Mega-Tech Services, LLC

Technical Evaluation Report Related to Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events, EA-12-049

Revision 0

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Carolina Power and Light (CP&L)
H. B. Robinson Steam Electric Plant, Unit 2
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Technical Evaluation Report

H. B. Robinson Steam Electric Plant, Unit 2
Order EA-12-049 Evaluation

1.0 BACKGROUND

Following the events at the Fukushima Dai-ichi nuclear power plant on March 11, 2011, the U.S. Nuclear Regulatory Commission (NRC) established a senior-level agency task force referred to as the Near-Term Task Force (NTTF). The NTTF was tasked with conducting a systematic, methodical review of NRC regulations and processes to determine if the agency should make additional improvements to these programs in light of the events at Fukushima Dai-ichi. As a result of this review, the NTTF developed a comprehensive set of recommendations, documented in SECY-11-0093, "Near-Term Report and Recommendations for Agency Actions Following the Events in Japan," dated July 12, 2011. These recommendations were enhanced by the NRC staff following interactions with stakeholders. Documentation of the staff's efforts is contained in SECY-11-0124, "Recommended Actions to be Taken without Delay from the Near-Term Task Force Report," dated September 9, 2011, and SECY-11-0137, "Prioritization of Recommended Actions to be Taken in Response to Fukushima Lessons Learned," dated October 3, 2011.

As directed by the Commission's staff requirement memorandum (SRM) for SECY-11-0093, the NRC staff reviewed the NTTF recommendations within the context of the NRC's existing regulatory framework and considered the various regulatory vehicles available to the NRC to implement the recommendations. SECY-11-0124 and SECY-11-0137 established the staff's prioritization of the recommendations.

After receiving the Commission's direction in SRM-SECY-11-0124 and SRM-SECY-11-0137, the NRC staff conducted public meetings to discuss enhanced mitigation strategies intended to maintain or restore core cooling, containment, and spent fuel pool (SFP) cooling capabilities following beyond-design-basis external events (BDBEEs). At these meetings, the industry described its proposal for a Diverse and Flexible Mitigation Capability (FLEX), as documented in Nuclear Energy Institute's (NEI) letter, dated December 16, 2011 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML11353A008). FLEX was proposed as a strategy to fulfill the key safety functions of core cooling, containment integrity, and spent fuel cooling. Stakeholder input influenced the NRC staff to pursue a more performance-based approach to improve the safety of operating power reactors relative to the approach that was envisioned in NTTF Recommendation 4.2, SECY-11-0124, and SECY-11-0137.

On February 17, 2012, the NRC staff provided SECY-12-0025, "Proposed Orders and Requests for Information in Response to Lessons Learned from Japan's March 11, 2011, Great Tohoku Earthquake and Tsunami," to the Commission, including the proposed order to implement the enhanced mitigation strategies. As directed by SRM-SECY-12-0025, the NRC staff issued Order EA-12-049, "Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events."

Guidance and strategies required by the Order would be available if a loss of power, motive force and normal access to the ultimate heat sink needed to prevent fuel damage in the reactor and SFP affected all units at a site simultaneously. The Order requires a three-phase approach for mitigating BDBEEs. The initial phase requires the use of installed equipment and resources to maintain or restore key safety functions including core cooling, containment, and SFP cooling. The transition phase requires providing sufficient portable onsite equipment and consumables to maintain or restore these functions until they can be accomplished with resources brought from offsite. The final phase requires obtaining sufficient offsite resources to sustain those functions indefinitely.

NEI submitted its document NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide" in August 2012 (ADAMS Accession No. ML12242A378) to provide specifications for an industry-developed methodology for the development, implementation, and maintenance of guidance and strategies in response to Order EA-12-049. The guidance and strategies described in NEI 12-06 expand on those that industry developed and implemented to address the limited set of BDBEEs that involve the loss of a large area of the plant due to explosions and fire required pursuant to paragraph (hh)(2) of 10 CFR 50.54, "Conditions of licenses."

As described in Interim Staff Guidance (ISG), JLD-ISG-2012-01, "Compliance with Order EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," the NRC staff considers that the development, implementation, and maintenance of guidance and strategies in conformance with the guidelines provided in NEI 12-06, Revision 0, subject to the clarifications in Attachment 1 of the ISG are an acceptable means of meeting the requirements of Order EA-12-049.

In response to Order EA-12-049, licensees submitted Overall Integrated Plans (hereafter, the Integrated Plan) describing their course of action for mitigation strategies that are to conform with the guidance of NEI 12-06, or provide an acceptable alternative to demonstrate compliance with the requirements of Order EA-12-049.

2.0 EVALUATION PROCESS

In accordance with the provisions of Contract NRC-HQ-13-C-03-0039, Task Order No. NRC-HQ-13-T-03-0001, Mega-Tech Services, LLC (MTS) performed an evaluation of each licensee's Integrated Plan. As part of the evaluation, MTS, in parallel with the NRC staff, reviewed the original Integrated Plan and the first 6-month status update, and conducted an audit of the licensee documents. The staff and MTS also reviewed the licensee's answers to the NRC staff's and MTS's questions as part of the audit process. The objective of the evaluation was to assess whether the proposed mitigation strategies conformed to the guidance in NEI 12-06, as endorsed by the positions stated in JLD-ISG-2012-01, or an acceptable alternative had been proposed that would satisfy the requirements of Order EA-12-049. The audit plan that describes the audit process was provided to all licensees in a letter dated August 29, 2013 from Jack R. Davis, Director, Mitigating Strategies Directorate (ADAMS Accession No. ML13234A503).

The review and evaluation of the licensee's Integrated Plan was performed in the following areas consistent with NEI 12-06 and the regulatory guidance of JLD-ISG-2012-01:

- Evaluation of External Hazards
- Phased Approach
  - Initial Response Phase
  - Transition Phase
  - Final Phase
- Core Cooling Strategies

- SFP Cooling Strategies
- Containment Function Strategies
- Programmatic Controls
    - Equipment Protection, Storage, and Deployment
    - Equipment Quality

The technical evaluation (TE) in Section 3.0 documents the results of the MTS evaluation and audit results. Section 4.0 summarizes Confirmatory Items and Open Items that require further evaluation before a conclusion can be reached that the Integrated Plan is consistent with the guidance in NEI 12-06 or an acceptable alternative has been proposed that would satisfy the requirements of Order EA-12-049. For the purpose of this evaluation, the following definitions are used for Confirmatory Item and Open Item.

> Confirmatory Item – an item that is considered conceptually acceptable, but for which resolution may be incomplete. These items are expected to be acceptable, but are expected to require some minimal follow up review or audit prior to the licensee's compliance with Order EA-12-049.
>
> Open Item – an item for which the licensee has not presented a sufficient basis to determine that the issue is on a path to resolution. The intent behind designating an issue as an Open Item is to document items that need resolution during the review process, rather than being verified after the compliance date through the inspection process.

Additionally, for the purpose of this evaluation and the NRC staff's interim staff evaluation (ISE), licensee statements, commitments, and references to existing programs that are subject to routine NRC oversight (Updated Final Safety Analysis Report (UFSAR) program, procedure program, quality assurance program, modification configuration control program, etc.) will generally be accepted. For example, references to existing UFSAR information that supports the licensee's overall mitigating strategies plan, will be assumed to be correct, unless there is a specific reason to question its accuracy. Likewise, if a licensee states that they will generate a procedure to implement a specific mitigating strategy, assuming that the procedure would otherwise support the licensee's plan, this evaluation accepts that a proper procedure will be prepared. This philosophy for this evaluation and the ISE does not imply that there are any limits in this area to future NRC inspection activities.

3.0 TECHNICAL EVALUATION

By letter dated February 26, 2013, (ADAMS Accession No. ML13071A415) and as supplemented by the first 6-month status report in a letter dated August 28, 2013 (ADAMS Accession No. ML13252A243) Duke Energy/Carolina Power and Light (CP&L) (hereinafter referred to as the licensee) provided H. B. Robinson Steam Electric Plant, Unit 2's (RNP) Integrated Plan for Compliance with Order EA-12-049 for. The Integrated Plan describes the strategies and guidance under development for implementation by the licensee for the maintenance or restoration of core cooling, containment, and SFP cooling capabilities following a BDBEE, including modifications necessary to support this implementation, pursuant to Order EA-12-049. By letter dated August 28, 2013 (ADAMS Accession No. ML13234A503), the NRC notified all licensees and construction permit holders that the staff is conducting audits of their responses to Order EA-12-049. That letter described the process used by the NRC staff in its review, leading to the issuance of an interim staff evaluation and audit report. The purpose of the staff's audit is to determine the extent to which the licensees are proceeding on a path towards successful implementation of the actions needed to achieve full compliance with the Order.

3.1 EVALUATION OF EXTERNAL HAZARDS

Sections 4 through 9 of NEI 12-06 provide the NRC-endorsed methodology for the determination of applicable extreme external hazards in order to identify potential complicating factors for the protection and deployment of equipment needed for mitigation of BDBEEs leading to an extended loss of all alternating current (ac) power (ELAP) and loss of normal access to the ultimate heat sink (UHS). These hazards are broadly grouped into the categories discussed below in Sections 3.1.1 through 3.1.5 of this evaluation. Characterization of the applicable hazards for a specific site includes the identification of realistic timelines for the hazard; characterization of the functional threats due to the hazard; development of a strategy for responding to events with warning; and development of a strategy for responding to events without warning.

3.1.1 Seismic Events

NEI 12-06, Section 5.2 states that:

> All sites will address BDB [beyond-design-basis] seismic considerations in the implementation of FLEX strategies, as described below. The basis for this is that, while some sites are in areas with lower seismic activity, their design basis generally reflects that lower activity. There are large, and unavoidable, uncertainties in the seismic hazard for all U.S. plants. In order to provide an increased level of safety, the FLEX deployment strategy will address seismic hazards at all sites.
>
> These considerations will be treated in four primary areas: protection of FLEX equipment, deployment of FLEX equipment, procedural interfaces, and considerations in utilizing off-site resources.

On page 1 of the Integrated Plan, the licensee stated that per the RNP UFSAR, the site is located in Zone 1 of the Uniform Building Codes' Map and Equal Seismic Probability, which is characterized as a zone of light earthquake activity that would result in minor damage. Additionally, the dynamic analyses of all seismic Category 1 structures include the operating basis earthquake (OBE) and safe shutdown earthquake (SSE) with design values of maximum horizontal ground acceleration of 0.1g and 0.2g respectively.

On pages 2 and 3 of the Integrated Plan, the licensee stated that the Integrated Plan assumes the 10 CFR 50.54(f) seismic re-evaluations do not result in changes to the current design basis. The licensee also stated that it is assumed that the seismic re-evaluation does not adversely impact the equipment that forms a part of the RNP FLEX strategy, and that any changes to the seismic basis may require a change to the plans in the RNP response to the Order.

The licensee's approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to screening for seismic hazards, if these requirements are implemented as described.

3.1.1.1 Protection of FLEX Equipment – Seismic Hazard

NEI 12-06, Section 5.3.1 states:

1. FLEX equipment should be stored in one or more of following three configurations:

    a. In a structure that meets the plant's design basis for the Safe Shutdown Earthquake (SSE)(e.g., existing safety-related structure).

    b. In a structure designed to or evaluated equivalent to [American Society of Civil Engineers] ASCE 7-10, *Minimum Design Loads for Buildings and Other Structures*.

    c. Outside a structure and evaluated for seismic interactions to ensure equipment is not damaged by non-seismically robust components or structures.

2. Large portable FLEX equipment such as pumps and power supplies should be secured as appropriate to protect them during a seismic event (i.e., Safe Shutdown Earthquake (SSE) level).

3. Stored equipment and structures should be evaluated and protected from seismic interactions to ensure that unsecured and/or non-seismic components do not damage the equipment.

On page 3 of the Integrated Plan, the licensee stated that where non-safety, non-seismically designed, permanently installed equipment is used for FLEX strategies, structures systems and components (SSC's) will be considered seismically robust if:

- Seismic Qualification Utility Group (SQUG) methods are applied per existing plant licensing basis.
- Testing, analysis or experience-based methods are applied for the equipment class at design basis seismic levels.
- Methodologies in Electric Power Research Institute (EPRI) 1019199, "Experience Based Seismic Verification Guidelines for Piping and Tubing Systems," can be successfully applied relative to the SSE.

As indicated in its Integrated Plan, the licensee intends to construct a single FLEX equipment storage facility. On page 18 of the Integrated Plan, the licensee stated that the FLEX equipment storage building location has not yet been decided.

On pages 16, 24, 36, and 47 of the Integrated Plan, the licensee stated that the structure to provide protection of the FLEX equipment will be constructed to meet the requirements identified in NEI 12-06, Section 11. The licensee also stated that the structures will be built prior to the FLEX implementation date, and that the RNP procedures and programs are being developed, to address storage structure requirements, and FLEX equipment requirements relative to the hazards applicable to RNP.

The licensee did not specify the type of BDB storage building configuration, how FLEX equipment such as pumps and power supplies would be secured or how stored equipment and structures would be protected from seismic interactions. This has been identified as Confirmatory Item 3.1.1.1.A in Section 4.2.

The licensee's approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and subject to the successful closure of issues related to the Confirmatory Item, provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to protection of FLEX equipment during seismic hazards, if these requirements are implemented as described.

3.1.1.2 Deployment of FLEX Equipment -- Seismic Hazard

NEI 12-06, Section 5.3.2 states:

> The baseline capability requirements already address loss of non-seismically robust equipment and tanks as well as loss of all AC. So, these seismic considerations are implicitly addressed.
>
> There are five considerations for the deployment of FLEX equipment following a seismic event:
>
> 1. If the equipment needs to be moved from a storage location to a different point for deployment, the route to be traveled should be reviewed for potential soil liquefaction that could impede movement following a severe seismic event.
>
> 2. At least one connection point for the FLEX equipment will only require access through seismically robust structures. This includes both the connection point and any areas that plant operators will have to access to deploy or control the capability.
>
> 3. If the plant FLEX strategy relies on a water source that is not seismically robust, e.g., a downstream dam, the deployment of FLEX coping capabilities should address how water will be accessed. Most sites with this configuration have an underwater berm that retains a needed volume of water. However, accessing this water may require new or different equipment.
>
> 4. If power is required to move or deploy the equipment (e.g., to open the door from a storage location), then power supplies should be provided as part of the FLEX deployment.
>
> 5. A means to move FLEX equipment should be provided that is also reasonably protected from the event.

On page 7 of the Integrated Plan, the licensee stated that deployment routes shown in Figure 1 of the Integrated Plan are expected to be utilized to transport FLEX equipment to the deployment areas. The licensee also stated that the identified paths and deployment areas will be accessible during all modes of operation, and that this deployment strategy will be included within an administrative program in order to keep pathways clear or to take actions to clear the pathways.

On pages 16, 24, 36, and 47 of the Integrated Plan, the licensee stated that the RNP procedures and programs are being developed to address deployment path and FLEX equipment requirements relative to the hazards applicable to RNP.

On page 15 of the Integrated Plan, the licensee stated that the ultimate source of core cooling water is Lake Robinson. The UHS will withstand a seismic event as the earthen dam is seismically robust, per Calculation 52212-C-069, Revision 1, “Updated Geotechnical Review,” July 25, 2000, which was developed under the Individual Plant Examination for External Events (IPEEE) program and evaluated the seismic robustness of Lake Robinson Dam.

On pages 54 of the Integrated Plan, the licensee lists two debris removal equipment/skid steer tractors and a large front end loader, however the licensee did not specify how these vehicles would be protected from seismic events. This has been identified as Confirmatory Item 3.1.1.2.A in Section 4.2.

On page 71 of the Integrated Plan, the licensee stated that the equipment connection points will be designed to withstand the applicable hazards.

The licensee did not address consideration 1 regarding potential for liquefaction in the integrated plan, however, the licensee provided a reference (Calculation 52212-C-069) which contains an evaluation of the potential for liquefaction at the site. During the audit process, the licensee stated that it would evaluate all site travel paths and routes for deployment strategies and improve as necessary with particular concern paid to potential soil liquefaction, and that engineering changes will be developed that include soil studies, core borings, geotechnical evaluations and remediation to ensure survivability following a seismic event.

The Integrated Plan did not completely address consideration 2, regarding protected connection points and access through seismically robust structures, as deployment paths have not been determined. During the audit process, the licensee specified that connection points for the secondary feed strategies are located in the Turbine Building (TB) Class 1 bay and the Reactor Auxiliary Building (RAB). Additionally, the strategy to supply power to the vital battery chargers takes place entirely inside the RAB, a seismic Class 1 structure, and the SFP cooling strategies take place inside the seismic Class 1 SFP Building. Updated diagrams will be included in the February 2014 Integrated Plan update. Review of these updated drawings is required to fully evaluate the licensee’s deployment strategies. This has been identified as Confirmatory Item 3.1.1.2.B in Section 4.2.

The licensee did not address consideration 4 regarding the need for power supplies to move or deploy the equipment. During the audit process, the licensee stated that equipment doors shall be sized such that FLEX equipment can be moved from the building designed to withstand tornado missiles, and that all doors will be electrically operated with the capability for manual override.

The licensee’s approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to deployment of FLEX equipment during seismic hazards, if these requirements are implemented as described.

3.1.1.3 Procedural Interfaces - Seismic Hazard

NEI 12-06, Section 5.3.3 states:

There are four procedural interface considerations that should be addressed.

