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February 27, 2013

AEP-NRC-2013-13
10 CFR 50.54(f)
10 CFR 50.4

Docket Nos.: 50-315
50-316

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-001

Subject: Donald C. Cook Nuclear Plant Unit 1 and Unit 2
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. Nuclear Regulatory Commission Order Number EA-12-049, Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events, dated March 12, 2012.
2. Nuclear Regulatory Commission 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.
3. NEI 12-06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide," Revision 0, dated August, 2012.
4. Donald C. Cook Nuclear Plant Unit 1 and Unit 2 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 26, 2012.

On March 12, 2012, the Nuclear Regulatory Commission issued an order (Reference 1) to Donald C. Cook Nuclear Plant (CNP) Unit 1 and Unit 2. Reference 1 was immediately effective and directs CNP to develop, implement, and maintain guidance and strategies to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities in the event of a beyond-design-basis external event. 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 (Reference 2), issued August 29, 2012, endorses industry guidance document 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 CNP 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. This letter confirms CNP has received Reference 2 and has an Overall Integrated Plan developed in accordance with the guidance for defining and deploying strategies that will enhance the ability to cope with conditions resulting from beyond-design-basis external events.

The information in Enclosure 2 provides the CNP Overall Integrated Plan for mitigation strategies pursuant to Reference 3. The enclosed 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 Enclosure 2, will be provided in the 6-month Integrated Plan updates required by Reference 1.

This letter contains no new regulatory commitments. If there are any questions regarding this plan, please contact Mr. Michael K. Scarpello, Manager, Nuclear Regulatory Affairs, at (269) 466-2649.

Sincerely,

Joel P. Gebbie
Site Vice President

DMB/ssl

Enclosures: 1. Affirmation
2. Donald C. Cook Nuclear Plant FLEX Integrated Plan

c: C. A. Casto, NRC Region III
J.T. King, MPSC
S. M. Krawec, AEP Ft. Wayne, w/o enclosure
MDEQ – RMD/RPS
NRC Resident Inspector
T. J. Wengert, NRC Washington, DC

AFFIRMATION

I, Joel P. Gebbie, being duly sworn, state that I am Site Vice President of Indiana Michigan Power Company (I&M), that I am authorized to sign and file this request with the Nuclear Regulatory Commission on behalf of I&M, and that the statements made and the matters set forth herein pertaining to I&M are true and correct to the best of my knowledge, information, and belief.

Indiana Michigan Power Company

Joel P. Gebbie
Site Vice President

SWORN TO AND SUBSCRIBED BEFORE ME

THIS 27 DAY OF February, 2013

Notary Public

My Commission Expires 04-04-2018

DANIELLE BURGOYNE
Notary Public, State of Michigan
County of Berrien
My Commission Expires 04-04-2018
Acting in the County of Berrien

ENCLOSURE 2 TO AEP-NRC-2013-13

Donald C. Cook Nuclear Plant FLEX Integrated Plan

General Integrated Plan Elements (PWR & BWR)	
Determine Applicable Extreme External Hazard **Ref: 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 temps.* *Describe how NEI 12-06 sections 5 – 9 were applied and the basis for why the plant screened out for certain hazards.* Seismic Hazard Assessment: Per the Updated Final Safety Analysis Report (UFSAR) (Reference 1) Section 2.8.6, the seismic criteria for Donald C Cook Nuclear Power Plant (CNP) include two earthquake spectra: Operating Basis Earthquake (OBE) and Design Basis Earthquake (DBE). The DBE and OBE are 0.20g and 0.10g, respectively, horizontal ground acceleration and two-thirds this value acting vertically. Per NEI 12-06, Diverse and Flexible Coping Strategies (FLEX) Implementation Guide, (Reference 2) all sites will consider the seismic hazard. External Flood Assessment: The most plausible flood for CNP is a seiche condition from Lake Michigan. Plant configuration provides passive flood protection from the maximum seiche level (Reference 1). Portable FLEX equipment will be stored above the maximum seiche level. Considering a seiche is a relatively short duration event, the maximum seiche level is considered in the deployment of portable FLEX equipment. Extreme Cold Assessment: Figure 8-2 from the NEI FLEX Implementation Guide (Reference 2) was used for this assessment. It was determined that the CNP site is located in an ice severity level 5 region. Portable FLEX equipment will be stored in a configuration that will maintain the equipment in a condition to perform its function in a timely manner when called upon. In addition, snow, ice, and extreme cold conditions are considered in the procurement and deployment of portable FLEX equipment.

	High Wind Hazard Assessment: Figure 7-2 from the NEI FLEX implementation Guide (Reference 2) was used for this assessment. It was determined that the CNP site is in Region 1 with wind speeds of 200 mph. CNP Site is Latitude N41.98 Longitude W86.57. Extreme High Temperature Assessment: Per Reference 2, all sites will consider high temperatures. The CNP site may experience extreme high temperatures for a prolonged duration. However, the extreme drought and high temperature events are slow meteorological evolutions. Existing plant administrated operational procedures are in place to ensure that the plant is shut down and is at safe conditions if the temperature of any required systems, structures, or components (SSC) exceed their respective design basis limiting conditions. The event considered herein is a loss of alternating current (AC) power as a result of short extreme high temperatures (less than 24 hours in duration) coincident with high electrical grid demands, resulting in regional black out. During this type of event, the equipment and water inventories in the station are within the Technical Specification limits and therefore no additional limitation on initial conditions/failures/abnormalities are expected. The hazards applicable to CNP are seismic, flooding, ice, snow, high wind, and high temperatures.
Key Site assumptions to implement NEI 12-06 strategies. **Ref: NEI 12-06 section 3.2.1**	*Provide key assumptions associated with implementation of FLEX Strategies:* • *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. As the re-evaluations are completed, appropriate issues will be entered into the corrective action system and addressed on a schedule commensurate with other licensing bases changes.* • *Exceptions for the site security plan or other (license/site specific) requirements of 10CFR may be required.* • *Deployment resources are assumed to begin arriving at hour 6 and fully staffed by 24 hours.* • *Certain Technical Specifications cannot be complied with during FLEX implementation.*

