

NRC INSPECTION MANUAL

NRO/DSRA/SPSB

INSPECTION PROCEDURE 82002.08

INSPECTION OF SITE SPECIFIC IMPLEMENTATION OF 10 CFR 50.54(hh)(2) MITIGATING STRATEGIES FOR NUCLEAR POWER PLANTS REFERENCING THE AP1000 CERTIFIED DESIGN

Effective Date: 09/17/2018

PROGRAM APPLICABILITY: IMC 2504 Appendix B

82002.08-01 INSPECTION OBJECTIVES

This inspection is performed during the plant construction and startup phases, prior to fuel load, to verify the operational readiness of the licensee's loss of large areas (LOLA) mitigating strategies are in conformance with 10 CFR 50.54(hh)(2). Initiating events classified as LOLA are beyond the design basis for existing and proposed new nuclear power plants.

82002.08-02 INSPECTION REQUIREMENTS

The Commission endorsed NEI 06-12, "B.5.b Phase 2 & 3 Submittal Guideline," as an acceptable method for reactor licensees to comply with the mitigating strategies requirement. NEI 06-12 breaks down the LOLA mitigating strategies and descriptions into three phases.

Phase 1 focuses on the operational aspects of responding to explosions or fire, including items such as prearranging for the involvement of outside organizations, planning and preparation activities (e.g., pre-positioning equipment, personnel, and materials to be used for mitigating the event), and developing procedures and training for the event.

Phase 2 focuses on issues associated with mitigating an event involving the spent fuel pool (SFP).

Phase 3 focuses on methods to provide sources of alternative cooling water to critical systems as well as mitigating the impact of a radiological release.

All current licensees and applicants referencing the AP1000 certified design have used the guidance in NEI 06-12, Appendix D as a template for their combined license application. The Mitigating Strategy Table, which is part of NEI 06-12, Appendix D provides a list of the individual strategies for each phase that the applicant is expected to address in their submittal. This inspection procedure follows the outline of the Mitigating Strategy Table in Appendix D of NEI 06-12.

The following information should be requested from the licensee as appropriate to support the scope and focus of the planned inspection:

1. Copies of procedures/guidelines that were revised or generated to implement the mitigating strategies. These could be Extensive Damage Mitigating Guidelines (EDMGs), Severe Accident Management Guidelines (SAMGs), Emergency Operating Procedures (EOPs), Abnormal Operating Procedures, etc.
2. A matrix that shows the correlation between the mitigating strategies identified in NEI 06-12 and the site-specific procedures or guidelines that are used to implement the strategy.
3. Engineering evaluations/calculations that were used to verify engineering bases for the mitigating strategies.
4. Simplified flow diagrams for systems relied upon in the mitigating strategies. These diagrams could be the type used for training.
5. Simplified drawings/descriptions of modifications that were made to plant systems to implement the mitigating strategies.
6. Detailed drawings (e.g., piping and instrumentation drawings) of systems used to implement mitigating strategies.
7. Copies of procedures used to inventory equipment used in the mitigating strategies (e.g., hoses, fittings, pumps, etc.).
8. Training records/training matrix/lesson plans related to LOLA.
9. Copies of Memoranda of Understanding (MOUs) with local fire departments, other emergency services, or private organizations that are required to implement any mitigating strategies.
10. Copies of any evaluations performed to document that enough equipment is available to implement the mitigating strategies (e.g., enough fire hose or electrical cable is available based on a plant walk down or review of drawings).

82002.08-03 INSPECTION GUIDANCE

Review the Safety Evaluation Report (SER), site-specific application, and NEI 06-12 to identify the commitments that the licensee made to implement each mitigating strategy. Since the licensee made some of these commitments before it finalized procedures or equipment purchases, it is possible that the implementing details are different from those that the NRC reviewed and documented in the SER. This may be acceptable if the capability, intent, and function of the strategy, as outlined in NEI 06-12, are maintained. Through discussions with plant staff, review of documentation and plant walk downs where appropriate, verify that the strategies have been implemented by the licensee as stated in their application and documented in the SER. Below provides additional general guidance and definitions that apply to the inspection of all specific strategies.

1. Engineering basis for flow: Many strategies are intended to provide makeup or spray water at a specified flow rate for a specified period of time. NEI 06-12 states: "The site should have an engineering basis that provides reasonable assurance that the intended makeup rate and capacities can be provided. The basis should be auditable, but does not have to be a quality related calculation." The inspector should review the engineering bases for the strategies to verify that the intended makeup flow and capacities can be provided with the equipment specified in the strategy. Some factors that may affect the ability to provide the specified flow for the required period of time include the following:
 - (a) Pump design output performance (flow/pressure) characteristics.
 - (b) Line losses due to hose size, coupling size, and hose length.
 - (c) Head losses due to elevation changes, especially for spray strategies.
 - (d) Back pressure when injecting into closed/pressurized spaces (e.g., containment, steam generators).
 - (e) Capacity of the suction sources (condensate storage tank/refueling water storage tanks/circulating water basin/fire main/city water supply/lake/river, etc.) to provide an adequate supply (12 hours for many strategies) for the pumps (fire engines, portable pumps, Fire Protection System Pumps, etc.)
 - (f) Potential detrimental impact on water supply source or output pressure when using the same source or permanently installed pumps for both makeup and firefighting.
 - (g) Availability of sufficient supply of fuel onsite to operate diesel powered pumps for the required period of time, typically 12 hours.
 - (h) Availability of an adequate and reliable source of electrical power to operate electric powered pumps for the required period of time, typically 12 hours.
 - (i) Potential clogging of pumps, valves or hoses from debris or ice when using rivers, lakes, ocean, or cooling tower basins as a water supply.
2. Fire Protection System management strategies. The site Fire Protection System is relied upon for implementation of many of the SFP strategies and the Reactor/Containment strategies. The information provided in the mitigating strategies report discusses attributes of the site Fire Protection System including isolation of damaged portions of the system and prioritization of response actions. It also may describe pump capacities and sources of water that are necessary to support the SFP and Reactor/Containment strategies. This Fire Protection System information is intended to supplement the information provided for each of the strategies. For any strategy that relies on the Fire Protection System, the inspector should consider if the information provided in the specific strategy, or in any associated implementing procedures, adequately addresses considerations for sharing and balancing Fire Protection System resources.
3. Storing (i.e., staging) equipment: Portable equipment which is needed to implement many strategies is required to be stored in a location that would be presumed to survive a LOLA type event, generally at least 100 yards from target buildings. However, there are exceptions which are noted in the specific guidance for individual strategies. Some current licensees have opted to store equipment in multiple locations to increase survivability and reduce response time. Some strategies allow storing of portable equipment adjacent to where it will be used, as NEI 06-12 assumes that these areas will be accessible. The inspector should do a plant walk down to verify that portable equipment has been stored as stated in the strategy. The types of portable equipment can include the following:

