Xcel Energy®

Monticello Nuclear Generating Plant
2807 W County Road 75
Monticello, MN 55362

February 28, 2013

L-MT-13-017
10 CFR 2.202

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Monticello Nuclear Generating Plant
Docket No. 50-263
Renewed Facility Operating License No. DPR-22

Monticello Nuclear Generating Plant's Overall Integrated Plan in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)

References:

1. NRC Order Number EA-12-049, "Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," dated March 12, 2012 (ADAMS Accession Number ML12054A736).

2. NRC Interim Staff Guidance 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," Revision 0, dated August 29, 2012 (ADAMs Accession Number ML12229A174).

3. NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide," Revision 0, dated August, 2012.

4. NSPM Letter to NRC, "Initial Status Report in Response to March 12, 2012 Commission Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)," dated October 29, 2012 (ADAMs Accession Number ML12305A420).

On March 12, 2012, the Nuclear Regulatory Commission (NRC) issued an Order (Reference 1) to all NRC power reactor licensees and holders of construction permits in active or deferred status. Reference 1 was immediately effective and directs Northern

States Power Company, a Minnesota corporation (NSPM), d/b/a Xcel Energy, to develop, implement, and maintain guidance and strategies to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities following a beyond-design-basis external event for the Monticello Nuclear Generating Plant (MNGP). Specific requirements are outlined in Attachment 2 of Reference 1.

Reference 1 requires submission of an Overall Integrated Plan by February 28, 2013. The NRC Interim Staff Guidance (ISG) (Reference 2) was issued August 29, 2012 which endorses industry guidance document Nuclear Energy Institute (NEI) 12-06, Revision 0 (Reference 3) with clarifications and exceptions identified in Reference 2. Reference 3 provides direction regarding the content of this Overall Integrated Plan.

Reference 4 provided the NSPM initial status report regarding mitigation strategies, as required by Reference 1.

The purpose of this letter is to provide the Overall Integrated Plan pursuant to Section IV, Condition C.1, of Reference 1. Included in the Overall Integrated Plan is a description of how compliance with the requirements described in Attachment 2 of Reference 1 will be achieved. The enclosed Overall Integrated Plan considers the guidance of References 2 and 3.

The enclosed Overall Integrated Plan is based on conceptual design information. Final design details and associated procedure guidance, as well as any revisions to the information contained in the Enclosure, will be provided in the six-month status reports required by Reference 1.

Please contact Jennie Eckholt, Licensing Engineer, at 612-330-5788, if additional information or clarification is required.

Summary of Commitments

This letter makes no new commitments and no revisions to existing commitments.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on February 28, 2013.

Mark A. Schimmel
Site Vice President, Monticello Nuclear Generating Plant
Northern States Power Company - Minnesota

Enclosure

cc: Administrator, Region III, USNRC
Director of Nuclear Reactor Regulation (NRR), USNRC
NRR Project Manager, MNGP, USNRC
Senior Resident Inspector, MNGP, USNRC

ENCLOSURE

Monticello Nuclear Generating Plant

NRC Order EA-12-049

Overall Integrated Plan

(50 pages to follow)

General Integrated Plan Elements (PWR & BWR)	
Determine Applicable Extreme External Hazard **References:** **-NEI 12-06, Section 4.0-9.0** **-JLD-ISG-2012-01, Section 1.0**	*Input the hazards applicable to the site; seismic, external flood, high winds, snow, ice, cold, high temperatures.* *Describe how NEI 12-06, Sections 5 – 9, were applied and the basis for why the plant screened out for certain hazards.* The applicable extreme external hazards for Monticello Nuclear Generating Plant (MNGP) are seismic, flooding, high winds, snow, ice and extreme cold, and high temperatures, as outlined below. Seismic Hazard Assessment: Consistent with NEI 12-06, Section 5.2, all sites will address seismic hazards. Seismic hazards are applicable to MNGP. The design basis safe shutdown earthquake (SSE) is 0.12g. The associated spectra are included in MNGP Updated Safety Analysis Report (USAR) Section 2, Figure 2.6-5. MNGP screens in for an assessment of the seismic hazard. **Protection** of FLEX equipment from seismic hazard: The MNGP plan for storage locations includes use of the existing onsite storage location for the portable equipment required by 10 Code of Federal Regulations (CFR) 50.54(hh), and a new storage location in a building designed to the standard American Society of Civil Engineers (ASCE) 7-10, *Minimum Design Loads for Buildings and Other Structures*, or an evaluated equivalent so that at least one of the storage locations can be expected to withstand the seismic event. Large portable Diverse and Flexible Coping Strategy (FLEX) equipment will be secured for a seismic event and located so that it is not damaged by other items in a seismic event. **Deployment** of FLEX equipment following seismic event: As described in the USAR, Section 2.5.5, the site is not considered susceptible to liquefaction based on the soil properties and design basis earthquake accelerations. Site borings used in this evaluation, as shown in USAR Figure

General Integrated Plan Elements (PWR & BWR)	
	2.5-2, cover the area including expected deployment paths. Deployment pathways of FLEX equipment from the proposed storage locations include the potential for debris due to non-seismically designed structures. Debris removal equipment onsite will be capable of clearing pathways for deployment. External Flood Hazard Assessment: External flooding events are applicable to the MNGP, consistent with NEI 12-06 section 6.2. The design bases flood for the MNGP is a Probable Maximum Flood (PMF) on the Mississippi River. The flood is a relatively slow developing event with actions based on forecasts of river water level. Maximum predicted flood water level is 939.2 ft and there are about 12 days available until the peak stage would be reached. The peak flood is a result of the worst combination of hydrometeorological, hydrological, and climatic conditions. Site grade would be flooded for approximately 11 days. MNGP screens in for the external flood hazard. Site procedures provide for flood protection of all Class I structures and all Class II structures housing Class I equipment. **Protection** of FLEX equipment from external flood hazard: The MNGP plan for storage locations includes use of the existing onsite storage location for the portable equipment required by 10 CFR 50.54(hh) and a new storage location in a building designed to ASCE 7-10, or an evaluated equivalent. The buildings will not be designed to withstand an external flood because the flood hazard has ample warning time to allow deployment of FLEX equipment. The planned new storage building will be located at an elevation that prevents a flood from impacting access to FLEX equipment during the early stages of the flood. **Deployment** of FLEX equipment for flooding event: There is sufficient time for pre-staging the Phase 2 FLEX equipment within the flood-protected area before the design basis flood level is reached. The main access road

General Integrated Plan Elements (PWR & BWR)

to the site will not be available in the design basis flood. An alternate access road will be constructed as part of the flood preparations. Phase 3 equipment from the Regional Response Center can be requested prior to flooding of the main access road or can be brought in on the temporary access road and set up on site in advance of the PMF. Plant procedures require the plant to shut down when the river level is predicted to exceed elevation 921'. Backup power supplies and pumps will be pre-staged as part of the plant procedures for construction of flood protection features. No other beyond design basis event is assumed to occur with the flood; therefore makeup from the Condensate Storage Tanks (CST) will be available for makeup functions because the CSTs will be located inside the flood protection features. Portable pumps will be moved as necessary to ensure that they are protected from the flood and also have access to a water supply.

High Wind Hazard Assessment:

Tornado and high wind hazards are applicable to the MNGP. As described in NEI 12-06, Section 7.2.1, tornadoes with the capacity to do significant damage are generally considered to be those with winds above 130 mph. Figure 7-2 in NEI 12-06 provides recommended design wind speeds for probability level of 10^{-6} per year of 184 mph based on the plant location of 45° 20' North latitude and 93° 50' West longitude. A tornado event has very little warning to enable anticipatory plant response. MNGP screens in for the tornado hazard. The design bases wind speed for Class I and II structures at the MNGP is 100 mph, and design bases tornado loadings are a differential pressure of 2 psi, rotational wind with tangential velocity of 300 mph, and a torsional moment from the wind speed on half of the structure.

Tornado missiles design parameters are provided in USAR Section 12.2.1.8.