	Provide key assumptions associated with implementation of FLEX Strategies: • 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. As the re-evaluations are completed, appropriate issues will be entered into the corrective action system and assessed on a schedule commensurate with other licensing bases changes. • Following conditions exist for the baseline case: o Seismically designed direct current (DC) banks are available. o Seismically designed alternating current (AC) and DC distribution is available. o Plant initial response is the same as that for a station blackout (SBO). o Best estimate analysis and decay heat is used to establish operator time and action. o No single failure of SSC assumed. Therefore, turbine-driven auxiliary feedwater (TDAFW) pump will perform. An alternate secondary pump will be deployed when steam supply to permanent equipment reaches the value dictated by procedures. • Margin will be added to the design of FLEX components and hardened connection points to provide allowance for future increases as detailed design progresses. All components procured will be commercial grade. • The hardened connections will be designed to be protected against external events or redundant locations will be identified. • Access routes that are needed to transport the FLEX portable equipment have been reviewed for events that could impede the equipment deployment. As required by the external hazard, debris removal or alternate routes are evaluated and identified. • All Phase 2 components are stored at site and available after the event they were designed to be protected against. • Additional staff resources are expected to arrive beginning at 6 hours and the site will be fully staffed 24 hours after the event. • This plan defines strategies capable of mitigating a simultaneous loss of all 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 (EOP) 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, as such, may warrant invocation of 10 CFR 50.54(x) and/or 10 CFR 73.55(p). (Reference 37)
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. **Ref: JLD-ISG-2012-01 NEI 12-06 13.1**	*Include a description of any alternatives to the guidance, and provide a milestone schedule of planned action.* Full conformance with JLD-ISG-2012-001 (Reference 51), Order EA-12-049 (Reference 49), and NEI 12-06 (Reference 2) is expected with no deviations identified at this time. Where there are interpretations of NEI-12-06 or JLD-ISG-2012-001 requirements, Indiana and Michigan Power (I&M) will follow those interpretations jointly developed by the NRC and NEI.
Provide a sequence of events and identify any time constraint required for success including the technical basis for the time constraint. **Ref: 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 walkthrough of deployment).* *Describe in detail in this section the technical basis for the time constraint identified on the sequence of events timeline Attachment 1A.* *See attached sequence of events timeline (Attachment 1A).*

	Technical Basis Support information, see attached NSSS Significant Reference Analysis Deviation Table (Attachment 1B) General: 1. A CNP specific evaluation has been performed to assess the analysis performed in support of WCAP-17601 (Reference 3) for the 4 loop Westinghouse plants and determine the applicability of the generic analysis to CNP. The analysis performed by the NSSS vendor, in WCAP-17601, was performed for plants with comparable core thermal power rating and plant configurations that were adequate to envelope the CNP configuration. Where required, plant specific differences were noted and documented for the applicable function and justification is documented in the area of that function. 2. Containment integrity was reviewed by use of Modular Accident Analysis Program (MAAP) as part of Calculation PRA-TH-L1-1 (Reference 4). This calculation shows containment pressure increasing just 2 psi over the duration of the 24 hour event. The final pressure is far less than the containment design pressure of 12 psig indicated in the UFSAR (Reference 1). I&M intends to perform further containment analysis to show that containment integrity can be maintained up until a point in time when containment cooling can be restored during Phase 3 (Pending Action 20). Since the MAAP analysis reflects that CNP can wait until a time in Phase 3 where containment cooling can be provided, I&M will implement resources received from offsite to provide power to the containment ventilation system thereby ensuring pressure control in containment. To accomplish this function, power would be supplied to a containment ventilation fan and a corresponding NESW pump by the 4160 Vac generator described above. Only one pump will be required to operate because the NESW system pumps are cross-tied. All NESW system valves that require power and air to allow the system to perform the cooling function are powered by the 250 Vdc buses (Reference 38). If the NESW system is not available to provide cooling to the containment ventilation units, an alternate method to control containment atmosphere exists by using a containment spray (CS) pump taking suction from the

	containment recirculation sump with cooling provided by forebay water to the associated CS heat exchanger. Ice bed melt will provide adequate sump suction volume for CS pump operation. CS heat exchanger cooling can be provided via a portable self-powered pump discharging to a MDAFW pump ESW suction line (see Figure 5). The CS pump can be aligned per existing EOPs and the ESW piping connection modification performed per CNP Fire Pre-Plans (Reference 30) and ESW can be aligned as desired to support cooling the heat exchangers (References 31 and 32). In the event ice bed melt does not provide adequate sump suction volume for CS pump operation, a self-powered pump will be aligned to supply water from Lake Michigan to the RHR spray header as described in or the CNP Fire Pre-Plans (Reference 30) or to the test connections located on the cross-ties between upper and lower containment spray headers. Additional details are available in DB-12-SBO Section 4.55 (Reference 5) and UFSAR, Section 8.7.2.5 (Reference 1). 3. The best estimate decay heat curve was assumed to be consistent with the generic plant analysis of a 4 loop, 12 foot core, values used in WCAP-17601 (Reference 3). 4. Environmental conditions within the station compartments were evaluated using Generation of Thermal Hydraulic Information for Containment (GOTHIC) code and the NUMARC 87-00 methodologies for the other dominant rooms of interest (Reference 6). The TDAFW pump room temperatures have been considered in a GOTHIC analysis, TH-00-05 (Reference 7), that was performed to assess the heat up during an SBO event as well as an Appendix R event. The SBO event considered lasted four hours and the analysis concluded that at the end of the four hours, the TDAFW pump room temperature was approximately 131.5 °F. The Appendix R event duration of 72 hours resulted in a temperature of 167 °F. This evaluation assumed the TDAFW pump was required for 32 hours after event initiation. The temperature at 32 hours was 153 °F. The equipment survivability temperature limit for the TDAFW pump room is 200 °F for 15 days. These temperatures were evaluated as acceptable for the events described. For an extended loss of AC power (ELAP) event as discussed in

	NEI 12-06 (Reference 2), the time of TDAFW pump operation is comparable to the conditions used in this evaluation. 5. CNP plant is a four hour coping plant as defined in 10 CFR 50.63 and Regulatory Guide 1.155. <u>Discussion of time constraints identified in Attachment 1A table.</u> Action item 3 - Route alternate suction source to TDAFW pump from fire water system - 15 minutes. Action is based on the time to diagnose that the condensate storage tank (CST) is not available as a suction source for the TDAFW pump (Pending Action 2). Action item 4 - Begin DC bus load shed – 30 minutes (Table - item 3): Based on validation performed to support IER 11-4 response in GT 2011-8795-12 (Reference 8), the DC load shed must be completed within 1 hour. Action item 5 - Alternate suction source to TDAFW pump in service and TDAFW pump restarted – 55 minutes. Validation will be required upon final pump suction configuration. Timing is to support TDAFW pump return to service prior to SG dryout conditions (55 minutes per WCAP-17601, Subsection 5.4.1.1). Action item 6 - Complete DC bus load shed – 60 minutes (Table – item 6): See above Action item 8 – Reactor coolant system (RCS) cooldown is started within 2 hours of initiation. This action is consistent with the assumption used in WCAP-17601, Subsection 4.2.2. Cooldown will be performed in accordance with the guidance contained in EOPs.
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.* Deployment of portable equipment to the staging areas shown in Attachment 3 will be identified in the FLEX mitigation strategies. The pathways to the identified areas will be cleared of any debris