- (a) Portable pumps
 - (b) Fire Engines
 - (c) Fire hoses and couplings
 - (d) Fire hose tie-offs or clamping devices
 - (e) Hose adaptors
 - (f) Spray or monitor nozzles
 - (g) Valve/hydrant tools
 - (h) Portable power supplies
 - (i) Cabling
 - (j) Tools needed to implement strategy
 - (k) Portable radios and chargers
 - (l) Dosimetry
4. Plant modifications: Some strategies may involve the installation of plant modifications. These modifications may include addition of adaptors to allow attachment of fire hoses and jumpers to facilitate connection to plant equipment. Inspectors should verify by review of plant documentation or plant walk downs that the modifications have been completed.
5. Implementing procedures and guidance: Most strategies require that licensees develop procedures or guidance. The inspector should review the appropriate documentation to verify that the licensee has developed appropriate procedures and guidance to implement these strategies. If a strategy relies on an existing procedure, verify that the licensee has evaluated the procedure for applicability to the potential conditions (e.g., Can it work in a potential loss of internal power distribution (LIPD) condition? Does it rely on equipment that may not be available?).
6. Training of personnel: Most strategies require that the licensee provide training to appropriate staff. The level of training is to be consistent with SAMG-type actions. The inspector should verify through discussions with licensee staff and review of training records that the licensee has provided training on the implementing procedures and guidance used for these strategies.
7. Feasibility of strategy: For a sample of strategies, the inspector should review with licensee representatives any engineering evaluations, testing, or training exercises performed by the licensees to demonstrate the feasibility of the strategy. The inspector should also verify by walk through of the proposed strategy with knowledgeable licensee staff that the strategy appears to be feasible. The walk through should include accessible areas of the plant and should evaluate whether the required plant equipment will be accessible given the potential conditions assumed for the strategy and that required portable equipment (e.g., pumps, hoses, adapters, ladders, jumpers, etc.) can be moved to the required location and placed in service. For strategies with time constraints, the inspector should also verify that the licensee has established a basis for the determination that the strategy can be implemented within the time allowed.
8. Compatibility of equipment: Many strategies require connecting portable equipment such as fire hoses or electrical devices that may not have been connected or tested in the configuration proposed for the strategy. They might also require connections between onsite and offsite (e.g., fire departments) equipment that have not been verified. The inspector should verify that the licensee has confirmed by engineering evaluation or a demonstration that hoses can be connected to each other and to pumps, adapters, and

fittings; that electrical cables, connectors, and jumpers are compatible; and, that fire hoses and nozzles can be attached to lifting devices and/or secured in place as needed for the strategy.

9. Loss of internal power distribution (LIPD): Many strategies assume a LIPD. For purposes of the LOLA reviews an LIPD means that no onsite or offsite AC or DC power is available from existing normal or emergency power systems. However, it is assumed that portable power supplies such as batteries or AC/DC power supplies may be available.
10. Maintenance and testing of equipment: Equipment required to implement these strategies must be maintained and periodically tested to ensure it will operate when called upon. Installed plant equipment (reactor core isolation cooling, auxiliary feedwater, fire protection systems, tanks, etc.) with established maintenance and testing requirements may not need additional requirements. However, if these systems are modified to accommodate the strategies (e.g., adding fire hose connections) then licensees are expected to confirm that existing maintenance and testing are adequate. Any new fire pumps, hoses, nozzles purchased for these strategies are also expected to be maintained and tested. NEI 06-12 states that "Equipment associated with (the external SFP spray strategies) will meet industry practices for procuring and maintaining commercial equipment." This is the the minimum requirement for any equipment required for the LOLA strategies. Other tools, adaptors, wrenches, jumpers, etc., that don't require maintenance or testing should, at a minimum, be stored in an accessible location and periodically inventoried to ensure that the equipment is available when needed. Although it is permissible for equipment to be taken out of service for routine maintenance activities, appropriate licensee personnel should be made aware when a lack of replacement parts, or other maintenance issues, cause LOLA equipment to be unavailable for extended periods of time and therefore not available to support the response strategies.

Table 1 - List of AP1000 Strategies

<u>Item Number</u>	<u>Strategy Phase and Title</u>
	<u>Phase 1 – Firefighting Response Strategy</u>
1	Staging of Fire Brigade Equipment
2	Dispersal of Fire Brigade Personnel
3	Airlifted Resources
4	Command and Control
5	Evaluating Capabilities of Offsite Resources
6 & 7	Evaluation of MOUs for Offsite Fire Fighting Resources
8	Coordination with Regional Resources
9	Controlling Emergency Response Vehicles and Dosimetry for Responders
10	Communications Enhancements for Firefighting Response
11	Mass Casualties – Provisions for Treatment of Casualties
12	Triage Areas
13	Firefighting Training and Exercises

14	Means for Supplying Water to the Fire Protection Ring Header
	<u>Phase 1 – Plant Operations to Mitigate Fuel Damage</u>
1	Dispersal of Personnel – Operations and Support Personnel
2	Communications Enhancements for Recovery Teams
3	Compartmentalization of Plant Areas to Minimize Fire Spread
4	Establishing Supplemental Response Capabilities
5	Establishing Supplemental Response Capabilities
6	Spent Fuel Pool Mitigating Strategies - Dispersal of Fuel
7	Training on Integrated Fire Response Strategy
	<u>Phase 1 – Actions to Minimize Releases</u>
1	Dose to Onsite Responders
	<u>Phase 2 – Spent Fuel Pool Strategies</u>
1	Diverse SFP Makeup Source (Internal Strategy)
2	SFP Makeup Capability (External Strategy)
3	SFP Spray Capability (External Strategy)
4	SFP Leakage Control Strategies
	<u>Phase 3 – Reactor and Containment Strategies</u>
1	Command and Control Offsite and Onsite Communications Notifications/ERO Activation Initial Operational Response Actions Initial Damage Assessment
2	Portable Sprays
3	Reactor Coolant System Makeup
4	Safety Injection
5	Decay Heat Removal
6	Containment Cooling
7	Containment Isolation

INSPECTION GUIDANCE – SPECIFIC GUIDANCE FOR EACH ITEM LISTED IN NEI 06-12, APPENDIX D, AND MITIGATING STRATEGY TABLE

Mitigating Strategy Table – Phase 1 – Firefighting Response Strategy

Item 1. Staging of Fire Brigade Equipment

The licensees should have staged appropriate fire brigade equipment (i.e., enough turnout gear, self-contained breathing apparatus, and radios to equip a typical 5-person fire brigade) in a location at least 100 yards from the target areas. If 100 yards was not achievable, a lesser distance is acceptable if that location is either hardened or there is an intervening structure or

equipment is stored at a number of diverse locations at the site providing sufficient assurance that equipment would be available to support fire brigade response.

- a. Verify that the licensee has staged appropriate fire brigade equipment (i.e., enough turnout gear, self-contained breathing apparatus, and radios to equip a typical 5-person fire brigade).
- b. Verify that the staging area is located at least 100 yards from target areas. If 100 yards is not achievable, verify that the location is either hardened or that there is an intervening structure or equipment is stored at a number of diverse locations at the site providing sufficient assurance that equipment would be available to support fire brigade response.

