-DCS-026-GEN, “FSB 110 Ton X-SAM Gantry Crane,” and 2-DCS-027-GEN, “FSB 110 Ton X-SAM Gantry Crane Preventative Maintenance,” prior to moving any load. A qualified CFH is required to approve any heavy load moved in the FSB.

IP2 procedure 2-DCS-009-GEN limits lifts and movement of multi-purpose canisters (MPCs) to a section of the SFP with no fuel assemblies in place. The transfer path is limited to one section of the SFP wall and is designed to limit interaction with SFP cooling piping.

IP2 DSAR Section 3.5.5.4 “Response to NUREG 0612, Phase I Elements” reads in part:

> Fuel Storage Building Ederer Crane
>
> The Ederer 110-ton design rated gantry crane is used to move spent fuel casks up to 110 tons into and out of the spent fuel pit by lifting a fully loaded Holtec HI-TRAC® 100 spent fuel transfer cask and its associated components. The HI-STORM® cask system utilizes the HI-TRAC® 100 transfer cask for transporting a MPC from the spent fuel pit, and for inter-

> cask MPC transfers required for on-site storage. However, this crane is restricted from handling casks over spent fuel in the spent fuel pit and will only be utilized for other loading activities in the FSB.
>
> Fuel Handling Crane
>
> No object weighing more than 2,000 pounds may be moved over any region of the spent fuel pit when the pit contains spent fuel, unless a technical analysis has been performed consistent with the requirements of NUREG-0612 establishing the necessary controls to assure that a load drop accident could damage no more than a single fuel assembly. Administrative and procedural controls to protect fuel and fuel racks may include path selection to prevent loads from passing over or near fuel. For cases in which very heavy loads (>30,000 pounds) are transported over the spent fuel pit, the loads cannot under any circumstances pass over irradiated fuel. In all cases where loads >2,000 pounds are carried over the pit, the ventilation system must be functional.

IP3 procedure 3-SOP-CM-002, "Fuel Storage Building Crane Operation," delineates the specific path that the Shielded Transfer Canister (STC) must follow. The procedure specifies that the spent fuel transfer cask and the STC shall not be moved over the spent fuel storage racks in any region of the SFP containing irradiated fuel. If the SFP contains irradiated fuel, then movement across the SFP involving loads greater than 2000 pounds and movement across the SFP with FSB ventilation inoperable are also limited by this procedure. IP3 DSAR Section 3.10.4.1, "Response to NUREG 0612, Phase I Elements" reads in part:

> …the DSAR and facility procedures prevent any object weighing more than 2,000 pounds from being moved over any region of the spent fuel pit containing irradiated fuel, unless a technical analysis has been performed consistent with the requirements of NUREG-0612 establishing the necessary controls to assure that a load drop accident could damage no more than a single fuel assembly. Administrative and procedural controls to protect fuel and fuel racks may include a path selection to prevent loads from passing over or near fuel. For cases in which very heavy loads (>30,000 pounds) are transported over the spent fuel pit, the loads cannot under any circumstances pass over irradiated fuel. In all cases where loads >2,000 pounds are carried over the pit, the ventilation system must be functional.

Procedures will remain in place to perform filling and loss of cooling recovery of the SFPs during an abnormal loss of cooling or level, as well as filling the SFPs in the event that access to the SFP floor is inaccessible.

The NRC staff finds that the described procedures are consistent with the administrative controls considered in the NRC staff analysis presented in NUREG-1738.

IDC #10: Routine testing of the alternative fuel pool makeup system components will be performed, and administrative controls for equipment out of service will be implemented to provide added assurance that the components would be available, if needed.

Evaluation: HDI states that both IP2 and IP3 have motor- and diesel-driven fire pumps, as well as two diesel-driven B.5.b pumps (shared between the units) that can be used to provide makeup water to either SFP.

Repairs to equipment designated for the SFPs will be performed using the normal work management system (or equivalent). Current preventative maintenance (PM) and work orders (or equivalent) will remain in place for all SFP equipment. Testing remains in place for SFP equipment and includes level indication, pumps, and installed backup pumps. B.5.b equipment PMs will remain in effect until all fuel is transferred out of each SFP.

The NRC staff finds that the described administrative controls conform to those considered in the NRC staff analysis presented in NUREG-1738.

SDA #1: Spent fuel pool cooling design will be at least as capable as that assumed in the risk assessment, including instrumentation. Licensees will have at least one motor-driven and one diesel-driven fire pump capable of delivering inventory to the SFP.

Evaluation: Section 1.7, “Design Criteria for Structures and Components,” of the IP2 and IP3 DSARs states that the SFPs are designed as Seismic Category I structures, i.e., designed to withstand a safe shutdown earthquake. Both units’ SFP cooling system designs have two independent trains of SFP cooling. Each train rejects its heat to the component cooling water system at each unit, and its heat, in turn, is rejected to the service water system at each unit, with its heat being rejected to the Hudson River.

The NRC staff finds that the described cooling and makeup capabilities are comparable to the capabilities considered in the NRC staff analysis presented in NUREG-1738.

SDA #2: Walk-downs of SFP systems will be performed at least once per shift by the operators. Procedures will be developed for and employed by the operators to provide guidance on the capability and availability of onsite and offsite inventory makeup sources and time available to initiate these sources for various loss-of-cooling or inventory events.

Evaluation: HDI states that currently a walkdown of the SFP systems at IPEC is performed each shift (i.e., twice per day) and that SFP normal instrumentation readings are recorded during operator rounds. The backup level instrumentation readings are recorded on a weekly basis during operator rounds. The capability to monitor SFP temperature and level (via alarms) is in place in the IP2 and IP3 control rooms. These rounds (or equivalent) will remain in place following the permanent shutdown and permanent defueling of IP2 and IP3.

Procedures will remain in place to perform filling and loss of cooling recovery of the SFPs during an abnormal loss of cooling or level, as well as filling the SFPs in the event that access to the SFP floor is inaccessible. IP2 DSAR Section 3.3.3.2.2 “Spent Fuel Pit Cooling Loop” states that with a complete loss of spent fuel pit cooling and with no heat removal, the time for the spent fuel pit water to rise from 180°F to 212°F with a full core in storage is at least 1.8 hours. Makeup water can be supplied within this time from the PSWT and/or the fire protection system. The maximum required makeup rate for boiloff is 62 gallons per minute (gpm) (for a full core).

IP3 DSAR Table 3.3-2 “Spent Fuel Cooling Loop Component Data” indicates that in the absence of spent fuel pit cooling due to pit water inertia and no heat removal it could take as long as 8 ½ hours to heat from 150°F to 212°F. Section 3.2.1 “System Design and Operation” indicates that the PWST has a volume of 165,000 gallons. DSAR Table 3.2-2 “Chemical And Volume Control System Principal Component Data Summary” indicates that the two Primary Water Makeup Pumps each have a capacity 150 gpm at a design head of 235 feet.

The NRC staff finds that the monitoring of the SFP systems is consistent with the NRC staff analysis presented in NUREG-1738 based on the improvements in SFP monitoring capability and reliability implemented since the publication of NUREG-1738, specifically in response to the events at Fukushima Dai-ichi in 2011.

SDA #3: Control room instrumentation that monitors SFP temperature and water level will directly measure the parameters involved. Level instrumentation will provide alarms at levels associated with calling in offsite resources and with declaring an emergency.

Evaluation: HDI states that the IP2 SFP water level is monitored via two independent level channels that were added to meet the NRC’s post-Fukushima requirements. LS-6500A and LS6500B indicate remotely in the IP2 fan house. High and low SFP water level is indicated by LC-650 and alarmed in the IP2 Control Room. The high-low alarm is a float switch assembly set for plus or minus 6 inches of the normal level, which is 93 feet-9 inches. The IP2 SFP temperature is locally indicated by TIC-651 and high temperature is alarmed by TIC-651 in the IP2 Control Room at 125°F.

The IP3 SFP water level is required to be 23 feet over the top of the spent fuel assemblies seated in the storage racks. IP3 SFP water level is monitored via two independent level channels that were added in compliance with Order EA-12-051. LC-650 actuates the SFP level alarm in the IP3 Control Room. Determination of the alarm condition (i.e., high or low SFP level) is accomplished locally. The high-low alarm is a float switch assembly set for 10 inches from the top of the SFP for the high alarm and 22 inches from the top of the SFP for the low-level alarm.

The IP3 SFP temperature is locally indicated by TIC-651. TIC-651 also actuates the SFP high temperature alarm at 135 ºF in the IP3 Control Room.

Area radiation monitors are located within each of the IP2 and IP3 Fuel Storage Buildings. Remote readouts and audible alarms are provided in each of the respective control rooms.

The NRC staff finds that the SFP monitoring capability is consistent with the assumptions in the analysis presented in NUREG-1738.

SDA #4: The licensee determines that there are no drain paths in the SFP that could lower the pool level (by draining, suction, or pumping) more than 15 feet below the normal pool operating level, and that the licensee initiates recovery using offsite sources.

Evaluation: HDI states that the IP2 and IP3 SFP designs meet the intent of this SDA. The lowest point of the suction line in the SFPs is just a few feet below the technical

specifications' minimum levels at each unit. The lowest drain point with available alignment to installed pumps is the SFP cooling return line for both units, both of which are equipped with an anti-siphon hole located at an elevation slightly above the technical specifications minimum level. If unmitigated draining were to occur through this line, the lowest SFP level that could be reached would still be above the technical specification minimum level for each unit and well above the top of the fuel assemblies in the fuel storage racks. If draining were to occur in SFP, it would be signaled by two level alarms that annunciate in the respective control room. Therefore, neither drain path is considered a credible failure mode for inventory loss given that inventory loss is not the direct result of catastrophic failures.

The NRC staff concludes that the SFP design protections against drainage are consistent with the assumptions used in the analysis presented in NUREG-1738.

SDA #5: Load drop consequence analysis will be performed for facilities with non-single, failure-proof systems. The analyses and any mitigative actions necessary to preclude catastrophic damage to the SFP that would lead to a rapid pool draining would be sufficient to demonstrate that there is high enough confidence in the facility's ability to withstand a heavy load drop.

Evaluation: HDI states that the IP2 and IP3 designs meet the intent of this SDA. Heavy load lifts in and around the area of the SFPs are performed by single-failure-proof cranes that handle casks in the FSBs. Therefore, performance of load drop consequence analyses is not required.

Since the subject cranes are single-failure-proof, analysis of cask-drop accidents is not required per condition 5.1.2(4) of NUREG-0612. The staff concurs with HDI's conclusion that a performance of load drop consequence analyses is not required.

The NRC staff finds that HDI's protection against heavy load drops is consistent with the assumptions considered in the analysis presented in NUREG-1738.

SDA #6: Each decommissioning plant will successfully complete the seismic checklist provided in Appendix 2B to NUREG-1738. If the checklist cannot be successfully completed, the decommissioning plant will perform a plant-specific seismic risk assessment of the SFP and demonstrate that the potential for SFP seismically induced structural failure and rapid loss of inventory is less than the generic bounding estimates provided in NUREG-1738 ($<1 \times 10^{-5}$ per year including non-seismic events).

Evaluation: The licensee of the IPEC at the time (Entergy) conducted a seismic evaluation in response to an NRC letter to all power reactor licensees dated March 12, 2012 (Reference 51). This evaluation provided an assessment of earthquake probabilities at potentially damaging accelerations. The NRC accepted the results of this assessment indicating that the low seismic hazard screening criteria had been satisfied at IP2 and IP3 by letters dated March 20, 2014, and March 6, 2014, respectively.