1. Seismic studies have shown that even seismically qualified electrical equipment can be affected by BDB seismic events. In order to address these considerations, each plant should compile a reference source for the plant operators that provides approaches to obtaining necessary instrument readings to support the implementation of the coping strategy (see Section 3.2.1.10). This reference source should include control room and non-control room readouts and should also provide guidance on how and where to measure key instrument readings at containment penetrations, where applicable, using a portable instrument (e.g., a Fluke meter). Such a resource could be provided as an attachment to the plant procedures/guidance. Guidance should include critical actions to perform until alternate indications can be connected and on how to control critical equipment without associated control power.

2. Consideration should be given to the impacts from large internal flooding sources that are not seismically robust and do not require ac power (e.g., gravity drainage from lake or cooling basins for non-safety-related cooling water systems).

3. For sites that use ac power to mitigate ground water in critical locations, a strategy to remove this water will be required.

4. Additional guidance may be required to address the deployment of FLEX for those plants that could be impacted by failure of a not seismically robust downstream dam.

In the 6-month update the licensee revised the initial strategy for determining local instrument readings from modifying instrument racks to a strategy to develop procedures to use a portable digital voltmeter at the instrument racks. The licensee also stated that they will develop a reference source to include control room (CR) and non-control room readouts and will provide guidance on how and where to measure key instrument readings in the Hagan instrument racks. The necessary equipment will be stored and protected from applicable RNP hazards.

The licensee did not address the need for guidance for critical actions to perform until alternate indications can be connected and on how to control critical equipment without associated control power. This has been identified as Confirmatory Item 3.1.1.3.A in Section 4.2.

On page 15 of the Integrated Plan, the licensee stated that the ultimate source of core cooling water is Lake Robinson. The UHS will withstand a seismic event as the earthen dam is seismically robust per Calculation 52212-C-069, which was developed under the IPEEE program and evaluated the seismic robustness of Lake Robinson Dam.

During the audit process, the licensee provided the following information regarding flooding:

- Internal flooding events are mitigated at RNP by the physical characteristics of the site in conjunction with procedures and specific systems, structures and components designed for that purpose.
- RNP does not have gravity drainage from the lake or cooling basins for non-safety related cooling water systems.

- The service water (SW) system in the RAB is seismically robust and will not have ac power available.
- The SW system in the TB is not seismically robust and will not have ac power available.
- The TB is an open structure that will readily drain in the event of a SW break.

Additionally, the licensee specified that RNP does not use ac power to mitigate ground water in critical locations.

The licensee's approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to deployment of FLEX equipment during seismic hazards, if these requirements are implemented as described.

3.1.1.4 Considerations in Using Offsite Resources – Seismic Hazard

NEI 12-06, Section 5.3.4 states:

> Severe seismic events can have far-reaching effects on the infrastructure in and around a plant. While nuclear power plants are designed for large seismic events, many parts of the Owner Controlled Area and surrounding infrastructure (e.g., roads, bridges, dams, etc.) may be designed to lesser standards. Obtaining off-site resources may require use of alternative transportation (such as air-lift capability) that can overcome or circumvent damage to the existing local infrastructure.
>
> 1. The FLEX strategies will need to assess the best means to obtain resources from off-site following a seismic event.

On pages 9 and 10 of the Integrated Plan, the licensee provided the following information regarding off site resources: The industry will establish two (2) Regional Response Centers (RRCs) to support utilities during beyond design basis events. Equipment will be moved from an RRC to a local Assembly Area, established by the Strategic Alliance for FLEX Emergency Response (SAFER) team and the utility. Communications will be established between the affected nuclear site and the SAFER team and required equipment moved to the site as needed. First arriving equipment, as established during development of the nuclear site's playbook, will be delivered to the site within 24 hours from the initial request.

On page 71 of the Integrated Plan the licensee identified an open item, to develop a SAFER Response Plan (RRC playbook) to support RNP during beyond design basis events, and describing the coordination strategies between RNP and the RRC. This has been identified as Confirmatory Item 3.1.1.4.A in Section 4.2.

The licensee's approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and subject to the successful closure of issues related to the Confirmatory Item, provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to using offsite resources during seismic hazards, if these requirements are implemented as described.

3.1.2 Flooding

NEI 12-06, Section 6.2 states:

The evaluation of external flood-induced challenges has three parts. The first part is determining whether the site is susceptible to external flooding. The second part is the characterization of the applicable external flooding threat. The third part is the application of the flooding characterization to the protection and deployment of FLEX strategies.

NEI 12-06, Section 6.2.1 states in part:

Susceptibility to external flooding is based on whether the site is a “dry” site, i.e., the plant is built above the design basis flood level (DBFL). For sites that are not “dry,”water intrusion is prevented by barriers and there could be a potential for those barriers to be exceeded or compromised. Such sites would include those that are kept “dry” by permanently installed barriers, e.g., seawall, levees, etc., and those that install temporary barriers or rely on watertight doors to keep the design basis flood from impacting safe shutdown equipment.

On page 1 of the Integrated Plan, the licensee stated that this hazard is not applicable to RNP since the plant is built above the design basis flood level. As stated in the RNP UFSAR Chapter 2 (Sections 2.4.2 and 2.4.4) the maximum flood elevation is 222 ft. while the grade level at RNP is 225 ft. Per NEI 12-06 (Section 6.2.1), RNP is classified as a dry site and the external flood hazard is, therefore, not applicable on site.

On pages 2 and 3 of the Integrated Plan, the licensee stated that the 10 CFR 50.54(f) seismic and flood re-evaluations are assumed to not result in changes to the current design basis. It is assumed that RNP remains dry subsequent to the external flood event, and that any changes to the flood design basis may require a change to the plans in the RNP response to the Order.

During the audit process, the licensee provided the following additional information from the UFSAR regarding flooding: Per USFAR Section 2.4.1.1, flooding at the plant will not occur, as plant grade is above the maximum lake level which can be maintained by the dam and appurtenant structures. Additionally, UFSAR per Section 2.4.4.2, flow spills over two electrically operated tainter gates under normal operation as well as discharging through valves. Peak flows at Lake Robinson will be controlled by opening the tainter gates. Auxiliary power is available to operate the gates in the event of power failure.

Issues from Sections 3.1.2.1, 3.1.2.2 and 3.1.2.3, are not addressed since the site is a dry site, however Section 3.1.2.4 regarding obtaining off site resources is addressed as off-site flooding issues are possible.

The licensee’s approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to screening for flooding hazards, if these requirements are implemented as described.

3.1.2.4 Considerations in Using Offsite Resources – Flooding Hazard

NEI 12-06, Section 6.2.3.4 states:

Extreme external floods can have regional impacts that could have a significant impact on the transportation of off-site resources.

1. Sites should review site access routes to determine the best means to obtain resources from off-site following a flood.

2. Sites impacted by persistent floods should consider where equipment delivered from off-site could be staged for use on-site.

On page 71 of the Integrated Plan the licensee identified an open item, to develop the RRC playbook to support RNP during beyond design basis events, and describing the coordination strategies between RNP and the RRC. This has been combined with Confirmatory Item 3.1.1.4.A in Section 4.2.

The licensee's approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and subject to the successful closure of issues related to the Confirmatory Item, provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to using offsite resources during flood hazards, if these requirements are implemented as described.

3.1.3 High Winds

NEI 12-06, Section 7, provides the NRC-endorsed screening process for evaluation of high wind hazards. This screening process considers the hazard due to hurricanes and tornadoes. The first part of the evaluation of high wind challenges is determining whether the site is potentially susceptible to different high wind conditions to allow characterization of the applicable high wind hazard.

The screening for high wind hazards associated with hurricanes should be accomplished by comparing the site location to NEI 12-06, Figure 7-1 (Figure 3-1 of U.S. NRC, "Technical Basis for Regulatory Guidance on Design Basis Hurricane Wind Speeds for Nuclear Power Plants," NUREG/CR-7005, December, 2009); if the resulting frequency of recurrence of hurricanes with wind speeds in excess of 130 mph exceeds 10^{-6} per year, the site should address hazards due to extreme high winds associated with hurricanes.

The screening for high wind hazard associated with tornadoes should be accomplished by comparing the site location to NEI 12-06, Figure 7-2, from U.S. NRC, "Tornado Climatology of the Contiguous United States," NUREG/CR-4461, Rev. 2, February 2007; if the recommended tornado design wind speed for a 10^{-6}/year probability exceeds 130 mph, the site should address hazards due to extreme high winds associated with tornadoes.

On pages 5 and 6 of the Integrated Plan, the licensee provided the following information: The high wind hazard is applicable for RNP. RNP is located in Darlington County, SC with coordinates Latitude 34˚ 24' 02" N, Longitude 080˚ 09' 05" W (UFSAR Section 2.1.1.1). Peak-gust wind speed, per NEI 12-06 Figure 7-1, is 170 mph. Tornado design wind speed per NEI 12-06 Figure 7-2, Region 1, which includes RNP, is 200 mph. These values indicate that RNP has the potential to experience severe winds from hurricanes and tornadoes with the capacity to do significant damage, which are generally considered to be winds above 130 mph as defined in NEI 12-06 Section 7.2.1.

The licensee's approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to screening for high wind hazards, if these requirements are implemented as described.

3.1.3.1 Protection of FLEX Equipment - High Winds Hazard

NEI 12-06, Section 7.3.1 states:

> These considerations apply to the protection of FLEX equipment from high wind hazards:
>
> 1. For plants exposed to high wind hazards, FLEX equipment should be stored in one of the following configurations:
>
>   a. In a structure that meets the plant's design basis for high wind hazards (e.g., existing safety-related structure).
>
>   b. In storage locations designed to or evaluated equivalent to ASCE 7-10, *Minimum Design Loads for Buildings and Other Structures* given the limiting tornado wind speeds from Regulatory Guide 1.76 or design basis hurricane wind speeds for the site.
>
>   ▪ Given the FLEX basis limiting tornado or hurricane wind speeds, building loads would be computed in accordance with requirements of ASCE 7-10. Acceptance criteria would be based on building serviceability requirements not strict compliance with stress or capacity limits. This would allow for some minor plastic deformation, yet assure that the building would remain functional.
>
>   ▪ Tornado missiles and hurricane missiles will be accounted for in that the FLEX equipment will be stored in diverse locations to provide reasonable assurance that N sets of FLEX equipment will remain deployable following the high wind event. This will consider locations adjacent to existing robust structures or in lower sections of buildings that minimizes the probability that missiles will damage all mitigation equipment required from a single event by protection from adjacent buildings and limiting pathways for missiles to damage equipment.
>
>   ▪ The axis of separation should consider the predominant path of tornados in the geographical location. In general, tornadoes travel from the West or West Southwesterly direction, diverse locations should be aligned in the North-South arrangement, where possible. Additionally, in selecting diverse FLEX storage locations, consideration should be given to the location of the diesel generators and switchyard such that the path of a single tornado would not impact all locations.
>
>   ▪ Stored mitigation equipment exposed to the wind should be adequately tied down. Loose equipment should be in protective boxes that are adequately tied down to foundations or slabs to prevent protected equipment from being damaged or becoming airborne. (During a tornado, high winds may blow away metal siding and metal deck roof, subjecting the equipment to high wind forces.)

c. In evaluated storage locations separated by a sufficient distance that minimizes the probability that a single event would damage all FLEX mitigation equipment such that at least N sets of FLEX equipment would remain deployable following the high wind event. (This option is not applicable for hurricane conditions).

  - Consistent with configuration b., the axis of separation should consider the predominant path of tornados in the geographical location.

  - Consistent with configuration b., stored mitigation equipment should be adequately tied down.

On pages 16, 24, 36, and 47 of the Integrated Plan, the licensee stated that the structure to provide protection of the FLEX equipment will be constructed to meet the requirements identified in NEI 12-06, Section 11. The licensee also stated that the structures will be built prior to the FLEX implementation date, and that the RNP procedures and programs are being developed, to address storage structure requirements, and FLEX equipment requirements relative to the hazards applicable to RNP.

The licensee did not specify the type of BDB storage building configuration, how FLEX equipment such as pumps and power supplies would be secured or how stored equipment and structures would be protected from high wind events. This is combined with Confirmatory Item 3.1.1.1.A in Section 4.2.

The licensee's approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and subject to the successful closure of issues related to the Confirmatory Item, provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to storage of FLEX equipment during high wind hazards, if these requirements are implemented as described.

3.1.3.2 Deployment of FLEX Equipment - High Wind Hazard

NEI 12-06, Section 7.3.2 states:

> There are a number of considerations which apply to the deployment of FLEX equipment for high wind hazards:
>
> 1. For hurricane plants, the plant may not be at power prior to the simultaneous ELAP and LUHS condition. In fact, the plant may have been shut down and the plant configuration could be established to optimize FLEX deployment. For example, the portable pumps could be connected, tested, and readied for use prior to the arrival of the hurricane. Further, protective actions can be taken to reduce the potential for wind impacts. These factors can be credited in considering how the baseline capability is deployed.
>
> 2. The ultimate heat sink may be one of the first functions affected by a hurricane due to debris and storm surge considerations. Consequently, the evaluation should address the effects of ELAP/LUHS, along with any other equipment that would be damaged by the postulated storm.
>
> 3. Deployment of FLEX following a hurricane or tornado may involve the need to

remove debris. Consequently, the capability to remove debris caused by these extreme wind storms should be included.

4. A means to move FLEX equipment should be provided that is also reasonably protected from the event.

5. The ability to move equipment and restock supplies may be hampered during a hurricane and should be considered in plans for deployment of FLEX equipment.

Regarding consideration 1, the Integrated Plan did not provide information regarding potential deployment actions that could be taken with advance hurricane high wind warning. It also did not identify that deployment vehicles designated for moving FLEX equipment would be protected from hurricane high wind damage. During the audit process, the licensee stated that procedure AP-053, “Severe weather Response,” includes preparations for hurricane and tornados and also includes; deploying heavy equipment operators from maintenance for the duration of the event, ensuring debris removal equipment such as trucks and chain saws are fueled and available, adequate fuel oil is on hand, and sufficient consumables area available. The licensee is also in the process of developing a FLEX support Guideline (FSG) for initial assessment and FLEX equipment staging.

Consideration 2, regarding storm surge considerations, is not applicable as RNP is not a coastal site.

On pages 16, 24, 36, and 47 of the Integrated Plan, the licensee stated that the RNP procedures and programs are being developed to address storage structure requirements, deployment path requirements, and FLEX equipment requirements relative to the hazards applicable to RNP.

On pages 54 and 55 of the Integrated Plan, the licensee stated that Phase 2 FLEX equipment includes debris removal equipment/skid steer tractors and a large front end loader.

On page 74 of the Integrated Plan, the licensee stated that an analysis will be performed to determine the commodities requirements.

The licensee’s approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to deployment of FLEX equipment during high wind hazards, if these requirements are implemented as described.

3.1.3.3 Procedural Interfaces - High Wind Hazard

NEI 12-06, Section 7.3.3, states:

> The overall plant response strategy should be enveloped by the baseline capabilities, but procedural interfaces may need to be considered. For example, many sites have hurricane procedures. The actions necessary to support the deployment considerations identified above should be incorporated into those procedures.

On page 12 of the Integrated Plan, the licensee stated that site-specific procedures and/or FSGs will be developed using industry guidance to address the criteria in NEI 12-06, Section 11.4. During the audit process, the licensee stated that procedure AP-053, "Severe weather Response," specifies preparations for hurricane and tornados that include deploying heavy equipment operators from maintenance for the duration of the event. The licensee is also in the process of developing FLEX FSGs for initial assessment and FLEX equipment staging.

The licensee's approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to procedural interfaces for high wind hazards, if these requirements are implemented as described.

3.1.3.4 Considerations in Using Offsite Resources - High Wind Hazard

NEI 12-06, Section 7.3.4 states:

> Extreme storms with high winds can have regional impacts that could have a significant impact on the transportation of off-site resources.
>
> 1. Sites should review site access routes to determine the best means to obtain resources from off-site following a hurricane.
>
> 2. Sites impacted by storms with high winds should consider where equipment delivered from off-site could be staged for use on-site.

On pages 9 and 10 of the Integrated Plan, the licensee provided the following information regarding off site resources: The industry will establish two (2) RRCs to support utilities during beyond design basis events. Equipment will be moved from an RRC to a local Assembly Area, established by the SAFER team and the utility. Communications will be established between the affected nuclear site and the SAFER team and required equipment moved to the site as needed. First arriving equipment, as established during development of the nuclear site's playbook, will be delivered to the site within 24 hours from the initial request.

On page 71 the licensee identified an open item, to develop an RRC playbook to support RNP during beyond design basis events, and describing the coordination strategies between RNP and the Regional Response Center. This is combined with Confirmatory Item 3.1.1.4.A in Section 4.2.

The licensee's approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and subject to the successful closure of issues related to the Confirmatory Item, provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to using offsite resources during high wind hazards, if these requirements are implemented as described.

3.1.4 Snow, Ice and Extreme Cold

As discussed in part in NEI 12-06, Section 8.2.1:

All sites should consider the temperature ranges and weather conditions for their site in storing and deploying their FLEX equipment consistent with normal design practices. All sites outside of Southern California, Arizona, the Gulf Coast and Florida are expected to address deployment for conditions of snow, ice, and extreme cold. All sites located north of the 35th Parallel should provide the capability to address extreme snowfall with snow removal equipment. Finally, all sites except for those within Level 1 and 2 of the maximum ice storm severity map contained in Figure 8-2 should address the impact of ice storms.