Item 2. Dispersal of Fire Brigade Personnel

The purpose of this strategy is to ensure the evacuation of members of the fire brigade from target buildings. For an aircraft imminent threat, licensees are expected to evacuate personnel from target buildings (for a ground threat, sheltering personnel may be a more viable strategy and is not intended to be addressed by these elements). Personnel need to be warned to move rapidly from most likely target buildings to buildings less likely to be a target. Generically, sheltering in place is not an acceptable solution. If the licensee has a valid reason and can justify a safe shelter area in a target building, then shelter in place may be an appropriate action if evacuation from target buildings is not feasible. Some current licensees have committed to "maximizing survivability" by dispersing operations and fire brigade members to locations that are sufficiently distant from each other (i.e., opposite ends of the turbine building, opposite sides of the containment structure), however are still located in target buildings. This approach is acceptable provided that dispersing personnel outside of the target areas was not achievable.

- a. Verify that firefighting personnel are dispersed.
- b. Verify that this dispersal is proceduralized.
- c. Verify that dispersal location is at least 100 yards or is sufficiently protected from the target area. This location could be an area that has pre-staged firefighting equipment (turnout gear, self-contained breathing apparatus, and radios) as identified in element 1 above.
- d. Verify that fire brigade members do not report to a location in target buildings to gather equipment before reporting to the designated dispersal area.

Item 3. Airlifted Resources

The purpose of this strategy is to identify possible nearby equipment that could be airlifted to mitigate a LOLA event within a specific timeframe. Licensees are expected to look for airlifted resources using a 2 hour total response criteria (2 hours from door to door). Resources may be acquired via existing mutual aid agreements so long as the licensee is aware of what resources are available via this system and how those resources are activated. Airlifted resources may include helicopter/fixed-wing transport for personnel/equipment, securing airfields for takeoff/landing, and helicopter water drop capability. Also, there is an expectation that licensees evaluate the use of airlifted resources and document these resources, if any, in their mitigating strategy documents. Where possible, MOUs should be established; however, when an MOU is not possible, a verbal agreement as a minimum should be documented in site procedures.

- a. Verify that the licensee has looked for airlifted resources using a 2-hour total response criterion (2 hours from door to door).
- b. Verify that the licensee has evaluated the use of these resources and documented them in their mitigating strategy documents.

Item 4. Command and Control

This expectation ensures that protocols for command and control for an event that is of the magnitude of a LOLA event will be covered in procedures, and those procedures will include protocols for interface with offsite responders. Licensees are expected to maintain command and control authority for onsite firefighting actions to ensure that firefighting priorities, as defined by operations, are communicated to the incident commander. It is expected that plant staff will have a means for providing immediate technical assistance (i.e., a licensed operator) to the incident commander. In cases where state law prevents the licensee from being in charge of the onsite firefighting actions, the licensee should have a means to ensure that the firefighting priority is to support plant recovery efforts.

- a. Verify that the command and control protocols are proceduralized.
- b. Verify that the licensee maintains overall command authority at all times.
- c. Verify that onsite and offsite response strategies are factored into the command and control protocol.
- d. Verify that the licensee provides technical assistance to the incident commander.

Item 5. Evaluating Capabilities of Offsite Resources

The purpose of this strategy is to identify outside organizations that may have the required knowledge skills and abilities that could be brought to the site to mitigate a LOLA event. The NRC expectation is that the capabilities of mutual aid or other local/regional resources that could be available to respond to the plant, including what equipment might be brought to bear during an event, will be evaluated. Specialized capabilities include but are not limited to debris removal equipment (e.g., bulldozers, large cranes, etc.), specialized firefighting equipment (e.g., low-expansion foam, etc.), and hazmat response equipment. These capabilities should be described in site procedures.

- a. Verify that the licensee has evaluated the capabilities of mutual aid or other local/regional resources that could be available to respond to the plant, including what equipment might be brought to bear during an event.
- b. Verify that the off-site resources provide response enhancements and that the specialized capabilities were identified.
- c. Verify that the licensee has documented these capabilities in site strategies/procedures.

Items 6 and 7. Evaluation of MOUs for Offsite Fire Fighting Resources

The purpose of these expectations is to re-evaluate the capabilities of local firefighting assets in light of the nature of a LOLA event, and to have mutual aid agreements in place to limit any delays in receiving aid. The establishment of MOUs or other agreements which have limited cost impact with mutual aid organizations that are within reasonable distance to the site should specifically address the roles and responsibilities of the responders. Desired capabilities

include: (1) high volume solution, typically 3% alcohol-resistant aqueous film-forming foam (AFFF) (1000 gallons minimum preferable); (2) transportable skid mounted fire water pumping system, greater than 2000 gpm; (3) trailer mounted monitor nozzle-1000-6000 gpm, and hoses and nozzles; (4) ventilation equipment; (5) communications equipment to provide for activation of mutual aid resources and for firefighting teams; (6) transportable extinguishing systems; (7) self-contained breathing apparatus equipment with refill capability; (8) reflective suits for entry into areas with pooled liquids; (9) emergency lighting; and (10) personnel protection equipment; and (11) appropriate adapters for hoses and firefighting equipment to ensure compatibility with installed plant equipment.

- a. Verify that the licensee has evaluated existing MOUs and revised them or created new ones as necessary
- b. Verify that exceptions to listed equipment (items 1-11) were identified
- c. Verify that roles and responsibilities are addressed in MOUs or that the licensee used an equivalent approach.

Item 8. Coordination with Regional Resources

The purpose of this expectation is to identify and assess the role of other regional ground based resources that would be part of a fully preplanned mobilization effort. The expectation is that there will be a 2 hour total response criterion (2 hours from door to door) for ground based resources. Resources may be acquired via mutual aid agreements, including county or state emergency response arrangements, so long as there is an awareness of what resources are available via this system and how those resources are activated. A well planned response will include coordination with municipal fire departments, nearby industrial facilities, nearby airports and military bases to augment existing plant and local resources. Licensees are expected to evaluate the availability and use of these resources and document these resources, if any, in their mitigating strategy documents. Licensees should consider using offsite facilities to pre-position firefighting assets if the on-site staging areas are not adequate.

- a. Verify that the licensee has looked for ground-based regional resources using a 2-hour total response criterion (2 hours from door to door).
- b. Verify that the licensee has established MOUs where possible, however, when an MOU was not possible, a verbal agreement also yields confidence that resources would be available to respond when called upon and is acceptable.
- c. Verify that the licensee has evaluated the availability and use of these resources and documented these resources, if any, in their mitigating strategy documents.