HDI developed an analysis demonstrating successful completion of the Enhanced Seismic Checklist provided in NUREG-1738 for the IP2 and IP3 SFPs demonstrating a high confidence of a low probability (less than 1×10^{-5} per year) of seismic failure of the

SFP structures. This analysis is summarized in Table 6 of the enclosure to HDI's letter dated December 22, 2021.

Therefore, the NRC staff finds that HDI satisfies NUREG-1738 SDA #6.

SDA #7: Licensees will maintain a program to provide surveillance and monitoring of Boraflex in high-density spent fuel racks until such time as spent fuel is no longer stored in these high-density racks.

Evaluation: HDI states that this SDA does not apply to the spent fuel racks for IP2, as the IP2 SFP criticality analysis does not credit the Boraflex panels in its spent fuel racks. The IP2 technical specification controls on SFP boron concentration and spent fuel rack storage provide assurance that the required 5 percent sub-criticality margin is maintained without crediting neutron absorber inserts in the spent fuel racks.

The IP3 spent fuel racks utilize Boral (boron carbide/aluminum powder clad in aluminum) rather than Boraflex as a neutron absorber material. All of the storage cells in the two regions of spent fuel racks are bounded on four sides by Boral sheets, except on the periphery of the rack array. As described in Appendix A of the IP3 DSAR, the Boral Surveillance Program is an existing aging management program that provides assurance that the Boral neutron absorbers in the spent fuel racks maintain validity of the criticality analysis in support of the spent fuel rack design. The program relies on representative coupon samples mounted in surveillance assemblies located in the SFP. Surveillance assemblies are removed from the SFP on a prescribed schedule and the physical and chemical properties are measured. From this data, the performance, stability, and integrity of the Boral in the storage cells are monitored and assessed without disrupting the integrity of the storage system.

Therefore, the NRC staff finds that HDI satisfies NUREG-1738 SDA #7.

Based on the above evaluations, the NRC staff concludes that the design and operation of structures, systems, and components associated with SFP storage provide for safe storage of spent fuel and are consistent with the capabilities assumed in the analysis presented in NUREG-1738.

5.0 EXEMPTIONS

Pursuant to 10 CFR 50.12, the Commission may, upon application by any interested person or upon its own initiative, grant exemptions from the requirements of 10 CFR Part 50: (1) when the exemptions are authorized by law, will not present an undue risk to public health and safety, and are consistent with the common defense and security, and (2) when special circumstances are present. Special circumstances exist, in part, when application of the regulation in the particular circumstance would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule (10 CFR 50.12(a)(2)(ii)).

The underlying purpose of the planning standards in 10 CFR 50.47(b), the requirements in 10 CFR 50.47(c)(2), and certain requirements of Section IV of Appendix E to 10 CFR Part 50 are to ensure that there is reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency, and that licensees maintain effective offsite and onsite radiological emergency response plans. This section reflects the NRC staff's

technical evaluation of the licensee's exemption requests, as provided to the Commission in SECY-22-0102, which was approved by the Commission in the SRM to SECY-22-0102.

5.1 Specific Exemptions for 10 CFR 50.47

HDI's letter dated December 22, 2021, as supplemented by letters dated February 1, 2022, February 2, 2022, and May 12, 2022, requested exemptions from certain sections (as indicated by strikeout and bolded text) of 10 CFR 50.47 for IPEC.

5.1.1 10 CFR 50.47(b)

> The onsite **~~and, except as provided in paragraph (d) of this section, offsite~~** emergency response plans for nuclear power reactors must meet the following standards:

The NRC requires a level of licensee EP commensurate with the potential consequences to public health and safety and common defense and security at the licensee's site. HDI's exemption request included radiological analyses to show that, as of 30 days after the permanent cessation of power operations, the radiological consequences of the only remaining applicable DBAs would not exceed the limits of the EPA early phase PAGs at the EAB. HDI also performed an analysis which shows that, 15 months after the shutdown of IP3, the spent fuel stored in the SFPs will have decayed to the extent that in the unlikely event all cooling is lost to the spent fuel and a heat up under adiabatic conditions resulted, 10 hours would be available to take mitigative actions before the hottest fuel assembly reached 900˚C.

NUREG-1738, as well as enhancements put into place as a result of the events of September 11, 2001, and the Fukushima Dai-ichi accident, support the NRC staff assumption that only a highly unlikely, beyond-design-basis event (e.g., extreme earthquake or large aircraft impact) could result in an SFP fire. In addition, there would be a significant amount of time between the initiating event and the possible onset of conditions that could result in an SFP zirconium cladding fire. This time provides a substantial opportunity for event mitigation. Licensees are 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 be available for OROs to implement these measures using a CEMP or "all-hazards" approach.

Considering the very low probability of beyond-design-basis events affecting the SFPs and the time available to initiate mitigative actions consistent with plant conditions (i.e., the time between the loss of both water and air cooling to the spent fuel and the onset of a postulated zirconium cladding fire), formal offsite REP plans (in accordance with 44 CFR Part 350) are not considered necessary for a permanently shutdown and defueled nuclear power reactor.

Based on the above analysis, the NRC staff concludes that the exempted language from 10 CFR 50.47(b), above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.1.2 10 CFR 50.47(b)(1)

> 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.

NUREG-0396 provides that emergency response plans should be useful for responding to any accident that would produce offsite radiological doses in excess of the EPA early phase PAGs. Additionally, it introduced the concept of generic plume exposure pathway zones as a basis for the planning of response actions, which would result in dose savings in the environs of nuclear facilities in the event of a serious power reactor accident. As previously discussed, HDI has provided radiological analyses which show that, as of 30 days after permanent cessation of power operations, the radiological consequences to the public for the only remaining applicable DBAs at IPEC will not exceed the limits of the EPA early phase PAGs beyond the EAB. In addition, reactor core melt (Class 9) scenarios, which were also considered in NUREG-0396, are no longer applicable to a permanently shutdown and defueled power reactor.

Considering the very low probability of beyond-design-basis events affecting the SFPs and the time available to initiate mitigative actions consistent with plant conditions (i.e., the time between the loss of both water and air cooling to the spent fuel and the onset of a postulated zirconium cladding fire), formal offsite REP plans (in accordance with 44 CFR Part 350) are not considered necessary for a permanently shutdown and defueled nuclear power reactor. Therefore, designated 10-mile plume exposure and 50-mile ingestion pathway emergency planning zones are no longer needed for IPEC.

In addition, in the SOC for the Final Rule for EP requirements for ISFSIs and monitored retrievable storage facilities (MRS) (60 FR 32430; June 22, 1995), the Commission responded to comments concerning EPZs for an ISFSI and MRS and concluded that “based on the potential inventory of radioactive material, potential driving forces for distributing that amount of radioactive material, and the probability of the initiation of these events, the Commission concludes that the offsite consequences of potential accidents at an ISFSI or a MRS would not warrant establishing Emergency Planning Zones.”

Based on the above analysis, the NRC staff concludes that the exempted language from 10 CFR 50.47(b)(1), above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.1.3 10 CFR 50.47(b)(3)

> 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.

With the termination of power reactor operations at IPEC and the permanent removal of the fuel from the reactor vessel to the SFPs, most of the accident scenarios postulated for operating power reactors are no longer possible. The spent fuel will be stored in the SFPs and the ISFSI

and will remain onsite until it can be moved offsite for long-term storage or disposal. The reactor, reactor coolant system (RCS), and secondary systems are no longer in operation and have no function related to the storage of the spent fuel. Therefore, postulated accidents involving failure or malfunction of the reactor, RCS, or supporting systems are no longer applicable. During reactor decommissioning, the principal public safety concerns involve the radiological risks associated with decontamination and demolition, as well as onsite storage of spent fuel.

The emergency operations facility (EOF) is a support facility for the purpose of managing overall licensee emergency response (including coordination with Federal, State, and local officials), coordination of radiological and environmental assessments, and determination of recommended public protective actions. Considering the very low probability of beyond-design-basis events affecting the SFPs and the time available to initiate mitigative actions consistent with plant conditions (i.e., the time between the loss of both water and air cooling to the spent fuel and the onset of a postulated zirconium cladding fire), formal offsite REP plans (in accordance with 44 CFR Part 350) are not considered necessary for a permanently shutdown and defueled nuclear power reactor. Therefore, an EOF would not be needed to coordinate these types of assessments for determining public protective actions. Onsite staff will continue to maintain and provide for communication and coordination capabilities with offsite authorities for the purpose of notification, as well as provide the level of support required for the only remaining applicable DBAs and the prompt implementation of mitigative actions in response to an event affecting the SFPs.

Based on the above analysis and the analysis provided in Section 5.1.1 of this safety evaluation, the NRC staff concludes that the exempted language from 10 CFR 50.47(b)(3), above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.1.4 10 CFR 50.47(b)(4)

> 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~~**.

Considering the very low probability of beyond-design-basis events affecting the SFPs and the time available to initiate mitigative actions consistent with plant conditions (i.e., the time between the loss of both water and air cooling to the spent fuel and the onset of a postulated zirconium cladding fire), formal offsite REP plans (in accordance with 44 CFR Part 350) are not considered necessary for a permanently shutdown and defueled nuclear power reactor. The IPEC Permanently Defueled Emergency Plan will continue to maintain arrangements for requesting and using assistance resources from offsite support organizations. Therefore, minimum initial offsite response measures are no longer required.

Based on the above analysis and the analysis provided in Section 5.1.1 of this safety evaluation, the NRC staff concludes that the exempted language from 10 CFR 50.47(b)(4), above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.1.5 10 CFR 50.47(b)(5)

> 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**.

HDI's exemption request provided radiological analyses to show that, as of 30 days after permanent cessation of power operations at IPEC, the radiological consequences to the public of the only remaining applicable DBAs would not exceed the limits of the EPA early phase PAGs beyond the EAB. Considering the very low probability of beyond-design-basis events affecting the SFPs and the time available to initiate mitigative actions consistent with plant conditions (i.e., the time between the loss of both water and air cooling to the spent fuel and the onset of a postulated zirconium cladding fire), formal offsite REP plans (in accordance with 44 CFR Part 350) are not considered necessary for a permanently shutdown and defueled nuclear power reactor. Therefore, a means to provide early notification and clear instruction to the populace within a designated 10-mile plume exposure pathway EPZ is no longer required.

Based on the above analysis, as well as the analyses provided in Sections 5.1.1 and 5.1.2 of this safety evaluation, the NRC staff concludes that the exempted language from 10 CFR 50.47(b)(5), above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.1.6 10 CFR 50.47(b)(6)

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

HDI's exemption request provided radiological analyses to show that, as of 30 days after permanent cessation of power operations at IPEC, the radiological consequences to the public of the only remaining applicable DBAs would not exceed the limits of the EPA early phase PAGs beyond the EAB. Considering the very low probability of beyond-design-basis events affecting the SFPs and the time available to initiate mitigative actions consistent with plant conditions (i.e., the time between the loss of both water and air cooling to the spent fuel and the onset of a postulated zirconium cladding fire), formal offsite REP plans (in accordance with 44 CFR Part 350) are not considered necessary for a permanently shutdown and defueled nuclear power reactor. Therefore, the requirement to provide prompt communication to the public within a designated 10-mile plume exposure pathway EPZ regarding initial or predetermined protective actions is no longer needed.

Based on the above analysis, as well as the analyses provided in Sections 5.1.1 and 5.1.2 of this safety evaluation, the NRC staff concludes that the exempted language from 10 CFR 50.47(b)(6), above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.1.7 10 CFR 50.47(b)(7)

> **~~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.