On page 1 of the Integrated Plan, the licensee provided the following information: RNP is located in Darlington County, SC with coordinates Latitude 34˚ 24' 02" N, Longitude 080˚ 09' 05" W (UFSAR Section 2.1.1.1). RNP is located below the 35th parallel. Per NEI 12-06, Figure 8-1, RNP is in an area corresponding to "low to significant snow accumulations" and "low temperatures." The area represents a record snowfall that is approximately 18-25 inches accumulation over three days. Such snowfalls are considered unlikely to present a significant problem for deployment of FLEX equipment. The licensee concluded that RNP is not required to address extreme snowfall, however, per NEI 12-06, Figure 8-2, RNP is located in a Level 5 area, which is characterized as "Catastrophic destruction to power lines and/or existence of extreme amount of ice," therefore RNP is required to consider the adverse effects of ice on the deployment of FLEX equipment.

The licensee's approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to screening for snow, ice, and extreme cold hazards, if these requirements are implemented as described.

3.1.4.1 Protection of FLEX Equipment – Snow, Ice and Extreme Cold Hazard

NEI 12-06, Section 8.3.1 states:

> These considerations apply to the protection of FLEX equipment from snow, ice, and extreme cold hazards:
>
> 1. For sites subject to significant snowfall and ice storms, portable FLEX equipment should be stored in one of the two configurations.
>
>   a. In a structure that meets the plant's design basis for the snow, ice and cold conditions (e.g., existing safety-related structure).
>
>   b. In a structure designed to or evaluated equivalent to ASCE 7-10, *Minimum Design Loads for Buildings and Other Structures* for the snow, ice, and cold conditions from the site's design basis.
>
>   c. Provided the N sets of equipment are located as described in a. or b. above, the N+1 equipment may be stored in an evaluated storage location capable of withstanding historical extreme weather conditions such that the equipment is deployable.
>
> 2. Storage of FLEX equipment should account for the fact that the equipment will need to function in a timely manner. The equipment should be maintained at a temperature within a range to ensure its likely function when called upon. For example, by storage in a heated enclosure or by direct heating (e.g., jacket water, battery, engine block heater, etc.).

On pages 16, 24, 36, and 47 of the Integrated Plan, the licensee stated that the structure to provide protection of the FLEX equipment will be constructed to meet the requirements identified in NEI 12-06, Section 11. The licensee also stated that the structures will be built prior to the FLEX implementation date, and that the RNP procedures and programs are being developed, to address storage structure requirements, and FLEX equipment requirements relative to the hazards applicable to RNP.

The licensee did not specify the type of BDB storage building configuration or how FLEX equipment such as pumps and power supplies would be stored and protected from extreme cold events. This has been combined with Confirmatory Item 3.1.1.1.A in Section 4.2.

The licensee's approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and subject to the successful closure of issues related to the Confirmatory Item, provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to storage of FLEX equipment during icing and cold temperature events, if these requirements are implemented as described.

3.1.4.2 Deployment of FLEX Equipment - Snow, Ice and Extreme Cold Hazard

NEI 12-06, Section 8.3.2 states:

> There are a number of considerations that apply to the deployment of FLEX equipment for snow, ice, and extreme cold hazards:
>
> 1. The FLEX equipment should be procured to function in the extreme conditions applicable to the site. Normal safety-related design limits for outside conditions may be used, but consideration should also be made for any manual operations required by plant personnel in such conditions.
>
> 2. For sites exposed to extreme snowfall and ice storms, provisions should be made for snow/ice removal, as needed to obtain and transport equipment from storage to its location for deployment.
>
> 3. For some sites, the ultimate heat sink and flow path may be affected by extreme low temperatures due to ice blockage or formation of frazil ice. Consequently, the evaluation should address the effects of such a loss of the UHS on the deployment of FLEX equipment. For example, if UHS water is to be used as a makeup source, some additional measures may need to be taken to assure that the FLEX equipment can utilize the water.

On page 71 of the Integrated Plan, the licensee stated that equipment associated with these strategies will be procured as commercial equipment in accordance with NEI 12-06, Section 11.1.

The Integrated Plan did not discuss measures to deal with potential ice formation on the UHS (Lake Robinson) and did not identify any specific equipment that could be deployed for ice removal on deployment paths. In the Integrated Plan, the table noted as "PWR Portable Equipment Phase 2," did not specifically identify that snow removal equipment was available although debris removal equipment was noted. During the audit the the licensee stated that AP-053, "Severe Weather Response," includes preparations for winter storms and ensurs that snow and ice removal equipment is available. During the audit process, the licensee provided additional information from UFSAR Section 2.3.1.1. This section discuses winter conditions which are described as mild with cold weather lasting from November to late March. Disruption from snowfall is unusual as more than three days of sustained snow cover is rare. The average winter has five days with temperatures of 20 degrees F or below and temperatures below 10 degrees F are rare. Additionally, the licensee stated that there is no documented evidence of Lake Robinson freezing. Anecdotal evidence in the form of UHS injection temperatures during plant operation over a period of 512 days from 6/20/2012 thru 11/14/2013 indicates the coldest injection temperature in winter was 52 degrees F.

The licensee's approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to deployment of FLEX equipment during ice, and cold temperature hazards, if these requirements are implemented as described.

3.1.4.3 Procedural Interfaces - Snow, Ice and Extreme Cold Hazard

NEI 12-06, Section 8.3.3 states:

> The only procedural enhancements that would be expected to apply involve addressing the effects of snow and ice on transport the FLEX equipment. This includes both access to the transport path, e.g., snow removal, and appropriately equipped vehicles for moving the equipment.

On page 12 of the Integrated Plan, the licensee stated that site-specific procedures and/or FSGs will be developed using industry guidance to address the criteria in NEI 12-06, Section 11.4. During the audit process, the licensee stated that procedure AP-053, "Severe Weather Response," includes preparations for winter storms that includes deploying additional heavy equipment operators for the duration of the event and ensuring snow and ice removal equipment is available. The licensee is also in the process of developing FSGs for initial assessment and FLEX equipment staging.

The licensee's approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to procedural interfaces for ice and low temperature hazards, if these requirements are implemented as described.

3.1.4.4 Considerations in Using Offsite Resources- Snow, Ice and Extreme Cold Hazard

NEI 12-06, Section 8.3.4, states that:

> Severe snow and ice storms can affect site access and can impact staging areas for receipt of off-site material and equipment.

On pages 9 and 10 of the Integrated Plan, the licensee provided the following information: The industry will establish two (2) RRCs to support utilities during beyond design basis events. Equipment will be moved from an RRC to a local Assembly Area, established by the SAFER team and the utility. The licensee also stated that communications will be established between the affected nuclear site and the SAFER team and required equipment moved to the site as needed. First arriving equipment, as established during development of the nuclear site's playbook, will be delivered to the site within 24 hours from the initial request.

On page 71 the licensee identified an open item, to develop an RRC playbook to support RNP during beyond design basis events, and describing the coordination strategies between RNP and the RRC. This is combined with Confirmatory Item 3.1.1.4.A in Section 4.2.

The licensee's approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and subject to the successful closure of issues related to the Confirmatory Item, provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to use of off-site resources for ice and cold temperature hazards, if these requirements are implemented as described.

3.1.5 High Temperature Hazard

NEI 12-06, Section 9 states:

> All sites will address high temperatures. Virtually every state in the lower 48 contiguous United States has experienced temperatures in excess of 110˚F. Many states have experienced temperatures in excess of 120˚F.
>
> In this case, sites should consider the impacts of these conditions on deployment of the FLEX equipment.

On page 2 of the Integrated Plan, the licensee stated that the extreme high temperature hazard is applicable for all sites in the United States based on NEI 12-06 Section 9.2, and that virtually every state in the lower 48 contiguous United States has experienced temperatures in excess of 110 degrees F and many in excess of 120 degrees F. The licensee also stated that RNP will consider the impacts of extreme high temperature conditions of 130 degrees F on the procurement, storage, and deployment of FLEX equipment.

The licensee's approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to screening for high temperature hazards, if these requirements are implemented as described.

3.1.5.1 Protection of FLEX Equipment - High Temperature Hazard

NEI 12-06, Section 9.3.1, states that:

> The equipment should be maintained at a temperature within a range to ensure its likely function when called upon.

On pages 16, 24, 36, and 47 of the Integrated Plan, the licensee stated that the structure to provide protection of the FLEX equipment will be constructed to meet the requirements identified in NEI 12-06, Section 11. The licensee also stated that the structures will be built prior to the FLEX implementation date, and that the RNP procedures and programs are being developed, to address storage structure requirements, and FLEX equipment requirements relative to the hazards applicable to RNP.

The licensee did not specify the type of BDB storage building configuration, how FLEX equipment such as pumps and power supplies would be secured or how stored equipment and structures would be protected from high temperatures. This is combined with Confirmatory Item 3.1.1.1.A in Section 4.2.

The licensee's approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and subject to the successful closure of issues related to the Confirmatory Item, provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to protection of FLEX equipment considering high temperatures hazards, if these requirements are implemented as described.

3.1.5.2 Deployment of FLEX Equipment - High Temperature Hazard

NEI 12-06, Section 9.3.2 states:

> The FLEX equipment should be procured to function, including the need to move the equipment, in the extreme conditions applicable to the site. The potential impact of high temperatures on the storage of equipment should also be considered, e.g., expansion of sheet metal, swollen door seals, etc. Normal safety-related design limits for outside conditions may be used, but consideration should also be made for any manual operations required by plant personnel in such conditions.

The Integrated Plan did not identify any specific situations where equipment would be operating at high ambient temperatures, or potentially higher temperature inside buildings where the equipment may be required to operate. However, FLEX equipment deployment strategies are not complete so it is not clear what the actual operating environments for the FLEX equipment will be. During the audit process, the licensee provided the following information: RNP is located in a temperate climate and temperatures in the region range between historical extremes of -9 to 107 degrees F. Personnel will be adequately dressed and will follow safety protocols for high temperatures when performing manual actions to support the mitigation strategies. An outside engineering firm has been contracted to perform an evaluation to provide calculations of the environmental conditions in various areas/compartments related to an ELAP event, and the results of those calculations will be used to provide a better idea of the environmental conditions expected during the event. The resolution of the issue is provided in TER Section 3.2.4.2.

The licensee did not address how potential problems with door access such as sheet metal expansion or swollen door seals would be mitigated This has been identified as Confirmatory Item 3.1.5.2.A in Section 4.2.

The licensee's approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to deployment of FLEX equipment considering high temperatures hazards, if these requirements are implemented as described.

3.1.5.3 Procedural Interfaces - High Temperature Hazard

NEI 12-06, Section 9.3.3 states that:

> The only procedural enhancements that would be expected to apply involve addressing the effects of high temperatures on the portable equipment.

On page 12 of the Integrated Plan, the licensee stated that site-specific procedures and/or FSGs will be developed using industry guidance to address the criteria in NEI 12-06, Section 11.4.

The licensee did not identify any specific procedures for equipment operating at high ambient temperatures, or potentially higher temperature inside buildings where the equipment may be required to operate. The licensee identified an open item regarding procedures to be developed, however, FLEX equipment deployment strategies are not complete so it is not clear what the actual operating environments for the FLEX equipment will be. During the audit process, the licensee stated that RNP is performing an evaluation to provide calculations of the environmental conditions in various areas/compartments related to an ELAP event, and the results of those calculations will be used to provide a better idea of the environmental conditions expected during the event. The resolution of the issue is provided in TER Section 3.2.4.2.

The licensee's approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to procedural interfaces for high temperatures hazards, if these requirements are implemented as described.

3.2 PHASED APPROACH

Attachment (2) to Order EA-12-049 describes the three-phase approach required for mitigating BDBEEs in order to maintain or restore core cooling, containment and spent fuel pool cooling capabilities. The phases consist of an initial phase using installed equipment and resources, followed by a transition phase using portable onsite equipment and consumables and a final phase using offsite resources.

To meet these EA-12-049 requirements, licensees will establish a baseline coping capability to prevent fuel damage in the reactor core or SFP and to maintain containment capabilities in the context of a BDBEE that results in the loss of all ac power, with the exception of buses supplied by safety-related batteries through inverters, and loss of normal access to the UHS.

As discussed in NEI 12-06, Section 1.3, plant specific analysis will determine the duration of each phase.

3.2.1 RCS Cooling and Heat Removal, and RCS Inventory Control Strategies

NEI 12-06, Table 3-2 and Appendix D summarize one acceptable approach for the reactor core cooling strategies. This approach uses the installed auxiliary feedwater (AFW)/emergency feedwater (EFW) system to provide steam generator (SG) makeup sufficient to maintain or restore SG level in order to continue to provide core cooling for the initial phase. This approach relies on depressurization of the SGs for makeup with a portable injection source in order to provide core cooling for the transition and final phases. This approach accomplishes reactor coolant system (RCS) inventory control and maintenance of long term subcriticality through the use of low leak reactor coolant pump seals and/or borated high pressure RCS makeup with a letdown path. In mode 5 (cold shutdown) and mode 6 (refueling) with SGs not available, this approach relies on an on-site pump for RCS makeup and diverse makeup connections to the RCS for long-term RCS makeup with borated water and residual heat removal from the vented RCS.

As described in NEI 12-06, Section 3.2.1.7 and JLD-ISG-2012-01, Section 2.1, strategies that have a time constraint to be successful should be identified and a basis provided that the time can be reasonably met. NEI 12-06, Section 3 provides the performance attributes, general criteria, and baseline assumptions to be used in developing the technical basis for the time constraints. Since the event is a beyond-design-basis event, the analysis used to provide the technical basis for time constraints for the mitigation strategies may use nominal initial values (without uncertainties) for plant parameters, and best-estimate physics data. All equipment used for consequence mitigation may be assumed to operate at nominal setpoints and capacities. NEI 12-06, Section 3.2.1.2 describes the initial plant conditions for the at-power mode of operation; Section 3.2.1.3 describes the initial conditions; and Section 3.2.1.4 describes boundary conditions for the reactor transient.

Acceptance criteria for the analyses serving as the technical basis for establishing the time constraints for the baseline coping capabilities described in NEI 12-06, which provide an acceptable approach, as endorsed by JLD-ISG-2012-01, to meeting the requirements of EA-12-049 for maintaining core cooling are 1) the preclusion of core damage as discussed in NEI 12-06, Section 1.3 as the purpose of FLEX; and 2) prevention of recriticality as discussed in Appendix D, Table D-1.

As described in NEI 12-06, Section 1.3, plant-specific analyses determine the duration of the phases for the mitigation strategies. In support of its mitigation strategies, the licensee performed a thermal-hydraulic analysis for an event with a simultaneous loss of all alternating current (ac) power and loss of normal access to the ultimate heat sink for an extended period (the ELAP event).

Section 3.2 of WCAP-17601-P discusses the pressurized water reactor owner group (PWROG) recommendations that cover various subjects for consideration in developing FLEX mitigation strategies.

Section 3.2 of WCAP-17601-P discusses the PWROG's recommendations that cover the following subjects for consideration in developing FLEX mitigation strategies: (1) minimizing reactor coolant pump (RCP) seal leakage rates; (2) adequate shutdown margin; (3) time initiating cooldown and depressurization; (4) prevention of the RCS overfill; (5) blind feeding an SG with a portable pump; (6) nitrogen injection from cold leg accumulators (CLAs), and (7) asymmetric natural circulation cooldown. The licensee was requested to; discuss their position on each of the recommendations noted above for developing the FLEX mitigation strategies, list the recommendations that are applicable to the plant, provide rationale for the applicability, address how the applicable recommendations are considered in the ELAP coping analysis, discuss the plan to implement the recommendations, and to provide a rationale for each of the recommendations that are determined to be not applicable to the plant. Review of the response to the above issues has been identified as Confirmatory Item 3.2.1.B in Section 4.2.

On Page 12 of the Integrated Plan, the licensee stated that a seismically qualified pressure source (accumulator) capable of supplying 8 hours of SG pressure operated relief valve (PORV) operation will be installed. The licensee did not state whether the accumulator will be missile protected or provide a milestone for completion. The licensee was requested to provide information on the missile protection of the accumulator and when it will be installed. During the audit process, the licensee stated that RNP is refining the SG PORV motive force strategy based on existing plant qualifications for wind and missile protection. Additionally, a new Phase 2 pressure source is being evaluated for feasibility and constructability. A portable strategy is also being considered. This will be the subject of a future six-month update. This has been identified as Confirmatory Item 3.2.1.C in Section 4.2.

On Page 11 of the Integrated Plan, the licensee stated that one of the three trains of the steam supply and regulating valves will be modified to operate on dc power and will be capable of being operated from the CR, to limit the required post-event operator actions. However, in the licensee's six-month update, dated August 28, 2013, the licensee revised the strategy to rely on existing procedures to manually open the valves. The licensee was requested to discuss how this would impact other operator actions during Phase 1 of the ELAP event, and to justify how the manual operation of the steam supply valves will not impede other operator actions during the ELAP event.

During the audit process, the licensee stated that RNP procedure EPP-1, "Loss of all AC power," includes the proposed manual actions. Additionally, the operators are trained on this strategy and perform time critical job performance measures (JPMs) to practice the skills necessary. One of the on-shift non-licensed operators is dedicated at the start of each shift as the safe shutdown operator and would perform this role without impacting shift staffing.

Regarding an uncontrolled cooldown, the licensee was requested to discuss the following issues:

a) Clarify whether the SG PORV or upstream associated piping is a safety-related system, protected from external events such as tornadoes. If not, address the following questions:
b) Clarify whether damage to an SG PORV or upstream associated piping could occur during an ELAP that would result in an uncontrolled cooldown of the reactor coolant system and provide a basis for the response.
c) Clarify whether postulated damage would be limited to a single SG PORV and/or associated piping, or whether failures could be postulated resulting in an uncontrolled cooldown affecting both SGs, and provide a basis for the response.
d) If ELAP scenarios involving the uncontrolled cooldown of one or more SGs may be postulated, describe key operator actions that would be taken to mitigate these events.
e) If ELAP scenarios involving the uncontrolled cooldown of one or more SGs may be postulated, provide analysis demonstrating that the intended mitigating actions would lead to satisfaction of the requirements of Order EA-12-049 for these cases.
f) As applicable, if the operator actions to mitigate an ELAP event involving an uncontrolled cooldown results in an asymmetric cooldown of the reactor coolant system, address the consequences of the asymmetric cooldown on the mixing of boric acid that is added to the reactor coolant system to ensure sub-criticality.