Item 9. Controlling Emergency Response Vehicles and Dosimetry for Responders

The purpose of this strategy is to ensure the site can accommodate a large number of resources responding from off-site, including local law enforcement, firefighting and specialized equipment. Staging areas should be established and documented in procedures for large numbers of responding vehicles. Provisions should be made with local law enforcement agencies (LLEA) to ensure that responding vehicles (e.g., firefighting, plant personnel, etc.) are not restricted at roadblocks and prevented from accessing the site. Those provisions should be documented in plant security procedures. General site familiarization (overall layout of site, access points, staging areas, etc.) should be provided to LLEA personnel. Sufficient dosimetry should be staged and available for initial arriving offsite response personnel. This dosimetry

should be staged in a location at least 100 yards from target areas. The appropriate number of dosimetry is expected to be performance-based. An estimate should be made of the number of responders (those who do not normally carry dosimetry with them) that are expected onsite during the initial stages of a LOLA event. There should be enough dosimetry provided for those individuals. It is expected that licensees could acquire/relocate additional dosimetry for longer-term arriving assets.

- a. Verify that the licensee has established and documented in procedures staging areas for large numbers of responding vehicles.
- b. Verify that the licensee has made provisions with the LLEA to ensure that responding vehicles (firefighting, plant personnel, etc.) are not restricted at roadblocks and prevented from accessing the site. Those provisions should be documented in plant security procedures.
- c. Verify that the licensee has provided general site familiarization (overall layout of site, access points, staging areas, etc.) to LLEA personnel.
- d. Verify that the licensee has sufficient dosimetry staged and available for initial arriving offsite response personnel. This dosimetry should be staged in a location at least 100 yards from target areas. The appropriate number of dosimetry is expected to be performance-based.

Item 10. Communications Enhancements for Firefighting Response

The purpose of this strategy is to ensure radios used for the firefighting response are available in appropriate numbers, function without interoperability issues, and that plant response personnel are provided with pagers or equivalent to receive dispatch notices both on and off shift. The expectation is that the issue of interoperability of radios will be addressed by either pairing site personnel holding site radios with offsite responders or having radios that are interoperable by nature. The appropriate number of radios should be performance-based, predicated on an evaluation of the number of radios needed to support firefighting responders expected to be involved during a LOLA event and the method they use to distribute these radios. That number of radios (with associated batteries and chargers) is to be provided in a location at least 100 yards from target areas.

- a. Verify that the licensee has addressed the issue of interoperability of radios
- b. Verify that the appropriate number of radios with associated batteries and chargers are located at least 100 yards from target areas.
- c. Verify that plant response personnel are provided with pagers or equivalent.

Item 11. Mass Casualties – Provisions for Treatment of Casualties

The expectation for this element is that the handling of a mass casualty situation (an event beyond the typical contaminated injured individual medical emergency) will be addressed in site procedures. Use of county or state mass casualty plans is acceptable, so long as the site plans reference the framework of those offsite procedures. If a state or county mass casualty plan is not utilized, then there must be assurance that the existing medical mutual aid/MOU response framework can deliver adequate medical capabilities. Additional regional medical resources may need to be sought. The NRC staff does not expect licensees to have the medical expertise

or equipment onsite to treat casualties; rather, licensees need only to provide for their care until offsite expertise and equipment arrives.

- a. Verify that the licensee has addressed the handling of a mass casualty situation in site procedures.

Item 12. Triage Areas

The purpose of this expectation is to identify a location or locations to be used for onsite triage for a large number of potential casualties that could result from a LOLA event. An acceptable location would be an area at least 100 yards from target areas. The area could be indoors or outdoors (although indoors is preferred due to weather uncertainty), as long as there is sufficient area to hold a large number of injured individuals (approximately 30 to 50).

- a. Verify that the licensee has documented in a plant procedure or guidance document an assembly area for triage.
- b. Verify that the documented location is at least 100 yards from target areas. Multiple triage areas are acceptable if the licensee wants to decide which to use during the event due to radiological conditions as long as these areas and the decision process detailing which to use is captured in procedures or guidance documents.

It is acceptable for the licensee to note in their procedure or guidance document that although preplanned triage areas are defined in the plant documents, the incident commander may choose to locate the triage area at a previously undefined location. This is the prerogative of the incident commander. In this case, the licensee's preplanned areas provide options to the incident commander.

Item 13. Firefighting Training and Exercises

The staff's expectation is that firefighting training on accelerant-fed fire will be provided to onsite fire brigade members. In addition, the staff expects fire brigade training to address the coordinated fire response between onsite and offsite fire responders (including interface with operations). The staff expects that site familiarization training will be provided to local offsite responders and, if possible, information about LOLA event related mitigating strategies and measures will be shared with offsite responders. The final expectation is that an exercise or tabletop will be conducted prior to initial fuel load. The site exercise should involve, at a minimum, MOU firefighting responders, site fire brigade, and operations staff to enhance the understanding of the coordinated response strategies for a LOLA event. The tabletop exercise can be held onsite or offsite.

- a. Verify that the licensee has provided firefighting training on accelerant-fed fire to onsite fire brigade members.
- b. Verify that fire brigade training addresses the coordinated fire response between onsite and offsite fire responders (including interface with operations).
- c. Verify that the licensee provides site familiarization training to local offsite responders and, if possible uses this as an opportunity to share information with offsite responders about LOLA related mitigating strategies and measures.

- d. Verify that the licensee has conducted an exercise or tabletop involving, at a minimum, MOU fire responders, site fire brigade, and operations staff to enhance the understanding of the coordinated response strategies for a LOLA event.

Item 14. Means for Supplying Water to the Fire Protection Ring Header

The NRC expects that a means to feed the fire protection water supply mains located underground (also called a ring header) using alternate water supplies (e.g., lake, river, cooling tower basin, available water tanks, etc.) with either appropriately staged onsite equipment or arriving offsite equipment will be developed and implemented. This means should be either documented in site procedures or demonstrated by the appropriate fire responders.

- a. Verify that the licensee has developed a means to feed the fire protection ring header using alternate water supplies with either appropriately staged onsite equipment or arriving offsite equipment. This should either be documented in site procedures or have been demonstrated by the appropriate fire responders.

Mitigating Strategy Table - Phase 1 - Plant Operations to Mitigate Fuel Damage

Item 1. Dispersal of Personnel – Operations and Support Personnel

The NRC expectation is that operations and support staff members are dispersed from target buildings to locations approximately 100 yards away. The NRC recognizes that technical specifications require a minimum number of operators in the control room. Any operators not required to be in the control room to implement imminent threat procedures should be dispersed to safe locations. This expectation also ensures that the licensee has an efficient process for bringing off-shift personnel to the site to assist in firefighting and mitigating fuel damage as well as for bringing personnel with expertise from other sites to assist.

- a. Verify that the licensee has implemented guidance that meets the NRC expectation that operations and support staff members be dispersed away from target buildings at least 100 yards. The NRC recognizes that a minimum number of operators is required in the control room. Any operators not required to be in the control room to implement imminent threat procedures should be dispersed to safe locations.

