Evaluation of Request by Entergy Nuclear Operations, Inc. for Exemptions from Certain Emergency Planning Requirements for the Pilgrim Nuclear Power Station

The following U.S. Nuclear Regulatory Commission (NRC) staff evaluation verifies that the Entergy Nuclear Operations, Inc. (Entergy) provided the analyses described in Section 5, "Evaluation of Exemptions to Emergency Planning 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 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML14106A057). These analyses meet the criteria in the ISG to justify elimination of the requirement on the licensee to maintain the plume exposure pathway and ingestion pathway emergency planning zones (EPZs) and formal offsite radiological emergency preparedness (REP) plans. The discussion that follows lists each ISG criterion, followed by the staff's evaluation of Pilgrim Nuclear Power Station's (PNPS) consistency with that criterion.

1. The licensee has performed an analysis indicating that any radiological release from applicable design-basis accidents (DBAs) would be within Section 50.67 to Title 10 of the *Code of Federal Regulations* (10 CFR) dose limits and Regulatory Guide 1.183, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors," dose acceptance criteria. The licensee evaluated the maximum 2-hour total effective dose equivalent (TEDE) to an individual located at the exclusion area boundary (EAB), 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 U.S. Environmental Protection Agency (EPA) early phase protective action guides (PAGs) recommendation for protection of the public.[1]

   Evaluation: The licensee has stated, and the staff agrees, that while spent fuel remains in the spent fuel pool (SFP), the only postulated DBA that would remain applicable to the permanently defueled Pilgrim Nuclear Power Station (PNPS) that could contribute a significant dose would be a fuel handling accident (FHA) in the Reactor Building, where the SFP is located. For completeness, the staff also evaluated the applicability of other DBAs documented in the PNPS Updated Final Safety Analysis Report (UFSAR) (ADAMS Accession Package No. ML16083A494), to ensure that these accidents would not have consequences that could potentially exceed the 10 CFR 50.67 dose limits and Regulatory Guide 1.183 dose acceptance criteria or approach the EPA early phase PAGs.

   Fuel Handling Accident – In the PNPS UFSAR, the licensee has determined that within 46 days after shutdown, doses from a FHA would decrease to a level that would not warrant protective actions under the EPA early phase PAG framework, notwithstanding meeting the dose limit requirements under 10 CFR 50.67 and dose acceptance criteria under Regulatory Guide 1.183.

[1] 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," and endorsed by the Commission in a policy statement published on October 23, 1979 (44 *Federal Register* 61123).

The staff notes that the doses from an FHA are dominated by the isotope Iodine-131. The licensee has based its application for revision to the emergency plan and emergency action level (EAL) scheme on an effective implementation date no earlier than 10 months after the permanent cessation of power operations. Therefore, by the date of implementation of the revised emergency plan and EAL scheme, the fuel will have decayed for 10 months. With 10 months of decay, the thyroid dose from an FHA would be negligible. After 10 months of decay, the only isotope remaining in significant amounts, among those postulated to be released in the design-basis accident FHA, would be Krypton-85. Since 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. Therefore, based on review of the licensee's analysis, the staff concludes that the dose consequence from an FHA for the permanently defueled PNPS would not approach the EPA early phase PAGs.

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

   Evaluation: The 10-hour criterion, conservatively, does not consider the fuel uncovery time 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.

   The licensee performed a site-specific quantitative analysis of an adiabatic heatup of a representative fuel assembly stored in the PNPS SFP. In Attachment 2, "Calculation No. PNPS-EC-73355-M1418, Adiabatic Heatup Analysis for Drained Spent Fuel Pool," of its application dated July 3, 2018 (ADAMS Accession No. ML18186A635), the licensee provided the analysis used to evaluate the length of time it takes for an uncovered spent fuel assembly in the SFP to reach the temperature where the zirconium cladding would fail and determine the time for the hottest fuel assembly to heat adiabatically from its normal storage temperature to a temperature of 900°C. The licensee calculated the time to reach temperatures of 565°C, associated with the 10-hour creep rupture time and where incipient cladding failure might occur, and 900°C as the temperature where "runaway oxidation" (zirconium fire) is expected to occur, as defined in NUREG-1738, "Technical Study of Spent Fuel Pool Accident Risk at Decommissioning Nuclear Power Plants" (ADAMS Accession No. ML010430066).

This criterion considers the time for the hottest assembly to heat up from 30°C to 900°C adiabatically. If the heatup time is greater than 10 hours, then offsite emergency preplanning involving the plant is not necessary. Based on the limiting fuel assembly for decay heat and adiabatic heatup analysis presented in its application, as supplemented by letters dated December 4, 2018 (ADAMS Accession no. ML18341A219) and February 18, 2019 (ADAMS Accession No. ML19056A260), at 10 months after permanent cessation of power operations under 10 CFR 50.82(a)(1) (i.e., 10 months decay time), the time for the hottest fuel assembly to reach 900°C is 10 hours after the assemblies have been uncovered. As stated in NUREG-1738, 900°C is an acceptable temperature to use for assessing onset of fission product release under transient conditions to establish the critical decay time for determining availability of 10 hours. The 10 hours would provide an adequate timeframe for deployment of mitigation equipment, and for offsite agencies, if deemed warranted, to take appropriate action to protect the health and safety of the public, if fuel and cladding oxidation occurs in air.

Attachment 2 of the application contains the adiabatic heatup analysis for a drained SFP. In the attachment, Table 2, “Fuel Bundle Inputs for GNF2 [Global Nuclear Fuel 2] Fuel,” lists the geometry inputs for the GNF2 fuel bundles evaluated in the analysis. The mass of the upper and lower plenums, 13.217 and 14.612 pounds mass, respectively, are listed. These values are then added to the calculated mass of Zircaloy-2, which are used to calculate the total heat capacity of the fuel assembly. This heat capacity was used to demonstrate that a 10-hour heatup time to the ignition temperature (900°C) would be available with a 10-month decay time, assuming the fuel assembly heats uniformly.

Based on the staff’s review of the calculation, the staff issued subsequent requests for additional information (ADAMS Accession Nos. ML18310A021 and ML19036A651). In its letter dated February 18, 2019, the licensee submitted a revised adiabatic calculation that replaced, in its entirety, the previous version of the calculation. The adiabatic heatup analysis was revised to incorporate a redefined adiabatic envelope boundary that removed the upper and lower plenums and included only the fuel rods, water rods, spacers, and part of the mass of the GNF2 channel box surrounding the fuel over the active fuel length. The revised analysis also incorporated temperature-dependent material properties. In the revised adiabatic heatup analysis, only the masses within the active fuel region (fuel rods, water rods, and spacers) are initially credited. When the bulk temperature reaches 304.44°C, the channel mass in the active fuel region is added to the adiabatic envelope. Radiative heat transfer between the fuel rods and the channel is a function of the surface area of the fuel rods that is viewed by the channel, the emissivity of the fuel rods, and the difference in temperatures raised to the fourth power between the fuel rods and the channel. With multiple rods in the 10x10 fuel array providing an adequate viewing factor of the channel, and emissivity values typical for Zircaloy-2, the entire bundle decay heat can be transferred to the channel at temperatures significantly less than 304.44°C. As such, the licensee determined that the channel box could be considered thermally connected to the active fuel region and included in the adiabatic envelope at temperatures exceeding 304.44°C. Thus, heat transfer could occur to all components within the proposed adiabatic envelope.