HDI's exemption request provided radiological analyses to show that, as of 30 days after permanent cessation of power operations at IPEC, the radiological consequences to the public of the only remaining applicable DBAs would not exceed the limits of the EPA early phase PAGs beyond the EAB. Considering the very low probability of beyond-design-basis events affecting the SFPs and the time available to initiate mitigative actions consistent with plant conditions (i.e., the time between the loss of both water and air cooling to the spent fuel and the onset of a postulated zirconium cladding fire), formal offsite REP plans (in accordance with 44 CFR Part 350) are not considered necessary for a permanently shutdown and defueled nuclear power reactor. Therefore, the requirement to provide periodic information to the public within a designated plume exposure pathway EPZ on how they will be notified and what their initial or predetermined protective actions should be in an emergency is not needed.

Based on the above analysis, as well as the analyses provided in Sections 5.1.1 and 5.1.2 of this safety evaluation, the NRC staff concludes that the exempted language from 10 CFR 50.47(b)(7), above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.1.8 10 CFR 50.47(b)(9)

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

HDI's exemption request provided radiological analyses to show that, as of 30 days after permanent cessation of power operations at IPEC, the radiological consequences to the public of the only remaining applicable DBAs would not exceed the limits of the EPA early phase PAGs beyond the EAB. Considering the very low probability of beyond-design-basis events affecting the SFPs and the time available to initiate mitigative actions consistent with plant conditions (i.e., the time between the loss of both water and air cooling to the spent fuel and the onset of a postulated zirconium cladding fire), formal offsite REP plans (in accordance with 44 CFR Part 350) are not considered necessary for a permanently shutdown and defueled nuclear power reactor. Therefore, the requirement for assessing or monitoring offsite consequences beyond the EAB is not needed. HDI maintains and operates the onsite monitoring systems needed to provide data that is essential for initiating emergency measures and performing accident assessment, including dose assessment and assessing the magnitude of a release.

Based on the above analysis and the analysis provided in Section 5.1.1 of this safety evaluation, the NRC staff concludes that the exempted language from 10 CFR 50.47(b)(9), above, is not necessary to achieve the underlying purpose of this requirement as it applies to

IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.1.9 10 CFR 50.47(b)(10)

> 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.~~**

HDI's analyses demonstrated that, as of 30 days after the permanent cessation of power operations at IPEC, no credible events within the design basis would result in doses to the public that would exceed the EPA early phase PAGs at the EAB. Therefore, EPZs beyond the EAB, as well as the associated protective actions developed based on evacuation time estimates, are no longer required. Additionally, in the unlikely event of an SFP accident, the iodine isotopes, which contribute to offsite dose from an operating power reactor accident, are not present, so potassium iodide distribution would no longer serve as an effective or necessary supplemental protective action. As such, the NRC staff concludes that HDI provides for an acceptable level of EP at IPEC in its permanently shutdown and defueled condition, and also provides reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency at IPEC.

Although formal offsite REP plans (in accordance with 44 CFR Part 350) have typically been exempted for decommissioning sites, OROs will continue to be relied upon for firefighting, law enforcement, ambulance, and medical services in support of the licensee's (onsite) emergency plan. The licensee is responsible for providing protective measures for any emergency workers responding onsite. Additionally, the licensee is responsible for control of activities within the EAB, including public access. The licensee actions necessary to protect the health and safety of members of the public who are in the EAB may include, but are not limited to, evacuation, sheltering, and decontamination in the unlikely event of a release of radioactive materials.

Based on the above analysis, as well as the analyses provided in Sections 5.1.1 and 5.1.2 of this safety evaluation, the NRC staff concludes that the exempted language from 10 CFR 50.47(b)(10), above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.1.10 10 CFR 50.47(c)(2)

> **~~Generally, the plume exposure pathway EPZ for nuclear power plants shall consist of an area about 10 miles (16 km) in radius and the ingestion pathway EPZ shall consist of an area about 50 miles (80 km) in radius. The exact size and configuration of the EPZs surrounding a particular nuclear power reactor shall be determined in relation to local emergency response needs and capabilities as they are affected by such conditions as~~**

> **~~demography, topography, land characteristics, access routes, and jurisdictional boundaries.~~** The size of the EPZs **~~also~~** may be determined on a case-by-case basis for gas-cooled nuclear reactors and for reactors with an authorized power level less than 250 MW thermal. **~~The plans for the ingestion pathway shall focus on such actions as are appropriate to protect the food ingestion pathway.~~**

HDI's exemption request provided radiological analyses to show that, as of 30 days after permanent cessation of power operations at IPEC, the radiological consequences to the public of the only remaining applicable DBAs would not exceed the limits of the EPA early phase PAGs beyond the EAB. Considering the very low probability of beyond-design-basis events affecting the SFPs and the time available to initiate mitigative actions consistent with plant conditions (i.e., the time between the loss of both water and air cooling to the spent fuel and the onset of a postulated zirconium cladding fire), formal offsite REP plans (in accordance with 44 CFR Part 350) are not considered necessary for a permanently shutdown and defueled nuclear power reactor. Therefore, an EPZ is no longer required.

Section 50.47(c)(2) and footnote 1 to Appendix E of 10 CFR Part 50 both state, in part: "The size of the EPZs also may be determined on a case-by-case basis for gas-cooled nuclear reactors and for reactors with an authorized power level less than 250 MW [megawatt] thermal." This provision is not applicable to IPEC because it is not a gas-cooled reactor and has permanently ceased power operations. Therefore, no exemption is required.

Based on the above analysis and the analysis provided in Section 5.1.9 of this safety evaluation, the NRC staff concludes that the exempted language from 10 CFR 50.47(c)(2), above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.2 Specific Exemptions for 10 CFR Part 50, Appendix E, Section IV

HDI's letter dated February 2, 2022, requested exemptions from certain sections (as indicated by strikeout and bolded text) of Appendix E to 10 CFR Part 50 for IPEC.

5.2.1 <u>10 CFR Part 50, Appendix E, Section IV.1</u>

> The applicant's emergency plans shall contain, but not necessarily be limited to, information needed to demonstrate compliance with the elements set forth below, i.e., organization for coping with radiological emergencies, assessment actions, activation of emergency organization, notification procedures, emergency facilities and equipment, training, maintaining emergency preparedness, recovery**~~, and onsite protective actions during hostile action~~**. In addition, the emergency response plans submitted by an applicant for a nuclear power reactor operating license under this part, or for an early site permit (as applicable) or combined license under 10 CFR part 52, shall contain information needed to demonstrate compliance with the standards described in § 50.47(b), and they will be evaluated against those standards.

After the terrorist attacks of September 11, 2001, the NRC evaluated the EP planning basis to ensure that it continued to protect the public health and safety in the current threat environment. In 2002, the NRC issued Orders requiring compensatory measures, which include nuclear

security and EP. The NRC staff determined that the EP planning basis continues to protect public health and safety; however, the NRC staff recognized that enhancements were desirable to ensure effective plan implementation during security-related events at nuclear power reactors (e.g., more timely NRC notification, additional onsite protective action considerations, and revision of emergency action levels to identify security-related emergencies more succinctly).

The agency issued NRC Bulletin (BL) 2005-02, "Emergency Preparedness and Response Actions for Security-Based Events," dated July 18, 2005 (Reference 59), to obtain information from licensees on progress in implementing security-event-related EP program enhancements. The 2011 EP Final Rule, "Enhancements to Emergency Preparedness Regulations" (76 FR 72560; November 23, 2011), made generically applicable the security-based response elements of NRC BL 2005-02. The enhancements of NRC BL 2005-02 were not applicable to holders of operating licenses for power reactors that had permanently ceased operations and certified that fuel had been removed from the reactor vessel. Therefore, the requirement for onsite protective actions during hostile action is not necessary for IPEC.

Additionally, the NRC excluded non-power reactors from the definition of "hostile action" at the time of the 2011 EP Final Rule because, as defined in 10 CFR 50.2, "Definitions," a non-power reactor is not considered a nuclear power reactor and a regulatory basis had not been developed to support the inclusion of non-power reactors in the definition of "hostile action." Similarly, a decommissioning nuclear power reactor or ISFSI is not a "nuclear reactor" as defined in the NRC's regulations. Like a non-power reactor, a decommissioning nuclear power reactor also has a lower likelihood of a credible accident resulting in radiological releases requiring offsite protective measures than does an operating nuclear power reactor. For all of the above reasons, the NRC staff concludes that a decommissioning nuclear power reactor is not a facility that falls within the definition of "hostile action." However, although this analysis provides a justification for exempting IPEC from "hostile action" related requirements, some EP requirements for security-based events are maintained. The classification of security-based events, notification of offsite authorities, and coordination with offsite agencies are still required.

Based on the above analysis, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.1, above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.2.2 10 CFR Part 50, Appendix E, Section IV.2

> ~~**This nuclear power reactor license applicant shall also provide an analysis of the time required to evacuate various sectors and distances within the plume exposure pathway EPZ for transient and permanent populations using the most recent U.S. Census Bureau data as of the date the applicant submits its application to the NRC.**~~

HDI's exemption request provided radiological analyses to show that, as of 30 days after permanent cessation of power operations at IPEC, the radiological consequences to the public of the only remaining applicable DBAs would not exceed the limits of the EPA early phase PAGs beyond the EAB. Considering the very low probability of beyond-design-basis events affecting the SFPs and the time available to initiate mitigative actions consistent with plant conditions (i.e., the time between the loss of both water and air cooling to the spent fuel and the onset of a postulated zirconium cladding fire), formal offsite REP plans (in accordance with 44 CFR Part 350) are not considered necessary for a permanently shutdown and defueled

nuclear power reactor. Therefore, the requirements for emergency planning zones and the associated evacuation time estimates (ETEs) are no longer required.

Based on the above analysis and the analysis provided in Section 5.1.9 of this safety evaluation, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.2, above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.2.3 10 CFR Part 50, Appendix E, Section IV.3

> ~~**Nuclear power reactor licensees shall use NRC approved evacuation time estimates (ETEs) and updates to the ETEs in the formulation of protective action recommendations and shall provide the ETEs and ETE updates to State and local governmental authorities for use in developing offsite protective action strategies.**~~

HDI's exemption request provided radiological analyses to show that, as of 30 days after permanent cessation of power operations at IPEC, the radiological consequences to the public of the only remaining applicable DBAs would not exceed the limits of the EPA early phase PAGs beyond the EAB. Considering the very low probability of beyond-design-basis events affecting the SFPs and the time available to initiate mitigative actions consistent with plant conditions (i.e., the time between the loss of both water and air cooling to the spent fuel and the onset of a postulated zirconium cladding fire), formal offsite REP plans (in accordance with 44 CFR Part 350) are not considered necessary for a permanently shutdown and defueled nuclear power reactor. Since formal offsite REP plans are not needed, the requirement to have an ETE and to perform an update to the ETE is not needed.

Based on the above analysis and the analysis provided in Section 5.2.2 of this safety evaluation, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.3, above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.2.4 10 CFR Part 50, Appendix E, Section IV.4

> ~~**Within 365 days of the later of the date of the availability of the most recent decennial census data from the U.S. Census Bureau or December 23, 2011, nuclear power reactor licensees shall develop an ETE analysis using this decennial data and submit it under § 50.4 to the NRC. These licensees shall submit this ETE analysis to the NRC at least 180 days before using it to form protective action recommendations and providing it to State and local governmental authorities for use in developing offsite protective action strategies.**~~

HDI's exemption request provided radiological analyses to show that, as of 30 days after permanent cessation of power operations at IPEC, the radiological consequences to the public of the only remaining applicable DBAs would not exceed the limits of the EPA early phase PAGs beyond the EAB. Considering the very low probability of beyond-design-basis events affecting the SFPs and the time available to initiate mitigative actions consistent with plant conditions (i.e., the time between the loss of both water and air cooling to the spent fuel and the

onset of a postulated zirconium cladding fire), formal offsite REP plans (in accordance with 44 CFR Part 350) are not considered necessary for a permanently shutdown and defueled nuclear power reactor. Since formal offsite REP plans are not needed, the requirement to have an ETE and to perform an update to the ETE is not needed.