Item 2. Communications Equipment for Recovery Teams

The purpose of this expectation is to ensure that a sufficiently robust communication infrastructure exists to facilitate communications between on-site recovery teams following a LOLA event. The appropriate number of radios should be performance-based, predicated on a licensee's evaluation of the number of radios needed to support operational recovery teams expected to be involved during a LOLA event. That number of radios (with associated batteries and chargers) is to be provided in a location at least 100 yards from target areas. Licensees are expected to have an established communications scheme, using multiple radio channels, to minimize crosstalk and confusion during an event. Radios for firefighting and recovery teams should not be the same radios. They may be stored in the same location; however, these radios may all need to be in service simultaneously and cannot be shared. Credit should be given to licensee mitigating strategies that provide for augmentation of radios from offsite resources.

- a. Verify that the licensee has provided that number of radios (with associated batteries and chargers) in a location at least 100 yards from target areas.

- b. Verify that the licensee has established a communications scheme, using multiple radio channels, to minimize crosstalk and confusion during an event.
- c. Verify that radios for firefighting response and recovery teams are not the same radios. They may be stored in the same location; however, these radios may all need to be in service simultaneously and cannot be shared.

Item 3. Compartmentalization of Plant Areas to Minimize Fire Spread:

It is expected that an analysis or walk down of target areas will be performed with a LOLA event in mind and that the results will be documented. The primary consideration during this walk down is accelerant fluid flow. Any feasible compartmentalization enhancements should be implemented so long as they do not impact other barrier programs (e.g., high energy line break, fire protection). Some examples of enhancements may include sealing of floor plugs, expedited closure of floor plugs, enhanced fire door closing mechanisms, flood berms, and closing of tornado hatches. Enhancements may also be incorporated by design and this should be considered by applicants.

- a. Verify that an evaluation was performed (e.g., analysis, plant walk down, etc.)
- b. Verify that compartmentalization enhancements have been implemented, if identified by evaluation.
- c. Verify that NRC inspectors have not identified opportunities for further enhancements.

Item 4. Establishing Supplemental Response Capabilities:

The expectation of the licensees is to establish supplemental methods for responding to events. This expectation is to consider alternate sources of water should the ultimate heat sink (UHS) become unavailable.

- a. Verify that the licensee has identified alternative supplies to provide water to the UHS.

Item 5. Establishing Supplemental Response Capabilities:

This expectation is to determine an alternate method for cooling the **Normal Residual Heat Removal (RNS)** heat exchanger upon loss of normal **component** cooling water.

- a. Verify that the licensee has identified alternative water supplies **to supply the RNS heat exchanger.**

Item 6. Spent Fuel Pool Mitigating Measures

1. Dispersal of Fuel:

Licensees are expected to put spent fuel in a 1 x 4 repeating pattern or equivalent, unless otherwise proven to be not applicable or achievable. Holders of a license to operate a new nuclear power reactor facility are expected to pre-configure the SFP to enable direct placement of the expended assemblies from the vessel to the final distributed fuel pattern. The NRC staff has accepted alternate strategies for the timing to achieve the appropriate pattern at facilities currently operating. This was done in consideration of the feasibility and practicality of such an operation in a pool filled with many cycles of spent fuel, and possibly containing fuel storage racks with different designs. Such timing considerations are not considered necessary for newly designed spent fuel storage facilities.

Licensees who choose to conform to the NRC-approved resolution (NRC letter dated March 16, 2006 (ML060690339)) are expected to include the following concept in procedures: "Where feasible and practical, consistent with safe fuel handling practices, the licensee should make every attempt to pre-configure the spent fuel pool to enable direct placement of the expended assemblies from the vessel to the final distributed fuel pattern. Where this is not feasible or practical, licensees should distribute the fuel into the final pattern as soon as possible but no later than 60 days after sub-criticality."

The NRC considers that fuel dispersal exists when permanently discharged fuel is arranged in the defined 1 X 4 pattern, i.e., one recently discharged fuel assembly surrounded by four non-recently discharged assemblies on each face and without recently discharged assemblies at the corners. Permanently discharged fuel being in its final dispersed location, but arranged adjacent to recently discharged fuel to be reloaded into the reactor does not constitute dispersal.

- a. Verify that procedures exist that require the licensee to distribute spent fuel in a coolable geometry within 60 days of sub criticality.

Item 7. Training on Integrated Fire Response Strategy.

It is the staff's expectation that training (preferably classroom training) has been incorporated into the licensee's initial licensed operator training program as well as their licensed operator requalification program. NRC staff considers training frequency on LOLA procedures and strategies to be acceptable if it is the same as, or more frequent than, SAMG training. In addition to operators (licensed and non-licensed), licensees are expected to train the appropriate emergency response organization (ERO) personnel, as determined by a training needs analysis. For an event of a LOLA magnitude, training and preplanning are paramount to effective event response. The personnel involved in implementing and supporting LOLA mitigating strategies need to understand and appreciate the scale and consequences of this event. In addition, they need to be able to have advanced knowledge of the unique and challenging strategies that may need to be implemented.

- a. Verify that the licensee developed training material for mitigating strategies involving preventing fuel damage.
- b. Verify that training on mitigating strategies was incorporated into Licensed Operator Initial and Licensed Operator Requalification Programs.
- c. Verify that the Systematic Approach to Training (SAT) is used.
- d. Verify that the frequency of training is appropriate
- e. Verify that appropriate plant staff are trained-Operations and ERO.

Mitigating Strategy Table - Phase 1 - Actions to Minimize Releases

Item 3. Dose to Onsite Responders.

The expectation is for the licensees is to evaluate existing dose projection models for their adequacy in projecting doses to event responders onsite under the conditions envisioned for this event.

- a. Verify that the licensee has estimated the on-site doses to emergency responder as a result of a LOLA style event.

Mitigating Strategy Table - Phase 2 Spent Fuel Pool Strategies

Item 1. Diverse SFP Makeup Source (Internal Strategy)

The purpose of this strategy is to establish a diverse means of SFP makeup with at least a concurrent makeup capability of 500 gpm beyond the normal SFP makeup capability. The concurrent SFP makeup capability of 500 gpm is the total flow rate of water that can be simultaneously supplied to the pool beyond the normal SFP makeup capability. This total concurrent makeup capability can be accomplished with multiple systems beyond the normal makeup system, but all must be diverse from the normal makeup system. The term “diverse” means that the makeup source does not rely upon any of the same components or piping as the normal makeup source. This includes power supplies that are located in the same building as the SFP.