During the audit process, the licensee stated that RNP is evaluating the SG PORVs for hazard protection, and the evaluation will be described in an Engineering Change package, and that the SG PORV strategies will be the subject of a future six-month update. This has been identified as Confirmatory item 3.2.1.D in Section 4.2.

The licensee was requested to discuss the reliability of the steam driven auxiliary feedwater (SDAFW) pump with respect to the following issues:

a) The steam traps are all ganged into one line to the condenser that has the potential to be pinched or crimped in an event and render the SDAFW pump inoperable.
b) The SDAFW pump mini-flow recirculation line has the same exposure.

During the audit process, the licensee stated that an engineering evaluation will be required to respond to the question and will be the subject of a six-month update. This has been identified as Confirmatory Item 3.2.1.E in Section 4.2.

During the audit process, the licensee was requested to provide a discussion regarding the required start of cooldown, a basis for the timing of the start of the cooldown, and the time required to supply SGs prior to dryout.

The licensee provided the following information during the audit process: The cooldown will begin at approximately 2 hours following the event and proceed at 70 degrees F/hr until T-cold is 420 degrees F and SG pressure is approximately 300 psig. The safety-related SDAFW pump is credited to operate as designed with primary and alternative suction sources during initial phase. The portable pump listed on page 53 of the Integrated Plan will have a design capacity of approximately 500 gpm/500 psig and will only be effective after SG depressurization. The portable pump is not intended to provide makeup to the SGs prior to dryout. WCAP-17601-P, Section 5.4 indicates that a feedwater flow interruption at T+0 would result in SG dryout at 3670 seconds (612 minutes) for a Model ‘F’ SG with an initial mass of 91,200 lbm (similar to RNP SGs). The time to dryout increased as the time to the feedwater flow interruption increases (129 minutes at 0.5 hour and 175 minutes at 1 hour).

The licensee’s approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and subject to the successful closure of issues related to the Confirmatory Items, provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to RCS cooling and heat removal, and RCS inventory control strategies, if these requirements are implemented as described.

3.2.1.1 Computer Code Used for the ELAP Analysis

NEI 12-06, Section 1.3 states:

> To the extent practical, generic thermal hydraulic analyses will be developed to support plant specific decision-making. Justification for the duration of each phase will address the on-site availability of equipment, the resources necessary to deploy the equipment consistent with the required timeline, anticipated site conditions following the beyond-design-basis external event, and the ability of the local infrastructure to enable delivery of equipment and resources from offsite.

The licensee did not discuss and has not yet performed a site-specific analysis using a computer code to predict RCS conditions following an ELAP. The licensee stated that RNP is enveloped by the WCAP-17601-P conclusions in that rated thermal power and secondary heat removal characteristics are bounded by the reference plant assumptions cited in WCAP-17601-P. Robinson was explicitly analyzed with NOTRUMP or hand calculations to quantify the ELAP coping period with respect to inventory loss (see WCAP-17601-P, Section 4.1.1.1).

Although NOTRUMP has been reviewed and approved for performing small break LOCA analysis for PWRs, the NRC staff had not previously examined its technical adequacy for simulating an ELAP event. In particular, the ELAP scenario is differentiated from typical design-basis small-break LOCA scenarios in several key respects, including the absence of normal ECCS injection and the substantially reduced leakage rate, which places significantly greater emphasis on the accurate prediction of primary-to-secondary heat transfer, natural circulation, and two-phase flow within the RCS. As a result of these differences, concern arose associated with the use of the NOTRUMP code for ELAP analysis for modeling of two-phase flow within the RCS and heat transfer across the steam generator tubes as single-phase natural circulation transitions to two-phase flow and the reflux condensation cooling mode. This concern resulted in the following Confirmatory Item:

> Reliance on the NOTRUMP code for the ELAP analysis of Westinghouse plants is limited to the flow conditions prior to reflux condensation initiation. This includes specifying an acceptable definition for reflux condensation cooling. This is identified as Confirmatory Item 3.2.1.1.A in Section 4.2.

The licensee's approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and subject to the successful closure of issues related to the confirmatory item, provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to the computer codes used to perform ELAP analysis if these requirements are implemented as planned.

3.2.1.2 Reactor Coolant Pump Seal Leakage Rates

NEI 12-06, Section 1.3 states:

> To the extent practical, generic thermal hydraulic analyses will be developed to support plant specific decision-making. Justification for the duration of each phase will address the on-site availability of equipment, the resources necessary to deploy the equipment consistent with the required timeline, anticipated site conditions following the beyond-design-basis external event, and the ability of the local infrastructure to enable delivery of equipment and resources from offsite.

During the audit process the licensee was requested to discuss Section 5.7.1 of WCAP-17601 which discusses the analyses for the RCS response with RCP safe shutdown/low-leakage seals. Regarding this issue, the licensee provided the following information:

a) RNP assumes 1 gpm/RCP seal leakage in the proposed FLEX strategies.
b) RNP has a modification in place to replace current RCP seals with low-leakage seals. RNP is tracking Part 21 issues with seals and will provide complete response to these questions following receipt of additional Westinghouse/NRC information.
c) RNP is also in discussions with Westinghouse regarding similar questions regarding how WCAP-17601-P applies to RNP.
d) RNP is an 1100 psia SG design plant.
e) RNP uses Westinghouse Model 93 RCPs with standard 8 inch Westinghouse high temperature O-rings.
f) The RNP primary ELAP strategy is to perform a symmetric cooldown using all RCS loops.

During an ELAP event, cooling to the RCP seal packages will be lost and water at high temperatures may degrade seal materials leading to excess leakage from the RCS. Without ac power available to the emergency core cooling system, inadequate core cooling may eventually result from the leakage out of the seals. The ELAP analysis credits operator actions to align the high pressure RCS makeup sources and replenish the RCS inventory in order to ensure the core is covered with water, thus precluding inadequate core cooling. The amount of high pressure RCS makeup needed is mainly determined by the seal leakage rate, therefore the seal leakage rate is of primary importance in an ELAP analysis as greater values of the leakage rates will result in a shorter time period for the operator action to align the high pressure RCS makeup water sources.

The licensee provided a SOE in their Integrated Plan, which included the time constraints and the technical basis for their site. The SOE is based on an analysis using specific RCP seal leakage rates. The issue of RCP seal leakage rates was identified as a Generic Concern and was addressed by the NEI in the following submittals:

- WCAP-17601-P, Revision 1, "Reactor Coolant System Response to the Extended Loss of AC Power Event for Westinghouse, Combustion Engineering and Babcock & Wilcox NSSS Designs" dated January 2013 (ADAMS Accession No. ML13042A011 and ML13042A013 (Non-Publically Available)).

- A position paper dated August 16, 2013, entitled "Westinghouse Response to NRC Generic Request for Additional Information (RAI) on Reactor coolant (RCP) Seal Leakage in Support of the Pressurized Water reactor Owners Group (PWROG)" (ADAMS Accession No. ML13190A201 (Non-Publically Available)).

After review of these submittals, the NRC staff has placed certain limitations for Westinghouse designed plants. Those limitations and their corresponding Confirmatory Item numbers for this TER are provided as follows:

(1) Some Westinghouse plants have installed or will install the SHIELD shutdown seals, or other types of low leakage seals, and have credited or will credit a low seal leakage rate (e.g., 1 gpm/seal) in the ELAP analyses for the RCS response. For those plants, information should be provided to address the impacts of the Westinghouse 10 CFR Part 21 report, "Notification of the Potential Existence of Defects Pursuant to 10 CFR Part 21," dated July 26, 2013 (ADAMS No. ML13211A168) on the use of the low seal leakage rate in the ELAP analysis. (This has been identified as Confirmatory Item 3.2.1.2.A)

(2) If the seals are changed to the newly designed Generation 3 SHIELD seals, or non-Westinghouse seals, the acceptability of the use of the newly designed Generation 3 SHIELD seals, or non-Westinghouse seals should be addressed, and the RCP seal leakages rates for use in the ELAP analysis should be provided with acceptable justification. (This has been identified as Confirmatory Item 3.2.1.2.B)

The licensee's approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and subject to the successful closure of issues related to the Confirmatory Items, provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to the reactor coolant pump seal leakages rates if these requirements are implemented as planned.

3.2.1.3 Decay Heat

NEI Section 3.2.1.2 states in part:

> The initial plant conditions are assumed to be the following:
>
> (1) Prior to the event the reactor has been operating at 100 percent rated thermal power for at least 100 days or has just been shut down from such a power

history as required by plant procedures in advance of the impending event.

The licensee was requested to address the applicability of assumption 4 from WCAP Section 4.2.1 Input Assumptions - Common to All Plant Types on page 4-13 of WCAP-17601, which states that “Decay heat is per ANS 5.1-1979 + 2 sigma, or equivalent,” and to provide a discussion regarding the following key parameters used to determine the decay heat: (1) initial power level, (2) fuel enrichment, (3) fuel burnup, (4) effective full power operating days per fuel cycle, (5) number of fuel cycles, if hybrid fuels are used in the core, and (6) fuel characteristics are based on the beginning of the cycle, middle of the cycle, or end of the cycle. If a different decay heat model is used, the licensee was also requested to address the specific model and the acceptability of the model. During the audit process the licensee stated that they were engaged in discussions with Westinghouse regarding the ELAP analysis and will provide additional information in a future six-month update to the Integrated Plan. This has been identified as Open Item 3.2.1.3.A in Section 4.2.

The licensee’s approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and subject to the successful closure of issues related to the Open Item, provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to decay heat, if these requirements are implemented as planned.

3.2.1.4 Initial Values for Key Plant Parameters and Assumptions

NEI 12-06, Section 3.2 provides a series of assumptions to which initial key plant parameters (core power, RCS temperature and pressure, etc.) should conform. When considering the code used by the licensee and its use in supporting the required event times for the SOE, it is important to ensure that the initial key plant parameters not only conform to the assumptions provided in NEI 12-06, Section 3.2, but that they also represent the starting conditions of the code used in the analyses and that they are included within the code’s range of applicability.

The licensee stated that the technical basis for strategies, assumptions, acceptance criteria and time constraints are described in WCAP-17601-P, however no specific RNP RCS or core parameters were provided in the Integrated Plan. During the audit process the licensee stated that RNP compared specific values for various plant parameters in WCAP-17601-P to verify its analysis was bounding for RNP.

- RNP is a three loop Westinghouse PWR with Model 93 RCPs and Model 44F SGs.
- WCAP-17601-P refers to RNP specifically as member participants in the development of WCAP-17601-P.
- Robinson was explicitly analyzed with NOTRUMP or hand calculations to quantify the ELAP coping period with respect to inventory loss (WCAP-17601-P, Section 4.1.1.1.)
- RNP is licensed to 2339 MWt, which is bounded by WCAP17601-P higher power assumption of 2900 MWt.
- RNP is analyzed specifically for core cooling coping times for the Model 93 RCP seal leakage donor location aspect and improved coping times (WCAP Section 5.3.1.5 and 5.3.1.7)
- WCAP-17601-P PORV capacities and the core power level assumed in the analysis were compared to RNP SG PORV capacities and RNP core power. The RNP relief capacity is greater than the values in Table 5.4.2.1.3-1, and the core power level is greater than the RNP core power of 2339 MWt.

The licensee's approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to initial values for key plant parameters and assumptions, if these requirements are implemented as planned.

3.2.1.5 Monitoring Instrumentation and Controls

NEI 12-06, Section 3.2.1.10 states in part:

> The parameters selected must be able to demonstrate the success of the strategies at maintaining the key safety functions as well as indicate imminent or actual core damage to facilitate a decision to manage the response to the event within the Emergency Operating Procedures and FLEX Support Guidelines or within the SAMGs. Typically, these parameters would include the following:
>
> - SG Level
> - SG Pressure
> - RCS Pressure
> - RCS Temperature
> - Containment Pressure
> - SFP Level
>
> The plant-specific evaluation may identify additional parameters that are needed in order to support key actions identified in the plant procedures/guidance or to indicate imminent or actual core damage

On pages 12/13, 21/22 and 28/29 of the Integrated Plan, the licensee provided the following regarding instrumentation credited for ELAP analysis and to support strategy implementation:

- RCS Hot Leg Temperature
- RCS Cold Leg Temperature
- RCS Wide Range (WR) Pressure
- SG Narrow Range (NR) Level
- SG WR Level Core cooling
- Core Exit Thermocouple Temperature
- RCS Passive Injection
- Accumulator Level
- Pressurizer Level
- Reactor Vessel Level Indicating Monitor reactor vessel
- System inventory
- AFW Pump Flow
- SG Pressure
- CST Level
- Battery Capacity/DC Bus Voltage
- Neutron Flux Maintain sub-criticality
- Containment Pressure
- Containment Temperature

On page 41 of the Integrated Plan, the licensee stated the current configuration can result in a loss of SG wide range level indication and to retain indication throughout an ELAP, the power supply for the A train SG wide range level instrumentation will be moved to either the A or B safety battery.

During the audit process, the license was requested to provide justification that the instrumentation listed and the associated indications are reliable and adequate to provide the desired functions on demand during the ELAP with the containment harsh conditions at high moisture, temperature and pressure levels. Additionally, the licensee was requested to provide a table listing the peak containment pressure and temperature vs. the corresponding design limits, a discussion of the containment analysis including the computer code/method and assumptions, and also, a discussion of the analysis used to determine the strategies and time requirements for actions beyond 7 days to reduce containment pressure and temperature,

During the audit process, the licensee provided the following information: The instruments listed in the Integrated Plan that are located in containment are environmentally qualified and designed for harsh conditions in accordance with Reg Guide 1.97. Calculation RNP-MECH-1877 (available on the e-portal) describes the containment response to the ELAP event assuming the planned installation of low leakage RCP seals. The GOTHIC computer code version 8.0(QA) was used for this analysis. Moisture profiles were not included in the calculation.

Additionally, the licensee stated that: 1) no Phase 1 or 2 strategies are planned for containment protection, 2) Phase 3 strategies include using portable pumps to supply the service water system from Lake Robinson, 3) RRC diesel generators (DGs) will power the emergency buses which in turn will make power available to the containment fan coolers, therefore containment temperature and pressure will be limited and controllable, and 4) the analysis showed that containment pressure and temperature are not challenged for up to 43 days.

The licensee's approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and subject to the successful closure of issues related to the Confirmatory Item, and provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to monitoring instruments and controls, if these requirements are implemented as planned.

3.2.1.6 Sequence of Events

NEI 12-06 discusses an event timeline and time constraints in several sections of the document, for example Section 1.3, Section 3.2.1.7 principle (4) and (6), Section 3.2.2 Guideline (1) and Section 12.1.

NEI 12-06, Section 3.2.2, in part, addresses the minimum baseline capabilities:

> Each site should establish the minimum coping capabilities consistent with unit-specific evaluation of the potential impacts and responses to an ELAP and LUHS. In general, this coping can be thought of as occurring in three phases:
>
> - Phase 1: Cope relying on installed plant equipment.
> - Phase 2: Transition from installed plant equipment to on-site FLEX equipment.

- Phase 3: Obtain additional capability and redundancy from off-site equipment until power, water, and coolant injection systems are restored or commissioned.

In order to support the objective of an indefinite coping capability, each plant will be expected to establish capabilities consistent with Table 3-2 (PWRs). Additional explanation of these functions and capabilities are provided in NEI 12-06 Appendix D, “Approach to PWR Functions.”

The licensee listed Item 9 in the SOE timeline which specified that “at 2-5 hours - Modes 1-4; depressurize the SGs to 300 psia.” Items 18 and 19 of the SOE specify “restoring power to a charging pump for borated makeup to RCS from Refueling Water Storage Tank (RWST) (Primary strategy for RCS makeup)” or “align portable pumps and hoses from the RWST to the Safety Injection (SI) header for makeup to RCS (contingency based on charging pump availability).” The licensee stated that this must be performed in accordance with boration needs which will vary throughout the core cycle. The licensee was requested to provide analysis with supporting details regarding the worst case minimum time makeup to the RCS would be required, the minimum required makeup rates, or when boration was required.

During the audit process, the licensee provided the following information:

The worst case time to core uncovery for RNP is discussed in WCAP-17601-P, Section 5.3.1.5 which states that: “The Turkey Point units and H. B. Robinson have Model 93 RCPs. Quantification of the seal leakage donor location aspect was considered in these cases as well. When factored in, the approximate core cooling coping time increased from 55 hours to approximately 235 hours. A confirmatory informal NOTRUMP run was executed which showed an approximate 24 hours of additional core cooling time compared to the hand calculated value”

Section 5.3.1.7 also states: “All of these cases consider the standard Westionghjouse RCP seal package as supplied with the paarticualr pump model. If a safe shutwond seal or low leakage seal were considered, the core cooling time increases significantly.” RNP plans to install low-leakage RCP seals prior to FLEX implementation as of this writing. Makeup rates, boration strategies and times are being vetted and refined and will be the subject of a future six-month update. This has been identified as Confirmatory Item 3.2.1.6.A in Section 4.2.