Protection of FLEX equipment from high wind hazard:
The MNGP plan for storage locations includes use of the existing onsite storage location for the portable equipment required by 10 CFR 50.54(hh) and a new storage location in a building designed to ASCE 7-10, or an evaluated equivalent building. Large portable FLEX equipment will

General Integrated Plan Elements (PWR & BWR)	
	be secured for a high wind event and located so that it is not damaged by other items in a high wind event. The location of the new building will be selected considering the predominant tornado travel paths from the West or West Southwesterly direction. The FLEX equipment will be stored in diverse locations in a North-South arrangement with sufficient separation distance such that "N" sets of equipment are reasonably protected and deployable after a tornado. **Deployment** of FLEX equipment following high wind event: Following a high wind event, deployment of FLEX equipment could be impaired by large debris. Debris removal equipment will be provided to ensure a clear path for deployment of FLEX equipment is available. The debris removal equipment will be protected to ensure it is available after a tornado. Extreme Cold Hazard Assessment: Snow, Ice and Extreme Cold hazards are applicable to the MNGP, consistent with NEI 12-06 section 8.2. Per NEI 12-06 Figure 8-2, MNGP is located in the Level 4 region for ice severity and must consider ice storm impacts. The design bases for the MNGP snow load of 50 pounds per square foot of horizontal projected area is used in the design of structures and components exposed to snow (USAR Section 12.2.1.5). This is a ground snow load. Actual snow load on the structure accounts for roof geometry and features of the surrounding area. USAR Section 2.3.3 includes various return periods for ice thicknesses due to freezing rain. USAR Table 2.3-1 identifies an extreme minimum air temperature of -38°F. MNGP screens in for the extreme cold hazard. **Protection** of FLEX equipment from extreme cold hazard: The MNGP plan for storage locations includes use of the existing onsite storage location for the portable equipment required by 10 CFR 50.54(hh) and a new storage location in a building designed to ASCE 7-10, or an evaluated equivalent. Buildings will be provided with adequate heating to prevent equipment from freezing, and will also

General Integrated Plan Elements (PWR & BWR)	
	be designed to withstand required snow and ice loads. Backup heating is not required if power is lost because the equipment is expected to be deployed within 12 hours of the initiation of the extended loss of AC power (ELAP). **Deployment** of FLEX equipment during extreme cold event: Snow removal is a normal activity at the plant site because of the climate. Reasonable access to FLEX equipment will be maintained throughout a snow event. Ice management will be performed as required such that large FLEX equipment can be moved by vehicles. Debris removal equipment will be able to move through moderate snow accumulations and can also be used to move portable equipment. The ultimate heat sink will remain available as the discharge canal is maintained open during normal plant operations due to normal warm water discharge. Procedures will ensure that following plant shutdown, deployment of the FLEX pump suction piping will not be prevented by any minor ice development on the surface of the discharge canal. Extreme High Temperature Hazard Assessment: Consistent with NEI 12-06, Section 9.2, all sites will address high temperatures. USAR Table 2.3-1 identifies an extreme maximum air temperature of 107°F. MNGP screens in for the extreme high temperature hazard. **Protection** of FLEX equipment from extreme high temperature hazard: The MNGP plan for storage locations includes use of the existing onsite storage location for the portable equipment required by 10 CFR 50.54(hh) and a new storage location in a building designed to ASCE 7-10, or an evaluated equivalent. Buildings will be provided with adequate ventilation to maintain reasonable storage temperatures. Backup ventilation cooling is not required if power is lost because the equipment is expected to be deployed within 12 hours of the initiation of the ELAP.

General Integrated Plan Elements (PWR & BWR)	
	<u>**Deployment** of FLEX equipment during extreme high temperature event:</u> High temperature does not impact the deployment of FLEX equipment. All FLEX equipment will be procured to be suitable for use in peak temperatures for the region.
Key Site assumptions to implement NEI 12-06 strategies. **Reference:** **NEI 12-06, Section 3.2.1**	*Provide key assumptions associated with implementation of FLEX Strategies:* • *Flood and seismic reevaluations pursuant to the 10 CFR 50.54(f) letter of March 12, 2012 are not completed and therefore not assumed in this submittal.* • *Exceptions for the site security plan or other (license/site specific) requirements of 10 CFR may be required.* • *Deployment resources are assumed to begin arriving at hour 6 and fully staffed by 24 hours.* NEI 12-06 Section 3.2.1 provides assumptions to be used in establishing the baseline coping capability. These assumptions are utilized at MNGP, as follows: • General Criteria and Baseline Assumptions outlined in NEI 12-06 Section 3.2.1 for BWRs are assumed. • Flood and seismic re-evaluations pursuant to the 10 CFR 50.54(f) letter of March 12, 2012 are not completed and therefore not assumed in this submittal. • Exceptions for the site security plan or other site specific regulatory requirements may be required. • Deployment resources are assumed to begin arriving at hour six and fully staffed by 24 hours. • While procedures are in place to connect the non-safeguards diesel generator (Diesel Generator 13) to Class 1E loads (USAR Section 8.4.2.1), the diesel generator is assumed to be unavailable. • The Condensate Storage Tank (CST) will be used as a water supply if it is available, but the CST is assumed to be unavailable in this scenario. • The diesel driven fire pump can be lined up to provide river water makeup to the reactor and will be used if available, but is assumed to be unavailable in this scenario. • The fire protection piping will be used if available, but the

General Integrated Plan Elements (PWR & BWR)	
	equipment is assumed to be unavailable in this scenario. • MAAP analysis and the resulting timelines were used to establish the strategies and necessary actions described in this FLEX Overall Integrated Plan. • Debris removal equipment will be reasonably protected from the applicable external events such that it is likely to remain functional and deployable. • This plan defines strategies capable of mitigating a simultaneous loss of all alternating current (ac) power and loss of normal access to the ultimate heat sink resulting from a beyond-design-basis event by providing adequate capability to maintain or restore core cooling, containment, and SFP cooling capabilities at all units on a site. Though specific strategies are being developed, due to the inability to anticipate all possible scenarios, the strategies are also diverse and flexible to encompass a wide range of possible conditions. These pre-planned strategies developed to protect the public health and safety will be incorporated into the unit emergency operating procedures in accordance with established EOP change processes, and their impact to the design basis capabilities of the unit evaluated under 10 CFR 50.59. The plant Technical Specifications contain the limiting conditions for normal unit operations to ensure that design safety features are available to respond to a design basis accident and direct the required actions to be taken when the limiting conditions are not met. The result of the beyond-design-basis event may place the plant in a condition where it cannot comply with certain Technical Specifications and/or with its Security Plan, and, as such, may warrant invocation of 10 CFR 50.54(x) and/or 10 CFR 73.55(p).

General Integrated Plan Elements (PWR & BWR)	
Extent to which the guidance, JLD-ISG-2012-01 and NEI 12-06, are being followed. Identify any deviations to JLD-ISG-2012-01 and NEI 12-06. **References:** **-JLD-ISG-2012-01** **-NEI 12-06, Section 13.1**	*Include a description of any alternatives to the guidance, and provide a milestone schedule of planned action.* NSPM has no deviations to the guidelines in JLD-ISG-2012-01 and NEI 12-06. If deviations are identified, then the deviations will be communicated in future six-month status reports following identification of the issue.
Provide a sequence of events and identify any time constraint required for success including the technical basis for the time constraint. **References:** **-NEI 12-06, Section 3.2.1.7** **-JLD-ISG-2012-01, Section 2.1**	*Strategies that have a time constraint to be successful should be identified with a technical basis and a justification provided that the time can reasonably be met (for example, a walk through of deployment).* *Describe in detail in this section the technical basis for the time constraint identified on the sequence of events timeline Attachment 1.* *See attached sequence of events timeline (Attachment 1).* A Sequence of Events Timeline is provided in Attachment 1 . The technical bases for any time constraints are provided in this Attachment.
Identify how strategies will be deployed in all modes. **Ref: NEI 12-06 section 13.1.6**	*Describe how the strategies will be deployed in all modes.* Strategies will be driven by qualified programs and procedures, including administrative controls to ensure that FLEX portable equipment based on the Mode 1 strategy deployment remains possible to deploy in all modes. Specifically, outage arrangements will not prevent FLEX portable equipment deployment. The second storage location and access paths will be provided in six-month status reports, once they are identified in the design process.

General Integrated Plan Elements (PWR & BWR)	

Provide a milestone schedule. This schedule should include:
• **Modifications timeline**
  ○ **Phase 1 Modifications**
  ○ **Phase 2 Modifications**
  ○ **Phase 3 Modifications**
• **Procedure guidance development complete**
  ○ **Strategies**
  ○ **Maintenance**
• **Storage plan (reasonable protection)**
• **Staffing analysis completion**
• **FLEX equipment acquisition timeline**
• **Training completion for the strategies**
• **Regional Response Centers operational**
 	
Reference:
NEI 12-06, Section 13.1
	The dates specifically required by the order are obligated or committed dates. Other dates are planned dates subject to change. Updates will be provided in the periodic (six month) status reports.
	
	The milestone schedule is included in Attachment 2.

Identify how the programmatic controls will be met. **Reference:** **-NEI 12-06, Section 11** **-JLD-ISG-2012-01, Section 6.0**	*Provide a description of the programmatic controls equipment protection, storage and deployment and equipment quality. See section 11 in NEI 12-06. Storage of equipment, Section 11.3, will be documented in later sections of this template and need not be included in this section.* *See Section 6.0 of JLD-ISG-2012-01.* MNGP will implement an administrative program in accordance with NEI 12-06. FLEX strategies and their basis will be maintained in an overall program document, which will contain the basis for the ongoing maintenance and testing chosen for the FLEX equipment. This will include Preventative Maintenance (PM) with scope and frequency established considering EPRI guidelines and manufacturer recommendations. FLEX equipment will be procured as commercial grade equipment unless credited for other functions, in which case the quality attributes of the other functions apply.

General Integrated Plan Elements (PWR & BWR)	
	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.
Describe training plan	*List training plans for affected organizations or describe the plan for training development.* Training for FLEX strategies will be established in accordance with NEI 12-06, Section 11.6. The Systematic Approach to Training (SAT) will be followed.
Describe Regional Response Center plan	The industry will establish two (2) Regional Response Centers (RRC) to support utilities during beyond design basis events. NSPM has signed a participation contract with the Strategic Alliance for FLEX Emergency Response (SAFER). Each RRC will hold five (5) sets of equipment, four (4) of which will be able to be fully deployed when requested. The fifth set will have equipment in a maintenance cycle. Equipment will be moved from an RRC to a local assemble 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. Equipment arriving first, as established during development of the nuclear site's playbook, will be delivered to the local assemble area within 24 hours from the initial request.