The staff concluded that the adiabatic heatup calculation provided an acceptable method for determining the minimum time necessary for heatup to temperatures that would support runaway oxidation of the zircaloy cladding. The revised analysis employed specified dimensions of fuel assembly components, accurate thermal properties of the fuel assembly materials, and the maximum decay heat rate to ensure a bounding result. The staff found that after 10 months, more than 10 hours would be available before a significant offsite release could begin.

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 (indicates that any release would be less than EPA early phase PAGs at the EAB).

   Evaluation: The licensee analyzed the radiological consequences of a beyond-design-basis scenario to evaluate the effects of a loss of water inventory from the SFP. 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. The 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.

   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 radiation emitted skyward interacting with air molecules and subsequently scattered back down to the ground where it can expose members of the public (known as “skyshine”). Attachment 3, “Calculation No. PNPS-EC-73355-M1417, Dose at Exclusion Area Boundary and Control Room Due to Shine from Drained Spent Fuel Pool During SAFSTOR,” to the application, provides the offsite and control room radiological impacts based on a postulated complete loss of SFP water. The licensee determined that the skyshine dose rate at the EAB would be limited to small fractions of the EPA early phase PAGs. The extended period of time that would be required to exceed an integrated EPA early phase PAG of one rem TEDE would allow sufficient time to develop and implement onsite mitigative actions and provide confidence that additional offsite measures could be taken without formal offsite REP plans, if efforts to re-establish shielding over the fuel are delayed. The licensee determined that 10 months after the permanent cessation of power operations, the EAB dose rate would be limited to small fractions of the EPA early phase PAG exposure levels and the control room dose rate would be approximately 0.02 mrem/hour. The staff reviewed the license’s evaluation and performed independent analyses that confirmed the licensee’s results. Therefore, the staff concludes that the dose consequence from skyshine 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 PAG framework.

4. Considering the site-specific seismic hazard, the licensee has performed either an evaluation demonstrating a high-confidence of a low probability (less than 1 x 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: The licensee conducted a structural integrity seismic risk assessment of the PNPS SFP to assess seismically-induced structural failure and the potential for a rapid loss of coolant inventory. The licensee states that this assessment was performed using Electric Power Research Institute document 3002009564, "Seismic Evaluation Guidance: Spent Fuel Pool Integrity Evaluation," which the staff endorsed for performance of SFP seismic re-evaluations (ADAMS Accession No. ML17034A408). The assessment is comprised of several complementary seismic evaluations of the PNPS SFP, which satisfy the expectations and intent of the guidance in NUREG-1738.

   In addition to the primary seismic evaluation, the licensee completed a structural drawing review of the PNPS SFP. The review was based on the Enhanced Seismic Checklist in Appendix 2B, "Structural Integrity of Spent Fuel Pools Subject to Seismic Loads," of NUREG-1738 and used the as-built drawings of the PNPS Reactor Building and SFP. The structural drawing review did not identify any specific design or detail any vulnerability of the PNPS SFP that would challenge its seismic capacity. The licensee also performed a seismic walkdown to confirm the conclusions of the structural drawing review.

   The results of the staff evaluation documented 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 [BWR]," dated September 2014 (ADAMS Accession No. ML14255A365) supports the licensee's conclusion of a low risk of challenge to a BWR SFP seismic integrity. This study included a detailed evaluation of a representative SFP in a BWR Mark I containment, which is the design class of the PNPS Reactor Building. The staff evaluation determined that the SFP is a robust structure with a low probability of seismic structural failure. Furthermore, the study concluded that the fuel in a drained SFP could be effectively cooled by air after a 10-month decay time. Therefore, the staff concludes the PNPS SFP structure supports high confidence of a low-probability of structural failure due to seismic challenges.

5. If the licensee is storing fuel in an SFP, the licensee should address, for the decommissioning site, the risk reduction measures identified in NUREG-1738 as industry decommissioning commitments (IDC) and staff decommissioning assumptions (SDA).[2]

   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 or cask-drop events. This is an important difference relative to an

[2] Refers to IDCs proposed by the Nuclear Energy Institute (NEI) in a letter to the NRC dated November 12, 1999 (ADAMS Accession No. ML993340413), and several additional SDAs identified through the staff's risk assessment and the staff's 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." The IDCs and SDAs are summarized in Tables 4.2-1 and 4.2-2 to NUREG-1738.

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 PNPS 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 4.2, "Comparison to NUREG-1738 Industry Decommissioning Commitments and Staff Decommissioning Assumptions;" Table 4, "PNPS Compliance with NSIR/DPR-ISG-02 Industry Decommissioning Commitments (IDCs)," and Table 5, "PNPS Compliance with NSIR/DPR-ISG-02 Staff Decommissioning Assumptions (SDAs)," of Attachment 1, "Request for Exemptions from Portions of 10 CFR 50.47(b), 10 CFR 50.47(c)(2) and 10 CFR Part 50, Appendix E," to the application dated July 3, 2018, the licensee described the conformance of the PNPS facility and operations with the IDCs and the SDAs. In their discussion of the IDCs and SDAs, the licensee 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 (for example, those IDCs and SDAs related to fuel cask handling activities and seismic events).

The 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 SFPs. The following provides a summary of the staff's findings, based on an assessment of the licensee's IDC and SDA items:

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 (ADAMS Accession No. ML070250180),] will be implemented).

Evaluation: The licensee stated that the PNPS crane design is consistent with this commitment. The licensee further states that heavy load lifts in and around the area of the SFP are performed by the Reactor Building Overhead Crane (RBOC) and that the design of the crane is single failure-proof. Therefore, the likelihood of dropping the spent fuel casks in and around the SFP is extremely low. The design meets the requirements of NUREG-0554, "Single-Failure-Proof Cranes for Nuclear Power Plants," dated July 1979 (ADAMS Accession No. ML110450636) and Appendix C, "Modification of Existing Cranes," of NUREG-0612. PNPS procedures provide instructions for lifting activities to meet the guidance provided in NUREG-0612. Therefore, based on review of the licensee's procedures and design of the RBOC, the staff found that the qualification and operation of the RBOC as a single-failure-proof handling system satisfies the conditions assumed in the analysis presented in NUREG-1738 with respect to protection from potential cask drop events.

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.

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

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: The licensee listed and described how various plant procedures would provide for deployment of onsite resources and access to offsite resources. This included a comprehensive list of procedures that would establish communications with offsite organizations, bring offsite resources to bear onsite, and access other offsite resources to support strategies to maintain or restore adequate spent fuel cooling. The licensee states that, following permanent shutdown and removal of fuel from the reactor vessel, the on-shift plant operators will be trained on the relevant procedures and various actions to provide makeup to the SFP or implement strategies to restore spent fuel cooling using onsite or offsite resources. The licensee also states that these actions would be the highest priority activity, and staff to perform these actions would be available at all times. Therefore, based on review of the licensee's description of its procedures for deployment of onsite resources and access of offsite resources, the staff concludes the licensee has adequate procedures to satisfy the conditions assumed in the NUREG-1738 analysis regarding effective use of onsite and offsite resources to respond to events affecting the SFP.