The licensee stated in item 20 of the SOE that at 12-16 hours, operators would manually isolate cold leg accumulators to prevent nitrogen injection, and that this must be performed after re-powering the SI accumulator isolation valves, but before the SI accumulators empty or reach a low level. No analysis or supporting details were provided regarding why SI accumulators must be isolated at 12-16 hours. For example, the N2 pressure maintained in the accumulators relative to the status of the RCS cooldown and depressurization in this time frame was not provided.

In response to the staff’s inquiry during the audit process, the licensee stated that RNP is re-evaluating the SI accumulator isolation strategy to ensure timely isolation to prevent nitrogen injection in an indefinite coping strategy. Accumulator isolation strategies and time are being developed and refined and will be the subject of a future 6-month update. This has been identified as Confirmatory Item 3.2.1.6.B in Section 4.2.

The licensee’s approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and subject to the successful closure of issues related to the Confirmatory Items, provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to the SOE, if these requirements are implemented as planned.

3.2.1.7 Cold Shutdown and Refueling

NEI 12-06, Table 1-1, lists the coping strategy requirements as presented in Order EA--12-049. Item (4) of that list states:

> Licensee or CP holders must be capable of implementing the strategies in all modes.

The NRC staff reviewed the licensee's Integrated Plan and determined that the Generic Concern related to shutdown and refueling requirements is applicable to the plant. This Generic Concern has been resolved through the NRC endorsement of NEI position paper entitled "Shutdown/Refueling Modes" (ADAMS Accession No. ML13273A514); and has been endorsed by the NRC in a letter dated September 30, 2013 (ADAMS Accession No. ML13267A382). The position paper describes how licensees will, by procedure, maintain equipment available for deployment in shutdown and refueling modes. The NRC staff concluded that the position paper provides an acceptable approach for demonstrating that the licensees are capable of implementing mitigating strategies in all modes of operation. The NRC staff will evaluate the licensee's resulting program through the audit and inspection process.

The licensee informed the NRC of their plans to abide by this generic resolution.

The licensee's approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to core cooling during cold shutdown and refueling, if these requirements are implemented as described.

3.2.1.8 Core Sub-Criticality

NEI 12-06 Table 3-2 states in part that:

> All plants provide means to provide borated RCS makeup.

NEI 12-06 Table D-1, "Summary of Performance Attributes for PWR Core Cooling Functions" states the following regarding re-powering charging pumps: "In order to address the requirement for diversity, if re-powering of installed charging pumps is used for this function (maintain RCS inventory), then either (a) multiple power connection points should be provided to the charging pump, or (b) provide a single power supply connection point for the charging pump and a single connection point for a portable makeup pump" The licensee's initial strategy to makeup to the RCS in Phase 2 was to re-power an installed plant charging pump, with portable 480 volt ac generators.

The licensee was requested to provide a discussion or analysis of the worst case end of cycle conditions which would be the most limiting time needed to accomplish RCS makeup, and to specify the timing, duration, cooldown rate, and makeup needs for the cooldown where the need for RCS makeup under the proposed strategies would be required. The licensee was also requested to provide a discussion regarding the statement that the "Guidance in WCAP 17601 specifying RCS inventory positive displacement pumps sized at >30 gpm at an estimated 1500 psig will be followed," and also to provide a discussion or a plant specific analysis to confirm that the guidance noted in the WCAP is applicable to RNP, or specify if there are any significant gaps between RNP and the WCAP specifications.

During the audit process, the licensee provided the following information:

- RNP strategies for boration no longer include powering of a charging pump for Phase 2.
- A portable diesel powered high pressure pump will be used to take suction from the RWST (if available) or a portable boration tank.
- The pump capacity and pressure rating will be derived using hydraulic calculations (such as FATHOM) to insure feasibility.
- The cooldown phase will consider initial boron concentrations, xenon build-in, and decay and shutdown margin (SDM) requirements as defined in NEI 12-06
- Boration strategies, rates, and times and SDM are being developed and refined at this time and will be the subject of a future six-month update. This has been is identified as Confirmatory Item 3.2.1.8.A in Section 4.2.

The NRC staff reviewed the licensee's Integrated Plan and determined that the Generic Concern associated with the modeling of the timing and uniformity of the mixing of a liquid boric acid solution injected into the RCS under natural circulation conditions potentially involving two-phase flow was applicable to RNP.

The Pressurized Water Reactor Owners Group (PWROG) submitted a position paper, dated August 15, 2013 (withheld from public disclosure due to proprietary content), which provides test data regarding boric acid mixing under single-phase natural circulation conditions and outlined applicability conditions intended to ensure that boric acid addition and mixing would occur under conditions similar to those for which boric acid mixing data is available. In an endorsement letter dated January 8, 2014, (ADAMS Accession No MLxxxxxxxxx) the NRC staff concluded that the August 15, 2013, position paper constitutes an acceptable approach for addressing boric acid mixing under natural circulation during an ELAP event, provided that the following additional conditions are satisfied:

(1) The required timing for providing borated makeup to the primary system should consider conditions with no reactor coolant system leakage and with the highest applicable leakage rate for the reactor coolant pump seals and unidentified reactor coolant system leakage.

(2) For the condition associated with the highest applicable reactor coolant system leakage rate, two approaches have been identified, either of which is acceptable to the staff:

   a. Adequate borated makeup should be provided such that the loop flow rate in two-phase natural circulation does not decrease below the loop flow rate corresponding to single-phase natural circulation.

   b. If loop flow during two-phase natural circulation has decreased below the single-phase natural circulation flow rate, then the mixing of any borated primary makeup added to the reactor coolant system is not to be credited until one hour after the flow in all loops has been restored to a flow rate that is greater than or equal to the single-phase natural circulation flow rate.

(3) In all cases, credit for increases in the reactor coolant system boron concentration should be delayed to account for the mixing of the borated primary makeup with the reactor coolant system inventory. Provided that the flow in all loops is greater than or equal to the corresponding single-phase natural circulation flow rate, the staff considers a mixing delay period of one hour following the addition of the targeted quantity of boric acid to the reactor coolant system to be appropriate.

During the audit, the licensee informed the NRC staff of its intent to abide by the generic approach discussed above, including the additional conditions specified in the NRC's endorsement letter. As such, the generic concern associated with modeling the timing and uniformity of boric acid mixing within the reactor coolant system (RCS) under natural circulation conditions potentially involving two-phase flow has been adequately addressed for RNP.

The licensee's approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and subject to the successful closure of issues related to the Confirmatory and Open Items, provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to core sub-criticality, if these requirements are implemented as planned.

3.2.1.9 Use of Portable Pumps

NEI 12-06, Section 3.2.2, Guideline (13), states in part:

> Regardless of installed coping capability, all plants will include the ability to use portable pumps to provide RPV/RCS/SG makeup as a means to provide diverse capability beyond installed equipment. The use of portable pumps to provide RCS/SG makeup requires a transition and interaction with installed systems. For example, transitioning …. to a portable pump for SG makeup may require cooldown and depressurization of the SGs in advance of using the portable pump connections. Guidance should address both the proactive transition from installed equipment to portable and reactive transitions in the event installed equipment degrades or fails. Preparations for reactive use of portable equipment should not distract site resources from establishing the primary coping strategy. In some cases, in order to meet the time-sensitive required actions of the site-specific strategies, the FLEX equipment may need to be stored in its deployed position.
>
> The fuel necessary to operate the FLEX equipment needs to be assessed in the plant specific analysis to ensure sufficient quantities are available as well as to address delivery capabilities.

NEI 12-06 Section 11.2 states in part:

> Design requirements and supporting analysis should be developed for portable equipment that directly performs a FLEX mitigation strategy for core, containment, and SFP that provides the inputs, assumptions, and documented analysis that the mitigation strategy and support equipment will perform as intended.

On pages 14 and 15 of the Integrated Plan the licensee provided the following information:

- A portable pump will be procured and pre-staged near the condensate pump area, and an additional pump will be stored in a building designed per the criteria of NEI 12-06 Section 11.3, to meet spare (N+1) requirements, 2).
- These portable pumps will be capable of taking suction from a variety of plant sources, the preferred source is the condensate storage tank (CST).
- Makeup to the CST can be via the six inch emergency fill connection valve, DW-285, and an additional connection will be provided for the CST to satisfy primary and alternate criteria.
- A tee-connection will be added to the 'C' AFW pump discharge line, which will allow the portable pump to supply the AFW system.

Additionally, the licensee stated that the ultimate source of core cooling water is Lake Robinson however due to a relatively long distance between the lake and the plant, it is desirable to use service water (SW) piping as a flow path. Mechanical connections will be added directly into both the south and north SW headers to allow a portable pump to connect, while taking suction directly from Lake Robinson and bypassing the SW pumps. To enable this strategy, the necessary N+1 portable pumps will be stored in a robust structure in a protected location near the intake structure.

In the August 2013 six-month update the licensee provided a new strategy for RCS makeup and boration as follows: Installation of low-leakage SHIELD RCP seals is scheduled for the upcoming outage. With this modification RCS makeup will not be required until 7 days into the event. In Phase 3, the 480 Vac buses will be energized by using RRC generators which will allow charging pump availability and also the closure of the safety injection accumulator isolation valves. The charging pumps will not be required in Phase 2. The borated water source is the RWST for non-missile hazards and a portable boration tanker to be stored in a protected facility. RCS boration will be accomplished using high pressure pump supplied from the RWST or portable boration tanks stored in a protected facility. The RWST will not be hardened for missiles as previously planned.

The licensee listed the following portable pumps in the table titled "PWR Portable Equipment Phase 2" on page 53 of the Integrated Plan:

1) FLEX portable pump (2) for core cooling, @ greater than 300 gpm at 300 psig
2) High capacity FLEX portable pump (2) for core cooling, @ greater than 3000 gpm
3) High pressure FLEX positive displacement pump (2) for core cooling, @ greater than 30 gpm at approximately 1500 psig
4) FLEX portable pump (2) for containment cooling, @ greater than 300 gpm at 300 psig
5) FLEX portable pump (2) for SFP, @ greater than 500 gpm

During the audit process, the licensee was requested to provide supporting details regarding any analyses that were used to determine the required flow rates and corresponding pressures of the portable pumps for SG or RCS fill strategies for Phase 2 or 3 strategies. In response the licensee stated that the WCAP-17601-P, the PWROG position paper dated August 15, 2013, and EDMG-011, "Spent Fuel Pool Casualty," were the basis for the above pump discharge pressures and flow rates. Additionally, the licensee was requested to provide a discussion of the computer codes/methods and assumptions used in the analyses, and address their adequacy. In response the licensee stated that the pressures and flow rates were based on generic studies, and that each application of a portable pump and hoses will be analyzed using accepted industry standards for such hydraulic calculations (e.g., FATHOM) and available vendor information. This will be documented in a future six-month update. This has been identified as Confirmatory Item 3.2.1.9.A in Section 4.2.

Additionally, the licensee stated that: 1) the required AFW mass flow rate to account for decay heat is based on the Westinghouse calculation APP-GW-MOC-001 Rev 1 "Westinghouse Fluid Systems Add-ins," April 22, 2013, 2) decay heat is determined as a function of time with an applied standard deviation margin of 2-sigma, consistent with Westinghouse WCAP-17601-P and Westinghouse letter LTR-LIS-13-147, Rev 0 "Documentation of AFW Demand Calculation, During the First 24 hours of an ELAP Event to Support the FLEX Initiative," August 19, 2013, and the decay heat profiles for SFP heat up were created using two separate methods: a) NRC Branch Technical Position ASB 9-2 and b) ANS/ANSI 5.1-1979 standard.

TER Section 3.2.4.9, "Portable Equipment Fuel," addresses the fuel necessary to operate the FLEX equipment, and provides reasonable assurance that sufficient quantities of fuel as well as delivery capabilities are available.

The licensee's approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and subject to the successful closure of issues related to the Confirmatory Item, provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to use of portable, if these requirements are implemented as planned.

3.2.2 Spent Fuel Pool Cooling Strategies

NEI 12-06, Table 3-2 and Appendix D summarize one acceptable approach for the SFP cooling strategies. This approach uses a portable injection source to provide 1) makeup via hoses on the refuel deck/floor capable of exceeding the boil-off rate for the design basis heat load; 2) makeup via connection to SFP cooling piping or other alternate location capable of exceeding the boil-off rate for the design basis heat load; and alternatively 3) spray via portable monitor nozzles from the refueling deck/floor capable of providing a minimum of 200 gallons per minute (gpm) per unit (250 gpm to account for overspray). This approach will also provide a vent pathway for steam and condensate from the SFP.

As described in NEI 12-06, Section 3.2.1.7 and JLD-ISG-2012-01, Section 2.1, strategies that have a time constraint to be successful should be identified and a basis provided that the time can be reasonably met. NEI 12-06, Section 3 provides the performance attributes, general criteria, and baseline assumptions to be used in developing the technical basis for the time constraints. Since the event is a beyond-design-basis event, the analysis used to provide the technical basis for time constraints for the mitigation strategies may use nominal initial values (without uncertainties) for plant parameters, and best-estimate physics data. All equipment used for consequence mitigation may assume to operate at nominal setpoints and capacities. NEI 12-06, Section 3.2.1.2 describes the initial plant conditions for the at-power mode of operation; Section 3.2.1.3 describes the initial conditions; and Section 3.2.1.6 describes SFP initial conditions.

NEI 12-06, Section 3.2.1.1 provides the acceptance criterion for the analyses serving as the technical basis for establishing the time constraints for the baseline coping capabilities described in NEI 12-06, which provide an acceptable approach to meeting the requirements of EA-12-049 for maintaining SFP cooling. This criterion is keeping the fuel in the SFP covered.

On page 33 of the Integrated Plan, the licensee stated that there is no Phase 1 strategy necessary for SFP makeup on loss of power to the SFP cooling pumps other than to monitor the SFP level. The licensee also stated that with no heat removal, the time for the SFP water to rise from 150 degrees F to boiling for a full core discharge (fills SFP to capacity) is approximately 3.64 hours per calculation RNP-M-Mech-1 590, Revision 5, "Time-to-Boil Curves for the Spent Fuel Pool and Refueling Cavity," that this is sufficient time to mobilize equipment for Phase 2, and that the estimated time to uncover any spent fuel is significantly longer. During the audit process, the licensee was requested to clarify the time to fuel uncovery. The licensee responded that the worst case time-to-boil to the top of the fuel racks was calculated to be 45.23 hours which assumes a full core offload and an initial temperature of 150 degrees F.

The licensee also stated that additional actions to establish venting are not required for RNP due to the physical separation within the power block, and that the current design of the structure is such that opening the existing doors and roof hatch provides sufficient venting. The licensee was requested to confirm the vent path for this strategy. During the audit process, the licensee stated that access to the SFP is from the outside door at the 275 ft. elevation. There is also a large removable hatch via the roof of the SFP building. Either door or hatch can be used to vent the SFP steam and condensate cannot be vented into the RAB as there is no access directly to the RAB from the SFP.

On page 35 of the Integrated Plan, the licensee stated that refilling the SFP may be accomplished through the use of hoses on the refueling floor, use of spray nozzles, or providing makeup through the use of installed SFP piping. The licensee also stated that the primary strategy for providing makeup water to the SFP is through the use of a portable pump (250 gpm) with attached suction and discharge hoses, and that to deploy this strategy, at least one portable pump is obtained from the FLEX storage building, and placed at the discharge canal with hoses of sufficient length to reach the SFP connected to the portable pump.

The licensee stated that the alternate strategy is to provide makeup via installed SFP piping. RNP currently has two Emergency Cooling Connections (ECCs) that can be used for external filling to robust piping. The first connection is a four inch blind flange on the suction side of the 'B' SFP Cooling (SFPC) pump and allows water to be pumped directly into the pool. This connection is located on the second level of the Fuel Handling Building in the SFPC pump room. Located in the SFPC heat exchanger room, the ECC is upstream of the SFPC heat exchanger which then discharges into the SFP, (UFSAR Section 9.1.3). These connections will be used with portable pumps to draw water from diverse locations (RWST, discharge canal) and discharge directly into the pool.

The licensee was requested to provide a discussion on how these diverse water sources will be prioritized and how they will be connected to the ECCs, and to describe the prioritization of the water sources to be used to discharge into the SFP, and how each water source will be connected to the ECCs.

During the audit process, the licensee provided the following information regarding water sources: 1) the two readily available water sources are Lake Robinson and the discharge canal, and a portable pumper will be staged to take suction at one of the sources and hoses are used to route the discharge to the SFP. 2) Three options are available for routing. The first option is that a hose can be brought up to the SFP operating deck and deployed into the pool. The second option is to stage a monitor nozzle to deliver directly to the pool. The third option is to route the hose into the adjacent SFP heat exchanger room and connect to the hose to an installed FLEX connection at the outlet of the SFP heat exchanger which will refill the SFP from a connection outside the SFP building.

The licensee's approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to SFP cooling strategies, if these requirements are implemented as planned.

3.2.3 Containment Functions Strategies

NEI 12-06, Table 3-2 and Appendix D provide some examples of acceptable approaches for demonstrating the baseline capability of the containment strategies to effectively maintain containment functions during all phases of an ELAP. For example, containment pressure control/heat removal utilizing containment spray.

On page 28 of the Integrated Plan, the licensee specified that containment isolation will occur on a Station Blackout (SBO) event, and that the requirement for the containment safety function is the ability to maintain or re-power key containment parameter instruments as discussed in NEI 12-06, Section 3.2.1.10 and PWROG recommendations. The licensee also stated that the instrumentation recommended to monitor these key containment parameters are as follows: containment pressure, containment temperature, and battery capacity/dc bus voltage, which are powered by safety batteries and will be available until battery depletion.