Based on the above analysis and the analysis provided in Section 5.2.2 of this safety evaluation, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.4, above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.2.5 10 CFR Part 50, Appendix E, Section IV.5

> **~~During the years between decennial censuses, nuclear power reactor licensees shall estimate EPZ permanent resident population changes once a year, but no later than 365 days from the date of the previous estimate, using the most recent U.S. Census Bureau annual resident population estimate and State/local government population data, if available. These licensees shall maintain these estimates so that they are available for NRC inspection during the period between decennial censuses and shall submit these estimates to the NRC with any updated ETE analysis.~~**

HDI's exemption request provided radiological analyses to show that, as of 30 days after permanent cessation of power operations at IPEC, the radiological consequences to the public of the only remaining applicable DBAs would not exceed the limits of the EPA early phase PAGs beyond the EAB. Considering the very low probability of beyond-design-basis events affecting the SFPs and the time available to initiate mitigative actions consistent with plant conditions (i.e., the time between the loss of both water and air cooling to the spent fuel and the onset of a postulated zirconium cladding fire), formal offsite REP plans (in accordance with 44 CFR Part 350) are not considered necessary for a permanently shutdown and defueled nuclear power reactor. Since formal offsite REP plans are not needed, the requirement to have an ETE and to perform an update to the ETE is not needed.

Based on the above analysis and the analysis provided in Section 5.2.2 of this safety evaluation, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.5, above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.2.6 10 CFR Part 50, Appendix E, Section IV.6

> **~~If at any time during the decennial period, the EPZ permanent resident population increases such that it causes the longest ETE value for the 2-mile zone or 5-mile zone, including all affected Emergency Response Planning Areas, or for the entire 10-mile EPZ to increase by 25 percent or 30 minutes, whichever is less, from the nuclear power reactor licensee's currently NRC approved or updated ETE, the licensee shall update the ETE analysis to reflect the impact of that population increase. The licensee shall submit the updated ETE analysis to the NRC under § 50.4 no later than 365 days after the licensee's determination that the criteria for updating the ETE have been met and at least 180 days before using it to form protective~~**

~~action recommendations and providing it to State and local governmental authorities for use in developing offsite protective action strategies.~~

HDI's exemption request provided radiological analyses to show that, as of 30 days after permanent cessation of power operations at IPEC, the radiological consequences to the public of the only remaining applicable DBAs would not exceed the limits of the EPA early phase PAGs beyond the EAB. Considering the very low probability of beyond-design-basis events affecting the SFPs and the time available to initiate mitigative actions consistent with plant conditions (i.e., the time between the loss of both water and air cooling to the spent fuel and the onset of a postulated zirconium cladding fire), formal offsite REP plans (in accordance with 44 CFR Part 350) are not considered necessary for a permanently shutdown and defueled nuclear power reactor. Since formal offsite REP plans are not needed, the requirement to have an ETE and to perform an update to the ETE is not needed.

Based on the above analysis and the analysis provided in Section 5.2.2 of this safety evaluation, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.6, above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.2.7 10 CFR Part 50, Appendix E, Section IV.A.1

A description of the normal plant **~~operating~~** organization.

When the NRC dockets the certifications of permanent cessation of operations and removal of fuel from the reactor vessel, the 10 CFR Part 50 license for IPEC no longer authorizes operation of the reactor, or emplacement or retention of fuel into the reactor vessel, as specified in 10 CFR 50.82(a)(2). Because HDI will no longer be authorized to operate the reactor, IPEC does not have a plant "operating" organization. A description of the plant organization, as it relates to the requirements in Section IV.A.1 of Appendix E to 10 CFR Part 50 is still required.

Based on the above analysis, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.A.1, above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.2.8 10 CFR Part 50, Appendix E, Section IV.A.3

~~A description, by position and function to be performed, of the licensee's headquarters personnel who will be sent to the plant site to augment the onsite emergency organization.~~

The number of staff at a decommissioning power reactor site is smaller than that at an operating power reactor but is commensurate with the need to safely store spent fuel at the facility in a manner that is protective of public health and safety. HDI furnished information concerning the IPEC SFP inventory makeup strategies that could be used in the event of a catastrophic loss of SFP water inventory and stated that designated on-shift personnel are trained to implement such strategies with equipment maintained onsite. HDI has site personnel designated to respond within two hours of the declaration of an Alert classification level to assist the on-shift staff. As such, designation of specific licensee headquarters personnel is not necessary for the augmentation of the on-shift staffing and, therefore, is not described.

Based on the above analysis and the analysis provided in Section 5.1.1 of this safety evaluation, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.A.3, above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.2.9 10 CFR Part 50, Appendix E, Section IV.A.4

> Identification, by position and function to be performed, of persons within the licensee organization who will be responsible for making **~~offsite~~** dose projections, and a description of how these projections will be made and the results transmitted to State and local authorities, NRC, and other appropriate governmental entities.

HDI's exemption request provided radiological analyses to show that, as of 30 days after permanent cessation of power operations at IPEC, the radiological consequences to the public of the only remaining applicable DBAs would not exceed the limits of the EPA early phase PAGs beyond the EAB. While it is unlikely that a beyond-design-basis event would result in doses in excess of the EPA early phase PAGs to the public beyond the EAB, the licensee still must be able to determine if a radiological release is occurring, thereby achieving the underlying purpose of this regulatory provision. If a radiological release is occurring, then the licensee's staff is still required to communicate that information to offsite authorities for their consideration. The offsite authorities are responsible for deciding what, if any, protective actions should be taken that they consider appropriate to protect public health and safety.

Considering the very low probability of beyond-design-basis events affecting the SFP and the time available to initiate mitigative actions consistent with plant conditions (i.e., the time between the loss of both water and air cooling to the spent fuel and the onset of a postulated zirconium cladding fire), formal offsite REP plans (in accordance with 44 CFR Part 350) are not considered necessary for a permanently shutdown and defueled nuclear power reactor. Therefore, offsite dose projections are not required. HDI will maintain the capability at IPEC to determine if a radiological release is occurring and perform dose projections. If a release is occurring, HDI will communicate release and dose projection information to offsite authorities for their consideration. The offsite organizations are responsible for deciding what, if any, protective actions should be taken.

Based on the above analysis and the analysis provided in Section 5.1.1 of this safety evaluation, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.A.4, above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.2.10 10 CFR Part 50, Appendix E, Section IV.A.5

> **~~Identification, by position and function to be performed, of other employees of the licensee with special qualifications for coping with emergency conditions that may arise. Other persons with special qualifications, such as consultants, who are not employees of the licensee and who may be called upon for assistance for emergencies shall also be identified. The special qualifications of these persons shall be described.~~**

The number of licensee staff at a decommissioning nuclear power reactor site is smaller than that at an operating power reactor, but is commensurate with the need to operate the facility and store spent fuel in a manner that is protective of public health and safety. The NRC staff considered the staffing levels at a permanently shutdown and defueled reactor and at an operating power reactor site. The spectrum of accidents at a decommissioning facility is greatly reduced, and requires less specialized qualifications to address. The limited number of systems and equipment needed to maintain the spent fuel in a safe condition in the SFPs or in an ISFSI requires only minimal personnel, which is governed by the IPEC Technical Specifications.

HDI furnished information concerning the IPEC SFP inventory makeup strategies that could be used in the event of a catastrophic loss of SFP water inventory and stated that designated on-shift personnel are trained to implement such strategies with equipment maintained onsite. HDI has site personnel designated to respond within two hours of the declaration of an Alert classification level to assist the on-shift staff. As such, additional employees or other persons with special qualifications are not anticipated.

Considering the very low probability of beyond-design-basis events affecting the SFPs and the time available to initiate mitigative actions consistent with plant conditions (i.e., the time between the loss of both water and air cooling to the spent fuel and the onset of a postulated zirconium cladding fire), formal offsite REP plans (in accordance with 44 CFR Part 350) are not considered necessary for a permanently shutdown and defueled nuclear power reactor. Therefore, licensee and other personnel with special qualifications, as directed in 10 CFR Part 50, Appendix E, Section IV.A.5, are not required.

Based on the above analysis, as well as the analyses provided in Sections 5.1.1 and 5.2.8 of this safety evaluation, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.A.5, above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.2.11 10 CFR Part 50, Appendix E, Section IV.A.7

> **~~By June 23, 2014,~~** [I]dentification of**~~, and a description of the~~** assistance expected from appropriate State, local, and Federal agencies with responsibilities for coping with emergencies, including **~~hostile action at the site. For purposes of this appendix, "hostile action" is defined as~~** an act directed toward a nuclear power plant or its personnel that includes the use of violent force to destroy equipment, take hostages, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, projectiles, vehicles, or other devices used to deliver destructive force.

In the 2011 EP Final Rule, the Commission defined a "hostile action" as, in part, "an act directed toward a nuclear power plant or its personnel." The 2011 EP Final Rule made generically applicable the security-based response elements of NRC BL 2005-02. The enhancements of NRC BL 2005-02 were applicable to all holders of operating licenses for nuclear power reactors, except those who have permanently ceased operation and have certified that fuel has been permanently removed from the reactor vessel.

Because the NRC docketed the certifications of permanent cessation of operations and removal of fuel from the reactor vessels, the 10 CFR Part 50 license for IPEC no longer authorizes operation of the reactors, or emplacement or retention of fuel into the reactor vessels, as

specified in 10 CFR 50.82(a)(2). Therefore, the enhancements for hostile actions required by the 2011 EP Final Rule are not applicable for IPEC in a permanently shutdown and defueled status.

Although the "hostile action" enhancements in the 2011 EP Final Rule are not applicable to a decommissioning power reactor, the licensee's physical security plan must continue to provide high assurance against a potential security event impacting a designated target set. Therefore, some EP requirements for security-based events are maintained, such as the classification of security-based events, notification of offsite authorities, and coordination for the response of OROs (i.e., law enforcement, firefighting, medical assistance) onsite.

Based on the above analysis, as well as the analyses provided in Sections 5.1.1 and 5.2.1 of this safety evaluation, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.A.7, above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.2.12 10 CFR Part 50, Appendix E, Section IV.A.8

> **~~Identification of the State and/or local officials responsible for planning for, ordering, and controlling appropriate protective actions, including evacuations when necessary.~~**

HDI's exemption request provided radiological analyses to show that, as of 30 days after permanent cessation of power operations at IPEC, the radiological consequences to the public of the only remaining applicable DBAs would not exceed the limits of the EPA early phase PAGs beyond the EAB. Considering the very low probability of beyond-design-basis events affecting the SFPs and the time available to initiate mitigative actions consistent with plant conditions (i.e., the time between the loss of both water and air cooling to the spent fuel and the onset of a postulated zirconium cladding fire), formal offsite REP plans (in accordance with 44 CFR Part 350) are not considered necessary for a permanently shutdown and defueled nuclear power reactor. Therefore, identification of the State and/or local officials responsible for detailed pre-planning, ordering, and controlling appropriate offsite protective actions, including evacuations when necessary, is no longer required as part of the IPEC Permanently Defueled Emergency Plan. If State or local governmental officials determine that offsite protective actions are warranted, then sufficient time and capability would be available for OROs to implement these measures using a CEMP or "all-hazards" approach.