Maintain Core Cooling
BWR Installed Equipment Phase 1
Determine Baseline coping capability with installed coping[1] modifications not including FLEX modifications, utilizing methods described in Table 3-1 of NEI 12-06: • **RCIC/HPCI/IC** • **Depressurize RPV for injection with portable injection source** • **Sustained water source**
Provide a general description of the coping strategies using installed equipment including modifications that are proposed to maintain core cooling. Identify methods (RCIC/HPCI/IC) and strategy(ies) utilized to achieve this coping time. At the initiation of the event operators will enter existing Station Blackout (SBO) Abnormal Operating Procedure (AOP) and appropriate Emergency Operating Procedures (EOP). FLEX Support Guidelines (FSG) will be entered as directed by the AOP and EOPs. Initial core cooling during the ELAP will be achieved using the Reactor Core Isolation Cooling System (RCIC) and High Pressure Coolant Injection System (HPCI) to provide high pressure makeup to the reactor, with automatic initiation on low-low reactor water level (-47"). For Reference, top of active fuel is at -126". Both RCIC and HPCI automatically trip on high reactor water level (+48"). For reference, the bottom of the steam lines is at +109". The normal suction supply for both RCIC and HPCI are the non-seismically qualified Condensate Storage Tanks (CST) and are the preferred source, if available. If the CSTs are unavailable, which is assumed, suction automatically transfers to the safety-related Suppression Pool (Torus) on a low CST level signal. The Torus will be used as the heat sink for Safety Relief Valve (SRV) discharge, heat sink for RCIC and HPCI exhaust, and makeup water to the reactor. After the initial automatic initiation and trip of RCIC and HPCI, RCIC will be used as the primary strategy to provide makeup water to the reactor. RCIC will be manually started and operated to maintain reactor level in the normal range above -47" and below +48". HPCI equipment will be secured to extend the Division II battery life. The RCIC trip signals and isolation signals that could possibly prevent RCIC operation when needed during the ELAP will be overridden in accordance with procedural direction. MAAP analysis will be used to confirm that RCIC maintains adequate net positive suction head (NPSH) during the event, taking into account conditions in the Torus. Reactor depressurization will be initiated to reduce reactor pressure to approximately 100 psig using SRVs. SRVs will be manually cycled per procedure to control reactor pressure, but it will be maintained high enough such that RCIC can operate.

[1] Coping modifications consist of modifications installed to increase initial coping time, i.e. generators to preserve vital instruments or increase operating time on battery powered equipment.

Maintain Core Cooling	
BWR Installed Equipment Phase 1	
The Torus performs as the heat sink for core cooling. The Hardened Containment Vent System (HCVS) line for the Torus will be opened to remove heat from the Torus per the EOPs based on the pressure suppression pressure limit (a range of 17 to 33 psig, depending on Torus level). Based on MAAP analysis, this is expected to be approximately 6 hours after the initiation of the event, and will be confirmed by analysis. If the completed analysis results in a change in strategy, this will be provided in a six-month status report. Load shedding will be performed on the Division I and Division II station batteries to extend the time station batteries can be used to operate equipment and instruments used to provide core cooling. RCIC operates using the Division I station batteries. Instruments, SRVs, and the HCVS will be operated using Division II station batteries. Additional discussion of the load shedding strategy is provided in the section for Safety Functions Support – BWR Installed Equipment Phase 1. Nitrogen gas requirements for the first 24 hours are expected to be supplied by the installed capacity of the Alternate Nitrogen Supply System, and will be confirmed by analysis, so no changeout of bottles is required during Phase 1. If the completed analysis results in a change in strategy, this will be provided in a six-month status report. The applicable FLEX portable equipment, such as the diesel-driven pump or generator, will be staged as soon as possible during Phase 1.	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation.* NSPM will utilize the industry developed guidance from the Boiling Water Reactor Owners Groups, Electric Power Research Institute (EPRI) and Nuclear Energy Institute (NEI) to develop site specific procedures or guidelines to address the criteria in NEI 12-06. These procedures and/or guidelines will support the existing symptom based command and control strategies.
Identify modifications	*List modifications.* None.

Maintain Core Cooling

BWR Installed Equipment Phase 1

Key Reactor Parameters

List instrumentation credited for this coping evaluation.

Containment Essential Instrumentation	**Safety Function**
Drywell Pressure (PT-7251A,B)	Containment integrity
Drywell Air Temperature (TE-4247A/B/C/D/E/F/G/H)	Containment integrity
Torus Water Temperature (TE-4073A through 4080A (Division I) and TE-4073B through 4080B (Division II))	Containment integrity
Torus Water Level (LT-7338A,B)	Containment integrity
Reactor Vessel Essential Instrumentation	**Safety Function**
RPV Level – (LT-2-3-85A/B, LT-2-3-112A/B, LT-2-3-61)	Reactor vessel inventory and core heat removal
RPV Pressure (PT-6-53A/B)	Reactor vessel pressure boundary and pressure control

Notes:

Drywell Air Temperature Instruments TE-4247A/B/C/D/E/F/G/H are not DC powered, but will be able to be read from the Main Control Room using a hand held device.

Division I and II instruments are both listed in the Key Reactor Parameters table above, but Division I instrumentation will be load shed as part of the deep load shed. See a further discussion on this topic in the Safety Function Support Section.

Maintain Core Cooling

BWR Portable Equipment Phase 2

Provide a general description of the coping strategies using on-site portable equipment including modifications that are proposed to maintain core cooling. Identify methods (RCIC/HPCI/IC)and strategy(ies) utilized to achieve this coping time.

In summary, the strategy for Phase 2 Core Cooling will rely on RCIC and the Torus with venting through the HCVS for as long as possible. Once RCIC operation is no longer possible, the reactor will be fully depressurized using SRVs, and core cooling makeup will be provided by a FLEX portable diesel driven pump. DC powered equipment will be supported by a FLEX portable diesel-driven generator. Details of this strategy are outlined below.

A FLEX portable diesel driven pump will be used during Phase 2 to supply water from the discharge canal that empties to the Mississippi River in all events except the beyond design basis flooding event. The Mississippi River is the ultimate makeup water source, and will be available in all scenarios. The FLEX portable pump will be deployed near the discharge canal and take suction directly from the canal, with a strainer installed at the suction to prevent large debris from entering the pump. Water in the canal is less likely to have large debris because the water has already passed through plant equipment. For the flood hazard, the plant will be shutdown. The discharge canal will be flooded therefore the FLEX portable pump will be deployed inside the berm near the intake structure, and take suction directly from the river outside the berm. It will rely on its suction strainer to prevent large debris from entering the pump. The use of raw water is acceptable because the water level is maintained above the top of the fuel throughout the ELAP so cooling of the fuel does not rely solely on flow up from the bottom of the fuel assembly.

The FLEX pump will discharge through a hose into a connection point in the Division I RHR Service Water (RHRSW) piping in the Reactor Building. From this point, the water will utilize the seismically qualified cross tie connection between RHR and RHRSW to provide makeup water to the Reactor via RHR Low Pressure Coolant Injection (LPCI) lines. An alternate connection point for the makeup supply for LPCI will be in the Division I RHR pump discharge piping. The portable pump and temporary connection will be staged and available for use no later than eight hours after the initiation of the event. Valves required to align this injection path are all accessible and can be manually operated. The RHR to RHRSW cross tie valves are accessible via a dedicated, labeled ladder.

In Phase 2, a FLEX portable diesel generator is used to provide power to 250 VDC and 125 VDC system battery chargers, to maintain sufficient battery power to maintain the Phase 1 coping strategy. This deployment will occur no later than eight hours after event initiation. The FLEX portable diesel generator will use a primary connection point to a 480V load center, with an alternate connection point available at the battery chargers themselves.

Maintain Core Cooling	
BWR Portable Equipment Phase 2	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation.* NSPM will utilize the industry developed guidance from the Boiling Water Reactor Owners Groups, EPRI and NEI to develop site specific procedures or guidelines to address the criteria in NEI 12-06. These procedures and/or guidelines will support the existing symptom based command and control strategies.
Identify modifications	*List modifications.* The following modifications are planned: • Add connection points to connect 480 V portable diesel generators to the 480 V load centers (primary strategy). A breaker will be modified for connection to the 480 V portable diesel generators. The breaker will be racked into the 480 V load center in a spare location or in place of an existing breaker not required for the event. • Add connection points to connect 480 V portable diesel generators directly to the battery chargers (alternate strategy). • Add new connection point to RHRSW piping in Reactor Building with a fitting for hose connection. This connection provides a path to RHR using the cross tie piping between Division I RHR and RHRSW. The cross tie is intended to provide a path for an inexhaustible source of river water to the reactor core.
Key Reactor Parameters	*List instrumentation credited or recovered for this coping evaluation.* See instrumentation listed in Phase 1 Core Cooling; note that Division I instruments may be repowered after the FLEX portable diesel generator is connected. Local instrumentation (e.g., flow meter, pressure gauge) will be available where required to operate the Phase 2 FLEX equipment.