	per the mitigation strategy.
Provide a milestone schedule. This schedule should include: • **Modifications timeline** o **Phase 1 Modifications** o **Phase 2 Modifications** o **Phase 3 Modifications** • **Procedure guidance development complete** o **Strategies** o **Maintenance** • **Storage plan (reasonable protection)** • **Staffing analysis completion** • **FLEX equipment acquisition timeline** • **Training completion for the strategies** • **Regional Response Centers operational** **Ref: 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.* See Attachment 2: Milestone Schedule
Identify how the programmatic controls will be met. **Ref: 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, 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.* Indiana and Michigan Power (I&M) will implement an administrative program. A program owner will be assigned with responsibility for configuration control, maintenance and testing. (Pending Action 3) The equipment for ELAP will be designated for FLEX use and will have unique identification numbers. Installed structures, systems

	and components pursuant to 10 CFR 50.63(a) will continue to meet the augmented quality guidelines of Regulatory Guide 1.155, "Station Blackout." Standard industry preventive maintenance (PM) programs will be established for all components and testing procedures will be developed and frequencies established based on type of equipment and considerations made within Electric Power Research Institute (EPRI) guidelines and consistent with established CNP programs and processes.
Describe training plan	*List training plans for affected organizations or describe the plan for training development* New training of general station staff and emergency plan (EP) personnel will be performed in 2014, prior to the 1st unit design implementation. These programs and controls will be implemented in accordance with the Systematic Approach to Training. This approach will ensure that the training for beyond-design-basis event mitigation is not given undue weight in comparison with other training requirements. (Pending Action 4)
Describe Regional Response Center plan	The industry will establish two (2) Regional Response Centers (RRC) to support utilities during beyond design basis events. I&M has issued a contract for the RRC. 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 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 response plan, will be delivered to the site within 24 hours from the initial request.
Notes: None	

Maintain Core Cooling& Heat Removal
Determine Baseline coping capability with installed coping[1] modifications not including FLEX modifications, utilizing methods described in Table 3-2 of NEI 12-06: • **AFW/EFW** • **Depressurize SG for Makeup with Portable Injection Source** • **Sustained Source of Water** Ref: JLD-ISG-2012-01 section 2 and 3
PWR Installed Equipment Phase 1
Provide a general description of the coping strategies using installed equipment including station modifications that are proposed to maintain core cooling. Identify methods (AFW/EFW) and strategy(ies) utilized to achieve this coping time. **Phase 1 – MODES 1-4 Steam Generators available** Upon initiation of the event the reactor trips and reactor core cooling is accomplished by natural circulation of the RCS through the steam generators (SG). The SGs are supplied by the AFW system and steam pressure is initially controlled by the SG power operated relief valves (PORV). At the initiation of the event, operators will enter the existing SBO – EOPs. The governing procedure is OHP-4023-ECA-0.0, "Loss of All AC Power" (References 9 and 10). This procedure provides the direction to initiate DC load shed actions, attempt to restore emergency diesel generators (EDG) and supplemental diesel generators (SDG), and to initiate RCS cooldown. The FLEX Support Guidelines (FSG) will be entered when the EDGs and SDGs are confirmed unavailable, off-site power cannot be restored, and it is confirmed by the dispatcher or visual verification of physical damage to infrastructure at site. The FSGs may also be entered as required based on the existence of a symptom of a challenge to a safety function such as AFW. Command and control of the plant will remain within the EOPs. Operators will begin DC electrical load shedding and cool down the RCS per the guidance contained in plant EOPs. Further actions to perform a "deep DC load shed" will be initiated once it has been determined to be required. The objective of the "deep DC load shed" is to shed sufficient DC load such that total DC load for any Train A or Train B DC battery is less than 90 amps within one hour of the Loss of AC electrical power and associated loss of the safety-related battery chargers. This value was evaluated as part of the station response to Institute of Nuclear Power Operations (INPO) IER11-4 as documented in GT 2011-8795 (Action 13) (Reference 8). Detailed load shed and battery duration analysis will be performed, to validate the initial evaluation performed to support this conclusion, as part of the development of the procedures to perform the load shedding. (Pending Action 5)

[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.

Initial plant response to an ELAP condition will maintain core cooling with the actuation and operation of the TDAFW pump. The AFW flow from the TDAFW pump is verified early in ECA-0.0 (step 4). If the pump is not running, checks are made to ensure, 1) a steam supply to the pump is available, 2) proper trip throttle valve and governor alignment, and 3) an available water supply to the pump.

The CSTs are the primary source of inventory to the TDAFW pumps during the initial phase of an ELAP event. The CSTs are a Seismic Class II component qualified to Seismic Class I loads and located above the probable maximum flood elevation, which provides an inventory source during these external events. However, the CSTs are not protected from tornado missile hazards. For the tornado hazard, TDAFW pump suction relies upon redundancy and physical separation of plant components. The CSTs are on alternate sides of the plant, separated by Unit 1 and Unit 2 Containment Buildings and the Auxiliary Building (see Figure 16), which are Seismic Class I structures and hardened against tornado driven missiles. The CSTs are also located along a North-South axis, which provides a degree of protection from the predominant path of tornados which is from the West or Southwesterly direction. The primary strategy for TDAFW pump suction during a tornado event remains the CSTs. If one of the CSTs is impacted by a tornado missile OHP-4022-055-003, "Loss of Condensate to AFW Pumps" (References 11 and 12) provides direction to align the TDAFW pump suction to the intact CST via the crosstie line. Analysis to support the TDAFW pump operating in both units on one CST is provided in MD-12-CST-002-N, Operation of the Auxiliary Feedwater System Using the Condensate Storage Tank of the other Unit (Reference 13).

Further removed from the plant and CSTs are two fire water storage tanks (FWST), which can also provide a source of makeup water. The FWSTs are likewise not protected from tornado missiles. However, the separation between the FWSTs and Fire Pump House, and the CSTs make it unlikely that all of these sources would be unavailable following a tornado event. The alternate strategy in the unlikely event both CSTs are damaged or inaccessible is the fire water system. The FWST and associated diesel-driven fire pumps are separated from the CSTs such that it is unlikely that they will be damaged by the same tornado driven missile event. The primary strategy when using the FWST as an inventory source is to connect the TDAFW pump suction to the fire water header. Hoses will be used to connect the discharge of the diesel-driven fire water pumps to the suction of the TDAFW pumps in the event that the fire water ring header is damaged (See Figure 5). A modification will be required to the test header inside the Fire Pump House to allow for the hose connection (see Figure 3) (Pending Action 22).