Based on the above analysis, as well as and the analyses provided in Sections 5.1.1 and 5.1.2 of this safety evaluation, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.A.8, above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.2.13 10 CFR Part 50, Appendix E, Section IV.A.9

> **~~By December 24, 2012, for nuclear power reactor licensees, a detailed analysis demonstrating that on-shift personnel assigned emergency plan implementation functions are not assigned responsibilities that would prevent the timely performance of their assigned functions as specified in the emergency plan.~~**

The number of staff required at decommissioning sites is significantly reduced commensurate with the need to safely store spent fuel at the facility in a manner that is protective of public health and safety. The duties of the on-shift personnel at a decommissioning power reactor facility are not as complicated and diverse as those for an operating power reactor. The number of systems and equipment needed to maintain the spent fuel in a safe condition in the SFPs or in an ISFSI requires minimal personnel, which is governed by the IPEC Technical Specifications.

In the 2011 EP Final Rule, the NRC required nuclear power plant licensees to provide a detailed analysis to show that on-shift personnel assigned emergency plan implementation functions were not assigned any responsibilities that would prevent them from performing their assigned emergency plan functions in a timely manner. As part of the 2011 EP Final Rule, the NRC concluded that the staffing analysis requirement was not necessary for non-power reactor licensees due to the significantly smaller staffing levels required to operate the facility. Therefore, based on the similarities of non-power reactors and decommissioning power reactors with regard to staffing, and as discussed in Section 5.2.1 of this safety evaluation, a detailed staffing analysis is not needed for a decommissioning power reactor.

Based on the above analysis, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.A.9, above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.2.14 10 CFR Part 50, Appendix E, Section IV.B.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.

NEI 99-01, “Development of Emergency Action Levels for Non-Passive Reactors,” Revision 6 (Reference 60), is an acceptable method for development of an emergency action level (EAL) scheme for non-passive operating nuclear power reactors, permanently defueled power reactors, and ISFSIs. Since a radiological release from any remaining applicable DBAs at IPEC is not estimated to exceed the limits of the EPA early phase PAGs beyond the EAB, event classification above the Alert classification level is no longer required, which is consistent with emergency planning exemptions granted by the NRC for previous decommissioning power reactors. The licensee will still be required to maintain EALs for the classification of security -based events to the Alert classification level, which was provided in the proposed Permanently

Defueled Emergency Action Level Scheme, dated February 4, 2022 (Reference 61).

In the 2011 EP Final Rule, the Commission defined a “hostile action” as, in part, “an act directed toward a nuclear power plant or its personnel.” The 2011 EP Final Rule made generically applicable the security-based response elements of NRC BL 2005-02, which provided numerous enhancements to licensee emergency plans, including security-based EALs. The NRC staff is maintaining the requirement for security based EALs at decommissioning power reactors as described by the 2002 NRC Orders requiring compensatory measures. Exemption from the NRC BL 2005-02 hostile action enhancements for decommissioning power reactors was previously discussed in Section 5.2.1 of this safety evaluation.

HDI’s exemption request provided radiological analyses to show that, as of 30 days after permanent cessation of power operations at IPEC, the radiological consequences to the public of the only remaining applicable DBAs would not exceed the limits of the EPA early phase PAGs beyond the EAB. Considering the very low probability of beyond-design-basis events affecting the SFPs and the time available to initiate mitigative actions consistent with plant conditions (i.e., the time between the loss of both water and air cooling to the spent fuel and the onset of a postulated zirconium cladding fire), formal offsite REP plans (in accordance with 44 CFR Part 350) are not considered necessary for a permanently shutdown and defueled nuclear power reactor. Therefore, a decommissioning power reactor is not required to have EALs to determine protective measures offsite. In addition, HDI maintains and operates the onsite monitoring systems needed to provide data that is essential for initiating emergency measures and performing accident assessment, including dose assessment and assessing the magnitude of a radiological release, which would inform State or local governmental officials in making any determination that offsite protective actions are warranted.

Based on the above evaluation, as well as the analyses provided in Sections 5.1.1 and 5.2.1 of this safety evaluation, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.B.1, above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.2.15 10 CFR Part 50, Appendix E, Section IV.C.1

> The entire spectrum of emergency conditions that involve the alerting or activating of progressively larger segments of the total emergency organization shall be described. The communication steps to be taken to alert or activate emergency personnel under each class of emergency shall be described. Emergency action levels (based not only on onsite **and offsite** radiation monitoring information but also on readings from a number of sensors that indicate a potential emergency**, such as the pressure in containment and the response of the Emergency Core Cooling System**) for notification of offsite agencies shall be described. The existence, but not the details, of a message authentication scheme shall be noted for such agencies. The emergency classes defined shall include: (1) Notification of unusual events, (2) alert**, (3) site area emergency, and (4) general emergency**. These classes are further discussed in NUREG-0654/FEMA-REP-1.

For a permanently shutdown and defueled power reactor, containment pressure measurements and emergency core cooling systems are no longer required. Therefore, they would have no parameters indicating a potential emergency. Other available indications of a potential

emergency, such as SFP level, SFP temperature, and area radiation monitors will remain at IPEC and continue to indicate the condition of spent fuel stored in the SFPs.

In the SOC for the Final Rule for EP requirements for ISFSIs and MRS facilities, the Commission responded to comments concerning a General Emergency classification level at an ISFSI and MRS and concluded: "An essential element of a General Emergency is that [a] release can be reasonably expected to exceed EPA Protective Action Guidelines exposure levels off site for more than the immediate site area. As previously discussed, NRC studies have concluded that the maximum offsite dose would be less than 1 rem [roentgen equivalent man] which is within the EPA Protective Action Guides." The SOC further provides a response to comments concerning EPZs for an ISFSI and MRS and concluded that "based on the potential inventory of radioactive material, potential driving forces for distributing that amount of radioactive material, and the probability of the initiation of these events, the Commission concludes that the offsite consequences of potential accidents at an ISFSI or a MRS would not warrant establishing Emergency Planning Zones."

HDI's exemption request provided an analysis that demonstrates there are no remaining applicable DBAs that would reach the dose criteria for declaration of a Site Area Emergency or a General Emergency classification level. As discussed previously, the probability of a beyond-DBA condition that could reach a Site Area Emergency, or a General Emergency classification level is very low. In the highly unlikely event of a beyond-design-basis event resulting in the loss of all cooling to the spent fuel stored in the SFP, as of 15 months after permanent cessation of power operations, it would take at least 10 hours from the time the fuel is uncovered until it reaches a temperature of 900˚C. The licensee is required to maintain the capability to initiate prompt mitigative actions consistent with plant conditions. Considering the very low probability of beyond-design-basis events occurring that would affect SFP structural integrity, as well as the time available to initiate SFP mitigative measures before the onset of a postulated zirconium cladding fire, the need for an event classification level above an Alert is no longer required.

Based on the above analysis and the analysis provided in Section 5.1.1 of this safety evaluation, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.C.1, above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.2.16 10 CFR Part 50, Appendix E, Section IV.C.2

> ~~**By June 20, 2012, nuclear power reactor**~~ [L]icensees shall establish and maintain the capability to assess, classify, and declare an emergency condition ~~**within 15 minutes**~~ after the availability of indications to plant operators that an emergency action level has been exceeded and shall promptly declare the emergency condition as soon as possible following identification of the appropriate emergency classification level. Licensees shall not construe these criteria as a grace period to attempt to restore plant conditions to avoid declaring an emergency action due to an emergency action level that has been exceeded. Licensees shall not construe these criteria as preventing implementation of response actions deemed by the licensee to be necessary to protect public health and safety provided that any delay in declaration does not deny the State and local authorities the opportunity to implement measures necessary to protect the public health and safety.

As part of the 2011 EP Final Rule, nuclear power reactor licensees were required to assess, classify, and declare an emergency condition within 15 minutes. Non-power reactors do not have the same potential to impact public health and safety as operating power reactors. As such, non-power reactor licensees are not required to establish or maintain complex offsite emergency response activities, nor to assess, classify, and declare an emergency condition within 15 minutes. Similarly, a decommissioning power reactor has a lower likelihood of a credible accident resulting in radiological releases requiring offsite protective measures than does an operating power reactor.

Unlike operating power reactor accident sequences potentially leading to large early releases, accident scenarios at decommissioning plants' SFPs evolve much more slowly and provide a longer time period to initiate SFP mitigative actions or, if deemed warranted by governmental officials, initiate appropriate offsite protective actions for the public. Because a decommissioning power reactor, like a non-power reactor, does not have the same potential radiological impact on public health and safety as an operating power reactor, the NRC staff concludes that it is not necessary for a decommissioning power reactor licensee to assess, classify, and declare an emergency condition within 15 minutes. HDI proposed in its exemption request to assess, classify, and declare an emergency condition within 30 minutes. The NRC staff finds that 30 minutes to assess, classify, and declare an emergency condition is reasonable given the slower progression of a credible event resulting in a radiological release.

Based on the above analysis, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.C.2, above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.2.17 10 CFR Part 50, Appendix E, Section IV.D.1

> Administrative and physical means for notifying local, State, and Federal officials and agencies **and agreements reached with these officials and agencies for the prompt notification of the public and for public evacuation or other protective measures, should they become necessary,** shall be described. This description shall include identification **of the appropriate officials, by title and agency,** of the State and local government agencies **within the EPZs**.

HDI's exemption request provided radiological analyses to show that, as of 30 days after permanent cessation of power operations at IPEC, the radiological consequences to the public of the only remaining applicable DBAs would not exceed the limits of the EPA early phase PAGs beyond the EAB. Considering the very low probability of beyond-design-basis events affecting the SFPs and the time available to initiate mitigative actions consistent with plant conditions (i.e., the time between the loss of both water and air cooling to the spent fuel and the onset of a postulated zirconium cladding fire), formal offsite REP plans (in accordance with 44 CFR Part 350) are not considered necessary for a permanently shutdown and defueled nuclear power reactor. Therefore, the requirements for prompt notification of the public and maintenance of emergency planning zones are not needed.

Based on the above analysis, as well as the analyses provided in Sections 5.1.1, 5.1.2, and 5.1.5 of this safety evaluation, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.D.1, above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.2.18 10 CFR Part 50, Appendix E, Section IV.D.2

> **~~Provisions shall be described for yearly dissemination to the public within the plume exposure pathway EPZ of basic emergency planning information, such as the methods and times required for public notification and the protective actions planned if an accident occurs, general information as to the nature and effects of radiation, and a listing of local broadcast stations that will be used for dissemination of information during an emergency. Signs or other measures shall also be used to disseminate to any transient population within the plume exposure pathway EPZ appropriate information that would be helpful if an accident occurs.~~**

HDI's exemption request provided radiological analyses to show that, as of 30 days after permanent cessation of power operations at IPEC, the radiological consequences to the public of the only remaining applicable DBAs would not exceed the limits of the EPA early phase PAGs beyond the EAB. Considering the very low probability of beyond-design-basis events affecting the SFPs and the time available to initiate mitigative actions consistent with plant conditions (i.e., the time between the loss of both water and air cooling to the spent fuel and the onset of a postulated zirconium cladding fire), formal offsite REP plans (in accordance with 44 CFR Part 350) are not considered necessary for a permanently shutdown and defueled nuclear power reactor. Therefore, the requirements for dissemination of emergency planning information to the public and maintenance of emergency planning zones are not needed.