IDC #5: SFP 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: The licensee described that the SFP instrumentation includes instruments, indicators, and alarms for SFP water level, temperature, and radiation levels. SFP water level is monitored via two independent level channels that were added to meet the requirements of NRC order EA-12-051, "Order Modifying Licenses With Regard to Reliable Spent Fuel Pool Instrumentation (Effective Immediately)," dated March 12, 2012 (ADAMS Accession No. ML12056A044). Two independent indicators are installed on the North wall in the Control Room and provide indication via digital indication LI-4816A and LI-4816B. These indicators utilize MOHR Test and Measurement, LLC instrumentation that utilize a guided wave radar method for measuring level. The devices have a range of 93' 3" to 116' 7". These indicators do not provide any inputs to the plant computer or the plant annunciator. A low-level alarm is provided via LS-4801A and LS-4801B on panels C39 and C903. The set point for these alarms is 115' decreasing. There is also a local level indicator (ruler) to provide an alternate means for determining SFP level. TS-4807, which alarms on Panel C2 in the control room at a temperature value of 115 °F increasing, is located in the SFP. TE-4831, installed in the skimmer surge tank discharge line, provides temperature indication via a local recorder on panel C39 (TRU-4830). Area radiation monitors are located at the new fuel storage racks, refueling floor area/spent fuel area, and refueling area/shield plug area. Area radiation monitor alarms are provided on panel C903 in the control room. Therefore, based on review of the licensee's description of its instrumentation, the staff found that the licensee will maintain adequate SFP monitoring instrumentation to satisfy the conditions assumed in the NUREG-1738 analysis regarding monitoring events affecting the SFP.

IDC #6: SFP 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: The licensee stated that the PNPS SFP gates are designed with static seals and the licensee stated that there is no credible catastrophic failure mechanism for these seals. If SFP inventory were to leak due to seal rupture or degradation, the SFP water level would not go below the top of the spent fuel racks. The fixed top elevation of the refueling slot between the SFP and reactor vessel (where the removal gates are located) is above the top of fuel. As such, leakage by the gates could not lead to fuel uncovery. Therefore, based on the licensee's description of the design of the PNPS SFP gates, the staff found that the described design features that limit the potential for drainage through the gate openings 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, and (2) controls for pump suction and discharge points. The functionality of anti-siphon devices will be periodically verified.

Evaluation: The licensee described procedures and design elements that reduce the likelihood of a rapid drain-down event. PNPS procedures allow specified volumes to be pumped to, or letdown from, the SFP for cooling, makeup, or to support dry cask operations. The procedure meets the requirements of this IDC by controlling the suction and discharge points. The SFP is designed such that there is no drain piping tied to the SFP, and the only lines to enter the SFP are two 6" inlet lines which enter the SFP from the top. The SFP cooling pump suction flow path is from weirs at Elevation 116', through the skimmer surge tanks. Due to this arrangement, pump suction cannot draw the water level down below the elevation of the weirs. Each line is outfitted with a siphon break, which consists of a ½" nominal pipe welded to the inlet line. The normal SFP level is below the elevation of the siphon break. As such, a siphon event is not possible because the presence of the ½" pipe prevents the development of any vacuum in the line. The inlet lines and associated siphon breaks are routinely inspected as part of normal Operator tours. These inspections ensure that there is no degradation or otherwise undesirable condition associated with the siphon break piping. Therefore, based on review of the licensee's description of the procedures, controls, and design features, the staff found that the described procedures, administrative controls, and design features minimize the potential for rapid drainage through permanent systems and are consistent with the assumptions used in the analysis presented in NUREG 1738.

The licensee states that during dry cask operations, plant procedures also note that the displacement of the Holtec International Transfer Cask (HI-TRAC) will raise the SFP level by approximately 8.5" and provides instructions to preemptively lower the SFP level to accommodate this displacement by pumping water from the SFP directly into the skimmer surge tanks via a portable pump/hose arrangement. The procedures include a prerequisite activity to establish communications with the control room just prior to this evolution. The procedures also include instructions to establish abort criteria based on SFP level and temperature. The use of a siphon break is not required since the portable equipment used to lower the SFP level is continuously monitored during its operation.

PNPS plant procedures control additional dry cask operations in the SFP, and a review of these procedures confirms there are no dry cask related SFP operations which could result in a rapid drain down event. This complies with the Technical Specifications requirement that the SFP be maintained to prevent inadvertent draining below the 115' elevation.

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: The licensee stated that procedures are in place to restore the SFP cooling systems, provide normal makeup to the SFP, and provide an alternate path for makeup water to the SFPs without requiring entry to the refueling floor. The licensee also stated that PNPS plant procedures provide multiple methods to align makeup sources, none of which required entry to the refueling floor or to the SFP. These methods include:

- Condensate transfer system with either of two condensate transfer pumps;
- Demineralized water transfer system;
- Fire Protection System via hose station; and
- Fire Protection System via a cross-tie to the Residual Heat Removal system.

Based on review of the licensee's described procedures, the NRC staff found the planned SFP cooling and make-up water capability conformed to the capabilities assumed for the 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: The licensee described that plant procedures govern SFP operations, such as water transfer or dry cask operations for independent spent fuel storage installation (ISFSI) activities that could have the potential to rapidly decrease SFP inventory. Procedures control water inventory during ISFSI operations, including a prerequisite activity to establish an SFP level control team in assigned locations. This team establishes communication with the control room and ensures that the single-failure-proof attributes of the heavy load handling system are maintained.

PNPS plant procedures, which meet the requirements of this IDC by controlling the suction and discharge points, allow specified volumes to be pumped to or letdown from the SFP for cooling, makeup, or support dry cask operations. The SFP design ensures there is no drain piping tied to the SFP, and the only lines to enter the SFP are two 6" inlet lines that enter the top of the SFP. The SFP cooling pump suction flow path is from weirs at elevation 116' through the skimmer surge tanks. Pump suction cannot draw the water level down below the elevation of the weirs due to system arrangement.

During dry cask operations, plant procedures note that the displacement of the HI-TRAC will raise the SFP level by approximately 8.5" and provides instructions to preemptively lower the SFP level to accommodate this displacement by pumping water from the SFP

directly into the skimmer surge tanks via a portable pump/hose arrangement. The plant procedures also include a prerequisite activity to establish an SFP level control team in assigned locations establishing communications with the control room just prior to this evolution. The plant procedures also include instructions to establish abort criteria based on SFP level and temperature. The licensee stated that the use of a siphon break is not required since the portable equipment used to lower the SFP level is continuously monitored during its operation. The staff found the described procedures conformed to the administrative controls considered in the 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: The licensee described that plant procedures provide multiple methods to align makeup sources to the SFP without requiring entry to the refueling floor. If access to the refueling floor is available, an additional option includes the Fire Protection System via a hose station. For pumps necessary to provide makeup sources to the SFP, preventive maintenance will be in place to ensure that the pumps will perform as required when placed in service. This preventive maintenance must be implemented and scheduled in accordance with the Preventative Maintenance Program. The staff found that the described administrative controls conform to those considered in the staff analysis presented in NUREG-1738.