Each CNP unit requires approximately 340,000 gallons of water to depressurize the SGs to approximately 190 psig (for an ELAP the SGs will initially only be depressurized to 300 psig) and remove decay heat for 24 hours (Reference 8). Each CST normally contains at least 401,000 gallons (References 14 and 15) and therefore can adequately supply auxiliary feedwater for a 24 hour period. If only one CST is available, tank level will be monitored. If required due to a low level, either makeup will be initiated from an alternate source or an alternate suction source to the TDAFW pump will be established. If the FWST is used as the SG makeup inventory source, the available volume in the FWST is 685,000 gallons, which also provides sufficient volume for a minimum of 24 hours of makeup (Reference 13).

The combination of the CST and fire water system will provide a source of SG inventory for FLEX external hazards during the initial phase of FLEX implementation until portable equipment can be deployed.

The TDAFW pump suction piping from the essential service water (ESW) system will be permanently modified to accept the discharge of the fire water pumps (see Figure 5) (Pending Action 6). Validation is required to verify the selected fire header connection can be aligned to the AFW pump suctions before SG dryout. (Pending Action 2) Preliminary hose routes have been identified and assessed to support the alternate core cooling strategies (see Figure 4 and 6).

TDAFW Pump discharge motor operated valves (MOV) are powered from the N-Train battery (References 17 and 18). Procedures OHP-4025-LS-3 (References 19 and 20) and OHP-4025-LS-4 (References 21 and 22), which are entered from ECA.0-0, provide guidance for controlling these valves manually and for control of the SG PORVs when control pressure is not adequate using the reactor nitrogen bank. The N-Train battery power will be exhausted after approximately four hours with current load shed strategy. AMSAC (also powered via this battery) is directed to be shed in ECA.0-0 (References 9 and 10). Additional load shedding of the battery will be further analyzed to validate the conclusion used in the response to IER 11-4 (Reference 8) and additional load shedding actions will be implemented in plant procedures (Pending Action 7). In the event that the N-Train battery were to be identified as depleted, OHP-4025-LS-2, "Start-Up AFW" (References 25 and 26), provides operator instruction for local/manual initiation and control the TDAFW pumps.

If control air (CA) pressure is lost, ECA.0-0 response not obtained column implements OHP-4025-LS-3 (References 19 and 20) and OHP-4025-LS-4 (Reference 21 and 22) which aligns the backup nitrogen supply to the SG PORVs. Note that corrective actions are in progress, unrelated to the Fukushima response, that will allow SG PORV operation on nitrogen from the control rooms. During an ELAP, CA compressors and therefore CA will not be available and the outside nitrogen bottles and header are not fully protected from external hazards for FLEX events. Connection of the nitrogen bottles will be proceduralized in this existing procedure and/or a FSG (Pending Action 8). Since manual operation of the SG PORVs is possible, this capability will be added to the modified procedure to be used when no other option or alignment is possible.

MODES 5 and 6, Steam Generators Unavailable

If SGs are available in MODES 5 and 6, the same strategies will be used as described for MODES 1 through 4.

If the RCS is vented, RCS makeup during MODES 5 and 6 is available by gravity draining the RWST to the RCS. Procedure OHP-4022-017-001 (Reference 23 and 24) currently provides guidance for this strategy.

If SGs are unavailable in MODES 5 and 6 and the refueling cavity is not flooded, and the RCS heats up to near boiling, makeup flow to the RCS will be established from the accumulator(s). Prior to RCS reaching boiling conditions the accumulator discharge can be aligned to provide make up to the reactor vessel. The rate of discharge will be controlled by throttling the discharge MOV while monitoring RCS level and temperature. In MODEs 5 and 6 with SGs unavailable, at least two accumulators will be procedurally controlled at a reduced pressure and maintained available with a hot leg vent path established whenever possible.

Preliminary evaluations indicate that a single accumulator will supply water to compensate for boil off for approximately 40 minutes based on a Technical Specification 3.5.1 required volume between 921 and 978 cubic feet and a decay heat load requiring 170 gpm makeup to compensate for boil off (Reference 23 and 24).

If in MODE 6 with the cavity flooded the volume of the refueling cavity above the flange is 261,600 gallons to the top of the liner (Reference 47 and 48). Conservatively there is about 250,000 gallons of water at a cavity level of 23 ft. above the flange. Required flow to makeup for boil off is approximately 85 gallons per minute at 10,000 minutes (167 hours) after shutdown (Reference 23 and 24). This equates to a conservative estimate of 49 hours to boil off the inventory in the cavity if no makeup is available. A calculation will be performed to validate the conclusion that ample time is provided to align a makeup source as described in Phase 2 for core cooling (Pending Action 26).

These strategies are also described in the RCS Inventory Control strategies as the method of providing core cooling is to add inventory to the core for feed and bleed cooling.

OPEN ITEMS:

1. Detailed load shed and battery duration analysis to validate evaluation in support of Train A and B 250 Vdc deep load shed developed in GT 2011-8795 (Action 13). (Pending Action 5)
2. Validation is required to verify the selected fire header connection can be aligned to the AFW pump suctions before SG dryout. (Pending Action 2)
3. Additional load shedding of the N-Train battery to be analyzed for feasibility during procedure and modification package development to support Phase 2 power restoration options and timing. (Pending Action 7)

Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation.* Procedure ECA-0.0, "Loss of All AC Power" (References 9 and 10) will be revised to incorporate applicable references to FLEX support guidelines being developed to support this event. (Pending Action 8)

<table>
<tr>
<td>Identify modifications</td>
<td>List modifications and describe how they support coping time.

Modification conceptual designs can be found in Attachment 3: Conceptual Design Sketches.

1) Modify the fire test header inside the Fire Pump House to allow for the hose connection (see Figure 3) (Pending Action 22).

2) Modify the fire protection header inside the Turbine Building to provide an adequately sized connection to enable transfer of water to AFW pump suction. (Pending Action 9)

3) Modify TDAFW pump suction piping from the ESW system to accept the discharge of fire water or other water supply sources. (Pending Action 6)

4) Permanent nitrogen bottle racks will be installed near each SG PORV operating station with hose and regulators to align for control to remain available in the control room. (Pending Action 10)</td>
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<tr>
<td>Key Reactor Parameters</td>
<td>List instrumentation credited for this coping evaluation phase.

<table>
<tr><td>RCS Essential Instrumentation</td><td>Safety Function</td></tr>
<tr><td>Steam Generator levels</td><td>Secondary Heat Sink
RCS pressure boundary and pressure control</td></tr>
<tr><td>Steam Generator pressures</td><td>Secondary Heat Sink
RCS pressure boundary and pressure control</td></tr>
<tr><td>Thot, Tcold</td><td>Secondary Heat Sink
RCS coolant inventory and core heat removal</td></tr>
<tr><td>RCS Pressure</td><td>RCS pressure boundary and pressure control</td></tr>
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<td colspan="2">Notes: None</td>
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Maintain Core Cooling & Heat Removal
PWR 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 core cooling. Identify methods and strategy(ies) utilized to achieve this coping time.