Maintain Core Cooling	
BWR Portable Equipment Phase 2	
Storage / Protection of Equipment : **Describe storage / protection plan or schedule to determine storage requirements**	
See discussion under "Determine Applicable Extreme External Hazard" for storage and protection attributes to address each hazard.	
Seismic	*List how equipment is protected or schedule to protect.* See discussion under "Determine Applicable Extreme External Hazard" section for protection of equipment from seismic events.
Flooding Note: if stored below current flood level, then ensure procedures exist to move equipment prior to exceeding flood level	*List how equipment is protected or schedule to protect.* See discussion under "Determine Applicable Extreme External Hazard" section for protection of equipment from external flooding.
Severe Storms with High Winds	*List how equipment is protected or schedule to protect.* See discussion under "Determine Applicable Extreme External Hazard" section for protection of equipment from high winds.
Snow, Ice, and Extreme Cold	*List how equipment is protected or schedule to protect.* See discussion under "Determine Applicable Extreme External Hazard" section for protection of equipment from snow, ice and extreme cold.
High Temperatures	*List how equipment is protected or schedule to protect.* See discussion under "Determine Applicable Extreme External Hazard" section for protection of equipment from high temperatures.

Maintain Core Cooling		
BWR Portable Equipment Phase 2		
Deployment Conceptual Modification		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how the equipment will be deployed to the point of use.	*Identify modifications.*	*Identify how the connection is protected.*
Identification of storage locations are still in development. Debris removal equipment will be available to clear debris from the deployment path. Deployment of portable equipment and hoses will be performed using vehicles and trailers from the storage locations. Hoses and cables will be laid out to connect portable equipment. Hoses may be routed through plant security fences.	None.	Connection points will be located inside protected (Class I) areas of the Reactor Building, Emergency Filtration Trains Building, and Turbine Building. Multiple access pathways exist for hose and cable routing to connection points.
Notes: None.		

Maintain Core Cooling	
BWR Portable Equipment Phase 3	
Provide a general description of the coping strategies using phase 3 equipment including modifications that are proposed to maintain core cooling. Identify methods (RCIC/HPCI/IC)and strategy(ies) utilized to achieve this coping time. The Phase 3 strategy is to use equipment from the Regional Response Center to restore power to one RHR pump and restore cooling water flow on the RHR Service Water (RHRSW) side of one RHR heat exchanger. The Regional Response Center will provide a 4160 V diesel generator that can be connected to an essential bus to provide power to an RHR pump, and will have additional capacity to supply other necessary loads such as motor operated valves or additional support equipment as discussed in the Safety Function Support – BWR Portable Equipment Phase 3 section. Appropriate actions will be developed to prevent pipe damage due to water hammer prior to an RHR pump being started. The Regional Response Center will also provide a diesel driven pump to provide the motive force for cooling water on the RHRSW side of the RHR heat exchanger. The HCVS will be closed when cooling through the RHR heat exchanger is sufficient to remove the decay heat. In addition to the 4160 V diesel generator and diesel driven pump, the Regional Response Center will provide backups for active Phase 2 FLEX equipment that will continue to be used in Phase 3 and will provide consumables such as fuel and compressed gas supplies to support continued operation of equipment in Phase 3. Alternate connection points are provided in Divisions I and II of RHRSW by removal of valve bonnets in the intake structure and installation of a flange with a hose connection. Suction strainers will be provided for the pumps supplied by the Regional Response Center. Water in the discharge canal is unlikely to have large debris because it would have passed through the traveling screens and plant equipment. The suction strainers provided with the pumps will ensure that debris is not likely to clog heat exchanger tubes.	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation.* NSPM will utilize the industry developed guidance from the Boiling Water Reactor Owners Groups, EPRI and NEI to develop site specific procedures or guidelines to address the criteria in NEI 12-06. These procedures and/or guidelines will support the existing symptom based command and control strategies.

<table>
<tr><th colspan="3">Maintain Core Cooling</th></tr>
<tr><th colspan="3">BWR Portable Equipment Phase 3</th></tr>
<tr><td>Identify modifications</td><td colspan="2">List modifications.

The following modifications are planned:

- Add connection points to connect 4160 V diesel generators to the Division I or Division II 4160 V bus. Two breakers will be modified for connection to the 4160V portable diesel generators, one for each division. The breaker can be racked into the 4160 V load center in a spare location or in place of an existing breaker not required for the event.

- A flange will be fabricated for the alternate connection point in the intake structure to one of the four RHRSW lines.</td></tr>
<tr><td>Key Reactor Parameters</td><td colspan="2">List instrumentation credited or recovered for this coping evaluation.

The instrumentation is the same as the Phase 1 Core Cooling. See discussion in previous section on Phase 1.
Local instrumentation (e.g., flow meter, pressure gauge) will be available where required to operate the Phase 3 FLEX equipment obtained from the RRC.</td></tr>
<tr><th colspan="3">Deployment Conceptual Modification</th></tr>
<tr><td>Strategy</td><td>Modifications</td><td>Protection of connections</td></tr>
<tr><td>Identify Strategy including how the equipment will be deployed to the point of use.</td><td>Identify modifications.</td><td>Identify how the connection is protected.</td></tr>
<tr><td>Phase 3 equipment will be provided by the Regional Response Center (RRC) which will be located in Memphis, TN.</td><td>No modifications identified for Phase 3 deployment issues.</td><td>Connection points will be located inside protected (Class I) areas of the Reactor Building, Emergency Filtration Trains Building, Intake Structure, and Turbine Building.</td></tr>
<tr><td colspan="3">Notes:
None.</td></tr>
</table>

Maintain Containment	
BWR Installed Equipment Phase 1	
Determine Baseline coping capability with installed coping modifications, not including FLEX modifications, utilizing methods described in Table 3-1 of NEI 12-06: • **Containment Venting or Alternate Heat Removal** • **Hydrogen Igniters (Mark III containments only)**	
Provide a general description of the coping strategies using installed equipment including modifications that are proposed to maintain containment. Identify methods (containment vent or alternative / Hydrogen Igniters) and strategy(ies) utilized to achieve this coping time. The primary strategy for maintaining containment is through the use of the Hardened Containment Vent System (HCVS) to remove heat from the Suppression Pool (Torus). Torus temperature increases as the result of operation of the SRVs and RCIC exhaust. Heat removal from the Torus in the event of Extended Loss of AC Power (ELAP) will be accomplished by venting from the Torus through the Hardened Containment Vent System (HCVS). Venting of the Torus through HCVS will be initiated manually per the EOPs based on the pressure suppression pressure limit (a range of 17 to 33 psig, depending on Torus level). The HCVS can be operated using Train B of the alternate nitrogen system and Division II DC power. Operation of the HCVS limits the pressure and temperature reached in the Torus and drywell. Thus, containment integrity is not challenged and remains functional throughout the event. Phase 1 (i.e., the use of permanently installed plant equipment/features) strategies to maintain containment will be relied upon throughout the duration of the event. Continued operation of the permanently installed plant equipment and features is supported in Phase 2 and 3 by supplemental electrical power and nitrogen gas. DC battery life to support SRV, HCVS, and associated instrumentation will be extended as discussed in the Maintain Core Cooling – BWR Installed Equipment Phase 1 section.	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation.* NSPM will utilize the industry developed guidance from the Boiling Water Reactor Owners Groups, EPRI and NEI to develop site specific procedures or guidelines to address the criteria in NEI 12-06. These procedures and/or guidelines will support the existing symptom based command and control strategies.
Identify modifications	*List modifications.* Modifications associated with the HCVS are addressed in response to NRC Order EA-12-050.

<table>
<tr><th colspan="2">Maintain Containment</th></tr>
<tr><th colspan="2">BWR Installed Equipment Phase 1</th></tr>
<tr><td>Key Containment Parameters</td><td>List instrumentation credited for this coping evaluation.

Containment Essential Instrumentation	Safety Function
Drywell Pressure (PT-7251A,B)	Containment integrity
Drywell Air Temperature (TE-4247A/B/C/D/E/F/G/H)	Containment integrity
Torus Water Temperature (TE-4073A through 4080A (Division I) and TE-4073B through 4080B (Division II)	Containment integrity
Torus Water Level (LT-7338A, B)	Containment integrity
HCVS Rad Monitor (RE/RM-4544)	HCVS effluent radioactivity
HCVS system valve position indication (Component No. AO-4539, AO-4540)	HCVS operability
</td></tr>
<tr><td colspan="2">Notes:
Drywell Air Temperature Instruments TE-4247A/B/C/D/E/F/G/H are not DC powered, but will be read from the Main Control Room using a hand held device.

Division I and II instruments are both listed in the Key Reactor Parameters table above, but Division I instrumentation will be load shed as part of the deep load shed. See further discussion in the Safety Function Support Section.</td></tr>
</table>

Maintain Containment
BWR Portable Equipment Phase 2
Provide a general description of the coping strategies using on-site portable equipment including modifications that are proposed to maintain containment. Identify methods (containment vent or alternative / Hydrogen Igniters) and strategy(ies) utilized to achieve this coping time. The Phase 2 strategy to maintain containment uses Torus venting through the HCVS to maintain drywell and Torus temperatures and pressures within allowable limits. This is a continuation of the Phase 1 strategy, with the addition of the portable diesel-driven generator to support DC electrical system functions as discussed in the Maintain Core Cooling – BWR Portable Equipment Phase 2 section. The HCVS system is powered from the Division II 250 VDC system. As described in the Maintain Core Cooling – BWR Portable Equipment Phase 2 section, a FLEX portable diesel generator will be deployed to provide power to 250 VDC and 125 VDC system battery chargers, to maintain sufficient battery power to operate the HCVS nitrogen supply solenoids.

Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation.* NSPM will utilize the industry developed guidance from the Boiling Water Reactor Owners Groups, EPRI and NEI to develop site specific procedures or guidelines to address the criteria in NEI 12-06. These procedures and/or guidelines will support the existing symptom based command and control strategies.
Identify modifications	*List modifications.* Modifications associated with the HCVS are addressed in response to NRC Order EA-12-050.
Key Containment Parameters	*List instrumentation credited or recovered for this coping evaluation.* See instrumentation listed in the Phase 1 Maintain Containment section; note that Division I instruments may be repowered after the FLEX portable diesel generator is connected. Local instrumentation (e.g., flow meter, pressure gauge) will be available where required to operate the Phase 2 FLEX equipment.

<table>
<tr><th colspan="3">Maintain Containment</th></tr>
<tr><th colspan="3">BWR Portable Equipment Phase 2</th></tr>
<tr><th colspan="3">Storage / Protection of Equipment :
Describe storage / protection plan or schedule to determine storage requirements</th></tr>
<tr><td>Seismic</td><td colspan="2">List how equipment is protected or schedule to protect.

See discussion under “Determine Applicable Extreme External Hazard” section for protection of equipment from seismic events.</td></tr>
<tr><td>Flooding
Note: if stored below current flood level, then ensure procedures exist to move equipment prior to exceeding flood level.</td><td colspan="2">List how equipment is protected or schedule to protect.

See discussion under “Determine Applicable Extreme External Hazard” section for protection of equipment from external flooding.</td></tr>
<tr><td>Severe Storms with High Winds</td><td colspan="2">List how equipment is protected or schedule to protect.

See discussion under “Determine Applicable Extreme External Hazard” section for protection of equipment from high winds.</td></tr>
<tr><td>Snow, Ice, and Extreme Cold</td><td colspan="2">List how equipment is protected or schedule to protect.

See discussion under “Determine Applicable Extreme External Hazard” section for protection of equipment from snow, ice and extreme cold.</td></tr>
<tr><td>High Temperatures</td><td colspan="2">List how equipment is protected or schedule to protect.

See discussion under “Determine Applicable Extreme External Hazard” section for protection of equipment from high temperatures.</td></tr>
<tr><th colspan="3">Deployment Conceptual Design</th></tr>
<tr><th>Strategy</th><th>Modifications</th><th>Protection of connections</th></tr>
<tr><td>Identify Strategy including how the equipment will be deployed to the point of use.</td><td>Identify modifications.</td><td>Identify how the connection is protected.</td></tr>
<tr><td>See discussion in Phase 2 of Core Cooling.</td><td>See discussion in Phase 2 of Core Cooling.</td><td>See discussion in Phase 2 of Core Cooling.</td></tr>
<tr><td colspan="3">Notes:
None.</td></tr>
</table>

Maintain Containment
BWR Portable Equipment Phase 3
Provide a general description of the coping strategies using phase 3 equipment including modifications that are proposed to maintain containment. Identify methods (containment vent or alternative / Hydrogen Igniters) and strategy(ies) utilized to achieve this coping time. No additional equipment is needed beyond what is described in Phase 2. See the Maintain Core Cooling – BWR Portable Equipment Phase 3 section for discussion of Phase 3 strategies for decay heat removal.

Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation.* NSPM will utilize the industry developed guidance from the Boiling Water Reactor Owners Groups, EPRI and NEI to develop site specific procedures or guidelines to address the criteria in NEI 12-06. These procedures and/or guidelines will support the existing symptom based command and control strategies.
Identify modifications	*List modifications.* Modifications associated with the HCVS are addressed in response to NRC Order EA-12-050.
Key Containment Parameters	*List instrumentation credited or recovered for this coping evaluation.* The instrumentation is the same as the Phase 1 Maintain Containment. See discussion in previous section on Phase 1. Local instrumentation (e.g., flow meter, pressure gauge) will be available where required to operate the Phase 3 FLEX equipment obtained from the RRC.

Deployment Conceptual Design		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how the equipment will be deployed to the point of use.	*Identify modifications.*	*Identify how the connection is protected.*
See discussion in Phase 3 of Core Cooling.	See discussion in Phase 3 of Core Cooling.	See discussion in Phase 3 of Core Cooling.

Maintain Containment
BWR Portable Equipment Phase 3
Notes: None.

Maintain Spent Fuel Pool Cooling
BWR Installed Equipment Phase 1
Determine Baseline coping capability with installed coping[2] modifications not including FLEX modifications, utilizing methods described in Table 3-1 of NEI 12-06: • **Makeup with Portable Injection Source**
Provide a general description of the coping strategies using installed equipment including modifications that are proposed to maintain spent fuel pool cooling. Identify methods (makeup with portable injection source)and strategy(ies) utilized to achieve this coping time The only Phase 1 action is to monitor the Spent Fuel Pool level. The following paragraphs provide justification for the Phase 1 action. The emergency heat load assumes a full core discharge is required 30 days following startup from the last refueling discharge. The full core discharge fills the last 484 spaces, with the full core discharge complete 150 hours after shutdown. In this scenario, there is no fuel in the core, therefore the entire site focus would be on maintaining cooling in the Spent Fuel Pool. Under this condition, the Spent Fuel Pool will reach a boiling temperature no earlier than 8.3 hours, and have a maximum evaporation rate of 53 gpm after bulk boiling commences. The Spent Fuel Pool has 7,769 gallons per foot of depth. Once boiling begins, Spent Fuel Pool level would drop less than two feet in four hours. Four hours is adequate to stage a FLEX portable pump to inject water into the Spent Fuel Pool. Therefore, assuming event initiation under these conditions, no actions are required for Spent Fuel Pool cooling or makeup during Phase 1. The normal heat load for the Spent Fuel Pool is 5.55 x 10^6 Btu/hr (USAR Section 10.2.2.3). Conservatively assuming that the reactor is at 100% rated power after the discharge is completed, the time to boil for the Spent Fuel Pool after AC power is lost would be no earlier than 36.9 hours, and the evaporation rate would be 11.9 gpm (715 gal/hr), based on scaling the time to boil and evaporation rate of the emergency heat load with the normal heat load. The Spent Fuel Pool has 7,769 gallons per foot of depth. Once boiling begins, the Spent Fuel Pool level would drop by less than two feet in twenty hours. The FLEX portable pump staged for providing water to the reactor to maintain core cooling will be shown to have the capacity to maintain core cooling and maintain Spent Fuel Pool level. Assuming event initiation under normal operating conditions, no actions are required for Spent Fuel Pool cooling or makeup during Phase 1. As the spent fuel pool temperature increases, additional moisture will enter the atmosphere in the reactor building The roof vent on the Spent Fuel Pool floor and the reactor building railroad doors will be able to be opened to allow venting of the area.

[2] Coping modifications consist of modifications installed to increase initial coping time, i.e. generators to preserve vital instruments or increase operating time on battery powered equipment.

Maintain Spent Fuel Pool Cooling	
BWR Installed Equipment Phase 1	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation.* Procedures will be revised to include Spent Fuel Pool level monitoring, consistent with the Order EA-12-051.
Identify any equipment modifications	*List modifications.* Spent Fuel Pool level instrumentation will be provided in accordance with EA-12-051 and associated guidance.
Key SFP Parameter	*List instrumentation credited or recovered for this coping evaluation.* Spent Fuel Pool level instrumentation will be provided in accordance with EA-12-051 and associated guidance.
Notes: None.	

Maintain Spent Fuel Pool Cooling	
BWR Portable Equipment Phase 2	
Provide a general description of the coping strategies using on-site portable equipment including modifications that are proposed to maintain spent fuel pool cooling. Identify methods (makeup with portable injection source) and strategy(ies) utilized to achieve this coping time. In Phase 2, the Spent Fuel Pool level monitoring will continue under all scenarios and modes, as long as there is fuel in the pool. For the emergency heat load case, the full core has been moved to the Spent Fuel Pool. There is no need to meet core cooling or containment functions. Therefore, the portable diesel-driven FLEX pump staged as described in the Maintain Core Cooling – BWR Portable Equipment Phase 2 section would be relied upon to provide makeup to the Spent Fuel Pool to maintain Spent Fuel Pool Cooling. The FLEX pump could provide makeup either via RHR spent fuel pool cooling piping or via hoses that would be staged directly into the pool. For the normal heat load case, the event is assumed to occur with the reactor at 100% rated power, and the Phase 2 actions will be to pre-stage hoses for makeup, and open the roof vent. As noted in the Maintain Spent Fuel Pool Cooling – BWR Installed Equipment Phase 1 section, the pool level would drop by less than two feet in no less than 56 hours (36.9 hours to boiling plus 20 hours to drop less than two feet). Therefore, makeup is not necessary for the spent fuel pool in Phase 2.	
Schedule:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation.* Procedures will be revised to include Spent Fuel Pool level monitoring.
Identify modifications	*List modifications.* Spent Fuel Pool level instrumentation will be provided in accordance with EA-12-051 and associated guidance.
Key SFP Parameter	*List instrumentation credited or recovered for this coping evaluation.* Spent Fuel Pool level instrumentation will be provided in accordance with EA-12-051 and associated guidance.