On page 28 of the Integrated Plan, the licensee specified that a containment temperature and pressure analysis will be performed based on the postulated ELAP event, and it is anticipated that the results of this calculation will show that containment will neither over-pressurize nor reach a temperature exceeding instrumentation Environmental Qualification (EQ) limits; thus requiring no additional strategies. Should the analysis not yield the predicted results described, a primary and secondary strategy will be provided.

The licensee has not completed a containment temperature and pressure analysis for the ELAP condition. During the audit process, the licensee provided the following information regarding containment analysis: 1) Calculation RNP-M/MECH-1877, which was performed using the GOTHIC computer code version 8.0(QA), describes the containment response to an ELAP event assuming the planned installation of low-leakage seals. 2) This calculation showed that at 10 days containment pressure and temperature reached 15.7 psig and 203.3 degrees F, and that containment design pressure of 42 psig was reached at approximately 43 days and design temperature of 263 degrees F was reached at approximately 44 days. The licensee did not discuss any strategies for managing containment conditions during the ELAP. Further review of this calculation and information related to any contemplated strategies needed to maintain containment functions has been identified as Confirmatory Item 3.2.3.A in Section 4.2.

The licensee's approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and subject to the successful closure of issues related to the Confirmatory Item, provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to containment functions strategies, if these requirements are implemented as planned.

3.2.4 Support Functions

3.2.4.1 Equipment Cooling – Cooling Water

NEI 12-06, Section 3.2.2, Guideline (3) states:

Plant procedures/guidance should specify actions necessary to assure that equipment functionality can be maintained (including support systems or alternate method) in an ELAP/LUHS or can perform without ac power or normal access to the UHS.

Cooling functions provided by such systems as auxiliary building cooling water, service water, or component cooling water may normally be used in order for equipment to perform their function. It may be necessary to provide an alternate means for support systems that require ac power or normal access to the UHS, or provide a technical justification for continued functionality without the support system.

The Integrated Plan did not provide sufficient information regarding cooling functions provided by such systems as auxiliary building cooling water, service water, or component cooling water cooling when ac power is lost during the ELAP for Phases 1 and 2. The licensee was requested to provide additional information regarding supplemental cooling to the subject components and areas when normal cooling will not be available during the ELAP, and to include a detailed summary of the analysis and/or technical evaluation performed to demonstrate the adequacy of the ventilation provided in the pump rooms to support equipment operation throughout all phases of an ELAP. During the audit process, the licensee responded by stating that; RNP is performing an evaluation to provide calculations of the environmental conditions in various areas/compartments related to an ELAP event, the results of the evaluation will be used to determine if any specific actions are required to cope with extreme high temperatures, and will be the subject of a future six-month update. Review of planned actions to supply cooling water to various components has been identified as Confirmatory Item 3.2.4.1.A in Section 4.2.

The licensee's approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and subject to the successful closure of issues related to the Confirmatory Item, provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to equipment cooling water, if these requirements are implemented as planned.

3.2.4.2 Ventilation – Equipment Cooling

NEI 12-06, Section 3.2.2, Guideline (10) states:

Plant procedures/guidance should consider loss of ventilation effects on specific energized equipment necessary for shutdown (e.g., those containing internal electrical power supplies or other local heat sources that may be energized or present in an ELAP.

ELAP procedures/guidance should identify specific actions to be taken to ensure that equipment failure does not occur as a result of a loss of forced ventilation/cooling. Actions should be tied to either the ELAP/LUHS or upon reaching certain temperatures in the plant. Plant areas requiring additional air flow are likely to be locations containing shutdown instrumentation and power supplies, turbine-driven decay heat removal equipment, and in the vicinity of the inverters. These areas include: steam driven [auxiliary feedwater] AFW pump room, HPCI and RCIC pump rooms, the control room, and logic cabinets. Air flow may be accomplished by opening doors to rooms and electronic and relay cabinets, and/or providing supplemental air flow.

> Air temperatures may be monitored during an ELAP/LUHS event through operator observation, portable instrumentation, or the use of locally mounted thermometers inside cabinets and in plant areas where cooling may be needed. Alternatively, procedures/guidance may direct the operator to take action to provide for alternate air flow in the event normal cooling is lost. Upon loss of these systems, or indication of temperatures outside the maximum normal range of values, the procedures/guidance should direct supplemental air flow be provided to the affected cabinet or area, and/or designate alternate means for monitoring system functions.
>
> For the limited cooling requirements of a cabinet containing power supplies for instrumentation, simply opening the back doors is effective. For larger cooling loads, such as HPCI, RCIC, and AFW pump rooms, portable engine-driven blowers may be considered during the transient to augment the natural circulation provided by opening doors. The necessary rate of air supply to these rooms may be estimated on the basis of rapidly turning over the room's air volume.
>
> Temperatures in the HPCI pump room and/or steam tunnel for a BWR may reach levels which isolate HPCI or RCIC steam lines. Supplemental air flow or the capability to override the isolation feature may be necessary at some plants. The procedures/guidance should identify the corrective action required, if necessary.
>
> Actuation setpoints for fire protection systems are typically at 165-180°F. It is expected that temperature rises due to loss of ventilation/cooling during an ELAP/LUHS will not be sufficiently high to initiate actuation of fire protection systems. If lower fire protection system setpoints are used or temperatures are expected to exceed these temperatures during an ELAP/LUHS, procedures/guidance should identify actions to avoid such inadvertent actuations or the plant should ensure that actuation does not impact long term operation of the equipment.

On page 41 of the Integrated Plan, the licensee stated that upon loss of ac power, no heating ventilation and air conditioning (HVAC) systems are available, and that there are no actions to restore HVAC during Phase 1. Additionally strategies to provide cooling to the CR are already in place at RNP and will be used as-is, including opening cabinet and exterior doors, and all other plant areas are sufficiently cool for eight hours, as determined for the SBO scenario. Further calculations will be performed for an ELAP without installed ac power restoration for longer periods of time.

On page 45 of the Integrated Plan, the licensee stated that existing plant procedures describe how portable fan blowers and exhaust ductwork will be aligned in the CR within three hours, and that for other areas of the plant, the Phase 2 strategy of re-powering 480V switchgear E1 or E2 and 480V MCC 5 will restore HVAC. An analysis of HVAC requirements for operating equipment will be performed based on area heat-up times without cooling available for indefinite coping.

The licensee stated that the primary strategy powering the battery room exhaust fans to remove any hydrogen gas accumulation during charging will be through portable diesel generators at connection points near the emergency diesel generator as described for powering the essential instrument bus. Additionally for other areas of the plant, the strategy is to provide portable fan blowers and generators which will be procured and used to provide forced convection for personnel habitability in areas where needed. The alternate method for providing ventilation to the battery rooms requires installing manual transfer switches with the ability to quick-connect to portable 5kW diesel generators.

The licensee noted that all ventilation needs had not been determined. The licensee was requested to provide additional information regarding supporting analysis to determine the acceptability of the licensee's plans to provide ventilation to the subject areas when normal ventilation will not be available during the ELAP. During the audit process, the licensee responded by stating that RNP is performing an evaluation to provide calculations of the environmental conditions in various areas/compartments related to an ELAP event. The results of the evaluation will be used to determine if any specific actions are required to cope with extreme high temperatures. This will be the subject of a future six-month update. This has been identified as Confirmatory Item 3.2.4.2.A in Section 4.2.

The NRC has identified the following issues regarding habitability of the CR during the ELAP. Without ventilation the CR would most likely heat up. If temperatures approach a steady-state condition of 110 degrees F, the environmental conditions within the CR would remain at the uppermost habitability temperature limit defined in NUMARC 87-00 for efficient human performance. NUMARC 87-00 provides the technical basis for this habitability standard as MIL-STD-1472C, which concludes that 110 degrees F is tolerable for light work for a 4 hour period while dressed in conventional clothing with a relative humidity of ~30%. The licensee did not supply sufficient information to conclude that the habitability limits of the CR will be maintained in all Phases of an ELAP. During the audit process, the licensee responded by stating that RNP is performing an evaluation to provide calculations of the environmental conditions in various areas/compartments related to an ELAP event. The results of the evaluation will be used to determine if any specific actions are required to cope with extreme high temperatures. This has been combined with Confirmatory Item 3.2.4.2.A in Section 4.2.

The NRC has also identified issues with hydrogen accumulation in the battery rooms. With no ventilation for the battery rooms, hydrogen gas building could become an issue. As the strategy for providing ventilation to the battery room has not been developed, the licensee was requested to provide a discussion of battery room ventilation to prevent hydrogen accumulation while recharging the batteries in phase 2 or 3. During the audit process, the licensee stated that RNP is performing an evaluation to provide calculations of the environmental conditions in various areas/compartments related to an ELAP event, and that the results of the evaluation will be used to determine if any specific actions are required to cope with extreme high temperatures. Additionally, a calculation for hydrogen accumulation in the battery room is also being performed. This above analysis and calculations will be the subject of a future six-month update. This has been identified as Confirmatory Item 3.2.4.2.B in Section 4.2.

The licensee's approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and subject to the successful closure of issues related to the Confirmatory Items, provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to ventilation equipment cooling, if these requirements are implemented as planned.

3.2.4.3 Heat Tracing

NEI 12-06, Section 3.2.2, Guideline (12) states:

> *Plant procedures/guidance should consider loss of heat tracing effects for equipment required to cope with an ELAP. Alternate steps, if needed, should be identified to supplement planned action.*
>
> Heat tracing is used at some plants to ensure cold weather conditions do not result in freezing important piping and instrumentation systems with small diameter piping. Procedures/guidance should be reviewed to identify if any heat traced systems are relied upon to cope with an ELAP. For example, additional condensate makeup may be supplied from a system exposed to cold weather where heat tracing is needed to ensure control systems are available. If any such systems are identified, additional backup sources of water not dependent on heat tracing should be identified.

In the integrated plan, the licensee did not discuss the effects of loss of power to heat tracing and therefore additional information is required to conclude that this consideration from NEI 12-06, Section 3.2.2 paragraph 13, has been adequately addressed. During the audit process, the licensee stated that loss of heat tracing on instrument lines has been identified, however heat tracing is not safety-related and is not robust. Strategies will be developed to address the loss of heat tracing and will be the subject of a future six-month update. This has been identified as Confirmatory Item 3.2.4.3.A in Section 4.2.

The licensee's approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and subject to the successful closure of issues related to the Confirmatory Item, provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to heat tracing, if these requirements are implemented as planned.

3.2.4.4 Accessibility – Lighting and Communications

NEI 12-06, Section 3.2.2, Guideline (8) states:

> *Plant procedures/guidance should identify the portable lighting (e.g., flashlights or headlamps) and communications systems necessary for ingress and egress to plant areas required for deployment of FLEX strategies.*
>
> Areas requiring access for instrumentation monitoring or equipment operation may require portable lighting as necessary to perform essential functions.
>
> Normal communications may be lost or hampered during an ELAP. Consequently, in some cases, portable communication devices may be required to support interaction between personnel in the plant and those providing overall command and control.

On pages 41 and 42 of the Integrated Plan, the licensee stated the following regarding lighting: 1) upon loss of ac power, emergency lighting is provided by installed eight hour battery packs, 2) emergency plant lighting modifications to incorporate LED technology will be initiated thereby increasing the effective life of the battery packs, 3) safety batteries 'A' and 'B' provide limited plant lighting, and 4) supplementing the existing safety batteries with additional non-safety related batteries will have the objective of providing an overall eight hour minimum capacity.

Additionally, the licensee stated that: 1) this will extend Phase 1 long enough to get Phase 2 coping strategies in place for the lighting currently powered by vital buses supplied by the safety batteries, and 2) additional portable lighting will be procured to facilitate implementation of FLEX strategies and to reduce human error and increase safety during a BDBEE event, which will augment head and hand lamps, and will be coordinated with individual FLEX strategies.

On pages 44 and 45 of the Integrated Plan, the licensee specified that the vital lighting in the CR will be restored by providing power back to the battery chargers, and that the primary strategy for powering the battery chargers is by modifying the current 480V switchgear E1 or E2 and will include portable diesel generator connection points near the existing diesel generator capable of switching between the existing diesel generator power feeds and portable FLEX generator power feed (switchgear E1 and E2 provide power to the 480V MCCs that feed the battery chargers).

Additionally, the licensee stated that the alternate method for powering the battery chargers is to power battery chargers directly with manual transfer switches compatible for quick portable diesel generator connection, and when powering only one battery charger by use of a manual transfer switch the diesel generator must be capable of providing 60kW. For outside areas, portable lighting towers may be used.

On page 50 of the Integrated Plan, the licensee specified that the strategy for getting power restored to critical lighting areas (other than the CR) in Phase 3 is a continuation of the Phase 2 strategy. This is accomplished by modifying the current 480V switchgear E1 or E2 to include portable diesel generator connection points near the existing diesel generator. These connection points will be capable of switching between the existing diesel generator power feeds and portable FLEX generator power feeds. E1 or E2 provide power to critical 480V MCC's that feed various panels that supply lighting circuits considered critical to operations. The licensee stated that another strategy in Phase 3 to restore lighting is to power 480V MCC's 5 and 6 by either bus modification for diesel generator connection or by addition of a new panel with diesel generator connections integrated into the vertical panel design, allowing for full horizontal bus ampacity. The licensee has developed strategies for restoring normal and emergency lighting during the ELAP and has identified multiple open items in the Integrated Plan related to lighting.

The NRC staff has reviewed the licensee communications assessment (ADAMS Accession No. ML12311A299 and ML13058A045) in response to the March 12, 2012, 50.54(f) request for information letter, and as documented in the staff analysis (ADAMS Accession No. ML13105A413) has determined that the assessment for communications is reasonable, and the analyzed existing systems, proposed enhancements, and interim measures will help to ensure that communications are maintained. Therefore, there is reasonable assurance that the guidance and strategies developed by the licensee will conform to the guidance of NEI 12-06 Section 3.2.2 (8) regarding communications capabilities during an ELAP. Confirmation will be required that upgrades to the site’s communications systems have been completed. This has been identified as Confirmatory Item 3.2.4.4.A in Section 4.2.

The licensee’s approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and subject to the successful closure of issues related to the Confirmatory Item, provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to lighting and communications, if these requirements are implemented as planned.

3.2.4.5 Protected and Internal Locked Area Access

NEI 12-06, Section 3.2.2, Guideline (9) states:

> *Plant procedures/guidance should consider the effects of ac power loss on area access, as well as the need to gain entry to the Protected Area and internal locked areas where remote equipment operation is necessary.*
>
> At some plants, the security system may be adversely affected by the loss of the preferred or Class 1E power supplies in an ELAP. In such cases, manual actions specified in ELAP response procedures/guidance may require additional actions to obtain access.

On page 72 of the Integrated Plan, the licensee provided an open item which noted that necessary modifications will be made to existing onsite fences, structures or security parameters to facilitate flex equipment deployment.

Although the licensee stated that modifications will be made to existing onsite fences, structures or security parameters to facilitate flex equipment deployment, it is not clear if these modifications will eliminate the need for electric power to operate these systems. The licensee was requested to provide additional clarifying information regarding the need for electric power or alternate actions to facilitate deployment of FLEX equipment and access to internal locked areas when power is lost to security systems. During the audit process, the licensee stated that electric power is not required to access all areas of the plant in an ELAP, all plant operators and security personnel carry security keys that can access all locked doors regardless of ac power availability, and that gate access is similar to using available keys.

The licensee's approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to protected and internal locked area access, if these requirements are implemented as described.

3.2.4.6 Personnel Habitability – Elevated Temperature

NEI 12-06, Section 3.2.2, Guideline (11), states:

> *Plant procedures/guidance should consider accessibility requirements at locations where operators will be required to perform local manual operations.*
>
> Due to elevated temperatures and humidity in some locations where local operator actions are required (e.g., manual valve manipulations, equipment connections, etc.), procedures/guidance should identify the protective clothing or other equipment or actions necessary to protect the operator, as appropriate.
>
> FLEX strategies must be capable of execution under the adverse conditions (unavailability of installed plant lighting, ventilation, etc.) expected following a BDBE resulting in an ELAP/LUHS. Accessibility of equipment, tooling, connection points, and plant components shall be accounted for in the development of the FLEX strategies. The use of appropriate human performance aids (e.g., component marking, connection schematics, installation sketches, photographs,

etc.) shall be included in the FLEX guidance implementing the FLEX strategies.

Section 9.2 of NEI 12-06 states,

> Virtually every state in the lower 48 contiguous United States has experienced temperatures in excess of 110 degrees F. Many states have experienced temperatures in excess of 120 degrees F.

Since the licensee's response noted that all ventilation needs had not been determined, additional information is required regarding supporting analysis to determine the acceptability of the licensee's plans to provide ventilation to the subject areas when normal ventilation will not be available during the ELAP. During the audit process, the licensee responded by stating that RNP is performing an evaluation to provide calculations of the environmental conditions in various areas/compartments related to an ELAP event. The results of the evaluation will be used to determine if any specific actions are required to cope with extreme high temperatures. This will be the subject of a future six-month update. This has been combined with Confirmatory Item 3.2.4.2.A in Section 4.2.

In the August 2013 six-month update, RNP stated that they will use the current emergency strategy of manually operating valves to control the SDAFW pump.

The licensee was requested to discuss: a) how frequently manual operation of the valves is required, b) the temperature and humidity in the area where the valves are located, and c) the ability of operators to perform the required operation in the expected environmental conditions.

During the audit process, the licensee stated that; a) the steam supply valves to the SDAFW pump will be opened initially and operated infrequently during the first several hours of the event, and the AFW valves will be opened initially to restore SG levels to the normal range and then throttled and operated periodically to maintain levels (decay heat dependent), b) the SDAFW pump and associated manual valves are located in the turbine building Class 1 bay which is an open structure, and portable blowers will be available if necessary to provide for air movement in the area, and c) since RNP is located in what is considered to be a temperate climate, storage and operation of the FLEX equipment is not considered to be an issue.