Based on the above analysis, as well as the analyses provided in Sections 5.1.1, 5.1.2, and 5.1.5 of this safety evaluation, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.D.2, above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.2.19 10 CFR Part 50, Appendix E, Section IV.D.3

> A licensee shall have the capability to notify responsible State and local governmental agencies **within 15 minutes** after declaring an emergency. **~~The licensee shall demonstrate that the appropriate governmental authorities have the capability to make a public alerting and notification decision promptly on being informed by the licensee of an emergency condition. Prior to initial operation greater than 5 percent of rated thermal power of the first reactor at the site, each nuclear power reactor licensee shall demonstrate that administrative and physical means have been established for alerting and providing prompt instructions to the public with the plume exposure pathway EPZ. The design objective of the prompt public alert and notification system shall be to have the capability to essentially complete the initial alerting and notification of the public within the plume exposure pathway EPZ within about 15 minutes. The use of this alerting and notification capability will range from immediate alerting and notification of the public (within 15 minutes of the time that State and local officials are notified that a situation exists requiring urgent action) to the more likely events where there is substantial time available for the appropriate governmental authorities to make a judgment whether or not to activate the public alert and notification system. The alerting and notification capability shall additionally include administrative and physical means for a backup~~**

~~method of public alerting and notification capable of being used in the event the primary method of alerting and notification is unavailable during an emergency to alert or notify all or portions of the plume exposure pathway EPZ population. The backup method shall have the capability to alert and notify the public within the plume exposure pathway EPZ, but does not need to meet the 15 minute design objective for the primary prompt public alert and notification system. When there is a decision to activate the alert and notification system, the appropriate governmental authorities will determine whether to activate the entire alert and notification system simultaneously or in a graduated or staged manner. The responsibility for activating such a public alert and notification system shall remain with the appropriate governmental authorities.~~

In the permanently shutdown and defueled condition of a decommissioning power reactor, the rapidly developing accident scenarios associated with events initiated during reactor power operations are no longer credible. The slow progression of SFP events allows greater time for the licensee to successfully mitigate the accidents and, if deemed warranted by governmental officials or other offsite authorities, to implement appropriate offsite protective measures using a CEMP or "all-hazards" approach.

In the SOC for the Final Rule for EP requirements for ISFSIs and MRS facilities, the Commission responded to comments concerning a notification time of 15 minutes, and concluded that, "[t]he Commission has established a reasonable time limit for notification which has proven to be adequate in the past. 'The licensee shall also commit to notify the NRC Operations Center immediately after notifications of the appropriate offsite response organizations and not later than one hour after the licensee declares an emergency.'" HDI proposed in its exemption request to complete emergency notifications within 60 minutes after an emergency declaration or a change in emergency classification level. The 60-minute notification timeliness is consistent with the notification time requirements for emergency plans based on the requirements in 10 CFR 50.72(a)(3).

HDI's exemption request provided radiological analyses to show that, as of 30 days after permanent cessation of power operations at IPEC, the radiological consequences to the public of the only remaining applicable DBAs would not exceed the limits of the EPA early phase PAGs beyond the EAB. Considering the very low probability of beyond-design-basis events affecting the SFPs and the time available to initiate mitigative actions consistent with plant conditions (i.e., the time between the loss of both water and air cooling to the spent fuel and the onset of a postulated zirconium cladding fire), formal offsite REP plans (in accordance with 44 CFR Part 350) are not considered necessary for a permanently shutdown and defueled nuclear power reactor. The NRC's research and analysis shows that a decommissioning power reactor licensee would have sufficient time to implement mitigation measures consistent with plant conditions and, if deemed warranted, for OROs to initiate protective actions offsite. The NRC staff concludes that notifying OROs as soon as possible, and within 60 minutes, would not significantly impact the time available for OROs to initiate appropriate response actions.

Decommissioning-related EP submittals for IPEC have been discussed with cognizant OROs. These meetings have included discussion of the regulatory exemption requests. These discussions have addressed the changes to onsite and offsite emergency preparedness throughout the decommissioning process, including the proposed 30-minute declaration time and 60-minute notification time. Emergency management officials have not objected to the proposed changes. Based on the above analysis, the NRC staff agrees that 60 minutes to notify

the OROs of an emergency condition is reasonable. Additionally, the NRC staff agrees that the requirements for prompt notification of the public and an EPZ are not needed.

Based on the above analysis, as well as the analyses provided in Sections 5.1.1 and 5.1.2 of this safety evaluation, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.D.3, above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.2.20 10 CFR Part 50, Appendix E, Section IV.D.4

> ~~**If FEMA has approved a nuclear power reactor site's alert and notification design report, including the backup alert and notification capability, as of December 23, 2011, then the backup alert and notification capability requirements in Section IV.D.3 must be implemented by December 24, 2012. If the alert and notification design report does not include a backup alert and notification capability or needs revision to ensure adequate backup alert and notification capability, then a revision of the alert and notification design report must be submitted to FEMA for review by June 24, 2013, and the FEMA-approved backup alert and notification means must be implemented within 365 days after FEMA approval. However, the total time period to implement a FEMA-approved backup alert and notification means must not exceed June 22, 2015.**~~

HDI's exemption request provided radiological analyses to show that, as of 30 days after permanent cessation of power operations at IPEC, the radiological consequences to the public of the only remaining applicable DBAs would not exceed the limits of the EPA early phase PAGs beyond the EAB. Considering the very low probability of beyond-design-basis events affecting the SFPs and the time available to initiate mitigative actions consistent with plant conditions (i.e., the time between the loss of both water and air cooling to the spent fuel and the onset of a postulated zirconium cladding fire), formal offsite REP plans (in accordance with 44 CFR Part 350) are not considered necessary for a permanently shutdown and defueled nuclear power reactor. Therefore, the requirements for prompt notification of the public and an EPZ, including backup alert and notification capabilities, are not needed.

Based on the above analysis and the analysis provided in Section 5.2.19 of this safety evaluation, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.D.4, above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.2.21 10 CFR Part 50, Appendix E, Section IV.E.8.a.(i)

> A licensee ~~**onsite technical support center and an emergency operations**~~ facility from which effective direction can be given and effective control can be exercised during an emergency;

The guidance in NUREG-0696, "Functional Criteria for Emergency Response Facilities," dated February 1981 (Reference 62), provides that the technical support center (TSC) is an onsite facility located close to the control room that provides plant management and technical support to the reactor operating personnel located in the control room during emergency conditions. For

a permanently shutdown power reactor facility, onsite actions may be directed from the control room or other onsite location, without the requirements imposed on a TSC.

In addition, as there are no remaining applicable DBAs that would exceed the EPA early phase PAGs at the EAB, and there would be time available to initiate mitigative actions consistent with plant conditions between the loss of both water and air cooling to the spent fuel and the onset of a postulated zirconium cladding fire, an EOF would not be required to support interface with offsite agencies. If needed, coordination with offsite authorities and response organizations can occur from the control room or another onsite location. In addition, due to the reduced size of on-shift and ERO staff for a permanently shutdown and defueled power reactor, separate facilities to accommodate emergency response staff are no longer required. As such, greater efficiency and coordination is gained by locating staff in a central onsite facility.

Based on the above analysis, as well as the analyses provided in Sections 5.1.1 and 5.1.3 of this safety evaluation, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.E.8.a.(i), above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.2.22 10 CFR Part 50, Appendix E, Section IV.E.8.a.(ii)

> ~~**For nuclear power reactor licensees, a licensee onsite operational support center;**~~

The operational support center (OSC) is an onsite area separate from the control room and the TSC where licensee support personnel will assemble in an emergency. The OSC should provide a location where plant logistic support can be coordinated during an emergency and thereby restrict control room access to those support personnel specifically requested by the control room supervisor. HDI states that an onsite facility will continue to be maintained, from which effective direction can be given and effective control may be exercised during an emergency.

Given the permanently shutdown and defueled status of the IPEC reactor and storage of the spent fuel in the SFPs and ISFSI, an OSC will no longer be required to meet its original purpose during an emergency or to support initial SFP mitigation actions if needed. When activated, the ERO reports to the Emergency Director to assist the on-shift staff in the assessment, mitigation, and response to an emergency, as well as to support the dispatch of emergency teams. Due to the reduced size of on-shift and ERO staff for a permanently shutdown and defueled power reactor, separate facilities to accommodate emergency response staff are no longer required. As such, greater efficiency and coordination is gained by locating staff in a central onsite facility. An onsite facility will continue to be maintained at IPEC, from which effective direction can be given and effective control may be exercised during an emergency.

Based on the above analysis and the analysis provided in Section 5.2.21 of this safety evaluation, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.A.8.a.(ii), above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.2.23 10 CFR Part 50, Appendix E, Section IV.E.8.b

~~For a nuclear power reactor licensee's emergency operations facility required by paragraph 8.a of this section, either a facility located between 10 miles and 25 miles of the nuclear power reactor site(s), or a primary facility located less than 10 miles from the nuclear power reactor site(s) and a backup facility located between 10 miles and 25 miles of the nuclear power reactor site(s). An emergency operations facility may serve more than one nuclear power reactor site. A licensee desiring to locate an emergency operations facility more than 25 miles from a nuclear power reactor site shall request prior Commission approval by submitting an application for an amendment to its license. For an emergency operations facility located more than 25 miles from a nuclear power reactor site, provisions must be made for locating NRC and offsite responders closer to the nuclear power reactor site so that NRC and offsite responders can interact face- to-face with emergency response personnel entering and leaving the nuclear power reactor site. Provisions for locating NRC and offsite responders closer to a nuclear power reactor site that is more than 25 miles from the emergency operations facility must include the following:~~

~~(1) Space for members of an NRC site team and Federal, State, and local responders;~~

~~(2) Additional space for conducting briefings with emergency response personnel;~~

~~(3) Communication with other licensee and offsite emergency response facilities;~~

~~(4) Access to plant data and radiological information; and~~

~~(5) Access to copying equipment and office supplies;~~

Based on the analyses provided in Sections 5.1.1, 5.1.3, and 5.2.21 of this safety evaluation, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.E.8.b, above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.2.24 10 CFR Part 50, Appendix E, Section IV.E.8.c

~~By June 20, 2012, for a nuclear power reactor licensee's emergency operations facility required by paragraph 8.a of this section, a facility having the following capabilities:~~

~~(1) The capability for obtaining and displaying plant data and radiological information for each reactor at a nuclear power reactor site and for each nuclear power reactor site that the facility serves;~~

~~(2) The capability to analyze plant technical information and provide technical briefings on event conditions and prognosis to licensee~~

and offsite response organizations for each reactor at a nuclear power reactor site and for each nuclear power reactor site that the facility serves; and

(3) The capability to support response to events occurring simultaneously at more than one nuclear power reactor site if the emergency operations facility serves more than one site; and

Based on the analyses provided in Sections 5.1.1, 5.1.3, and 5.2.21 of this safety evaluation, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.E.8.c, above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.2.25 10 CFR Part 50, Appendix E, Section IV.E.8.d

For nuclear power reactor licensees, an alternative facility (or facilities) that would be accessible even if the site is under threat of or experiencing hostile action, to function as a staging area for augmentation of emergency response staff and collectively having the following characteristics: the capability for communication with the emergency operations facility, control room, and plant security; the capability to perform offsite notifications; and the capability for engineering assessment activities, including damage control team planning and preparation, for use when onsite emergency facilities cannot be safely accessed during hostile action. The requirements in this paragraph 8.d must be implemented no later than December 23, 2014, with the exception of the capability for staging emergency response organization personnel at the alternative facility (or facilities) and the capability for communications with the emergency operations facility, control room, and plant security, which must be implemented no later than June 20, 2012.

Based on the analyses provided in Sections 5.1.1, 5.2.1, and 5.2.11 of this safety evaluation, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.E.8.d, above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.2.26 10 CFR Part 50, Appendix E, Section IV.E.8.e

A licensee shall not be subject to the requirements of paragraph 8.b of this section for an existing emergency operations facility approved as of December 23, 2011;

Based on the analyses provided in Sections 5.1.1, 5.1.3, and 5.2.21 of this safety evaluation, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.E.8.e, above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.2.27 10 CFR Part 50, Appendix E, Section IV.E.9.a

> Provision for communications with contiguous State/local governments **~~within the plume exposure pathway EPZ~~**. Such communications shall be tested monthly.