MODES 1-4 Steam Generators available

Phase 2 core cooling will be achieved with a portable pump. The pump suction will come from the pressurized fire water header (if available). If the fire water header is not available and the TDAFW pump is still supplying the SGs, a single portable pump can supply the suction to the TDAFW pumps from Lake Michigan using the modified ESW connections (see Figure 2) (Pending Action 6). If the TDAFW pumps are not available and portable pumps are deployed, two pumps in series will be required with suction from Lake Michigan via the forebay or a connection installed on an abandoned fire pump suction piping from the circulating water discharge header (see Figure 1). These pumps would be aligned to discharge to the main Feed Water lines near the current B.5.b connections (Reference 30) (Pending Action 14).

Electrical power required to support continued core cooling and necessary instrumentation and control is provided with the existing supplemental diesel generators (SDG). If the SDG is unavailable, then portable generators for each unit are connected to the safety-related buses to restore power to auxiliary loads. The method of deploying the generator and supported equipment is as follows:

1) To restore power to 250 Vdc battery chargers (AB-2 and CD-1), as well as other required loads, a 600 Vac, 500 kW portable diesel generator will be staged near transformers 1-TR-1AB and 1-TR-MAIN (2-TR-1AB and 2-TR-MAIN). Permanent conduit and cable will be installed to the location of the 600 Vac buses 11B and 11D (21B and 21D). A permanently mounted NEMA-4X disconnect will be mounted on the exterior wall near the Auxiliary Building 4kV rooms for a connection point to each 600 Vac bus. The connections will be physically separated to provide protection. At this point permanent disconnect(s) will be installed which will allow the connection of the portable diesel generator to 600 Vac buses 11B and 11D (21B and 21D) (see Figure 11). (Pending Action 11)

   This portable generator connection provides power to the control room instrumentation distribution panels (CRID) for instrumentation, and an N-Train battery charger to support TDAFW pump operation. A method of routing a temporary cable to 600 Vac buses 11B and 11D (21B and 11D) provides an alternate method of restoring power to these buses.

2) If the above method of restoring power to CRIDs is not available, unnecessary loads will be removed from 120/208 Vac panel CRP-3. A 120/208 Vac portable diesel generator will be

Maintain Core Cooling & Heat Removal

PWR Portable Equipment Phase 2

connected to a transfer switch which will be installed near CRP-3 to restore power to the panel (see Figure 12). (Pending Action 12)

3) If the above method of restoring power to an N-Train battery charger (and power to the TDAFW pump controls) is not available, the N-Train B battery charger is supplied from a portable generator connected to MCC ABD-B (See Figure 12). (Pending Action 13)

   Supplying power to this location also restores power to the distributed ignition system Train B upper and lower containment glow plug assemblies.

MODES 5 and 6, Steam Generators Unavailable

If the RCS is pressurized in MODE 5 and makeup is required, then a PORV can be opened to reduce RCS pressure to a value that will allow the RWST to drain into the RCS.

If water cannot be drained from the RWST to the RCS, the water can be pumped from the RWSTs from a hose connection located on the piping located in the RWST valve house or other sources such as the FWSTs or the lake to the RCS through a new permanently installed standpipe or a series of hoses. The standpipe interface point will be on the 609 ft. elevation in the Auxiliary Building crane bay just inside the personnel door near the roll-up door. The pipe assembly will be routed through a stairwell to the overhead of the 587 ft. elevation to a location near the charging pump room entries (Pending Action 25) (See Figures 17, 18, and 19). From this location a hose can be used to connect the standpipe to the Chemical Volume Control System (CVCS) cross-tie at the modified drain line (See Figure 15).

A temporary hose network can also be established to support connections to external water sources. The hose enters the Auxiliary Building through the metal buildings near the Unit 1 and Unit 2 West Main Steam Enclosures on the 609 ft. elevation. From the Main Steam enclosure areas, the hose would run towards the center of the Auxiliary Building to a permanently modified connection on the discharge piping of the boron injection tanks. The connection would be located upstream of the shielded piping connected to the containment isolation valves. The new connection on the discharge of the boron injection tank will be constructed so that the external water supply can be mixed, if necessary, with boric acid in a configuration similar to the modified CVCS crosstie drain line configuration (See Figure 15). Boric acid will be provided by the boric acid transfer pumps via a hose connection from the boric acid transfer pump discharge header. A small passive mixing device will be located at this connection point to ensure homogeneity of the makeup water and boric acid. The hose strategy will be able to support water transfer to either unit's RCS with access from either unit's Auxiliary Building access point. The boric acid transfer pump discharge header will be able to provide boric acid to either BIT discharge connection.

Maintain Core Cooling & Heat Removal	
PWR Portable Equipment Phase 2	
The portable self-powered lift pump identified for steam generator makeup can produce enough head to inject at least 170 gpm into the RCS at atmospheric pressure. The boric acid transfer pumps are also capable of injecting into the RCS at atmospheric pressure considering the hose connection configuration discussed in the paragraph above. The maximum estimated flow rate of boric acid required for RCS makeup with unborated water is approximately 50 gpm. The total flow rate required for injection will be the boric acid flow rate of approximately 50 gpm plus the balance of unborated water to deliver a total of 200 gpm flow to the RCS. To move water from the FWSTs to the connection point downstream of the BIT the fire water header can be used, if intact, with a hose connecting to the nearest fire water standpipe. If the fire water header is not intact, a hose can be routed from the new Fire Water Pump Building connection identified for SG makeup to one of the new Auxiliary Building standpipe connections previously discussed above. If the use of lake water is required, the self-powered portable diesel lift pump can be used to take water from the forebay and supply it to the connection on the newly identified Auxiliary Building piping routed to one of the new Auxiliary Building standpipe connections previously discussed above. Enough flow can be provided to support the SFP makeup and RCS makeup.	
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.* Procedure ECA-0.0, "Loss of All AC Power", (References 9 and 10) will be revised to incorporate applicable references to FLEX support guidelines being developed to support this event. (Pending Action 8)
Identify modifications	*List modifications necessary for phase 2* Modification conceptual designs can be found in Attachment 3: Conceptual Design Sketches 1. Modification for hose connection of all main Feed Water line flow nozzle inspection port flanges located near B.5.b connection. (Pending Action 14) 2. TDAFW pump ESW suction piping contains a clean-out flange which will be permanently modified for a hose connection (see