Maintain Spent Fuel Pool Cooling	
BWR Portable Equipment Phase 2	
Storage / Protection of Equipment : **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	*List how equipment is protected or schedule to protect.* See discussion under "Determine Applicable Extreme External Hazard" section for protection of equipment from seismic events.
Flooding Note: if stored below current flood level, then ensure procedures exist to move equipment prior to exceeding flood level.	*List how equipment is protected or schedule to protect.* See discussion under "Determine Applicable Extreme External Hazard" section for protection of equipment from external flooding.
Severe Storms with High Winds	*List how equipment is protected or schedule to protect.* See discussion under "Determine Applicable Extreme External Hazard" section for protection of equipment from high winds.
Snow, Ice, and Extreme Cold	*List how equipment is protected or schedule to protect.* See discussion under "Determine Applicable Extreme External Hazard" section for protection of equipment from snow, ice and extreme cold.
High Temperatures	*List how equipment is protected or schedule to protect.* See discussion under "Determine Applicable Extreme External Hazard" section for protection of equipment from high temperatures.

Deployment Conceptual Design		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how the equipment will be deployed to the point of use.	*Identify modifications.*	*Identify how the connection is protected.*
See discussion in Phase 2 of Core Cooling.	See discussion in Phase 2 of Core Cooling.	See discussion in Phase 2 of Core Cooling.

Maintain Spent Fuel Pool Cooling
BWR Portable Equipment Phase 2
Notes: None.

Maintain Spent Fuel Pool Cooling	
BWR Portable Equipment Phase 3	
Provide a general description of the coping strategies using phase 3 equipment including modifications that are proposed to maintain spent fuel pool cooling. Identify methods (makeup with portable injection source) and strategy(ies) utilized to achieve this coping time. For Phase 3, the Regional Response Center will provide a diesel driven pump that will be used to backup the FLEX pump, or will be used as the primary pump for makeup water to the Spent Fuel Pool. The 4160 V diesel generator provided by the Regional Response Center will be used to provide power to the Spent Fuel Pool level instruments that will be installed per NRC Order EA-12-051.	
Schedule:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation.* Procedures will be revised to include Spent Fuel Pool level monitoring.
Identify modifications	*List modifications.* Spent Fuel Pool level instrumentation will be provided in accordance with EA-12-051 and associated guidance.
Key SFP Parameter	*List instrumentation credited or recovered for this coping evaluation.* Spent Fuel Pool level instrumentation will be provided in accordance with EA-12-051 and associated guidance.

Deployment Conceptual Design

Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how the equipment will be deployed to the point of use.	*Identify modifications.*	*Identify how the connection is protected.*
See discussion in Phase 3 of Core Cooling.	See discussion in Phase 3 of Core Cooling.	See discussion in Phase 3 of Core Cooling.

Maintain Spent Fuel Pool Cooling
BWR Portable Equipment Phase 3
Notes: Strategies used in Phase 2 to maintain the water inventory in the Spent Fuel Pool can be used indefinitely.

Safety Functions Support

BWR Installed Equipment Phase 1

Determine baseline coping capability with installed coping[3] modifications not including FLEX modifications.

Provide a general description of the coping strategies using installed equipment including station modifications that are proposed to maintain and/or support safety functions. Identify methods and strategy(ies) utilized to achieve coping times.

Safety functions support can include DC power, ventilation, lighting, air/gas supplies for operation of valves, communication equipment, and fuel. Each of these supports is discussed below relative to the Phase 1 coping time.

DC Power

DC power is supplied to RCIC, SRVs, Hardened Containment Vent System (HCVS), critical instrumentation, and emergency lighting.

DC power is provided by two divisions of batteries and each division includes 125 VDC and 250 VDC sources. Battery life will be extended through deep load shedding on each battery. A high-level, preliminary summary of the major loads to remain and examples of those to be shed are provided below.

Battery	Major Loads to Remain Powered	Examples of Loads to be Shed
Division I 125 VDC (#11)	RCIC Controls	Emergency Lighting Secondary-Side Panels/ Benchboards Division I power supply to A, B, C, D SRVs Emergency Diesel Generator (EDG) Control Panels 4KV Switchgear Controls
Division I 250 VDC (#13)	RCIC Valves, Support Pumps, AC Controls (Y-71 Inverter)	Division I SRV solenoids to E, F, G, H SRVs Outboard Isolation Valves Non-RCIC Y-71 Inverter Loads
Division II 125 VDC (#12)	Essential Instrumentation (Panels) Division II SRV solenoids to A, B, C, D SRVs	HPCI Controls Secondary-Side Panels/ Benchboards EDG Control Panels 4KV Switchgear Controls
Division II 250 VDC (#16)	HCVS Division II SRV solenoids to E, F, G, H SRVs Essential Instrumentation	HPCI Non-Essential Y-81 Inverter Loads

With this deep load shedding strategy, it is expected that the station batteries can be extended

[3] Coping modifications consist of modifications installed to increase initial coping time, i.e. generators to preserve vital instruments or increase operating time on battery powered equipment.

Safety Functions Support
BWR Installed Equipment Phase 1
through Phase 1 and do not require portable supplemental charging before eight hours for the most limiting battery. Additional formal analysis will be performed to support this. If analysis results require a change in strategy, that change will be communicated in a six-month status report. This approach will reduce critical instrument diversity as only Division II of essential instrumentation will remain powered after load shedding. **Nitrogen Supply for Pneumatic Valves** The alternate nitrogen system is expected to have the capacity to provide nitrogen to the inboard Main Steam Isolation Valves (MSIV), T-ring seals on the containment purge and vent valves, SRVs, and the HCVS. HCVS usage includes breaking the rupture disc and actuation of air-operated valves. The SRVs and HCVS use the alternate nitrogen gas supply for valve actuation. Additional formal analysis of the nitrogen supply will be performed to assure that it is adequate. If changes to the Phase 1 strategy are required as a result of the analysis, they will be provided in a six-month status report. **MCR Environmental Conditions** The primary strategy for maintaining the environment of the Main Control Room (MCR) during Phase 1 is to open doors. The MCR temperature is not expected to exceed 110°F within eight hours of the event. **RCIC Room Environmental Conditions** The primary strategy for maintaining the environment of the RCIC Room during Phase 1 is to open doors. The existing SBO procedure directs operators to open room doors and panel doors supporting RCIC functions to promote heat removal. RCIC room temperatures are not expected to exceed the equipment limitations during Phase 1. Additional formal analysis of the RCIC room will be performed to assure that these areas remain accessible and temperatures are within the equipment functional limitations. If changes to the Phase 1 strategy are required as a result of the analysis, they will be provided in a six-month status report. **Torus Room Environmental Conditions** The primary strategy for maintaining the environment of the Torus Room during Phase 1 is to open doors. Torus area room temperatures are not expected to exceed the equipment limitations during Phase 1. Additional formal analysis of the Torus room will be performed to assure that temperatures are within the equipment functional limitations. If changes to the Phase 1 strategy are required as a result of the analysis, they will be provided in a six-month status report. Other than opening the doors as mentioned above, personnel access to the Torus area during Phase 1 is not required. **Battery Rooms Environmental Conditions** The primary strategy for maintaining the environment of the Battery Rooms during Phase 1 is to

Safety Functions Support
BWR Installed Equipment Phase 1

open doors. Battery room temperatures and hydrogen levels are not expected to exceed the equipment limitations during Phase 1. Hydrogen generation is only a concern when batteries are charging, and therefore hydrogen generation will not occur during Phase 1. Additional formal analysis of the battery rooms will be performed to assure that these areas remain accessible and temperatures are within the equipment functional limitations. If changes to the Phase 1 strategy are required as a result of the analysis, they will be provided in a six-month status report.

RHR Rooms Environmental Conditions

The primary strategy for maintaining the environment of the RHR Rooms during Phase 1 is to open doors. RHR room temperatures are not expected to exceed the equipment limitations during Phase 1. Additional formal analysis of the RHR room will be performed to assure that these areas remain accessible and temperatures are within the equipment functional limitations. If changes to the Phase 1 strategy are required as a result of the analysis they will be provided in a six-month status report. Personnel access to the RHR room during Phase 1 is not required.

Ventilation

No forced ventilation is expected to be required during Phase 1 as described above for each area. Plant doors may be opened as necessary to provide additional ventilation.

Lighting

Lighting is required for operator actions and access in the plant to implement actions associated with the SBO procedure. Emergency lighting is provided by local battery-powered emergency lighting and the lighting is available for at least eight hours.

Communications

A Communications Assessment was performed as a result of the information requested for NTTF Recommendation 9.3 in the March 12, 2012 NRC's 10 CFR 50.54(f) letter. This Communications Assessment was provided by NSPM to the NRC in a letter dated October 29, 2012, and supplemented on February 21, 2013. NSPM will implement recommendations from the Communications Assessment in coordination with development of FLEX mitigating strategies four months prior to the beginning of the MNGP R27 refueling outage or December 31, 2016, whichever comes first.

Diesel Fuel

No portable equipment is used in Phase 1; therefore no refueling is needed.

Safety Functions Support	
BWR Installed Equipment Phase 1	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation.* NSPM will utilize the industry developed guidance from the Boiling Water Reactor Owners Groups, EPRI and NEI to develop site specific procedures or guidelines to address the criteria in NEI 12-06. These procedures and/or guidelines will support the existing symptom based command and control strategies. Existing procedures will be reviewed with the industry generic FSGs and modified as appropriate.
Identify modifications	*List modifications and describe how they support coping time.* Necessary local battery-powered emergency lighting will be modified to use light emitting diode (LED) bulbs to extend the emergency lighting capability to beyond eight hours.
Key Parameters	*List instrumentation credited for this coping evaluation phase.* There is no instrumentation.
Notes: None.	