SDA #1: SFP 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: The licensee stated that the SFP structure and siphon breaks on the SFP cooling return piping are classified as safety-related. The return piping inside the SFP is seismically analyzed using criteria applicable for a Class I structure, system and component. Appendix C, “Structural Loading Criteria,” to the PNPS Final Safety Analysis Report (ADAMS Accession No. 16335A144), Section C.3, “Components,” defines the Class I criteria applicable to piping and equipment. Piping analysis methods and allowable stress limits were drawn from the American Society of Mechanical Engineers Standard B31.1.0, “Power Piping.” Likewise, the SFP structure has been analyzed for seismic loads as part of a seismic risk assessment further described in response to SDA-5. The seismic risk assessment included a physical walk down validating that the seismic design has been maintained and remains capable of sustaining its inventory boundary considering today’s excitation values. The instrumentation includes dual, independent level monitors with indications and alarms in the control room, including those for temperature. The SFP has redundant cooling pumps, redundant heat exchangers, and multiple make-up sources, in addition to the normal condensate transfer system. The additional sources include tie-ins to the Firewater System, with jockey pump P-146, electric pump P-135, and diesel driven pump P-140. The make-up source for the firewater is a municipal water system. Instrumentation was described in the discussion of IDC #5. The licensee stated that any changes to the SFP cooling configuration as a result of permanent cessation of power operations will be evaluated to confirm that the resulting configuration is at least as capable as the design assumed in Section 3.0, “Risk Assessment of Spent Fuel Pools at

Decommissioning Plants," of NUREG-1738. The staff found the described cooling and makeup capabilities comparable to the capabilities considered in the 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: The licensee stated that personnel will perform a walk-down of SFP systems once each shift. As described later in the response to SDA #3, there are various methods available to the control room for monitoring the SFP. As such, walk-downs may not be as frequent as originally described in NUREG-1738. Procedures provide the necessary guidance to address loss of SFP cooling and loss-of-level conditions. PNPS plant procedures specifically require an SFP inspection following a seismic event, including methods to diagnose the loss of cooling and/or inventory with a description of steps required to establish make up. The staff found that the proposed monitoring of the SFP systems would be comparable to the capability assumed for the staff analysis presented in NUREG-1738.

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: The licensee described that PNPS maintains a Technical Specification value that the SFP be maintained at an elevation of 111' 3". Two independent indicators are installed on the north wall in the control room and provide indication via digital indication LI-4816A and LI-4816B that utilize a guided wave radar method for measuring level. The devices have a range of 93' 3" to 116' 7". A low-level alarm is provided via LS-4801A and LS-4801B on panels C39 and C903. The set point for these alarms is 115' decreasing. TS-4807, which alarms on Panel C2 in the control room at a value of 115°F increasing, is located in the SFP. TE-4831, installed in the skimmer surge tank discharge line, provides temperature indication via a local recorder on panel C39. The licensee stated that the facility will employ permanently defueled EALs using an NRC approved EAL scheme based on Nuclear Energy Institute (NEI) document NEI 99-01, "Development of Emergency Action Levels for Non-Passive Reactors," Revision 6 (ADAMS Accession No. ML12326A805). The 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' below the normal pool operating level and that the licensee must initiate recovery using offsite sources.

Evaluation: The licensee described potential drain or siphon paths within the SFP. The SFP is designed such that there is no drain piping tied to the SFP, and the only lines to enter the SFP are two 6" inlet lines that enter the SFP from the top. The SFP cooling pump suction flow path is from weirs at Elevation 116' through the skimmer surge tanks. Due to this arrangement, it is not possible to drain or pump water from the SFP below

the level of the weirs at elevation 116'. Each 6" line which enters the SFP from the top is outfitted with a siphon break, which consists of a ½" nominal pipe welded to the inlet line. The normal SFP level is below the elevation of the siphon break. As such, a siphon event is not possible because the presence of the ½" pipe prevents the development of any vacuum in the line. As discussed previously in IDC #6, the passage between the fuel storage pool and the refueling cavity above the reactor vessel is provided with two double-sealed gates with a monitored drain between the gates. This arrangement permits detection of leaks from the passage and repair of the gates in the event of such leakage. If SFP inventory were to leak due to seal rupture or degradation, the level would not go below the top of the spent fuel racks. Therefore, the SFP design reasonably protects against drainage that results in fuel uncovery consistent with the assumptions used in the analysis presented in NUREG-1738. As discussed previously in IDC #4, the licensee listed how various plant procedures would provide for deployment of onsite resources and access to offsite resources. Based on review of the licensee's description of the potential drain or siphon paths within the SFP, the staff finds that the potential drain or siphon paths within the SFP are consistent with the assumptions 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: As discussed in IDC #1, the licensee committed to use single-failure-proof cranes for such loads. Therefore, the 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 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 conducted a structural integrity seismic risk assessment of the SFP to assess seismically induced structural failure and rapid loss of inventory. The staff reviewed the assessment and found that it demonstrates that the risk of an SFP seismically induced structural failure and rapid loss of inventory is 6.6×10^{-6} per year, which is less than the generic bounding estimates provided in NUREG-1738 ($<1 \times 10^{-5}$ per year including non-seismic events).

Additionally, Section 4.3, "Consequences of a Beyond Design-Basis Earthquake," of Attachment 1 to the application compares PNPS spent fuel storage characteristics with those of the reference plant evaluated by the staff in NUREG-2161. Based on its review, the staff concluded that PNPS spent fuel storage characteristics compares to those of the reference plant evaluated by the staff in NUREG-2161.

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: The licensee stated that nine SFP racks utilize sheets of Boraflex material sandwiched between stainless steel sheets. The licensee made a commitment in response to Generic Letter 96-04, "Boraflex Degradation in Spent Fuel Pool Storage," dated June 26, 1996 (ADAMS Accession No. ML031110008), to perform periodic inspection of the Boraflex material. FSAR license renewal commitments include implementation of the PNPS Boraflex Monitoring Program, excerpted as follows:

> The Boraflex Monitoring Program assures that degradation of the Boraflex panels in the spent fuel racks does not compromise the criticality analysis in support of the design of the spent fuel storage racks. The program relies on (1) neutron attenuation testing, (2) determination of boron loss through correlation of silica levels in spent fuel pool water samples and periodic areal density measurements, and (3) analysis of criticality to assure that the required 5% subcriticality margin is maintained.

The licensee stated the PNPS Boraflex Monitoring Program will remain in place and the commitment as written continues to apply until spent fuel is no longer stored in racks outfitted with Boraflex panels or until the Boraflex panels are no longer credited for neutron absorption in the SFP criticality analysis.