HDI's exemption request provided radiological analyses to show that, as of 30 days after permanent cessation of power operations at IPEC, the radiological consequences to the public of the only remaining applicable DBAs would not exceed the limits of the EPA early phase PAGs beyond the EAB. Considering the very low probability of beyond-design-basis events affecting the SFPs and the time available to initiate mitigative actions consistent with plant conditions (i.e., the time between the loss of both water and air cooling to the spent fuel and the onset of a postulated zirconium cladding fire), formal offsite REP plans (in accordance with 44 CFR Part 350) are not considered necessary for a permanently shutdown and defueled nuclear power reactor. Therefore, provisions for communications with contiguous State/local governments within the plume exposure pathway EPZ are not needed. HDI proposed in its exemption request to continue to complete emergency notifications to designated State/local governments contiguous to the site within 60 minutes after an emergency declaration or a change in emergency classification level. A description of the communications systems and the testing frequencies is included in the IPEC Permanently Defueled Emergency Plan.

Based on the above analysis, as well as the analyses provided in Sections 5.1.1 and 5.1.2 of this safety evaluation, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.E.9.a, above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.2.28 10 CFR Part 50, Appendix E, Section IV.E.9.c

> **~~Provision for communications among the nuclear power reactor control room, the onsite technical support center, and the emergency operations facility, and among the nuclear facility, the principal State and local emergency operations centers, and the field assessment teams. Such communications systems shall be tested annually.~~**

HDI's exemption request provided radiological analyses to show that, as of 30 days after permanent cessation of power operations at IPEC, the radiological consequences to the public of the only remaining applicable DBAs would not exceed the limits of the EPA early phase PAGs beyond the EAB. Considering the very low probability of beyond-design-basis events affecting the SFPs and the time available to initiate mitigative actions consistent with plant conditions (i.e., the time between the loss of both water and air cooling to the spent fuel and the onset of a postulated zirconium cladding fire), formal offsite REP plans (in accordance with 44 CFR Part 350) are not considered necessary for a permanently shutdown and defueled nuclear power reactor. Therefore, as discussed in Sections 5.2.21 and 5.2.22 of this safety evaluation, there is no need for a TSC, EOF, or offsite field assessment teams to meet the underlying purpose of the rule. With the elimination of the requirements for a TSC, EOF, and the field assessment teams, performing annual testing of communication among them is no longer required. Communications with State and local governments will be through the commercial phone system. Due to its frequency of use, additional testing of that system is not necessary.

Based on the above analysis, as well as the analyses provided in Sections 5.2.21 and 5.2.22 of this safety evaluation, the NRC staff concludes that the exempted language from 10 CFR

Part 50, Appendix E, Section IV.E.9.c, above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.2.29 10 CFR Part 50, Appendix E, Section IV.E.9.d

> Provisions for communications by the licensee with NRC Headquarters and the appropriate NRC Regional Office Operations Center from the ~~**nuclear power reactor control room, the onsite technical support center, and the near-site emergency operations**~~ facility. Such communications shall be tested monthly.

As discussed in Sections 5.2.21 and 5.2.22 of this safety evaluation, the need for a separate TSC and EOF no longer exists, given the smaller facility staffing and the greatly reduced required interaction with State and local emergency response facilities. The NRC staff concludes that the emergency functions of the control room, EOF, TSC, and OSC may be combined into one or more locations. As a result, communications between the EOF and TSC, and the NRC, as well as monthly testing of these capabilities, are no longer needed. The Emergency Notification System used to communicate with the NRC will be tested monthly.

Based on the above analysis, as well as the analyses provided in Sections 5.2.21 and 5.2.22 of this safety evaluation, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.E.9.d, above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent operations of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.2.30 10 CFR Part 50, Appendix E, Section IV.F.1

> The program to provide for: (a) The training of employees and exercising, by periodic drills, of radiation emergency plans to ensure that employees of the licensee are familiar with their specific emergency response duties, and (b) the participation in the training and drills by other persons whose assistance may be needed in the event of a radiation emergency shall be described. This shall include a description of specialized initial training and periodic retraining programs to be provided to each of the following categories of emergency personnel:
>
> i. Directors and/or coordinators of the plant emergency organization;
>
> ii. Personnel responsible for accident assessment, including control room shift personnel;
>
> iii. Radiological monitoring teams;
>
> iv. Fire control teams (fire brigades);
>
> v. Repair and damage control teams;
>
> vi. First aid and rescue teams;
>
> vii. Medical support personnel;

viii. **Licensee's headquarters support personnel;**

ix. Security personnel.

In addition, a radiological orientation training program shall be made available to local services personnel; e.g., local emergency services**/Civil Defense**, local law enforcement personnel**, local news media persons**.

The number of staff required at decommissioning sites is generally small but is commensurate with the need to safely store spent fuel at the facility in a manner that is protective of public health and safety. Decommissioning power reactors typically have a level of emergency response that does not require additional support by licensee headquarters personnel. Therefore, the NRC staff considers exempting a licensee's headquarters personnel from the decommissioning site-specific emergency response training requirements to be reasonable. Training for licensee personnel responding from company locations offsite will still be required based on the ERO positions specified above.

"Civil Defense" is an outdated term that is no longer used. This category of offsite responders, which could be expected to respond onsite, is captured under "local emergency services" and "local law enforcement." Local news media are not included in the category of local services personnel requiring periodic radiological orientation training for the facility since they will not be called upon to support a formal Joint Information Center (JIC).

Based on the above analysis, as well as the analyses provided in Sections 5.1.1 and 5.2.8 of this safety evaluation, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.F.1, above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.2.31 10 CFR Part 50, Appendix E, Section IV.F.2

The plan shall describe provisions for the conduct of emergency preparedness exercises as follows: Exercises shall test the adequacy of timing and content of implementing procedures and methods, test emergency equipment and communications networks, **test the public alert and notification system,** and ensure that emergency organization personnel are familiar with their duties.

Based on the analyses provided in Sections 5.1.1 and 5.2.19 of this safety evaluation, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.F.2, above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.2.32 10 CFR Part 50, Appendix E, Section IV.F.2.a

A full participation exercise which tests as much of the licensee, State, and local emergency plans as is reasonably achievable without mandatory public participation shall be conducted for each site at which a power reactor is located. Nuclear power reactor licensees shall submit exercise

~~**scenarios under § 50.4 at least 60 days before use in a full participation exercise required by this paragraph 2.a.**~~

HDI's exemption request provided radiological analyses to show that, as of 30 days after permanent cessation of power operations at IPEC, the radiological consequences to the public of the only remaining applicable DBAs would not exceed the limits of the EPA early phase PAGs beyond the EAB. Considering the very low probability of beyond-design-basis events affecting the SFPs and the time available to initiate mitigative actions consistent with plant conditions (i.e., the time between the loss of both water and air cooling to the spent fuel and the onset of a postulated zirconium cladding fire), formal offsite REP plans (in accordance with 44 CFR Part 350) are not considered necessary for a permanently shutdown and defueled nuclear power reactor. Therefore, conducting a full participation exercise with State and local agencies is not needed for a decommissioning power reactor site.

Based on above analysis and the analysis provided in Section 5.1.1 of this safety evaluation, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.F.2.a, above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.2.33 10 CFR Part 50, Appendix E, Section IV.F.2.b

> Each licensee at each site shall conduct a subsequent exercise of its onsite emergency plan every 2 years. ~~**Nuclear power reactor licensees shall submit exercise scenarios under § 50.4 at least 60 days before use in an exercise required by this paragraph 2.b. The exercise may be included in the full participation biennial exercise required by paragraph 2.c. of this section.**~~ In addition, the licensee shall take actions necessary to ensure that adequate emergency response capabilities are maintained during the interval between biennial exercises by conducting drills, including at least one drill involving a combination of some of the principal functional areas of the licensee's onsite emergency response capabilities. The principal functional areas of emergency response include activities such as management and coordination of emergency response, accident assessment, event classification, notification of offsite authorities, assessment of the onsite **and offsite** impact of radiological releases, ~~**protective action recommendation development, protective action decision making, plant**~~ system repair and mitigative action implementation. During these drills, activation of all of the licensee's emergency response facilities ~~**(Technical Support Center (TSC), Operations Support Center (OSC), and the Emergency Operations Facility (EOF))**~~ would not be necessary, licensees would have the opportunity to consider accident management strategies, supervised instruction would be permitted, operating staff in all participating facilities would have the opportunity to resolve problems (success paths) rather than have controllers intervene, and the drills may focus on the onsite exercise training objectives.

The intent of submitting emergency exercise scenarios in advance at an operating power reactor site is to ensure that licensees utilize different scenarios in order to prevent the preconditioning of responders at operating power reactors. For decommissioning power reactor sites, there are limited event scenarios that could occur, and as such, the submittal of exercise scenarios for the purpose of ensuring that responders do not get preconditioned to certain scenarios is not necessary to achieve the underlying purpose of the rule.

IPEC will continue to conduct biennial emergency response exercises and will invite the State of New York and local support organizations (firefighting, law enforcement, and ambulance and medical services) to participate in periodic drills and exercises to assess their ability to perform responsibilities related to an emergency at the site to the extent defined by the IPEC Permanently Defueled Emergency Plan.

HDI's exemption request provided radiological analyses to show that, as of 30 days after permanent cessation of power operations at IPEC, the radiological consequences to the public of the only remaining applicable DBAs would not exceed the limits of the EPA early phase PAGs beyond the EAB. Considering the very low probability of beyond-design-basis events affecting the SFPs and the time available to initiate mitigative actions consistent with plant conditions (i.e., the time between the loss of both water and air cooling to the spent fuel and the onset of a postulated zirconium cladding fire), formal offsite REP plans (in accordance with 44 CFR Part 350) are not considered necessary for a permanently shutdown and defueled nuclear power reactor. Therefore, drills involving principle functional areas associated with offsite REP are not needed. As discussed previously in Sections 5.2.21 and 5.2.22 of this safety evaluation, there is no need for an OSC, TSC, or EOF to meet the underlying purpose of the rule.

Based on the above analysis, as well as the analyses provided in Sections 5.1.1, 5.2.21, 5.2.22, and 5.2.32 of this safety evaluation, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.F.2.b, above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.2.34 10 CFR Part 50, Appendix E, Section IV.F.2.c

~~Offsite plans for each site shall be exercised biennially with full participation by each offsite authority having a role under the radiological response plan. Where the offsite authority has a role under a radiological response plan for more than one site, it shall fully participate in one exercise every two years and shall, at least, partially participate in other offsite plan exercises in this period. If two different licensees each have licensed facilities located either on the same site or on adjacent, contiguous sites, and share most of the elements defining co-located licensees, then each licensee shall:~~

~~(1) Conduct an exercise biennially of its onsite emergency plan;~~

~~(2) Participate quadrennially in an offsite biennial full or partial participation exercise;~~

~~(3) Conduct emergency preparedness activities and interactions in the years between its participation in the offsite full or partial participation exercise with offsite authorities, to test and maintain interface among the affected State and local authorities and the licensee. Co-located licensees shall also participate in emergency preparedness activities and interaction with offsite authorities for the period between exercises;~~

~~**(4) Conduct a hostile action exercise of its onsite emergency plan in each exercise cycle; and**~~

~~**(5) Participate in an offsite biennial full or partial participation hostile action exercise in alternating exercise cycles.**~~

HDI's exemption request provided radiological analyses to show that, as of 30 days after permanent cessation of power operations at IPEC, the radiological consequences to the public of the only remaining applicable DBAs would not exceed the limits of the EPA early phase PAGs beyond the EAB. Considering the very low probability of beyond-design-basis events affecting the SFPs and the time available to initiate mitigative actions consistent with plant conditions (i.e., the time between the loss of both water and air cooling to the spent fuel and the onset of a postulated zirconium cladding fire), formal offsite REP plans (in accordance with 44 CFR Part 350) are not considered necessary for a permanently shutdown and defueled nuclear power reactor. Therefore, conducting a full participation exercise with State and local agencies is not needed for a decommissioning power reactor site.