Maintain Core Cooling & Heat Removal	
PWR Portable Equipment Phase 2	
	Figure 5). (Pending Action 6) 3. Install NEMA-4X disconnects on the exterior wall near the Auxiliary Building 4kV rooms. Permanent conduit and cable will be installed to the location of the 600 Vac buses 11B and 11D (21B of 21D). Permanent disconnect(s) will be installed which will allow the connection of the diesel generator to 600 Vac buses 11B and 11D (21B and 21D) from the pre-staged cable or a temporary cable routed into the room (see Figure 11). (Pending Action 11) 4. Install a transfer switch in the incoming feeder to distribution cabinet CRP-3 via modification (see Figure 12). (Pending Action 12) 5. Install transfer switch in the incoming feeder to MCC ABD-B to facilitate installation of portable 3-phase diesel generator, 600 Vac, 55 kW (minimum) (see Figure 13). (Pending Action 13)
Key Reactor Parameters	*List instrumentation credited or recovered for this coping evaluation.* Same instrumentation as Phase 1 except for instrumentation needed to operate portable equipment.
Storage / Protection of Equipment : **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	*List Protection or schedule to protect* Storage of portable equipment will be within existing Class I structures, within existing structures qualified to the meet NEI 12-06 (Reference 2) requirements, or new structures will be constructed to meet NEI 12-06 (Reference 2) requirements. Temporary locations may be used until building construction completion. The schedule to construct permanent buildings is still to be determined. (Pending Action 1)

Maintain Core Cooling & Heat Removal	
PWR Portable Equipment Phase 2	
Flooding Note: if stored below current flood level, then ensure procedures exist to move equipment prior to exceeding flood level.	*List Protection or schedule to protect* Storage structures will be located to provide protection from flooding. The schedule to construct permanent buildings is still to be determined. Temporary locations may be used until building construction completion will be located above the maximum flood elevation, providing reasonable protection for FLEX mitigation equipment.
Severe Storms with High Winds	*List Protection or schedule to protect* Storage of portable equipment will be within existing Class I structures, within existing structures qualified to the meet NEI 12-06 (Reference 2) requirements, or new structures will be constructed to meet NEI 12-06 (Reference 2) requirements. Temporary locations that provide reasonable protection may be used until building construction completion. The schedule to construct permanent buildings is still to be determined. (Pending Action 1)
Snow, Ice, and Extreme Cold	*List Protection or schedule to protect* Structures (including temporary storage) will provide protection from extreme cold conditions (e.g., block heaters as applicable). FLEX equipment has been/will be procured such that it will operate in extreme cold conditions. Equipment will be available to transport the portable FLEX equipment in snow, ice, and extreme cold hazard conditions.
High Temperatures	*List Protection or schedule to protect* Storage structures will be ventilated to allow for equipment to function. Active cooling systems are not required as normal room ventilation will be utilized. The schedule to construct buildings is still to be determined and is an open item. (Pending Action 1)

Maintain Core Cooling & Heat Removal		
PWR Portable Equipment Phase 2		
Deployment Conceptual Design (Attachment 3 contains Conceptual Sketches)		
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*
The first structure will be near the FWST at elevation 610' south of the plant. The second location will be separated from the first structure. However, the specific location is yet to be determined. Deployment paths onsite for the transportation of FLEX equipment and controls to ensure a clear deployment path will be developed upon completion of the ongoing security upgrade project and specific locations for the storage facilities have been finalized.	Construction of two storage locations.	Storage location only.
For long term cooling and SG inventory makeup, the staging area for the portable diesel-driven pumps is located where the pumps can draw water from Lake Michigan via the forebay.	1. Modification for hose connection of all main Feed Water line flow nozzle inspection port flanges located near B.5.b connection. (Pending Action 14) 2. TDAFW pump ESW suction piping contains a clean-out flange which will be permanently modified for a hose connection (see Figure 5). (Pending Action 6)	1) The connection points associated with the connection to the Feed Water lines and TDAFW pump ESW suction piping are contained in a structure which is designed to withstand all external applicable external events. Piping and valves for FLEX are enclosed within a structure designed to assure the connection point is available for the external events for which it is credited to address. New FLEX piping will be installed to meet necessary seismic requirements.

Maintain Core Cooling & Heat Removal		
PWR Portable Equipment Phase 2		
Supply power to 600 Vac buses 11B and 11D (21B and 21D) using portable three phase 600 Vac 500 kW diesel generator.	A permanently mounted NEMA-4X disconnect will be mounted on the exterior wall near Auxiliary Building 4kV Rooms for a connection point to each of the 600 Vac buses 11B and 11D (21B and 21D). Permanent conduit and cable will be installed to the location of the 600 Vac buses 11B and 11D (21B and 21D). At this point permanent disconnect(s) will be installed which will allow the connection of the diesel generator to 600 Vac buses 11B and 11D (21B and 21D) (see Figure 11). (Pending Action 11)	Primary interior connections and disconnects will be in a Seismic Class I structure protected from all hazards. Alternate to external connections is to run cable from generator to the identified connection point.
The alternate connection point for restoring power to the CRIDs is to connect a 120/208 Vac portable diesel generator to CRP-3 to restore power to the panel. (Pending Action 12)	Install a transfer switch in the incoming feeder to distribution cabinet CRP-3 (see Figure 12). (Pending Action 12)	Primary interior connections and disconnects will be in a Seismic Class I structure protected from all hazards.
The alternate connection point for restoring power to an N-Train battery charger (and power to the TDAFW pump controls), is to connect a portable generator to MCC ABD-B, providing power to the battery charger input.	Install transfer switch in the incoming feeder to MCC ABD-B to facilitate installation of portable 3-phase diesel generator, 600 Vac, 55 kW (minimum) (see Figure 13). (Pending Action 13)	Primary interior connections and disconnects will be in a Seismic Class I structure protected from all hazards.

Maintain Core Cooling & Heat Removal
PWR Portable Equipment Phase 2
Notes: None

Maintain Core Cooling & Heat Removal	
PWR 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 and strategy(ies) utilized to achieve this coping time. The Phase 3 equipment for CNP includes a 4160 Vac generator for each unit. 4160 Vac bus T11A/D (T21A/D) will be modified to allow connection of external 4160 Vac three-phase portable diesel generator (see Figure 14) (Pending Action 15). The generators will be used to repower one train of cooling. With one train of cooling available, the plant can restore a shutdown cooling loop and achieve cold shutdown.	
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.* Procedure ECA-0.0, "Loss of All AC Power" (References 9 and 10) will be revised to incorporate applicable references to FLEX support guidelines being developed to support this event. (Pending Action 8)
Identify modifications	*List modifications necessary for phase 3* 4160 Vac bus T11A/D (T21A/D) will be modified to allow connection of external 4160 Vac three-phase portable diesel generator (see Figure 14) (Pending Action 15)
Key Reactor Parameters	*List instrumentation credited or recovered for this coping evaluation.* Same instrumentation as Phase 1 except for instrumentation needed to operate portable equipment.