Safety Functions Support
BWR Portable Equipment Phase 2
Provide a general description of the coping strategies using on-site portable equipment including station modifications that are proposed to maintain and/or support safety functions. Identify methods and strategy(ies) utilized to achieve coping times.

Portable equipment in Phase 2 is required to support continued strategies from Phase 1 and includes DC power, ventilation, lighting, air/gas supplies for operation of valves, communication equipment, and fuel. These supports are discussed below relative to the Phase 2 coping time.

<u>DC Power</u>

As discussed in the portable equipment section of Phase 2 for core cooling, a 480 V FLEX portable diesel generator will be connected to recharge the batteries and provide continuous DC power for RCIC operation, SRV operation, Hardened Containment Vent System operation, and critical instrumentation. Depending on conditions, loads shed in Phase 1 will be restored as needed when the FLEX portable diesel generator is supplying the power.

<u>Nitrogen Supply for Pneumatic Valves</u>

The Alternate Nitrogen Supply System will continue to supply nitrogen gas for SRVs and Hardened Containment Vent System valve actuation. In Phase 2, the nitrogen bottles will be changed out with replacement bottles, if required. The system design allows for replacement of nitrogen bottles without interruption to the nitrogen supply. It is expected that there are sufficient quantities of nitrogen stored on site to supply alternate nitrogen gas system usage for 72 hours. Additional formal analysis of the nitrogen quantities required for Phase 1 and 2 operations will be performed to assure that on site quantities are sufficient for at least 72 hours. If changes are required to the Phase 2 strategy as a result of the analysis, they will be provided in a six-month status report.

<u>MCR Environmental Conditions</u>

In Phase 2, supplemental ventilation will be provided for the operators in the Main Control Room using portable ducting and fans for air circulation as necessary to maintain a temperature below 110°F. Portable fans will be powered by the FLEX portable diesel generator. Additional formal analysis will be performed to determine the timing and scope of the supplemental cooling, or heating required, and the results of this analysis will be provided in a six-month status report.

<u>RCIC Room Environmental Conditions</u>

To maintain equipment qualification, the RCIC room is provided with supplemental ventilation using portable ducting and fans to lower the room temperature, if required. The RCIC room is open to a large area above. Natural convection will result in cooler air falling to the RCIC room, and warmer air rising to the space above. Portable fans will be powered by the FLEX portable diesel generator. Additional formal analysis will be performed to determine the timing and scope of the supplemental cooling required, and the results of this analysis will be provided in a six-month status report.

Safety Functions Support

BWR Portable Equipment Phase 2

Torus Room Environmental Conditions

The Torus room temperature is not expected to exceed 160°F. Additional formal analysis will be performed to confirm the temperature does not result in equipment failures, and the results of this analysis will be provided in a six-month status report.

Personnel access to the Torus room is not required to accomplish the FLEX strategies in Phase 2.

Battery Rooms Environmental Conditions

In Phase 2, the battery room cooling and hydrogen ventilation may be required. Portable fans, if required, will be placed outside the battery room doors to circulate air through the rooms for cooling and to mitigate hydrogen buildup. An increase in room temperature may impact the battery capacity; however, a reduction in the battery capacity in Phase 2 is not significant because the batteries are being recharged by the FLEX diesel generator. Additional formal analysis will be performed to determine the timing and scope of the supplemental cooling or hydrogen ventilation required, and the results of this analysis will be provided in a six-month status report.

RHR Rooms Environmental Conditions

Without AC power, RHR rooms will not have any equipment in operation. Therefore, RHR room temperatures are not expected to exceed the equipment limitations during Phase 2. Additional formal analysis of the RHR room will be performed to assure that these areas remain accessible and temperatures are within the equipment functional limitations. If changes are required to the Phase 2 strategy as a result of the analysis, they will be provided in a six-month status report. Personnel access to the RHR room during Phase 2 is required.

Ventilation

Ventilation for the RCIC Room, Battery Rooms, and Main Control Room will be provided, if required, from portable fans that are powered from the FLEX diesel generator. Plant doors may be opened as necessary to provide additional ventilation.

Lighting

Control Room emergency lighting will be available because the 125 VDC system will have power supplied to the battery chargers from the FLEX diesel generator.

Portable lights will be available for use in areas that require operator access to perform Phase 2 equipment connections. These lights will either be battery powered, or will be capable of being powered by the FLEX diesel generator.

Communications

See discussion in the Safety Functions Support – BWR Portable Equipment Phase 1 section for

Safety Functions Support	
BWR Portable Equipment Phase 2	
communication strategies. **Diesel Fuel** Portable equipment used in Phase 2 will be equipped with fuel storage tanks sufficient for at least 24 hours of operation without refueling to minimize actions required to keep equipment running. Portable fuel containers can be used to refuel equipment, and the fuel stored in day tanks for the Emergency Diesel Generators will be available. At least 3,000 gallons of fuel will be available in the day tanks.	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation with a description of the procedure / strategy / guideline.* NSPM will utilize the industry developed guidance from the Boiling Water Reactor Owners Groups, EPRI and NEI to develop site specific procedures or guidelines to address the criteria in NEI 12-06. These procedures and/or guidelines will support the existing symptom based command and control strategies. Existing procedures will be reviewed with the industry generic FSGs and modified as appropriate.
Identify modifications	*List modifications necessary for phase 2.* None.
Key Parameters	*List instrumentation credited or recovered for this coping evaluation.* See discussion under Phase 2 for core cooling modifications.
Storage / Protection of Equipment : **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	*List how equipment is protected or schedule to protect.* See discussion under "Determine Applicable Extreme External Hazard" section for protection of equipment from seismic events.
Flooding Note: if stored below current flood level, then ensure procedures exist to move equipment prior to exceeding flood level.	*List how equipment is protected or schedule to protect.* See discussion under "Determine Applicable Extreme External Hazard" section for protection of equipment from external flooding.

Safety Functions Support		
BWR Portable Equipment Phase 2		
Severe Storms with High Winds	*List how equipment is protected or schedule to protect.* See discussion under "Determine Applicable Extreme External Hazard" section for protection of equipment from high winds.	
Snow, Ice, and Extreme Cold	*List how equipment is protected or schedule to protect.* See discussion under "Determine Applicable Extreme External Hazard" section for protection of equipment from snow, ice and extreme cold.	
High Temperatures	*List how equipment is protected or schedule to protect.* See discussion under "Determine Applicable Extreme External Hazard" section for protection of equipment from high temperatures.	
Deployment Conceptual Design		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how the equipment will be deployed to the point of use.	*Identify modifications.*	*Identify how the connection is protected.*
Portable ventilation equipment will be deployed within the Reactor Building and Emergency Filtration Train Building.	No modifications are required to deploy portable ventilation equipment.	Portable ventilation does not require a hard connection.
Nitrogen bottles are deployed when system pressure is required. Bottles are moved from the FLEX storage areas to the connection point.	No modifications are required to deploy the nitrogen bottles.	The nitrogen connections are located in the Class I area of the Turbine Building.
Diesel fuel will be gravity drained, when required, from the Emergency Diesel Generator Day Tanks to fuel canisters.	No modifications are required to drain fuel oil from the Day Tanks.	The Day Tanks and associated drain lines are located in Class I structures.

Safety Functions Support
BWR Portable Equipment Phase 2
Notes: None.

Safety Functions Support	
BWR Portable Equipment Phase 3	
Provide a general description of the coping strategies using phase 3 equipment including modifications that are proposed to maintain and/or support safety functions. Identify methods and strategy(ies) utilized to achieve coping times. Phase 3 portable equipment will be supplied by the Regional Response Center. The Phase 3 portable equipment requirements will be a 4160 V diesel generator, an additional diesel driven pump comparable in size to those on site, and backups for any active Phase 2 FLEX equipment that will continue to be used in Phase 3. The 4160 V diesel generator will be used to power one division of essential power to support continued core cooling functions. The onsite FLEX diesel driven pump and the additional diesel driven pump will be used to support cooling functions by providing makeup to the reactor, makeup to the Spent Fuel Pool, cooling water to the RHR heat exchanger, and cooling water for necessary room and equipment cooling normally supplied by the Emergency Service Water System. As part of Phase 3 portable equipment, consumables such as fuel and nitrogen will also be provided.	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation with a description of the procedure / strategy / guideline.* NSPM will utilize the industry developed guidance from the Boiling Water Reactor Owners Groups, EPRI and NEI to develop site specific procedures or guidelines to address the criteria in NEI 12-06. These procedures and/or guidelines will support the existing symptom based command and control strategies. Existing procedures will be reviewed with the industry generic FSGs and modified as appropriate.
Identify modifications	*List modifications necessary for phase 3.* None.
Key Parameters	*List instrumentation credited or recovered for this coping evaluation.* See Phase 3 descriptions for core cooling and spent fuel pool for permanently installed instruments.