Based on the above analysis, as well as the analyses provided in Sections 5.2.1 and 5.2.32 of this safety evaluation, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.F.2.c, above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.2.35 10 CFR Part 50, Appendix E, Section IV.F.2.d

~~**Each State with responsibility for nuclear power reactor emergency preparedness should fully participate in the ingestion pathway portion of exercises at least once every exercise cycle. In States with more than one nuclear power reactor plume exposure pathway EPZ, the State should rotate this participation from site to site. Each State with responsibility for nuclear power reactor emergency preparedness should fully participate in a hostile action exercise at least once every cycle and should fully participate in one hostile action exercise by December 31, 2015. States with more than one nuclear power reactor plume exposure pathway EPZ should rotate this participation from site to site.**~~

HDI's exemption request provided radiological analyses to show that, as of 30 days after permanent cessation of power operations at IPEC, the radiological consequences to the public of the only remaining applicable DBAs would not exceed the limits of the EPA early phase PAGs beyond the EAB. Considering the very low probability of beyond-design-basis events affecting the SFPs and the time available to initiate mitigative actions consistent with plant conditions (i.e., the time between the loss of both water and air cooling to the spent fuel and the onset of a postulated zirconium cladding fire), formal offsite REP plans (in accordance with 44 CFR Part 350) are not considered necessary for a permanently shutdown and defueled nuclear power reactor. Therefore, the requirement to ensure the State fully participate in the ingestion pathway portion of an exercise is not needed. As noted in Section 5.1.2 of this safety evaluation, designated plume exposure and ingestion pathway EPZs are no longer needed.

Additionally, the NRC excluded non-power reactors from the definition of "hostile action" at the time of the 2011 EP Final Rule because, as defined in 10 CFR 50.2, a non-power reactor is not considered a nuclear power reactor and a regulatory basis had not been developed to support

the inclusion of non-power reactors in the definition of “hostile action.” Similarly, a decommissioning nuclear power reactor or ISFSI is not a “nuclear reactor” as defined in the NRC’s regulations. Like a non-power reactor, a decommissioning nuclear power reactor also has a lower likelihood of a credible accident resulting in radiological releases requiring offsite protective measures than does an operating nuclear power reactor. For all the above reasons, the NRC staff concludes that a decommissioning nuclear power reactor is not a facility that falls within the definition of “hostile action.”

Based on the above analysis, as well as the analyses provided in Sections 5.1.1, 5.1.2, 5.2.1, and 5.2.32 of this safety evaluation, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.F.2.d, above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.2.36 10 CFR Part 50, Appendix E, Section IV.F.2.e

> Licensees shall enable any State or local Government ~~**located within the plume exposure pathway EPZ**~~ to participate in the licensee’s drills when requested by such State or local Government.

HDI’s exemption request provided radiological analyses to show that, as of 30 days after permanent cessation of power operations at IPEC, the radiological consequences to the public of the only remaining applicable DBAs would not exceed the limits of the EPA early phase PAGs beyond the EAB. Considering the very low probability of beyond-design-basis events affecting the SFPs and the time available to initiate mitigative actions consistent with plant conditions (i.e., the time between the loss of both water and air cooling to the spent fuel and the onset of a postulated zirconium cladding fire), formal offsite REP plans (in accordance with 44 CFR Part 350) are not considered necessary for a permanently shutdown and defueled nuclear power reactor. Therefore, identifying State and local governments in relation to a plume exposure pathway EPZ that is no longer required is not needed. IPEC will continue to conduct biennial emergency response exercises and will invite the State of New York and local support organizations (firefighting, law enforcement, and ambulance and medical services) to participate in periodic drills and exercises to assess their ability to perform responsibilities related to an emergency at the site to the extent defined by the Permanently Defueled Emergency Plan.

Based on the above analysis, as well as the analyses provided in Sections 5.1.1 and 5.1.2 of this safety evaluation, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.F.2.e, above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.2.37 10 CFR Part 50, Appendix E, Section IV.F.2.f

> Remedial exercises will be required if the emergency plan is not satisfactorily tested during the biennial exercise, such that NRC~~**, in consultation with FEMA**~~, cannot (1) find reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency or (2) determine that the Emergency Response Organization (ERO) has maintained key skills specific to emergency response. ~~**The extent of State and local participation in remedial exercises must be sufficient to show that appropriate corrective**~~

~~measures have been taken regarding the elements of the plan not properly tested in the previous exercises.~~

As discussed previously in Section 5.2.32 of this safety evaluation, the requirement to conduct a full participation exercise with State and local agencies is not needed. Since full participation emergency plan exercises are not required, and FEMA does not have responsibilities related to onsite emergency preparedness, NRC consultation with FEMA is no longer necessary.

Based on the above analysis, as well as the analyses provided in Sections 5.1.1 and 5.2.32 of this safety evaluation, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.F.2.f, above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.2.38 10 CFR Part 50, Appendix E, Section IV.F.2.i

> Licensees shall use drill and exercise scenarios that provide reasonable assurance that anticipatory responses will not result from preconditioning of participants. **~~Such scenarios for nuclear power reactor licensees must include a wide spectrum of radiological releases and events, including hostile action.~~** Exercise and drill scenarios as appropriate must emphasize coordination among onsite and offsite response organizations.

The NRC staff previously evaluated the issues surrounding preconditioning for emergency drill scenarios, including hostile action scenarios, at decommissioning power reactors in Sections 5.2.1, 5.2.33, and 5.2.34 of this safety evaluation. In each instance, the NRC staff concluded that the exempted language from 10 CFR Part 50, Appendix E, Section IV.F.2.i, above, was not needed to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.2.39 10 CFR Part 50, Appendix E, Section IV.F.2.j

> **~~(i) The exercises conducted under paragraph 2 of this section by nuclear power reactor licensees must provide the opportunity for the ERO to demonstrate proficiency in the key skills necessary to implement the principal functional areas of emergency response identified in paragraph 2.b of this section.~~**
> **~~(ii) Each exercise must provide the opportunity for the ERO to demonstrate key skills specific to emergency response duties in the control room, TSC, OSC, EOF, and joint information center.~~**
> **~~(iii) In each 8-calendar-year exercise cycle, nuclear power reactor licensees shall vary the content of scenarios during exercises conducted under paragraph 2 of this section to provide the opportunity for the ERO to demonstrate proficiency in the key skills necessary to respond to the following scenario elements:~~**
> **~~(1) Hostile action directed at the plant site;~~**
> **~~(2) No radiological release or an unplanned minimal radiological release that does not require public protective actions;~~**
> **~~(3) An initial classification of, or rapid escalation to, a Site Area Emergency or General Emergency;~~**

~~(4) Implementation of strategies, procedures, and guidance under § 50.155(b)(2); and~~
~~(5) Integration of offsite resources with onsite response.~~
~~(iv) The licensee shall maintain a record of exercises conducted during each 8-year exercise cycle that documents the content of scenarios used to comply with the requirements of section IV.F.2.j of this appendix.~~
~~(v) Each licensee shall conduct a hostile action exercise for each of its sites no later than December 31, 2015.~~
~~(vi) The first 8-year exercise cycle for a site will begin in the calendar year in which the first hostile action exercise is conducted. For a site licensed under 10 CFR part 52, the first 8-year exercise cycle begins in the calendar year of the initial exercise required by section IV.F.2.a of this appendix.~~

In the SOC for the 2011 EP Final Rule, the NRC discussed the addition of a new Section IV.F.2.j to Appendix E of 10 CFR Part 50, which requires all operating nuclear power reactor licensees to provide an opportunity for the ERO to demonstrate proficiency in response to a wide spectrum of scenarios, including a "hostile action" and a loss of large areas of the plant due to fire or explosion. The NRC staff previously evaluated the need for hostile action enhancements at decommissioning power reactors in Section 5.2.1 of this safety evaluation. Section IV.F.2.j of Appendix E to 10 CFR Part 50 further provides that the ERO must demonstrate key skills specific to emergency response duties in the reactor control room, TSC, OSC, EOF, and JIC. The NRC staff previously concluded that the functions of the IPEC control room, EOF, TSC, and OSC may be combined into one or more locations in Sections 5.2.21, 5.2.22, and 5.2.29 of this safety evaluation. A dedicated JIC is also not needed based on the analysis in Section 5.2.30 of this safety evaluation. At a decommissioning site, where only the SFPs and their related support systems, structures, and components remain, there are no other facilities in which ERO personnel could demonstrate proficiency.

Based on the above analysis, as well as the analyses provided in Sections 5.1.1, 5.2.1, 5.2.30, and 5.2.33 of this safety evaluation, the NRC staff concludes that the exempted language from 10 CFR Part 50, Appendix E, Section IV.F.2.j, above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

5.2.40 10 CFR Part 50, Appendix E, Section IV.I

~~By June 20, 2012, for nuclear power reactor licensees, a range of protective actions to protect onsite personnel during hostile action must be developed to ensure the continued ability of the licensee to safely shut down the reactor and perform the functions of the licensee's emergency plan.~~

Based on the analysis provided in Section 5.2.1 of this safety evaluation, the NRC staff concludes that the enhancements for hostile actions, as required by the 2011 EP Final Rule, are not necessary for IPEC given its permanently shutdown and defueled status. Therefore, the exempted language from 10 CFR Part 50, Appendix E, Section IV.I, above, is not necessary to achieve the underlying purpose of this requirement as it applies to IPEC 15 months after permanent cessation of power operations and, therefore, meets the special circumstances provisions of 10 CFR 50.12(a)(2)(ii).

6.0 ENVIRONMENTAL CONSIDERATIONS

In accordance with 10 CFR 51.31(a), the Commission has determined that the granting of these exemptions will not have a significant effect on the quality of the human environment as discussed in the NRC staff's Finding of No Significant Impact and associated Environmental Assessment published in the *Federal Register* on October 31, 2023 (88 FR 74536).

7.0 CONCLUSION

The NRC staff has completed its review of the licensee's request for exemptions from certain requirements of 10 CFR 50.47(b), 10 CFR 50.47(c), and Appendix E to 10 CFR Part 50, as specified in this safety evaluation. On the basis of its review, the NRC staff concludes that (1) the postulated dose from any remaining applicable DBAs would not exceed the EPA early phase PAG limits to the public at the EAB and, (2) for any highly unlikely beyond-design-basis events impacting SFP integrity or the ability to cool spent fuel, the length of time available to implement pre-planned mitigation measures consistent with plant conditions and, should offsite authorities deem warranted, to implement protective actions using a CEMP approach, is adequate to ensure public health and safety. These conclusions are consistent with the NRC staff's evaluation, as provided to the Commission in SECY-22-0102, which was approved by the Commission in the SRM to SECY-22-0102, dated October 24, 2023.

Accordingly, the NRC staff has determined that, pursuant to 10 CFR 50.12(a), the exemptions evaluated above are authorized by law, will not present an undue risk to the public health and safety, and are consistent with the common defense and security. In addition, special circumstances are present. Specifically, the NRC staff finds that the licensee's requested exemptions continue to meet the underlying purpose of the planning standards in 10 CFR 50.47 and the requirements in Appendix E to 10 CFR Part 50. In addition, given the reduced risk of offsite radiological consequences associated with the permanently shutdown and defueled condition at IPEC, these exemptions satisfy the special circumstances in 10 CFR 50.12(a)(2)(ii) and can be implemented 15 months after permanent cessation of power operations.

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