Based on its review of the licensee's description of the SFP racks and Boraflex monitoring program, the 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.

6. Verification that the licensee presents a determination that there are sufficient resources and adequately trained personnel available on-shift to initiate mitigative actions within the 10-hour minimum time period that will prevent an offsite radiological release that exceeds the EPA early phase PAGs at the EAB.

Evaluation: The PNPS mitigative strategies are maintained in accordance with License Condition 3.K of the PNPS Renewed Facility Operating License. The licensee stated that the mitigating strategies for a catastrophic loss of SFP water inventory can be performed by the proposed on-shift staffing of a control room supervisor, non-certified operator, and radiation protection technician. The licensee further stated that PNPS performed a validation exercise that demonstrated the ability to perform the required actions with the designated personnel. PNPS plant procedures are in place to ensure onsite and offsite resources can be brought to bear during an event. The procedures and associated training will be updated as necessary to reflect the permanently shut down and defueled condition. Following permanent shut down and permanent removal of fuel from the reactor vessel, the licensee stated that the on-shift plant operators, including certified fuel handlers and non-certified operators, will be appropriately trained on the relevant procedures and on the various actions needed to provide makeup to the SFP. The licensee will ensure appropriate personnel receive initial and continuing training on procedures and strategies that are needed to respond to the loss of large

areas of the plant due to explosions or fire and are credited in applicable license conditions required by 10 CFR 50.54(hh)(2). Based on its review of the above evaluation, the staff concludes that the identified plant personnel will be appropriately trained on the relevant procedures and on the various actions needed to provide makeup to the SFP and are consistent with the capabilities assumed in the analysis presented in NUREG-1738.

7. Verification that mitigation strategies are consistent with those required by the permanently defueled Technical Specifications or by retained license conditions.

   Evaluation: The licensee stated that PNPS maintains procedures and mitigative strategies for the movement of any necessary portable equipment that will be relied upon for mitigating the loss of SFP water inventory. These mitigative strategies were developed in response to 10 CFR 50.54(hh)(2) and are maintained in accordance with applicable License Conditions of the PNPS Renewed Facility Operating License. The licensee stated that these diverse strategies provide defense-in-depth and ample time to provide makeup water or spray to the SFP prior to the onset of zirconium cladding ignition when considering very low probability beyond design-basis events affecting the SFP. The staff concludes that the identified procedures and strategies for the movement of any necessary portable equipment that will be relied upon for mitigating the loss of SFP water are consistent with the capabilities assumed in the analysis presented in NUREG-1738.

In addition to an evaluation against the specific NSIR/DPR-ISG-02 criteria above, Table 1, "Evaluation of Specific Exemptions to Emergency Planning Requirements," provides the staff's evaluation of the specific exemptions, shown as "strikethrough" text, requested to the requirements of 10 CFR 50.47 and Appendix E to Part 50, based on the justification provided by the licensee and evaluation criteria above.

Table 1 **Evaluation of Specific Exemptions to Emergency Planning Requirements**
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:
Staff's Evaluation: The NRC requires a level of licensee emergency preparedness (EP) commensurate with the potential consequences to public health and safety, and common defense and security at the licensee's site. Entergy's exemption request included radiological analyses to show that, as of 46 days after the final reactor shutdown, the radiological consequences of DBAs would not exceed the limits of the EPA early phase PAGs at the EAB. The licensee also concluded, and the NRC staff confirmed, as of 10 months after the permanent cessation of power operations, 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 before the hottest fuel assembly reached 900˚C to take mitigative actions. NUREG-1738, and enhancements put into place as a result of the events of September 11, 2001, and Fukushima Dai-ichi, support staff assumptions 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 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 offsite response organizations (OROs) to implement these measures using a comprehensive emergency management plan or "all hazards" approach. Considering the very low probability of beyond-design-basis events affecting the SFP, and with the time available to initiate mitigative actions consistent with plant conditions, the time between the loss of both water and air cooling to the spent fuel, and the time before the onset of a postulated zirconium cladding fire, formal offsite REP plans (in accordance with 44 CFR Part 350) are not necessary for a permanently shut down and defueled nuclear power reactor.
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.

Table 1 **Evaluation of Specific Exemptions to Emergency Planning Requirements**
Staff's Evaluation: NUREG-0396 provided 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 that would result in dose savings in the environs of nuclear facilities in the event of a serious power reactor accident. As previously discussed, Entergy has provided radiological analyses, which show that 10 months after the permanent cessation of power operations, the radiological consequences for DBAs at PNPS will not exceed the limits of the EPA early phase PAGs at the EAB. In addition, reactor core melt (Class 9) scenarios, which were also considered in NUREG-0396, are no longer applicable to a permanently shut down and defueled power reactor. Considering the very low probability of beyond-design-basis events affecting the SFP, the time available to initiate mitigative actions consistent with plant conditions, the time between the loss of both water and air cooling to the spent fuel, and the time before the onset of a postulated zirconium cladding fire, offsite REP plans (in accordance with 44 CFR Part 350) are not needed. Therefore, designated plume exposure and ingestion pathway EPZs are no longer needed.
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.
Staff's Evaluation: With the termination of reactor power operations at PNPS and the permanent removal of the fuel from the reactor vessel to the SFP, most of the accident scenarios postulated for operating reactors are no longer possible. The spent fuel will be stored in the SFP 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 will no longer be 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 secondary systems will no longer be applicable. During reactor decommissioning, the principal public safety concerns involve the radiological risks associated with the storage of spent fuel onsite. The Emergency Operations Facility (EOF) is a support facility for the purpose of managing the 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 SFP, the time available to initiate mitigative actions consistent with plant conditions, the time between the loss of both water and air cooling to the spent fuel, and the time before the onset of a postulated zirconium cladding fire, formal offsite REP plans (in accordance with 44 CFR Part 350) are not needed. Therefore, an EOF would not be needed to coordinate these types of assessments for determining public protective actions. Onsite personnel will continue to maintain and provide for communication and coordination capabilities with offsite authorities and OROs for the purpose of notification and for the level of support required for remaining design-basis accidents and the prompt implementation of

Table 1 **Evaluation of Specific Exemptions to Emergency Planning Requirements**
mitigative actions in response to an SFP accident.
10 CFR 50.47(b)(4): A standard emergency classification and action level scheme, the basis 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~~.
Staff's Evaluation: Considering the very low probability of beyond-design-basis events affecting the SFP, the time available to initiate mitigative actions consistent with plant conditions, the time between the loss of both water and air cooling to the spent fuel, and the time before the onset of a postulated zirconium cladding fire, offsite REP plans (in accordance with 44 CFR Part 350) are not needed. Therefore, the requirement for minimum initial offsite response measures is not required.
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~~.
Staff's Evaluation: Considering the very low probability of beyond-design-basis events affecting the SFP, the time available to initiate mitigative actions consistent with plant conditions, the time between the loss of both water and air cooling to the spent fuel, and the time before the onset of a postulated zirconium cladding fire, offsite REP plans (in accordance with 44 CFR Part 350) are not needed. Therefore, a means to provide early notification and clear instruction to the populace within a designated plume exposure pathway EPZ is no longer required.
10 CFR 50.47(b)(6): Provisions exist for prompt communications among principal response organizations to emergency personnel~~ and to the public~~.
Staff's Evaluation: Considering the very low probability of beyond-design-basis events affecting the SFP, the time available to initiate mitigative actions consistent with plant conditions, the time between the loss of both water and air cooling to the spent fuel, and the time before the onset of a postulated zirconium cladding fire, offsite REP plans (in accordance with 44 CFR Part 350) are not needed. Therefore, the requirement to provide prompt communication to the public within a designated plume exposure EPZ in regards to initial or pre-determined protective actions is no longer needed.
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.