Safety Functions Support		
BWR Portable Equipment Phase 3		
Deployment Conceptual Design		
Strategy	**Modifications**	**Protection of connections**
Identify Strategy including how the equipment will be deployed to the point of use.	*Identify modifications.*	*Identify how the connection is protected.*
Installed diesel fuel oil transfer pumps will be used to move fuel from the fuel storage tanks to portable tanks. RRC equipment will be used to deliver diesel fuel to the portable diesel-driven equipment.	None.	Installed pumps and connections are located inside Class I areas.
Notes: None.		

BWR Portable Equipment Phase 2							
Use and (potential / flexibility) diverse uses						*Performance Criteria*	*Maintenance*
List portable equipment[(1)]	Core	Containment	SFP	Instrumentation	Accessibility		Maintenance / PM requirements
Two (2) Self-Priming Pumps	**X**	**X**	**X**			Adequate for core cooling makeup / spent fuel pool makeup	Will follow EPRI template requirements
Two (2) Vehicles					**X**	Vehicles that can tow the pumps and generators.	Will follow EPRI template requirements
Two (2) 480VAC Diesel Generators	**X**	**X**		**X**		500 kW Cables – #1 per Phase.	Will follow EPRI template requirements
Two (2) Flatbed Trailers					**X**	Means to store and transport hoses, strainers, cables, and miscellaneous equipment.	Will follow EPRI template requirements
Two (2) Monitor Spray Nozzles for SFP Spray and required hoses			**X**			Sized for 250 gpm	Will follow EPRI template requirements
4 Portable fans and ducting	**X**	**X**		**X**	**X**	N/A	
Front loader					**X**	Debris removal and alternate for equipment placement	
Forklift					**X**	Debris removal and alternate for equipment placement	

(1) Represents quantity to meet "N+1" criteria

BWR Portable Equipment Phase 3							
Use and (potential / flexibility) diverse uses						*Performance Criteria*	*Notes*
List portable equipment	Core	Containment	SFP	Instrumentation	Accessibility		
Two (2) Self-Priming Pumps	**X**	**X**	**X**			Adequate for core cooling makeup / spent fuel pool makeup	Same as Phase 2
One (1) 4160VAC Diesel Generator	**X**	**X**	**X**	**X**		4160 VAC	To power RHR, etc.
One (1) set of cables for connecting portable generators	**X**			**X**	**X**	N/A	Supply as required
One (1) Diesel Generator fuel transfer pump and hoses	**X**	**X**	**X**	**X**		N/A	Supply as required. To ensure transfer capability of site fuel to portable equipment

Attachment 1
Sequence of Events Timeline

Action item	Elapsed Time	Action	ELAP Event Time Constraint Y/N[4]	Remarks / Applicability
	0	**Event Starts**	NA	Plant @100% power
1	Per SBO procedure	HPCI placed in Pull-to-Lock	NA	HPCI must be placed in pull-to-lock prior to its second automatic initiation such that it does not start. This is to preserve the Division II 250 VDC battery for other Phase 1 functions, including SRV and Hardened Containment Vent System operation. NA as the action occurs per the SBO procedure.
2	Per SBO procedure	RCIC manually initiated to control reactor level	NA	NA as the action occurs per the SBO procedure.
3	1 hr	ELAP Determination made	Y	In order to ensure that follow-on actions are completed consistent with the timelines identified, a timely decision must be made that the Station Blackout (SBO) condition is an Extended Loss of AC Power (ELAP). From event initiation, operations will have one hour to attempt to restart the Emergency Diesel Generators and evaluate site conditions prior to making the determination that the condition is an ELAP and entering appropriate procedures and FLEX strategies. This is a reasonable amount of time to allow operations to execute the initial SBO actions per procedure and make sufficient evaluation to determine an ELAP is likely.

[4] Instructions: Provide justification if No or NA is selected in the remark column
If yes include technical basis discussion as requires by NEI 12-06 section 3.2.1.7

Action item	Elapsed Time	Action	ELAP Event Time Constraint Y/N[4]	Remarks / Applicability
4	2 hr (preliminary)	DC load shed complete	Y	This is a necessary action to ensure safety-related battery power can be extended through Phase 1. This will be a deep load shed driven by a new procedure for the Division I and Division II 125 VDC and 250 VDC batteries. Loads will be shed by manipulating individual circuit breakers at the distribution panels. A specific sequence of loads to shed will be proceduralized based on priority and efficiency of execution. Individual circuits to be shed will be labeled with reflective FLEX labels so they are easy for operators to identify. DC panels are readily accessible and familiar to operators. The time is shown as preliminary as the supporting load-shed analysis is not yet complete. Changes will be provided in a six-month status report.
5	Following Action 4	Depressurize Reactor using SRVs to approximately 100 psig.	N	Reactor depressurization to approximately 100 psig will enable continued RCIC operation. Reactor depressurization is not time critical. Depressurization is required prior to venting the Torus.
6	6 hr	Initiate use of Hardened Containment Vent System	Y	The Hardened Containment Vent System (HCVS) must be opened per the EOPs. Opening the vent provides a path for heat removal from the Torus which extends time that the Torus is able to function as a heat sink and makeup water source. The vent is powered by an available battery and supplied with Nitrogen from the Alternate Nitrogen System. Controls for the HCVS are on the Alternate Shutdown System panel outside of the control room but are readily accessible and familiar to operators. HCVS controls will be labeled with reflective FLEX labels so they are easy for operators to identify.
7	6 hr	Off-site staffing resources begin to arrive	NA	NA because not a time constraint; included for reference.
8	8 hr (preliminary)	Batteries are being repowered using portable FLEX 480VAC Diesel Generator	Y	Necessary for continued DC power. Portable FLEX 480VAC Diesel Generator and necessary deployment equipment will be stored in a protected structure. The time is shown as preliminary as the supporting load-shed analysis is not yet complete. Changes will be provided in a six-month status report.

Action item	Elapsed Time	Action	ELAP Event Time Constraint Y/N[4]	Remarks / Applicability
9	8 hr	Portable diesel driven FLEX pumps staged for use	N	Strategy for core cooling relies on a portable diesel driven FLEX pump in Phase 2. The pump and necessary deployment equipment will be stored in a protected structure. Pumps will be staged with suction lined up to the discharge canal and discharge hose connections aligned to the RHRSW system or Spent Fuel Pool as necessary.
10	After 8 hr (preliminary)	Provide RCIC room cooling	N	Necessary for continued qualification and operation of RCIC equipment. Portable FLEX fans will be available and powered by either the FLEX 480V generator or other small portable generator and will maintain the room within required limits. The time is shown as preliminary as the supporting analysis is not yet complete. Changes will be provided in a six-month status report.
11	After 8 hr (preliminary)	Provide Main Control Room cooling	N	Necessary for continued Main Control Room habitability. Portable FLEX fans will be available and powered by the FLEX 480 V generator and will maintain the room within required limits. The time is shown as preliminary as the supporting analysis is not yet complete. Changes will be provided in a six-month status report.
12	After 8 hr (preliminary)	Provide Battery Room ventilation	Y	Necessary for continued qualification and operation of batteries and equipment. Portable FLEX fans will be available and powered by the FLEX 480V generator and will maintain the room within required limits. The time is shown as preliminary as the supporting analysis is not yet complete. Changes will be provided in a six-month status report.
13	12 hr	For emergency heat load, provide makeup to SFP	Y	For the SFP emergency heat load, provide makeup to the SFP using portable FLEX pump to at least meet the boil off rate (53 gpm for emergency heat load)
14	After 24 hr (preliminary)	Supplement Alternate Nitrogen	Y	Provide additional nitrogen supply to the Alternate Nitrogen System to support continued SRV and Hardened Containment Vent System operation. Bottles will be staged in accessible areas. The time is shown as preliminary as the supporting analysis is not yet complete. Changes will be provided in a six-month status report.

Action item	Elapsed Time	Action	ELAP Event Time Constraint Y/N[4]	Remarks / Applicability
15	After 24 hr	Refuel portable equipment	Y	Phase 2 portable equipment will require refueling no earlier than 24 hrs. All Phase 2 portable equipment will have fuel tanks with a minimum 24 hours capacity. Fuel and fuel containers will be available on site and can be transported by hand.
16	24-72 hr	Supplement on-site equipment with equipment from the Regional Response Center	Y	The Regional Response Center equipment will provide a reliable backup to the on-site portable equipment for extended operation. It will replenish consumables, and restore power to a 4160 V AC bus and restore water make up from the UHS.

Attachment 2
Milestone Schedule

The following milestone schedule is provided. The dates are planning dates subject to change as design and implementation details are developed. Any changes to the following target dates will be reflected in the subsequent six-month status reports.

Original Target Date	**Activity**	**Status** *{Include date changes in this column}*
October 2012	Submit 60 Day status report	Complete
February 2013	Submit Overall Integrated Implementation Plan	Complete with this submittal
August 2013	Submit six-month status report	
January 2014	Commence Engineering Modification Design – Phase 2 & 3	
February 2014	Submit six-month status report	
(TBD)	Regional Response Center Operational	
June 2014	Procure Equipment	
August 2014	Submit six-month status report	
August 2014	Commence Installation for Online Modifications – Phase 2 and 3	
December 2014	Implement Storage	
December 2014	Issue Maintenance Procedures	
February 2015	Implement Training	
February 2015	Submit six-month status report	
Four months prior to R27	Submit Staffing Assessment	
Four months prior to R27	Complete Communication Recommendations	
April 2015	Issue Procedures updated for FLEX strategies	
April 2015	Implementation Outage	
August 2015	Submit Completion Report	