- a. Verify that an engineering basis has been established which provides reasonable assurance that the intended 500 gpm makeup beyond the normal makeup capability can be provided.
- b. Verify that the capacities of the water supplies are as stated in the strategy. The total concurrent makeup capability can be accomplished with multiple systems, but all must be diverse from the normal makeup system.
- c. Verify that the proposed strategy is diverse and does not rely upon any of the same components or piping as the normal makeup system and that the strategy does not rely on any power supplies in the same building as the SFP.
- d. Verify that the strategy is feasible and can be accomplished with the plant conditions that may exist. There is no specific time limit for implementing this strategy (unlike the SFP external strategies). For the purposes of this strategy it is acceptable to use makeup connections that would require access to areas around the spent fuel pool, including the SFP deck area.
- e. Verify through a walk down of accessible areas of the plant that any equipment required to implement this strategy has been identified and stored in the location specified in the strategy. If flexible hoses are relied upon then some means to secure the hoses is required to ensure that the water is delivered into the SFP, e.g., tie-downs, clamps, or unmanned nozzles.
- f. Verify that the specified equipment connection devices and fittings are compatible with plant fittings.
- g. Verify that guidance for implementing this strategy has been incorporated into plant procedures or guidelines. Steps may be general in nature, consistent with the need for flexibility in deployment.
- h. Verify that training has been provided on implementing procedures/guidance. The level of training is expected to be consistent with SAMG-type actions and consistent with utility commitments made under LOLA Phase 1.

Flexible, Power-Independent Makeup Source (External Strategy)

This process is broken into two different strategies. The first strategy is an injection source similar as the internal makeup source except the makeup system is staged externally and contains its own portable power source. The second strategy is a spray system to be used in the case when pool level cannot be maintained. Each of these strategies is discussed below.

Item 2. SFP Makeup Capability (External Strategy)

Establish a flexible means of SFP makeup of at least 500 gpm using a portable, power independent pumping capability (e.g., a pumper truck or a portable pump.). This flow rate is required to the SFP of a single unit site, to the shared SFP of a dual unit site, or to either SFP (but not both simultaneously) of a dual unit site with separate SFPs.

- a. Verify that an engineering basis has been established which provides reasonable assurance that a flow rate of 500 gpm can be maintained to the SFP for 12 hours using the equipment specified for the strategy.
- b. Verify that the strategy is capable of being deployed within 2 hours from the time it is determined external SFP makeup is required.
- c. Verify that the strategy uses an independent pumper truck or portable pump and does not rely upon any installed piping (such as fire protection system standpipes) or power supplies in the SFP building. However, the strategy may use portions of the fire protection system external to the SFP building as a source of water for the portable pump. Some plants may initially utilize the external fire header and hoses to immediately supply water to the SFP because it could be implemented more quickly. However, an independent pumper truck or portable pump is still required to be available for this strategy.
- d. Verify that some reliable method to pressurize the fire protection header is available (where the fire protection header is relied upon to implement this strategy). This could be the installed diesel powered fire pump, independent electrical power sources for electrically powered fire pumps, use of fire protection system from another unit or from offsite sources such as municipal/city/county fire mains. The pump used to charge the fire header should be located approximately 100 yards from the target area, or if not, then it should be protected by intervening structure(s) or located in a reinforced concrete structure to justify pump survivability. In all cases the supply should be capable of supplying the required flow with the conditions assumed for this strategy.
- e. Verify that the water source for this strategy is sufficient to provide the anticipated flow for at least 12 hours (500 gpm for 12 hours requires 360,000 gallons).
- f. Verify that a 12-hour supply of fuel is stored onsite for the diesel (or gasoline) powered portable pump, if used, or that jumper cables are available if an electric powered portable pump is used. If the portable pump is AC powered using jumper cables from an on-site emergency power source, verify the emergency power source is spatially separated from the vicinity of the SFP.
- g. Verify that if portions of the external fire protection system ring header are relied upon to implement this strategy, the procedure or guideline requires that connections to the ring header be approximately 100 yards from the SFP and should address methods to isolate potentially damaged headers.

- h. Verify (by plant walk downs) that the portable pump and other equipment required to implement this strategy are stored onsite more than 100 yards away from the SFP.
- i. Verify that sufficient length of hose (or multiple hoses) is available to allow makeup from a source more than 100 yards from the damage area, via each accessible side of the structure containing the SFP.
- j. Verify a means to secure the hoses (e.g., tie downs or unmanned nozzles) will be available at, or near, the SFP to ensure the hose directs the water into the SFP. Connecting devices, hoses, nozzles and tie-downs that will be used in the vicinity of the SFP can be stored on the spent fuel pool deck or in adjacent stairwells.
- k. Verify that the specified equipment connection devices and fittings are compatible with plant fittings.
- l. Verify that guidance for implementing this strategy has been incorporated into plant procedures or documents. The implementing guidance for this strategy must include steps to assist the licensee staff in determining whether use of the external makeup strategy or external spray strategy is appropriate.
- m. Verify training has been provided on implementing procedures/guidance. The level of training is expected to be consistent with SAMG-type actions.

Item 3. SFP Spray Capability (External Strategy)

The purpose of this strategy is to establish a flexible means of providing spray to the SFP using a portable, power-independent pumping capability. The external makeup source requires a flexible means of SFP makeup of at least 200 gpm using a portable, power independent pumping capability for a single Unit and 400 gpm for dual Unit spent fuel pools. This makeup source is required to provide spray within 2 hours if the spent fuel is in an undispersed configuration. If the spent fuel is in a dispersed configuration, then a 5 hour deployment of the spray system is required. This makeup source could use the same pumping system used for the injection function, since the injection and spray will not be performed concurrently.

- a. Verify that an engineering basis has been established which provides reasonable assurance that the required minimum effective spray flow rate (200 gpm or 400 gpm) can be provided to the SFP for 12 hours using the equipment specified for the strategy. The licensee should perform a site specific assessment of the number of spray nozzles and their locations in order to assure that the required minimum spray flow rate is reaching the SFP and that the entire SFP is sprayed. Since some spray may not enter the SFP, the nozzle flow rate may have to be much larger than the minimum effective spray rate.
- b. Verify that the strategy is capable of being deployed within the time limit (2 hours or 5 hours) specified in the SER. When fuel is stored in the undispersed configuration the strategy should be capable of being deployed within 2 hours from the time licensee staff diagnose that external SFP spray required. Once the fuel is dispersed, (as defined in the SER review criteria) then the system should be capable of being deployed within 5 hours from the time licensee staff diagnose that external SFP spray is required. Fuel may be permanently stored in an undispersed configuration or the fuel may be temporarily stored in the undispersed configuration, such as during refueling. During

these periods deployment within 2 hours is required. However, if the fuel is subsequently placed in a dispersed configuration, deployment time for this strategy can be changed to 5 hours.