Table 1 **Evaluation of Specific Exemptions to Emergency Planning Requirements**
Staff's Evaluation: Considering the very low probability of beyond-design-basis events affecting the SFP, the time available to initiate mitigative actions consistent with plant conditions, the time between the loss of both water and air cooling to the spent fuel, and the time before the onset of a postulated zirconium cladding fire, offsite REP plans (in accordance with 44 CFR Part 350) are not needed. Therefore, the requirement to provide periodic information to the public within a designated plume exposure EPZ on how they will be notified and what their initial or predetermined protective actions should be in an emergency is not needed.
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.
Staff's Evaluation: Considering the very low probability of beyond-design-basis events affecting the SFP, the time available to initiate mitigative actions consistent with plant conditions, the time between the loss of both water and air cooling to the spent fuel, and the time before the onset of a postulated zirconium cladding fire, offsite REP plans (in accordance with 44 CFR Part 350) are not needed. Therefore, the requirement for assessing or monitoring offsite consequences beyond the EAB is not needed.
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.~~
Staff's Evaluation: The licensee's analysis demonstrated that, as of 46 days after the permanent cessation of power operations, 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 and the associated protective actions developed from evacuation time estimates are no longer required. Additionally, in the unlikely event of an SFP accident, the iodine isotopes, which contribute to an off-site dose from an operating reactor power accident, are not present, so potassium iodide (KI) distribution would no longer serve as an effective or necessary supplemental protective action. As such, the staff concludes that Entergy provides for an acceptable level of EP at PNPS 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 PNPS. 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

Table 1 **Evaluation of Specific Exemptions to Emergency Planning Requirements**
responding onsite. Additionally, the licensee is responsible for control of activities within the EAB, including public access. The licensee actions that are 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.
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.~~
Staff's Evaluation: Considering the very low probability of beyond-design-basis events affecting the SFP, the time available to initiate mitigative actions consistent with plant conditions, the time between the loss of both water and air cooling to the spent fuel, and the time before the onset of a postulated zirconium cladding fire, offsite REP plans (in accordance with 44 CFR Part 350) are not needed. Therefore, the requirement for an EPZ is not required. Paragraph 50.47(c)(2) and footnote 1 to Appendix E to 10 CFR Part 50 both state: "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 is not applicable to PNPS and, therefore, requires no exemption.
10 CFR Part 50, Appendix E, Section IV.1: 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, and 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.
Staff's Evaluation: The 2011 EP Final Rule (76 *Federal Register* 72560; November 23, 2011) made generically applicable the security-based response elements of NRC Bulletin 2005-02, "Emergency Preparedness and Response Actions for Security-Based Events," dated July 18, 2005 (ADAMS Accession No. ML051740058). The enhancements of NRC Bulletin 2005-02 were not applicable to holders of operating licenses for power reactors that had permanently ceased operations and had certified that fuel had been removed from the reactor vessel. Entergy has certified that it has permanently ceased operations at PNPS and that all fuel has been removed from the reactor vessel. Therefore, the enhancements for hostile actions, as required by the 2011 EP Final Rule, are not necessary for PNPS in a permanently shut down and defueled status.

Table 1 **Evaluation of Specific Exemptions to Emergency Planning Requirements**
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 power reactor or ISFSI is not a "nuclear reactor" as defined in the NRC's regulations. Like a non-power reactor, a decommissioning power reactor also has a lower likelihood of a credible accident resulting in radiological releases requiring offsite protective measures than does an operating power reactor. For all of the above reasons, the staff concludes that a decommissioning power reactor is not a facility that falls within the definition of "hostile action." Although this analysis provides a justification for exempting PNPS 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.
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.~~
Staff's Evaluation: Refer to basis for exemption from 10 CFR 50.47(b)(10).
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.~~
Staff's Evaluation: Refer to basis for exemption from 10 CFR Part 50, Appendix E, Section IV.2.
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.~~
Staff's Evaluation: Refer to basis for exemption from 10 CFR Part 50, Appendix E, Section IV.2
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~~

Table 1 **Evaluation of Specific Exemptions to Emergency Planning Requirements**
~~during the period between decennial censuses and shall submit these estimates to the NRC with any updated ETE analysis.~~
Staff's Evaluation: Refer to basis for exemption from 10 CFR Part 50, Appendix E, Section IV.2.
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.~~
Staff's Evaluation: Refer to basis for exemption from 10 CFR Part 50, Appendix E, Section IV.2.
10 CFR Part 50, Appendix E, Section IV.A.1: A description of the normal plant ~~operating~~ organization.
Staff's Evaluation: Upon docketing of the certifications of permanent cessation of operations and permanent removal of fuel from the reactor vessel, the 10 CFR Part 50 license for PNPS will no longer authorize operation of the reactor or emplacement or retention of fuel in the reactor vessel, as specified in 10 CFR 50.82(a)(2). Because the licensee will no longer be authorized to operate the reactor, the licensee will not have a plant "operating" organization. A description of the plant organization, as it relates to the requirements in 10 CFR Part 50, Appendix E, Section IV.A.1, is still required.
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.~~
Staff's Evaluation: The number of staff 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. Entergy furnished information concerning its SFP inventory makeup strategies that could be used in the event of a catastrophic loss of SFP water inventory and states that designated on-shift personnel will be trained to implement such strategies with equipment maintained onsite. PNPS will have site personnel designated to respond within 2 hours of the Alert classification 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.
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.

Table 1 **Evaluation of Specific Exemptions to Emergency Planning Requirements**
Staff's Evaluation: The licensee's analysis demonstrated that, as of 46 days after the permanent cessation of power operations, no DBAs would result in doses in excess of the EPA early phase PAGs to the public beyond the EAB. While it is unlikely that a beyond-design-basis accident 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 whether a radiological release is occurring, thereby achieving the underlying purpose of the rule. If a release is occurring, then the licensee's staff should promptly communicate that information to offsite authorities for their consideration. The offsite authorities are responsible for deciding what, if any, protective actions should be taken. Considering the very low probability of beyond-design-basis events affecting the SFP, the time available to initiate mitigative actions consistent with plant conditions, the time between the loss of both water and air cooling to the spent fuel, and the time before the onset of a postulated zirconium cladding fire, offsite REP plans (in accordance with 44 CFR Part 350) are not needed. Therefore, the requirement for offsite dose projections is not required.
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.~~
Staff's Evaluation: Entergy furnished information concerning its 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. Entergy will have site personnel designated to respond within 2 hours of the Alert classification 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 SFP, the time available to initiate mitigative actions consistent with plant conditions, the time between the loss of both water and air cooling to the spent fuel, and the time before the onset of a postulated zirconium cladding fire, offsite REP plans (in accordance with 44 CFR Part 350) are not needed. Therefore, the requirement for personnel with special qualifications, as directed in 10 CFR Part 50, Appendix E, Section IV.A.5, is not required.
10 CFR Part 50, Appendix E, Section IV.A.7: ~~By June 23, 2014,~~ identification 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 include 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.