Maintain Core Cooling & Heat Removal		
PWR Portable Equipment Phase 3		
Deployment Conceptual Design (Attachment 3 contains Conceptual Sketches)		
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*
Restore power to 4160 Vac bus T11A or T11D (T21A or T21D) (whichever is available).	4160 Vac Bus T11A/D (T21A/D) will be modified to allow connection of external 4160 Vac three-phase portable diesel generator (see Figure 14) (Pending Action 15) Preliminary size estimated at 2.25 MW.	Multiple connection points will be used for external connections. Internal connection points are in Seismic Class I structure protected from all hazards.
Notes: None		

Maintain RCS Inventory Control	
Determine Baseline coping capability with installed coping[2] modifications not including FLEX modifications, utilizing methods described in Table 3-2 of NEI 12-06: • **Low Leak RCP Seals or RCS makeup required** • **All Plants Provide Means to Provide Borated RCS Makeup**	
PWR Installed Equipment Phase 1:	
Provide a general description of the coping strategies using installed equipment including modifications that are proposed to maintain core cooling. Identify methods (Low Leak RCP Seals and/or borated high pressure RCS makeup) and strategy(ies) utilized to achieve this coping time. Prior to required implementation date of NRC Order EA-12-049 (Reference 49), I&M plans to replace all RCP seals with Westinghouse SHIELD® low leakage seals. (Pending Action 16) RCS initial makeup and boration will be accomplished by SG depressurization and resultant partial injection of accumulator contents in all modes as required.	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* Procedure ECA-0.0, "Loss of All AC Power" (References 9 and 10) will be revised to incorporate applicable references to FLEX support guidelines being developed to support this event. (Pending Action 8)
Identify modifications	*List modifications* I&M will install Westinghouse SHIELD® low leakage RCP seals during the Spring 2013 (Unit 1) and Fall 2013 (Unit 2) outages. (Pending Action 16)

[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 RCS Inventory Control	
Key Reactor Parameters	*List instrumentation credited for this coping evaluation.*

RCS Essential Instrumentation	Safety Function
RCS Pressure	RCS pressure boundary and pressure control
Pzr Level	RCS pressure boundary and pressure control
BAST level	RCS coolant inventory
RWST Level	RCS coolant inventory
Source Range Nuclear Instrument	Subcriticality

Notes: None

Maintain RCS Inventory Control
PWR 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 (Low Leak RCP Seals and/or borated high pressure RCS makeup)and strategy(ies) utilized to achieve this coping time.

I&M will be installing low leakage RCP seals at CNP. These seals substantially limit the loss of inventory from the RCS. The low leakage RCP seals will contribute to supporting sufficient RCS inventory to keep the core covered for more than 48 hours, allowing a controlled transition to Phase 3.

MODES 1-4 Steam Generators available

To address a potential return to criticality event, an electric powered portable pump will be used to inject boric acid into the RCS. The pump will be permanently located on the 587 ft. elevation of the Auxiliary Building on a cart. The pump will deliver 10 gpm at a discharge head of approximately 3850 ft. The pump will connect to the electrical distribution system that is re-energized by the connection of the 500 kW portable generator to the 600 Vac buses 11B and 11D (21B and 21D). The pump will take suction from a hose connected to a newly installed branch off the boric acid transfer pump suction header. The pump will discharge through a short piece of high pressure hose connected to a permanently installed piping assembly that will be routed to the CVCS cross-tie line (See Figure 17). As an alternative, the pump can also deliver boric acid through a hydraulic hose which will be stationed with the portable pump and connected to the CVCS crosstie connection by the operator. The injection point allows a pump connection from each unit to be accomplished without impacting the other unit.

The BASTs are the primary suction source for the portable pump since they have a higher boric acid concentration (6550 ppm minimum), and they are protected from applicable external hazards. The RWST is an alternate suction source; however, it is not protected against high wind generated missiles (Reference 1, Chapter 6) and has a lower boron concentration (2400 ppm minimum). The BASTs contain sufficient volume to maintain subcriticality after the RCS cooldown resulting from the SG depressurization directed in ECA.0-0 (References 9 and 10).

MODES 5 and 6, Steam Generators Unavailable

Diverse methods of supplying borated water to the RCS will exist for CNP during MODES 5 and 6.

If the RCS is vented, RCS makeup during MODES 5 and 6 is available by gravity draining the RWST to the RCS. Procedure OHP-4022-017-001 (Reference 23 and 24) currently provides guidance for this strategy.

If the RCS is pressurized in MODE 5 and makeup is required, then a PORV can be opened to reduce

Maintain RCS Inventory Control
PWR Portable Equipment Phase 2:

RCS pressure to a value that will allow the RWST to drain into the RCS.

If water cannot be drained from the RWST to the RCS, the water can be pumped from the RWSTs from a hose connection located on the piping in the RWST valve house or other sources such as the FWSTs or the lake to the RCS through a new permanently installed standpipe or a series of hoses. The standpipe interface point will be on the 609 ft. elevation in the Auxiliary Building crane bay just inside the personnel door near the roll-up door. The pipe assembly will be routed through a stairwell to the overhead of the 587 ft. elevation to a location in the Unit 1 and Unit 2 west centrifugal charging pump rooms (Pending Action 25) (See Figures 17, 18, and 19). From this location a short hose can be used to connect the standpipe to the CVCS cross-tie at the modified drain line (See Figure 15).

A temporary hose network can also be established to support connections to external water sources (See Figure 20). The hose enters the Auxiliary Building through the metal buildings near the Unit 1 and Unit 2 West Main Steam Enclosures on the 609 ft. elevation. From the Main Steam enclosure areas, the hose would run towards the center of the Auxiliary Building to a permanently modified connection on the discharge piping of the boron injection tanks. The connection would be located upstream of the shielded piping connected to the containment isolation valves. The new connection on the discharge of the boron injection tank will be constructed so that the external water supply can be mixed, if necessary, with boric acid in a configuration similar to the modified CVCS cross-tie drain line configuration (See Figure 15). Boric acid will be provided by the boric acid transfer pumps via a hose connection from the boric acid transfer pump discharge header. A small passive mixing device will be located at this connection point to ensure homogeneity of the makeup water and boric acid. The hose strategy will be able to support water transfer to either Unit's RCS with access from either Unit's Auxiliary Building access point. The boric acid transfer pump discharge header will be able to provide boric acid to either BIT discharge connection.

The portable self-powered lift pump identified for steam generator makeup can produce enough head to inject at least 170 gpm into the RCS at atmospheric pressure. The boric acid transfer pumps are also capable of injecting into the RCS at atmospheric pressure considering the hose connection configuration discussed in the paragraph above. The maximum estimated flow rate of boric acid required for RCS makeup with unborated water is approximately 50 gpm. The total flow rate required for injection will be the boric acid flow rate of approximately 50 gpm plus the balance of unborated water to deliver a total of 200 gpm flow to the RCS.