- c. Verify that the strategy uses an independent pumper truck or portable pump and does not rely upon any installed piping (such as fire protection system standpipes) or power supplies in the SFP building. However, the strategy may use portions of the fire protection system external to the SFP building as a source of water for the portable pump. Some plants may initially utilize the external fire header and hoses to immediately supply water to the SFP because it could be implemented more quickly. However, an independent pumper truck or portable pump is still required to be available for this strategy.
- d. Verify that some reliable method to pressurize the fire protection header is available (where the fire protection header is relied upon to implement this strategy). This could be the installed diesel powered fire pump, independent electrical power sources for electrically powered fire pumps, use of fire protection system from another unit or from offsite sources such as municipal/city/county fire mains. The pump used to charge the fire header should be located approximately 100 yards from the target area, or if not, then it should be protected by intervening structure(s) or located in a reinforced concrete structure to justify pump survivability. In all cases the supply should be capable of supplying the required flow with the conditions assumed for this strategy.
- e. Verify that if portions of the external fire protection system ring header are relied upon to implement this strategy, the procedure or guidance requires that connections to the ring header be approximately 100 yards from the SFP to assure survivability. In addition, the fire management strategy should address methods to isolate potentially damaged headers.
- f. Verify that a 12-hour supply of fuel is stored onsite for the diesel (or gasoline) powered portable pump, if used, or that jumper cables are available if an electric powered portable pump is used. If the portable pump is AC powered using jumper cables from an on-site emergency power source, verify the emergency power source is spatially separated from the vicinity of the SFP.
- g. Verify that sufficient hose is available to spray the SFP from a supply source more than 100 yards from the damage area, on to each accessible side of the structure containing the SFP.
- h. Verify that necessary hoses and monitor nozzles are stored on-site in an area approximately 100 yards or more away from the SFP in order to assure survivability and availability for the spray function. The licensee may elect to store additional hoses or nozzles adjacent to the SFP for use in the event that conditions permit personnel to enter the area. However, additional hoses and nozzles must be staged away from the SFP in the event conditions do not permit personnel to approach the SFP.
- i. Verify that the specified equipment connection devices and fittings are compatible with plant fittings.
- j. Verify that the water source for the pumper truck or portable pump is sufficient to operate the system at the required flow rate for 12 hours. The water source to the pumper truck

or portable pump may be the external fire protection system ring header. The connection to the ring header should be at least 100 yards away from the SFP in order to assure survivability.

- k. Verify that licensees have implemented additional spray strategies for plants where the fuel is stored within totally reinforced concrete enclosures and the top of active fuel is above grade. For plants with sheet metal siding above the spent fuel deck, it is assumed that the event itself will create the opening. For plants that have reinforced concrete walls and roof surrounding the SFP, the licensee was required to identify additional strategies to ensure that an adequate spray could be provided to the SFP. These additional strategies could include: direct dispersal of the fuel during refueling outages; use of aerial spray platforms; staging of hoses and spray nozzles; spray through blowout panels, doors, or building vents; spray from the SFP deck, and providing enhanced air cooling. These strategies were identified in the licensee's submittal(s) and the SER.
- l. Verify for plants where the SFP is surrounded by reinforced concrete and the top of active fuel is above grade that the licensee has plans for immediate actions that will be taken to pre-stage equipment near the SFP deck to maximize the probability of spray strategy deployment.
- m. Verify that the licensee has reached agreement, e.g., via a memorandum of understanding (MOU) or a letter of agreement (LOA) with off-site agencies to provide any necessary resources to implement this strategy. These could include agreement to provide lifting capability (e.g., crane or fire truck with an extension ladder) to elevate the monitor or spray nozzles to allow spraying into the spent fuel pool and/or pumping capacity to charge the fire header or provide spray into the spent fuel pool.
- n. Verify that guidance for implementing this strategy has been incorporated into plant procedures or documents. The implementing guidance for this strategy shall include steps to assist the licensee staff in determining whether use of the external makeup strategy or external spray strategy is appropriate. The implementing guidance for this strategy should also identify that spray flows to the SFP should be maximized in the event damage occurs prior to the recently discharged fuel being dispersed. The 200 gpm effective spray to the pool is the minimum required for this strategy. Licensees should attempt to maximize spray flow above this minimum using readily available means, to the extent practical, when recently discharged fuel is not dispersed.
- o. Verify that training has been provided on implementing procedures/guidance. The level of training is expected to be consistent with SAMG-type actions and consistent with utility commitments made under LOLA Phase 1.

Item 4. SFP Leakage Control Strategies

The purpose of this strategy is to identify for the ERO the on-site resources that could be used to reduce or stop leakage from a damaged spent fuel pool.

- a. Verify that procedures and guidance include the types and locations of materials available onsite which could be used to reduce SFP leakage rates. However, it is not necessary to maintain a minimum inventory of leakage control capabilities at all times. Likewise there is no requirement to store these materials at a specific distance from the potential damage area.

Mitigating Strategy Table - Phase 3 Reactor and Containment Strategies

Item 1. Command and Control

Off-site and On-site Communications. The objective is to improve the initial response of the available operational resources and enhance the capability for those resources to communicate with off-site resources.

- a. Verify that the licensee has the ability for onsite/offsite communications with the “normal” means lost. The response for this strategy provided a description of the diverse communication resources that existed or that would be added. The inspector should select a sample of these listed resources and verify that they are in place and are being maintained. This could include verifying that emergency radios are available, batteries are charged, and that staff knows how to operate them.
- b. Verify that onsite communications will be available during LIPD conditions in all areas of the plant (e.g., portable radios may not be effective when communicating within the Reactor Building or Containment due to building construction).
- c. Verify that the approach for mustering (assembling) the available plant (staff) resources in the event the control room/staff are substantially affected has been incorporated into plant procedures and communicated to licensee staff.
- d. Verify that the licensee has established plans for reestablishing communications immediately following an LOLA event. For single or common control room sites, the description should provide additional detail regarding who would assume immediate responsibility for communications.
- e. Verify that the licensee has established plans for how operations and security personnel will coordinate activities immediately following an LOLA event.
- f. Verify that training has been performed to implement these plans.

Notifications/ERO Activation. The potential damage to the command and control structure makes early notification of the utility ERO and ERO callout of great importance. This strategy is intended to provide an enhanced level of assurance that the proper notifications of the utility ERO occur and the ERO callout is initiated in a timely manner, despite the potential condition.

- a. Verify that the licensee has established plans or a process for establishing the command and control structure prior to the arrival of offsite resources.
- b. Verify that the licensee has established a procedure/guidance and developed training for making the appropriate offsite notifications of the ERO and ERO callout in the event the control room/staff are substantially affected. For single or common control room sites the description should provide additional details regarding who (i.e., security personnel, a fire brigade, operations) would implement the offsite notification method.
- c. Verify that training has been performed to implement this strategy.

Initial Operational Response Actions. Early actions to assure core cooling can minimize the potential for core damage or can assist in significantly delaying damage time lines. Given the potentially limited on-site resources, it is important to focus on the key actions that may be able to prevent or delay a release as well as be reasonably accomplished in adverse conditions.

- a. Verify that a procedure/guidance has been developed which describes the specific entry conditions (e.g., total loss of power, loss of control room, and large area loss in plant due to explosion or fire) for initial response actions.
- b. Verify through discussion with plant staff and review of documents that training has been developed and provided to plant staff.