Table 1 **Evaluation of Specific Exemptions to Emergency Planning Requirements**
Staff's Evaluation: Refer to basis for exemption from 10 CFR Part 50, Appendix E, Section IV.1.
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.~~
Staff's Evaluation: Considering the very low probability of beyond-design-basis events affecting the SFP, the time available to initiate mitigative actions consistent with plant conditions, the time between the loss of both water and air cooling to the spent fuel, and the time before the onset of a postulated zirconium cladding fire, offsite REP plans (in accordance with 44 CFR Part 350) are not needed. Therefore, identification of the State and/or local officials responsible for detailed pre-planning for, and ordering appropriate protective actions, including evacuations when necessary, is no longer required.
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.~~
Staff's Evaluation: As part of the 2011 EP Final Rule, the NRC concluded that the staffing analysis requirement was not necessary for non-power reactor licensees because staffing at non-power reactors is generally small, which is commensurate with operating the facility in a manner that is protective of the public health and safety. The similarities with regard to staffing between PNPS and non-power reactors show that the PNPS facility should be treated in a similar fashion as a non-power reactor for purposes of EP. Therefore, a detailed staffing analysis is not needed for a decommissioning reactor.
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.
Staff's Evaluation: Considering the very low probability of beyond-design-basis events affecting the SFP, the time available to initiate mitigative actions consistent with plant conditions, the time between the loss of both water and air cooling to the spent fuel, and the time before the onset of a postulated zirconium cladding fire, offsite REP plans (in accordance with 44 CFR Part 350) are not needed. Therefore, a decommissioning reactor is not required to have EALs to determine protective measures offsite. With respect to EALs for hostile action, refer to basis for exemption from 10 CFR Part 50, Appendix E,

Table 1 **Evaluation of Specific Exemptions to Emergency Planning Requirements**
Section IV.1.
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 [Federal Emergency Management Agency]-REP-1.
Staff's Evaluation: For a permanently shutdown and defueled power reactor, containment pressure and emergency core cooling system are no longer required. Therefore, their parameters no longer provide an indication of a potential emergency. Other indications, such as SFP level, SFP temperature, and area radiation monitors indicate the conditions at PNPS. The licensee's analysis demonstrated that, as of 46 days after the permanent cessation of power operations, no credible events within the DBA would reach the dose criteria for the declaration of a Site Area Emergency or a General Emergency. As discussed previously, the probability of a beyond-DBA condition that could reach emergency classifications of a Site Area Emergency or a General Emergency is very low. In the unlikely event of a severe beyond-DBA resulting in the loss of all cooling to the stored fuel, as of 10 months after the permanent cessation of power operations, it would take 10 hours from the time the fuel is uncovered until it reaches a temperature of 900˚C. During this time, the licensee could initiate mitigative actions consistent with plant conditions. The need for offsite radiation monitoring systems in support of event classification above an Alert classification level is no longer required because of 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.
10 CFR Part 50, Appendix E, Section IV.C.2: ~~By June 20, 2012, nuclear power reactor~~ licensees 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

Table 1 **Evaluation of Specific Exemptions to Emergency Planning Requirements**
public health and safety.
Staff's Evaluation: In the 2011 EP Final Rule, non-power reactor licensees were not required to assess, classify, and declare an emergency condition within 15 minutes. An SFP and an ISFSI are also not nuclear power reactors as defined in the NRC's regulations. Like non-power reactors and ISFSIs, a decommissioning power reactor has a low likelihood of a credible accident resulting in radiological releases requiring offsite protective measures. For these reasons, the staff concludes that a decommissioning power reactor should not be required to assess, classify, and declare an emergency condition within 15 minutes.
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~~.
Staff's Evaluation: Refer to basis for exemption from 10 CFR 50.47(b) and 10 CFR 50.47(b)(10).
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.~~
Staff's Evaluation: Refer to basis for exemption from 10 CFR Part 50, Appendix E, Section IV.D.1.
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~~

Table 1 **Evaluation of Specific Exemptions to Emergency Planning Requirements**
~~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.~~
Staff's Evaluation: Entergy proposes in its exemption requests to complete emergency notifications to the Commonwealth of Massachusetts and the Town of Plymouth within 60 minutes after an emergency declaration or a change in classification. Although Entergy is a general licensed ISFSI and the emergency plan is based on 10 CFR Part 50, the staff also considered the requirements in 10 CFR 72.32(a) to ensure consistency between general and specific licensed ISFSIs. The 60-minute notification timeliness is consistent with the notification time requirements for emergency plans based on the requirements in 10 CFR 72.32. Information will be disseminated to the public and media in accordance with State and local plans. Also refer to basis for exemption from 10 CFR 50.47(b) and 10 CFR 50.47(b)(10).
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.~~
Staff's Evaluation: Refer to the basis for exemption from 10 CFR Part 50, Appendix E, Section IV.D.3 regarding the alert and notification system requirements.
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;
Staff's Evaluation: The Technical Support Center (TSC) is an area located close to the control room that shall provide plant management and technical support to the reactor operating personnel located in the control room during emergency conditions. It shall have technical data displays and plant records available to assist in the detailed analysis and diagnosis of abnormal plant conditions and any significant release of radioactivity to the environment. The TSC shall be the primary communications center for the plant during an emergency. With the permanently shutdown and defueled status of the PNPS

Table 1 **Evaluation of Specific Exemptions to Emergency Planning Requirements**
reactor and the storage of the spent nuclear fuel in the SFP and the ISFSI, a TSC and EOF will no longer be required to meet its original purpose during an emergency, nor to support initial SFP mitigation actions if needed. Also see the basis for 10 CFR 50.47(b)(3).
10 CFR Part 50, Appendix E, Section IV.E.8.a.(ii): ~~For nuclear power reactor licensees, a licensee onsite operational support center;~~
Staff's Evaluation: The Operations Support Center (OSC) is an onsite area separate from the control room and the TSC where licensee operations support personnel will assemble in an emergency. The OSC should provide a location where plant logistic support can be coordinated during an emergency and restrict control room access to those support personnel specifically requested by the shift supervisor. With the permanently shutdown and defueled status of the PNPS reactor and the storage of the spent nuclear fuel in the SFP and the ISFSI, an OSC will no longer be required to meet its original purpose during an emergency, nor to support initial SFP mitigation actions if needed.
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;~~
Staff's Evaluation: Refer to basis for exemption from 10 CFR 50.47(b)(3).