The licensee's approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and subject to the successful closure of issues related to the Confirmatory Item, provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to personnel habitability with elevated temperatures, if these requirements are implemented as described.

3.2.4.7 Water Sources

NEI 12-06, Section 3.2.2, Guideline (5) states:

> *Plant procedures/guidance should ensure that a flow path is promptly established for makeup flow to the steam generator/nuclear boiler and identify backup water sources in order of intended use. Additionally, plant procedures/guidance should specify clear criteria for transferring to the next preferred source of water.*
>
> Under certain beyond-design-basis conditions, the integrity of some water sources may be challenged. Coping with an ELAP/LUHS may require water

supplies for multiple days. Guidance should address alternate water sources and water delivery systems to support the extended coping duration. Cooling and makeup water inventories contained in systems or structures with designs that are robust with respect to seismic events, floods, and high winds, and associated missiles are assumed to be available in an ELAP/LUHS at their nominal capacities. Water in robust UHS piping may also be available for use but would need to be evaluated to ensure adequate NPSH can be demonstrated and, for example, that the water does not gravity drain back to the UHS. Alternate water delivery systems can be considered available on a case-by-case basis. In general, all CSTs should be used first if available. If the normal source of makeup water (e.g., CST) fails or becomes exhausted as a result of the hazard, then robust demineralized, raw, or borated water tanks may be used as appropriate.

Finally, when all other preferred water sources have been depleted, lower water quality sources may be pumped as makeup flow using available equipment (e.g., a diesel driven fire pump or a portable pump drawing from a raw water source). Procedures/guidance should clearly specify the conditions when the operator is expected to resort to increasingly impure water sources.

On page 11 and 12 of the Integrated Plan, the licensee specified that the AFW system provides feedwater to the SGs as required to perform a RCS cooldown, maintain safe shutdown, and mitigate the consequences of all transient and accident scenarios in which AFW system operation is credited, and that the SDAFWP will deliver CST inventory to the SGs. During the audit process, the licensee provided the following information regarding water sources: 1) the installed CST is protected against all hazards except for wind driven missiles, and in all events that do not include this hazard the CST (150,000 gallons) will supply the SDAFW pump for approximately 4 hours, and 2) the four hour cooping time is sufficient to connect a portable pump at either the discharge canal or at the lake and supply water to a FLEX connection on the CST using a fire hose. Additionally, if the Circulating Water (CW) inlet bay survives the event the inlet bay can be used as follows: 1) a portable FLEX pump will be staged in the turbine pedestal and protected from missiles and will be aligned to take suction from the CW inlet bay (capacity approximately 530,000 gallons of stored volume with continuous makeup at normal lade level), 2) this will be supplied directly to the SDAFW pump via a fire hose, 3) this action will have an approximate time of 1 hour to prevent SG dryout, and 4) RNP will supply sufficient equipment to meet the N+1 requirement.

In the August 2013 six-month update, the licensee provided a new strategy for RCS makeup and boration. The license stated that they plan on installing the low-leakage SHIELD RCP seals in the upcoming outage, and with this modification RCS makeup will not be required until 7 days into the event. Additionally, in Phase 3, the 480 VAC busses will be energized by using RRC generators which will allow charging pump availability and also the closure of the safety injection accumulator isolation valves. The licensee also stated that the charging pumps will not be required in Phase 2, and that the borated water source is the RWST for non-missile hazards and a portable boration tanker to be stored in a protected facility. RCS boration will be accomplished using high pressure pump supplied from the RWST or portable boration tanks. The RWST will not be hardened for missiles as previously planned.

Also, the consequences of using potentially impure raw water source to supply the SG were not discussed. During the audit process, the licensee stated that RNP is performing an analysis to provide calculations and timing for strategies to use alternate cooling sources such as Lake

Robinson, the discharge canal and three deep well pumps as SG makeup sources. The results of the evaluation will be used to determine if any specific actions are required to cope with impure water sources. The results will be the subject of a future six-month update. This has been identified as Confirmatory Item 3.2.4.7.A in Section 4.2.

The licensee's approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and subject to the successful closure of issues related to the Confirmatory Items, provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to makeup water sources, if these requirements are implemented as described.

3.2.4.8 Electrical Power Sources/Isolations and Interactions

NEI 12-06, Section 3.2.2, Guideline (13) states in part:

> The use of portable equipment to charge batteries or locally energize equipment may be needed under ELAP/LUHS conditions. Appropriate electrical isolations and interactions should be addressed in procedures/guidance.

The licensee provided a strategy for connection of portable 480 VAC generators to re-power 480 VAC switchgear E1 or E2. The licensee was requested to provide a discussion regarding adequate electrical isolation between the plant generators and the portable equipment. During the audit process, the licensee stated that: 1) prior to re-energizing the battery chargers procedures will require opening the normal supply breaker to the chargers, 2) portable cable will be connected form the FLEX generator to a receptacle on the individual chargers 3) administrative controls will be used to unsure electrical isolation will be maintained such that Class 1E equipment is protected from faults in portable equipment and multiple sources do not attempt to power electrical busses, and 4) procedures will direct manipulations (rack out, open) operations of control power supplies and breaker switches in the MCB.

During the audit process, the licensee stated that the strategy to power the battery has been revised to use a pre-staged portable diesel generator to supply ac power directly to the vital battery chargers. This use of installed or pre-staged generators appears to be an alternative approach for satisfying the Mitigating Strategies Order, which relies primarily on portable equipment. Insufficient information has been provided by the licensee to determine whether the proposed approach provides an equivalent level of protection as would be provided through conformance with NEI 12-06. This is identified as Open Item 3.2.4.8.A in Section 4.1.

The licensee's approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and subject to the successful closure of issues related to the Open Item, and provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to electrical power sources/isolations and interactions, if these requirements are implemented as described.

3.2.4.9 Portable Equipment Fuel

NEI 12-06, Section 3.2.2, Guideline (13) states in part:

> The fuel necessary to operate the FLEX equipment needs to be assessed in the plant specific analysis to ensure sufficient quantities are available as well as to address delivery capabilities.

NEI 12-06, Section 3.2.1.3, initial condition (5) states:

> Fuel for FLEX equipment stored in structures with designs which are robust with respect to seismic events, floods and high winds and associated missiles, remains available.

On page 45 of the Integrated Plan, the licensee specified that to support the implemented strategies used during Phase 2, all portable equipment that supplies power will be refueled as needed. The licensee also stated that since the emergency diesel generators (EDG) will not be available during the BDBEE, the fuel oil tanks can be used to replenish the fuel tanks of the portable equipment used during Phase 2. Additionally, the licensee stated that RNP has several onsite fuel oil storage tanks; the Diesel Fuel Oil Storage Tanks (DFOSTs) and the Auxiliary Fuel Oil Storage Tanks (AFOSTs), but none are protected from all external hazards. The licensee stated that since the tanks are sufficiently separate from one other, they can be credited as being in diverse locations, unlikely to suffer from a common failure. Additionally, the licensee stated that though the inventory can be credited, the fuel currently cannot be easily retrieved under loss of power, and that RNP will acquire a fuel pumping vehicle/trailer that can be used to extract and deliver fuel oil from the tanks on site to staged FLEX equipment staged at various plant locations.

The licensee was requested to provide a discussion or analysis regarding the statement that although fuel tanks are not protected from all hazards, they are sufficiently separate from one other, can be credited as being in diverse locations, and are unlikely to suffer from a common failure, or damage from seismic, flood or high wind hazards, and to also specify fuel supply tank capacities and the flow paths for the fuel oil associated with the diesel-driven pumps. During the audit process, the licensee provided the following information regarding fuel tanks: 1) all FLEX equipment will be stored fully fueled, 2) initial diesel fuel for refueling will come from two 500 gallon diesel fuel trailers that will be stored in the FLEX storage facility that is protected from applicable hazards, 3) replacement fuel is available from the AFOSTs (protected for missile hazards and containing approximately 3,000 gallons) located on the third floor of the rad waste building in a robust area and can be gravity drained to the fuel trailers. Additionally, fuel can be drained or pumped via the DFOST (Technical Specification (TS) source for the emergency diesel generators (EDGs) - approximately 19,000 gallons) to the fuel trailers. The licensee also stated that fuel can also be gravity drained or pumped using the diesel powered pumps on the refueling trailers from the combustion turbine fuel tanks (14,000 gallons) to the fuel trailers, and that this is also a TS source for the EDGs. Additionally, the licensee stated that all supply sources are located above ground, and fuel quality is assured through routine sampling and normal usage and replenishment. The licensee identified an open item to perform an analysis to determine the fuel consumption rates of all portable generators and pumping equipment. This is identified as Confirmatory Item 3.2.4.9.A in Section 4.2.

On page 50 of the Integrated Plan, the licensee specified that to allow for coping through Phase 3, all portable equipment that supplies power will be refueled as needed, and that provisions will be made for an offsite fuel delivery to RNP before all onsite fuel is depleted.

The licensee's approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and subject to the successful closure of issues related to the Confirmatory Item, and provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to portable equipment fuel, if these requirements are implemented as described.

3.2.4.10 Load Reduction to Conserve DC Power

NEI 12-06, Section 3.2.2, Guideline (6) states:

> *Plant procedures/guidance should identify loads that need to be stripped from the plant dc buses (both Class 1E and non-Class 1E) for the purpose of conserving dc power.*
>
> DC power is needed in an ELAP for such loads as shutdown system instrumentation, control systems, and dc backed AOVs and MOVs. Emergency lighting may also be powered by safety-related batteries. However, for many plants, this lighting may have been supplemented by Appendix R and security lights, thereby allowing the emergency lighting load to be eliminated. ELAP procedures/guidance should direct operators to conserve dc power during the event by stripping nonessential loads as soon as practical. Early load stripping can significantly extend the availability of the unit's Class 1E batteries. In certain circumstances, AFW/HPCI /RCIC operation may be extended by throttling flow to a constant rate, rather than by stroking valves in open-shut cycles.
>
> Given the beyond-design-basis nature of these conditions, it is acceptable to strip loads down to the minimum equipment necessary and one set of instrument channels for required indications. Credit for load-shedding actions should consider the other concurrent actions that may be required in such a condition.

On pages 5-7 of the Integrated Plan the license specified that at 5-7 hours; restore power to the safety battery chargers, using a portable generator, and that this must be completed prior to battery depletion (at 8 hours) and after or simultaneously with re-powering the battery room exhaust fans (for hydrogen buildup).

On page 44 of the Integrated Plan, the license specified that the primary strategy for Phase 2 battery coping will require portable diesel generators to power the battery chargers. The primary strategy for powering the battery chargers is by modifying the current 480V switchgear and subsequently the E1 or E2 switchgear and the existing diesel generators to include portable diesel generator connection points near the existing diesel generator capable of switching between the existing diesel generator power feeds and portable FLEX generator power feed. The licensee also stated that E1 or E2 provide power to the 480V MCC's that supply the battery chargers and essential instrument busses, and that one portable generator will be capable of providing approximately 130kW to power two battery chargers and room ventilation fans. The licensee also stated that the secondary method for powering the battery chargers is to power them directly with manual transfer switches compatible for quick portable diesel generator connection. When powering only one battery charger by a manual transfer switch, the diesel generator must provide 60kW. Additionally, the licensee stated that permanent cables and raceways will need to be installed to make cable deployment directly to the battery chargers feasible, and that cables can be connected by utilizing a quick connect system.

On page 50 of the Integrated Plan, the license specified that the strategy for Phase 3 battery coping will be the continuation of the Phase 2 strategy and will require portable diesel generators to power the battery chargers. The licensee also stated that the strategy for powering the battery chargers will continue to consist of modifying the current 480V switchgear (E1 or E2) and the existing diesel generators to include portable diesel generator connection points near the existing diesel generator capable of switching between the existing diesel generator power feeds and portable FLEX generator power feeds. Additionally, the licensee stated that diesel fuel will be delivered to the site to allow for the continued use of Phase 2 generators/strategy of repowering batteries.

The licensee has not completed a (formal) load shed strategy for prolonging station battery life. The licensee specified that early load stripping can significantly extend the availability of the unit's Class 1E batteries. Given the beyond-design-basis nature of these conditions, it is acceptable to strip loads down to the minimum equipment necessary and one set of instrument channels for required indications. Credit for load-shedding actions should consider the other concurrent actions that may be required in such a condition. In the August 2013 status update, the licensee stated that, in lieu of installing additional supplemental batteries as backup to the existing vital batteries, RNP is installing a FLEX power connection point to each of the 4 station battery chargers that can be quickly connected to one of two diesel generators that will be staged in their protected deployed positions. The licensee also stated that preliminary ELAP battery coping analysis indicates there is sufficient time to accomplish this strategy when all equipment and connections are pre-staged. The licensee was requested to provide a formal loadshed analysis to address the issues stated above regarding time of battery recharging, and the time requirements for switching between installed battery chargers and the diesel generator.

During the audit process, the licensee stated that a formal load shed analysis is documented in Calculation RNP-E-6.032, and that the revised strategy is to re-power the battery chargers using portable generators connected directly to the chargers. The licensee noted that the loadshed calculation demonstrated that the ‘A’ vital battery has 3 hrs. 45 min. of coping time and the ‘B’ vital battery has 3 hrs. 15 min. of coping time, and that this is sufficient time to connect the diesel generator to the battery chargers located approximately 120 ft. away on the same elevation, via one passageway and three doors.

During the audit process, the licensee was requested to provide the following information with regard to the load shedding of the dc busses in order to conserve battery capacity:

a. Provide the dc load profile for the mitigation strategies to maintain core cooling, containment, and spent fuel pool cooling during all modes of operation. Also describe any load shedding that is assumed to occur and the actions necessary to complete each load shed. Also provide a detailed discussion on the loads that will be shed from the dc bus, the equipment location (or location where the required action needs to be taken), and the required operator actions needed to be performed and the time to complete each action. In your response, explain which functions are lost as a result of shedding each load and discuss any impact on defense-in-depth strategies and redundancy.
b. Identify any plant components that will change state if vital ac or dc power is lost or de-energized during the load shed. The NRC is particularly interested in whether a safety hazard is introduced, such as de-energizing the dc-powered seal oil pump for the main generator and allowing hydrogen to escape, which could contribute to risk of fire or explosion in the vicinity from the uncooled main turbine bearings.
c. Identify dc breakers that must be opened as a part of the load shed evolution.
d. Identify whether the dc breakers that must be opened will be physically identified by special markings to assist operators in manipulating the correct breakers.
e. Also, provide the minimum voltage that must be maintained and the basis for the minimum voltage on the dc bus.

During the audit process, the licensee provided the following response:

a. It is currently planned to expand the current load shedding as listed in EPP-1 "Loss of All AC Power." All loadshed activities will be performed in the same areas required by the current strategy. A detailed analysis has not been completed to determine the overall impact to defense-in-depth strategies and redundancy nor an assessment of the additional times required to completer these actions. This will be the subject of a future six-month update
b. An analysis has not been completed for assessing any safety hazards introduced by the additional load shedding. Regarding the main generator hydrogen leakage, the dc air side seal oil backup pump is powered from the 'C' station battery, which is not involved in current of planned loads shedding strategies. Regarding the main generator hydrogen issue in an ELAP, RNP has an existing emergency operating procedure to vent the main generator to atmosphere in loss of an ac power event. The RNP turbine building is not an enclosed structure.
c. A listing of dc breakers that will be opened for load shedding is provided in Calculation RNP-E-6.032.
d. All involved circuits have identification labels. The use of special markings for FLEX equipment and related strategies is planned and will be the subject of a future six-month update
e. The minimum voltage at the battery bus during its discharge cycle will be at or above the voltage required to assure operation of the instrument inverters. The inverter output minimum bus voltage from vital battery 'A' is 105.9 VDC and for vital battery 'B' is 106.2 VDC.

The licensee did not discuss sizing calculations for the FLEX DGs to show that they can supply the loads assumed in Phase 2 and Phase 3. This is identified as Open Item 3.2.4.10.A in section 4.1.

The licensee's approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and subject to the successful closure of issues related to the Confirmatory and Open Items, and provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to load reduction to conserve dc power, if these requirements are implemented as described.

3.3 PROGRAMMATIC CONTROLS

3.3.1 Equipment Maintenance and Testing

NEI 12-06, Section 3.2.2, the paragraph following Guideline (15) states in part:

> In order to assure reliability and availability of the FLEX equipment required to meet these capabilities, the site should have sufficient equipment to address all functions at all units on-site, plus one additional spare, i.e., an N+1 capability, where "N" is the number of units on-site. Thus, a two-unit site would nominally have at least three portable pumps, three sets of portable ac/dc power supplies, three sets of hoses & cables, etc. It is also acceptable to have a single resource that is sized to support the required functions for multiple units at a site (e.g., a single pump capable of all water supply functions for a dual unit site). In this case, the N+1 could simply involve a second pump of equivalent capability. In addition, it is also acceptable to have multiple strategies to accomplish a function (e.g., two separate means to repower instrumentation). In this case the

equipment associated with each strategy does not require N+1. The existing 50.54(hh)(2) pump and supplies can be counted toward the N+1, provided it meets the functional and storage requirements outlined in this guide. The N+1 capability applies to the portable FLEX equipment described in Tables 3-1 and 3-2 (i.e., that equipment that directly supports maintenance of the key safety functions). Other FLEX support equipment only requires an N capability.