Initial Damage Assessment. In the potential conditions, normal instrumentation may not be available. The purpose of this strategy is to utilize the available onsite resources to perform an assessment of the plant and equipment conditions in order to assist the arriving ERO personnel in decision-making and development of specific strategies.

- a. Verify that a procedure/guidance has been developed to utilize available onsite resources to perform an assessment of the main plant buildings (e.g., Containment, Turbine Building, Auxiliary Building, Reactor Building, SFP Building) and equipment conditions (e.g., AC/DC power, cooling water, air, communication systems) to assist the arriving ERO in decision making and development of specific strategies.
- b. Verify that training has been developed and provided to plant staff.

Item 2. Portable Sprays

Use portable sprays to reduce the magnitude of any fission product releases by spraying the release point of affected plant structures (Containment/Auxiliary Building). The Fire Protection System may be used as the water supply for the portable pump.

- a. Verify that the strategy is capable of providing the estimated flow rates and the capacities of the water supplies are as stated in the SER for this strategy.
- b. Verify that any portions of the affected plant structures (e.g., Containment/Auxiliary Building) that cannot be sprayed due to physical layout or equipment limitations have been identified.
- c. Verify that needed equipment (e.g., the portable pump, monitor nozzles, hoses) is stored at least 100 yards from the potential damage area.
- d. Verify that the specified equipment connection devices and fittings are compatible with plant fittings.
- e. Verify that the connection to the Fire Protection System ring header (if used for this strategy) is at least 100 yards from the potential damage area or that some justification for pump survivability is (e.g., intervening structures, nearly 100 yards away from key plant areas, contained in a reinforced concrete structure) is provided.
- f. Verify that the pump used to charge the Fire Protection System ring header (if used for this strategy) is at least 100 yards from the potential damage area. If this separation does not exist then justification for the equipment survivability should be provided.

- g. Verify that if the Fire Protection System is used for this strategy, consideration is made for isolating any damaged fire headers and that site procedures provide guidance on sharing/balancing the use of these resources between firefighting and makeup capabilities
- h. Verify that a procedure/guidance has been developed for implementing this strategy. Consideration should be given to containing runoff, including the amount of spray water that can be contained.
- i. Verify that training has been developed and provided to plant staff.
- j. Verify any items identified in the SER as candidates for onsite inspection have been resolved.

Item 3. Reactor Coolant System Makeup

For the function of reactor coolant system makeup the licensee is expected to identify the minimal set of equipment for both a primary and alternate means of satisfying this function including the necessary support equipment such as power, cooling water, ventilation, etc.

Verify that the licensee has identified the minimal set of equipment needed for both a primary and alternate means of satisfying this function.

Verify that the licensee has identified the physical location of the equipment and support equipment needed to satisfy this function.

Verify that the equipment and support equipment need to satisfy this function meet the separation criteria as described in NEI 06-12 Section 4.2.3.4.

Item 4. Safety Injection

For the function of safety injection the licensee is expected to identify the minimal set of equipment for both a primary and alternate means of satisfying this function including the necessary support equipment such as power, cooling water, ventilation, etc.

- a. Verify that the licensee has identified the minimal set of equipment needed for both a primary and alternate means of satisfying this function.
- b. Verify that the licensee has identified the physical location of the equipment and support equipment needed to satisfy this function.
- c. Verify that the equipment and support equipment needed to satisfy this function meet the separation criteria as described in NEI 06-12 Section 4.2.3.4.

Item 5. Decay Heat Removal

For the function of decay heat removal the licensee is expected to identify the minimal set of equipment for both a primary and alternate means of satisfying this function including the necessary support equipment such as power, cooling water, ventilation, etc.

- a. Verify that the licensee has identified the minimal set of equipment needed for both a primary and alternate means of satisfying this function.

- b. Verify that the licensee has identified the physical location of the equipment and support equipment needed to satisfy this function.
- c. Verify that the equipment and support equipment need to satisfy this function meet the separation criteria as described in NEI 06-12 Section 4.2.3.4.

Item 6. Containment Cooling

For the function of containment cooling the licensee is expected to identify the minimal set of equipment for both a primary and alternate means of satisfying this function including the necessary support equipment such as power, cooling water, ventilation, etc.

- a. Verify that the licensee has identified the minimal set of equipment needed for both a primary and alternate means of satisfying this function.
- b. Verify that the licensee has identified the physical location of the equipment and support equipment needed to satisfy this function.
- c. Verify that the equipment and support equipment need to satisfy this function meet the separation criteria as described in NEI 06-12 Section 4.2.3.4.

Item 7. Containment Isolation

For the function of containment isolation the licensee is expected to identify the minimal set of equipment for both a primary and alternate means of satisfying this function including the necessary support equipment such as power, cooling water, ventilation, etc.

- a. Verify that the licensee has identified the minimal set of equipment needed for both a primary and alternate means of satisfying this function.
- b. Verify that the licensee has identified the physical location of the equipment and support equipment needed to satisfy this function.
- c. Verify that the equipment and support equipment need to satisfy this function meet the separation criteria as described in NEI 06-12 Section 4.2.3.4.

82002.08-04 RESOURCE ESTIMATE

For planning purposes, the direct inspection effort to complete this inspection procedure is estimated to be 80 hours of on-site inspection (two inspectors for five days of inspection),

82002.08-05 PROCEDURE COMPLETION

The goal of the inspections conducted within this IP is to verify that the licensee has developed and implemented appropriate guidance and strategies that meet the requirements of the regulations, guidance and licensee commitments intended to responding to circumstances associated with loss of large areas of the plant due to explosions or fire developed in accordance with 10 CFR 50.54(hh)(2) (before initial fuel load). This procedure is complete upon satisfactory inspection results verifying that the guidance and strategies developed adequately document the strategies and guidance described by the licensee in its COL application.

82002.08-06 REFERENCES

NUREG-0800, Section 19.4, "Strategies and Guidance to Address Loss-of-Large Areas of the Plant Due to Explosions and Fires" (ADAMS Accession No. ML13106A331)

NEI 06-12, "B.5.b Phase 2 & 3 Submittal Guideline." Revision 3, September 2009 (ADAMS Accession No. ML092890400)

END

Attachment:
Revision History Table

Attachment 1: Revision History for IP 82002.08

Commitment Tracking Number	Accession Number Issue Date Change Notice	Description of Change	Description of Training Required and Completion Date	Comment Resolution and Closed Feedback Form Accession Number (Pre-Decisional, Non-Public Information)
N/A	ML17180A260 04/10/18 CN 18-008	Initial issue to support inspection of a license condition in the combined license. The inspection is to be conducted under the construction programs described in IMC 2504, Construction Inspection Program: Inspection of Construction and Operational Programs.	None	NML17233A362
N/A	ML18229A264 09/17/18 CN 18-032	Minor editorial change to reflect specific AP1000 target areas (Phase 1, Firefighting Response Strategy) and alternative water supply availability (Phase 1, Plant Operations to Mitigate Fuel Damage), consistent with NEI 06-12, Revision 3.	None	N/A