Table 1 **Evaluation of Specific Exemptions to Emergency Planning Requirements**
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~~
Staff's Evaluation: Refer to basis for exemption from 10 CFR 50.47(b)(3).
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.~~
Staff's Evaluation: Refer to basis for exemption from 10 CFR Part 50, Appendix E, Section IV.1 regarding "hostile action."
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;~~
Staff's Evaluation: Refer to basis for exemption from 10 CFR 50.47(b)(3).
10 CFR Part 50, Appendix E, Section IV.E.9.a: Provisions for communications with contiguous State/local governments ~~within the plume exposure pathway EPZ~~. Such communication shall be tested monthly.
Staff's Evaluation: PNPS will maintain communications with the Commonwealth of Massachusetts, the Town of Plymouth and the NRC. Refer to basis for exemption from 10 CFR 50.47(b) and 10 CFR 50.47(b)(10).

Table 1 **Evaluation of Specific Exemptions to Emergency Planning Requirements**
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.~~
Staff's Evaluation: Considering the very low probability of beyond-design-basis events affecting the SFP, the time available to initiate mitigative actions consistent with plant conditions, the time between the loss of both water and air cooling to the spent fuel, and the time before the onset of a postulated zirconium cladding fire, offsite REP plans (in accordance with 44 CFR Part 350) are not needed. 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, the requirements to perform annual testing is no longer required. Communications with State and local governments will be the commercial phone system. Due to its frequency of use, the testing of the system is not necessary.
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 emergency operations~~ facility. Such communications shall be tested monthly.
Staff's Evaluation: Based on the smaller facility staff and the greatly reduced required interaction with State and local emergency response facilities, the staff concludes that the functions of the control room, EOF, TSC, and the OSC may be combined into one or more locations. As discussed previously, there is no need for the TSC and EOF. As a result, communications between the EOF and TSC, and the NRC, and monthly testing of these capabilities are no longer needed. The Emergency Notification System used to communicate with the NRC will continue to be tested monthly.
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;

Table 1 **Evaluation of Specific Exemptions to Emergency Planning Requirements**
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~~.
Staff's Evaluation: Decommissioning power reactor sites typically have a level of emergency response that does not require additional response by the licensee's headquarters personnel. Therefore, the staff considers exempting licensee's headquarters personnel from training requirements to be reasonable. Due to the low probability of DBA or other credible events to exceed the EPA early phase PAGs, offsite emergency measures are limited to support provided by local police, fire departments, and ambulance and hospital services, as appropriate. Local news media personnel no longer need radiological orientation training since they will not be called upon to support the formal Joint Information Center. The term "Civil Defense" is no longer commonly used; references to this term in the examples provided in the regulation are, therefore, not needed.
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.
Staff's Evaluation: Refer to basis for exemption from 10 CFR Part 50, Appendix E, Section IV.D.1.
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.~~ [**F.2.a.(i), (ii), and (iii)** are not applicable.]
Staff's Evaluation: Considering the very low probability of beyond-design-basis events affecting the SFP, the time available to initiate mitigative actions consistent with plant conditions, the time between the loss of both water and air cooling to the spent fuel, and the time before the onset of a postulated zirconium cladding fire, offsite REP plans (in accordance with 44 CFR Part 350) are not needed. Therefore, the requirement to conduct a full participation exercise with State and local agencies is not required. The licensee would be exempt from 10 CFR Part 50, Appendix E, Paragraph IV.F.2.a.(i)-(iii) because the licensee would be exempt from the umbrella provision of 10 CFR Part 50, Appendix E, Section IV.F.2.a.

Table 1 **Evaluation of Specific Exemptions to Emergency Planning Requirements**
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, and 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.
Staff's Evaluation: Refer to basis for exemption from 10 CFR Part 50, Appendix E, Section IV.F.2.a.
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.~~
Staff's Evaluation: Refer to basis for exemption from 10 CFR Part 50, Appendix E, Section IV.F.2.a.

Table 1 **Evaluation of Specific Exemptions to Emergency Planning Requirements**
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.~~
Staff's Evaluation: Refer to basis for exemption from 10 CFR Part 50, Appendix E, Section IV.2.
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.
Staff's Evaluation: The licensee should provide the opportunity for any State and local Government agencies identified in the permanently defueled emergency plan to participate in licensee's drills and exercises upon request. Also see the basis for exemption from 10 CFR Part 50, Appendix E, Section IV.2.
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.~~
Staff's Evaluation: Considering the very low probability of beyond-design-basis events affecting the SFP, the time available to initiate mitigative actions consistent with plant conditions, the time between the loss of both water and air cooling to the spent fuel, and the time before the onset of a postulated zirconium cladding fire, offsite REP plans (in accordance with 44 CFR Part 350) are not needed. Therefore, the requirement to conduct a full participation exercise with State and local agencies is not needed. Since the staff previously concluded that full participation emergency plan exercises are not required, and FEMA does not have responsibilities related to onsite EP, NRC consultation with FEMA is not necessary.
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.
Staff's Evaluation: For decommissioning power reactor sites, there are limited events that could occur and, as such, the purpose of ensuring that responders do not get preconditioned to certain scenarios is not necessary to achieve the underlying

Table 1 **Evaluation of Specific Exemptions to Emergency Planning Requirements**
purpose of the rule. Considering the very low probability of beyond-design-basis events affecting the SFP, the time available to initiate mitigative actions consistent with plant conditions, the time between the loss of both water and air cooling to the spent fuel, and the time before the onset of a postulated zirconium cladding fire, offsite REP plans (in accordance with 44 CFR Part 350) are not needed. Therefore, drills involving principle functional areas associated with formal offsite REP are not needed.
10 CFR Part 50, Appendix E, Section IV.F.2.j: ~~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. 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. Additionally, in each eight 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: hostile action directed at the plant site, no radiological release or an unplanned minimal radiological release that does not require public protective actions, an initial classification of or rapid escalation to a Site Area Emergency or General Emergency, implementation of strategies, procedures, and guidance developed under § 50.54(hh)(2), and integration of offsite resources with onsite~~ justification~~. The licensee shall maintain a record of exercises conducted during each eight year exercise cycle that documents the content of scenarios used to comply with the requirements of this paragraph. Each licensee shall conduct a hostile action exercise for each of its sites no later than December 31, 2015. The first eight-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 Part 52, the first eight-year exercise cycle begins in the calendar year of the initial exercise required by Section IV.F.2.a.~~
Staff's Evaluation: For decommissioning power reactor sites, there are limited events that could occur and, as such, the purpose of ensuring that responders do not get preconditioned to certain scenarios is not necessary to achieve the underlying purpose of the rule. Considering the very low probability of beyond-design-basis events affecting the SFP, the time available to initiate mitigative actions consistent with plant conditions, the time between the loss of both water and air cooling to the spent fuel, and the time before the onset of a postulated zirconium cladding fire, offsite REP plans (in accordance with 44 CFR Part 350) are not needed. Therefore, drills involving principle functional areas associated with formal offsite REP are not needed.
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.~~
Staff's Evaluation: Refer to basis for exemption from 10 CFR Part 50, Appendix E, Section IV.E.8.d.