NEI 12-06, Section 11.5 states:

1. FLEX mitigation equipment should be initially tested or other reasonable means used to verify performance conforms to the limiting FLEX requirements. Validation of source manufacturer quality is not required.

2. Portable equipment that directly performs a FLEX mitigation strategy for the core, containment, or SFP should be subject to maintenance and testing guidance provided in INPO AP 913, Equipment Reliability Process, to verify proper function. The maintenance program should ensure that the FLEX equipment reliability is being achieved. Standard industry templates (e.g., EPRI) and associated bases will be developed to define specific maintenance and testing including the following:

    a. Periodic testing and frequency should be determined based on equipment type and expected use. Testing should be done to verify design requirements and/or basis. The basis should be documented and deviations from vendor recommendations and applicable standards should be justified.

    b. Preventive maintenance should be determined based on equipment type and expected use. The basis should be documented and deviations from vendor recommendations and applicable standards should be justified.

    c. Existing work control processes may be used to control maintenance and testing. (e.g., PM Program, Surveillance Program, Vendor Contracts, and work orders).

3. The unavailability of equipment and applicable connections that directly performs a FLEX mitigation strategy for core, containment, and SFP should be managed such that risk to mitigating strategy capability is minimized.

    a. The unavailability of installed plant equipment is controlled by existing plant processes such as the Technical Specifications. When installed plant equipment which supports FLEX strategies becomes unavailable, then the FLEX strategy affected by this unavailability does not need to be maintained during the unavailability.

    b. Portable equipment may be unavailable for 90 days provided that the site FLEX capability (N) is available.

    c. Connections to permanent equipment required for FLEX strategies can be unavailable for 90 days provided alternate capabilities remain functional.

d. Portable equipment that is expected to be unavailable for more than 90 days or expected to be unavailable during forecast site specific external events (e.g., hurricane) should be supplemented with alternate suitable equipment.

e. The short duration of equipment unavailability, discussed above, does not constitute a loss of reasonable protection from a diverse storage location protection strategy perspective.

f. If portable equipment becomes unavailable such that the site FLEX capability (N) is not maintained, initiate actions within 24 hours to restore the site FLEX capability (N) and implement compensatory measures (e.g., use of alternate suitable equipment or supplemental personnel) within 72 hours.

On pages 8 and 9 of the Integrated Plan, the licensee specified that equipment associated with these strategies will be procured as commercial equipment with design, storage, maintenance, testing, and configuration control in accordance with NEI 12-06, Section 11.5. Installed structures, systems and components pursuant to 10 CFR 50.63(a) will continue to meet the augmented guidelines of NRC Regulatory Guide 1.155, "Station Blackout." The licensee also stated that unavailability of equipment and applicable connections that directly perform a FLEX mitigation strategy will be managed using plant equipment control guidelines developed in accordance with NEI 12-06, Section 11.5.

The NRC staff reviewed the licensee's Integrated Plan and determined that the Generic Concern related to maintenance and testing of FLEX equipment is applicable to the plant. This Generic Concern has been resolved generically through the NRC endorsement of the EPRI technical report on preventive maintenance of FLEX equipment, submitted by NEI by letter dated October 3, 2013 (ADAMS Accession No. ML13276A573). The NRC staff's endorsement letter is dated October 7, 2013 (ADAMS Accession No. ML13276A224).

This Generic Concern involves clarification of how licensees would maintain FLEX equipment such that it would be readily available for use. The technical report provided sufficient basis to resolve this concern by describing a database that licensees could use to develop preventative maintenance programs for FLEX equipment. The database describes maintenance tasks and maintenance intervals that have been evaluated as sufficient to provide for the readiness of the FLEX equipment. The NRC staff has determined that the technical report provides an acceptable approach for developing a program for maintaining FLEX equipment in a ready-to-use status. The NRC staff will evaluate the resulting program through the audit and inspection processes.

At the time the audit was conducted, the licensee had neither (1) committed to abide by the generic approach discussed above nor (2) identified an acceptable alternate approach for justifying FLEX equipment maintenance and testing. As such, resolution of this concern is identified as Open Item 3.3.1.A in Section 4.1.

The licensee's approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and subject to the successful closure of issues related to the Open Item, provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to maintenance and testing, if these requirements are implemented as described.

3.3.2 Configuration Control

NEI 12-06, Section 11.8 states:

1. The FLEX strategies and basis will be maintained in an overall program document. This program document will also contain a historical record of previous strategies and the basis for changes. The document will also contain the basis for the ongoing maintenance and testing programs chosen for the FLEX equipment.

2. Existing plant configuration control procedures will be modified to ensure that changes to the plant design, physical plant layout, roads, buildings, and miscellaneous structures will not adversely impact the approved FLEX strategies.

3. Changes to FLEX strategies may be made without prior NRC approval provided:

   a) The revised FLEX strategy meets the requirements of this guideline.

   b) An engineering basis is documented that ensures that the change in FLEX strategy continues to ensure the key safety functions (core and SFP cooling, containment integrity) are met.

On page 9 of the integrated Plan, the licensee specified that the FLEX strategies and will be maintained in overall FLEX basis documents, and that existing plant configuration control procedures will be modified to ensure that changes to the plant design, physical plant layout, roads, buildings, and miscellaneous structures will not adversely impact the approved FLEX strategies in accordance with NEI 12-06, Section 11.8.

The licensee's approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to configuration control, if these requirements are implemented as described.

3.3.3 Training

NEI 12-06, Section 11.6, Training, states:

1. Programs and controls should be established to assure personnel proficiency in the mitigation of beyond-design-basis events is developed and maintained. These programs and controls should be implemented in accordance with an accepted training process.

2. Periodic training should be provided to site emergency response leaders on beyond design-basis emergency response strategies and implementing guidelines. Operator training for beyond-design-basis event accident mitigation should not be given undue weight in comparison with other training

requirements. The testing/evaluation of Operator knowledge and skills in this area should be similarly weighted.

3. Personnel assigned to direct the execution of mitigation strategies for beyond-design basis events will receive necessary training to ensure familiarity with the associated tasks, considering available job aids, instructions, and mitigating strategy time constraints.

4. "ANSI/ANS 3.5, Nuclear Power Plant Simulators for use in Operator Training" certification of simulator fidelity (if used) is considered to be sufficient for the initial stages of the beyond-design-basis external event scenario until the current capability of the simulator model is exceeded. Full scope simulator models will not be upgraded to accommodate FLEX training or drills.

5. Where appropriate, the integrated FLEX drills should be organized on a team or crew basis and conducted periodically; with all time-sensitive actions to be evaluated over a period of not more than eight years. It is not the intent to connect to or operate permanently installed equipment during these drills and demonstrations.

On page 9 of the Integrated Plan, the licensee stated that training will be initiated through the Systematic Approach to Training (SAT) process. The licensee also stated that training will be developed and provided to all involved plant personnel based on any procedural changes or new procedures developed to address and identify FLEX activities, and applicable training will be completed prior to the implementation of FLEX.

The licensee's approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to training, if these requirements are implemented as described.

3.4 <u>OFF SITE RESOURCES</u>

NEI 12-06, Section 12.2 lists the following minimum capabilities for offsite resources for which each licensee should establish the availability of:

1) A capability to obtain equipment and commodities to sustain and backup the site's coping strategies.
2) Off-site equipment procurement, maintenance, testing, calibration, storage, and control.
3) A provision to inspect and audit the contractual agreements to reasonably assure the capabilities to deploy the FLEX strategies including unannounced random inspections by the Nuclear Regulatory Commission.
4) Provisions to ensure that no single external event will preclude the capability to supply the needed resources to the plant site.
5) Provisions to ensure that the off-site capability can be maintained for the life of the plant.
6) Provisions to revise the required supplied equipment due to changes in the FLEX strategies or plant equipment or equipment obsolescence.
7) The appropriate standard mechanical and electrical connections need to be specified.

8) Provisions to ensure that the periodic maintenance, periodic maintenance schedule, testing, and calibration of off-site equipment are comparable/consistent with that of similar on-site FLEX equipment.
9) Provisions to ensure that equipment determined to be unavailable/non-operational during maintenance or testing is either restored to operational status or replaced with appropriate alternative equipment within 90 days.
10) Provision to ensure that reasonable supplies of spare parts for the off-site equipment are readily available if needed. The intent of this provision is to reduce the likelihood of extended equipment maintenance (requiring in excess of 90 days for returning the equipment to operational status).

The license's plans for the use of off-site resources conform to the minimum capabilities specified in NEI 12-06 Section 12.2, with regard to the capability to obtain equipment and commodities to sustain and backup the site's coping strategies (item 1 above), however, insufficient information was provided regarding the remaining items (2 through 10 above). This has been identified as Confirmatory Item 3.4.A in Section 4.2.

The licensee's approach described above, as currently understood, is consistent with the guidance found in NEI 12-06, as endorsed by JLD-ISG-2012-01, and subject to the successful closure of issues related to the Confirmatory Item, provides reasonable assurance that the requirements of Order EA-12-049 will be met with respect to off-site resources, if these requirements are implemented as described.

4.0 OPEN AND CONFIRMATORY ITEMS

4.1 OPEN ITEMS

Item Number	Description	Notes
3.2.1.3.A	The licensee stated that they were engaged in discussions with Westinghouse regarding the ELAP analysis for assumption 4 from WCAP 17601-P, Section 4.2.1 Input Assumptions - Common to All Plant Types on page 4-13 of WCAP-17601-P, which states that "Decay heat is per ANS 5.1-1979 + 2 sigma, or equivalent," and will provide additional information in a future six-month update to the Integrated Plan.	
3.2.4.8.A	During the audit process, the licensee stated that the strategy to power the battery has been revised to use a pre-staged portable diesel generator to supply ac power directly to the vital battery chargers. This use of installed or pre-staged generators appears to be an alternative approach for satisfying the Mitigating Strategies Order, which relies primarily on portable equipment.	
3.2.4.10.A	The licensee did not discuss sizing calculations for the FLEX DGs to show that they can supply the loads assumed in Phase 2 and Phase 3.	
3.3.1.A	At the time the audit was conducted, the licensee had neither (1) committed to abide by the generic approach discussed above nor (2) identified an acceptable alternate approach for justifying FLEX equipment maintenance and testing.	

4.2 CONFIRMATORY ITEMS

Item Number	Description	Notes
3.1.1.1.A	The FLEX equipment storage building and location has not yet been decided. The licensee did not specify the type of BDB storage building, its configuration, how FLEX equipment such as pumps and power supplies would be secured, or how stored equipment and structures would be protected from seismic interactions, high wind events, and extreme temperature conditions.	
3.1.1.2.A	The licensee lists two debris removal equipment/skid steer tractors and a large front end loader, however the licensee did not specify how these vehicles would be protected from seismic events.	
3.1.1.2.B	The strategy to supply power to the vital battery chargers takes place entirely inside the RAB, a seismic Class 1 structure, and the SFP cooling strategies take place inside the seismic Class 1 SFP Building. Updated diagrams will be included in the February 2014 Integrated Plan update. Review of these updated drawings is required to fully evaluate the licensee's deployment strategies for seismic events.	
3.1.1.2.B	The licensee stated that they would evaluate all site travel paths and routes for deployment strategies and improve as necessary with particular concern paid to potential soil liquefaction.	

Item Number	Description	Notes
	Engineering changes will be developed that include soil studies, core borings, geotechnical evaluations and remediation to ensure survivability following a seismic event.	
3.1.1.4.A	The licensee identified an open item, to develop a SAFER Response Plan to support RNP during beyond design basis events, and describing the coordination strategies between RNP and the Regional Response Center.	
3.1.5.2.A	The licensee did not address how potential problems with door access such as sheet metal expansion or swollen door seals would be mitigated.	
3.2.1.A	The licensee was requested to specify which analysis performed in WCAP-17601 is being applied to their plant, and to justify the use of that analysis by identifying and evaluating the important parameters and assumptions demonstrating that they are representative of their plant and appropriate for simulating the ELAP transient.	
3.2.1.B	The licensee was requested to; discuss their position on each of the recommendations noted in Section 3.2 of WCAP-17601-P for developing the FLEX mitigation strategies, list the recommendations that are applicable to the plant, provide rationale for the applicability, address how the applicable recommendations are considered in the ELAP coping analysis, discuss the plan to implement the recommendations, and to provide a rationale for each of the recommendations that are determined to be not applicable to the plant. Review of the response to the above issues is needed.	
3.2.1.C	The licensee stated that RNP is refining the SG PORV motive force strategy based on existing plant qualifications for wind and missile protection. A new Phase 2 pressure source is being evaluated for feasibility and constructability. A portable strategy is also being considered. This will be the subject of a future six-month update.	
3.2.1.D	The licensee stated that RNP is evaluating the SG PORV for hazard protection, and the evaluation will be described in an Engineering Change package. The SG PORV strategies will be the subject of a future six-month update.	
3.2.1.E	The licensee was request to discuss the reliability of the SDAFW pump with respect to the following issues: a) The steam traps are all ganged into one line to the condenser that has the potential to be inched or crimped in an event and render the SDAFW pump inoperable b) The SDAFW pump mini-flow recirculation line has the same exposure. The licensee stated that an engineering evaluation will required to respond to the question and will be the subject of a six-month update.	

3.2.1.1.A	Reliance on the NOTRUMP code for the ELAP analysis of Westinghouse plants is limited to the flow conditions prior to reflux condensation initiation. Specifying an acceptable definition for reflux condensation cooling is needed.	
3.2.1.2.A	Some Westinghouse plants have installed or will install the SHIELD shutdown seals, or other types of low leakage seals, and have credited or will credit a low seal leakage rate (e.g., 1 gpm/seal) in the ELAP analyses for the RCS response. For those plants, information should be provided to address the impacts of the Westinghouse 10 CFR Part 21 report, "Notification of the Potential Existence of Defects Pursuant to 10 CFR Part 21," dated July 26, 2013 (ADAMS No. ML13211A168) on the use of the low seal leakage rate in the ELAP analysis.	
3.2.1.2.B	If the seals are changed to the newly designed Generation 3 SHIELD seals, or non-Westinghouse seals, the acceptability of the use of the newly designed Generation 3 SHIELD seals, or non-Westinghouse seals should be addressed, and the RCP seal leakages rates for use in the ELAP analysis should be provided with acceptable justification.	
3.2.1.6.A	A confirmatory NOTRUMP run was executed which showed an approximate 24 hours of additional core cooling time compared to the hand calculated value. RNP intends to install low leakage RCP seals prior to FLEX implementation. Makeup rates, boration strategies and items are being evaluated and refined and will be the subject of a future six-month update.	
3.2.1.6.B	In response the licensee stated that RNP is re-evaluating the SI accumulator isolation strategy to ensure timely isolation to prevent nitrogen injection in an indefinite coping strategy. Accumulator isolation strategies and time are being developed and refined and will be the subject of a future six-month update.	
3.2.1.8.A	The cooldown phase will consider initial boron concentrations, xenon build-in, and decay and shutdown margin (SDM) requirements as defined in NEI 12-06. Boration strategies, rates, and times and SDM are being developed and refined at this time and will be the subject of a future six-month update.	
3.2.1.9.A	The licensee stated that the pressures and flow rates were based on generic studies. Each application of a portable pump and hoses will be analyzed using accepted industry standards for such hydraulic calculations (e.g., FATHOM) and available vendor information. This will be documented in a future six-month update..	
3.2.3.A	The licensee stated that Calculation RNP-M/MECH-1877 describes the containment response to an ELAP event assuming the planned installation of low leakage seals. The GOTHIC computer code version 8.0(QA) was used in this analysis. The licensee did not discuss any strategies for managing containment conditions during the ELAP. Further review of this calculation and information related to any contemplated strategies needed.	

3.2.4.1.A	The licensee stated that RNP is performing an evaluation to provide calculations of the environmental conditions in various areas/compartments related to an ELAP event. The results of the evaluation will be used to determine if any specific actions are required to cope with extreme high temperatures. This will be the subject of a future six-month update. Review of planned actions to supply cooling water to various components is needed.	
3.2.4.2.A	During the audit process the licensee responded by stating that RNP is performing an evaluation to provide calculations of the environmental conditions in various areas/compartments (main control room, battery room, SDAFW pump room) related to an ELAP event. The results of the evaluation will be used to determine if any specific actions are required to cope with extreme high temperatures. This will be the subject of a future six-month update.	
3.2.4.2.B	The licensee stated that additionally a calculation for hydrogen accumulation in the battery room is also being performed. This above analysis and calculations will be the subject of a future six-month update.	
3.2.4.3.A	The licensee stated that loss of heat tracing on instrument lines has been identified. The heat tracing is not safety related and is not robust. Strategies will be developed to address the loss of heat tracing and will be the subject of a future six-month update.	
3.2.4.4.A	The staff has reviewed the licensee's communications assessment however confirmation will be required that upgrades to the site's communications systems have been completed.	
3.2.4.7.A	The consequences of using potentially impure raw water source to supply the SG were not discussed. During the audit process the licensee stated that RNP is performing an analysis to provide calculations and timing for strategies to use alternate cooling sources such as Lake Robinson, the discharge canal and three deep well pumps as SG makeup sources. The results of the evaluation will be used to determine if any specific actions are required to cope with impure water sources. The results will be the subject of a future six-month update.	
3.2.4.9.A	The licensee identified an open item to perform an analysis to determine the fuel consumption rates of all portable generators and pumping equipment. Review of the analysis is needed.	
3.4.A	The licensee's plans for the use of off-site resources conform to the minimum capabilities specified in NEI 12-06 Section 12.2, with regard to the capability to obtain equipment and commodities to sustain and backup the site's coping strategies, however the licensee did not address the remaining items 2 through 10 of Section 12.2.	