To move water from the FWSTs to the connection point downstream of the BIT the fire water header can be used, if intact, with a hose connecting to the nearest fire water standpipe. If the fire water header is not intact, a hose can be routed from the new Fire Water Pump Building connection identified for SG makeup to one of the new Auxiliary Building standpipe connections previously discussed above.

If the use of lake water is required, the self-powered portable diesel lift pump can be used to take water

Maintain RCS Inventory Control	
PWR Portable Equipment Phase 2:	
from the forebay and supply it to the connection on the newly identified Auxiliary Building piping routed to one of the new Auxiliary Building standpipe connections previously discussed above. Enough flow can be provided to support the SFP makeup and RCS makeup.	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* FSGs will be developed for implementing RCS boration from available water sources.
Identify modifications	*List modifications* 1. Connection points will be installed to facilitate connecting a portable electric pump to the safety-related 600 Vac buses (e.g., 11B and 11D (21B and 21D)) for the portable boron addition pump (see Figure 11). (Pending Action 17) 2. A branch connection to the boric acid transfer pump suction header with quick disconnect fittings will be added. (Pending Action 23) 3. A branch connection to the boric acid transfer pump discharge header with quick disconnect fittings will be added. (Pending Action 24) 4. The CVCS crosstie drain line will be resized to 4 inch piping in order to accommodate the injection flows needed if an ELAP occurs during MODES 5 or 6. Finally a branch from the modified drain line will be provided so that a hose connection can be used to directly connect the portable boric acid injection pump or the boric acid transfer pumps in the event the newly installed piping cannot be used. (Pending Action 22) 5. Permanent piping will be installed from the boric acid tank room to the CVCS cross-tie for injecting boric acid from the high pressure portable pump. (Pending Action 21) 6. Modify vent connection downstream of the boron injection tanks for portable pump connection. (Pending Action 28)

Maintain RCS Inventory Control	
PWR Portable Equipment Phase 2:	
Key Reactor Parameters	*List instrumentation credited or recovered for this coping evaluation.* Same instrumentation as Phase 1 except for instrumentation needed to operate portable equipment.
Storage / Protection of Equipment: **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	*List Protection or schedule to protect* Storage of portable equipment will be within existing Class I structures, within existing structures qualified to the meet NEI 12-06 (Reference 2) requirements, or new structures will be constructed to meet NEI 12-06 (Reference 2) requirements. Temporary locations may be used until building construction completion. The schedule to construct permanent buildings is still to be determined. (Pending Action 1)
Flooding Note: if stored below current flood level, then ensure procedures exist to move equipment prior to exceeding flood level.	*List Protection or schedule to protect* Storage structures will be located to provide protection from flooding. The schedule to construct permanent buildings is still to be determined. Temporary locations may be used until building construction completion will be located above the maximum flood elevation, providing reasonable protection for FLEX mitigation equipment.
Severe Storms with High Winds	*List Protection or schedule to protect* Storage of portable equipment will be within existing Class I structures, within existing structures qualified to the meet NEI 12-06 (Reference 2) requirements, or new structures will be constructed to meet NEI 12-06 (Reference 2) requirements. Temporary locations that provide reasonable protection may be used until building construction completion. The schedule to construct permanent buildings is still to be determined. (Pending Action 1)
Snow, Ice, and Extreme Cold	*List Protection or schedule to protect* Structures (including temporary storage) will provide protection from

Maintain RCS Inventory Control	
PWR Portable Equipment Phase 2:	
	extreme cold conditions (e.g., block heaters as applicable). FLEX equipment has been/will be procured such that it will operate in extreme cold conditions. Equipment will be available to transport the portable FLEX equipment in snow, ice, and extreme cold hazard conditions.
High Temperatures	*List Protection or schedule to protect* Storage structures will be ventilated to allow for equipment to function. Active cooling systems are not required as normal room ventilation will be utilized. The schedule to construct buildings is still to be determined and is an open item. (Pending Action 1)

Deployment Conceptual Modification (Attachment 3 contains Conceptual Sketches)		
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*
Supply power to the portable boron injection pump.	A permanently mounted NEMA-4X connection point mounted on an interior wall near the portable pump deployment location. (Pending Action 17)	Primary interior connection will be in a Seismic Class I structure protected from all hazards.
Inject boron into RCS to maintain reactor subcritical during plant cooldown for SG inventory control.	Modify boric acid transfer pump suction and discharge headers, CVCS cross-tie, and drain line. (Pending Action 21, 22, 23 and 24)	Primary interior connection will be in a Seismic Class I structure protected from all hazards.
Notes: None		

Maintain RCS Inventory Control	
PWR 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 (Low Leak RCP Seals and/or borated high pressure RCS makeup) and strategy(ies) utilized to achieve this coping time.. The Phase 3 equipment for CNP includes a 4160 Vac generator for each unit. The 4160 Vac Bus T11A/D (T21A/D) will be modified to allow connection of external 4160 Vac three-phase portable diesel generators (see Figure 14) (Pending Action 15). The generators will be used to repower one train of cooling and RCS makeup equipment. With one train of cooling available, the plant can restore a shutdown cooling loop and achieve cold shutdown. As described in Phase 2, the BASTs are the primary source of borated water and the RWST is an alternate. The CVCS Holdup Tanks (HUT)s and Boric Acid Reserve Tank (BART) will be used to satisfy a longer term source of water if the RWST is not available. The contents in these tanks can be transferred to the monitor tanks (MT) with the CVCS HUT recirculation pump with discharge to hoses and primary water (PW) piping, if available. Two MTs will be modified to enable gravity drain via hose connection to the centrifugal charging pumps suction (see Figure 8 and Figure 9). The re-powering of the HUT recirculation pump will be accomplished using a 500 kW diesel generator which will repower 600 Vac bus 11D (21D), through an installed transfer switch to the normal power source from MCC AB-C. Water remaining in less than fully intact RWSTs and primary water storage tanks (PWST) can be transferred to the MTs. OHP-4021-018-008, "Operation of RWST Support Systems" (Reference 27 and 28) provides procedure guidance for draining the RWST to the middle CVCS holdup tank (HUT). Water available in a PWST can be pumped to a PW hose connection near the MTs for tank filling (see Figure 7). Power to the "1N" PW pumps, powered from the 11D (21D) 600 Vac bus, will be provided by the 500 kW generators.	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* Procedure ECA-0.0, "Loss of All AC Power", (References 9 and 10) will be revised to incorporate applicable references to FLEX support guidelines being developed to support this event. (Pending Action 8)
Identify modifications	*List modifications*

Maintain RCS Inventory Control	
PWR Portable Equipment Phase 3:	
	1. Monitor tanks will be modified for temporary hose connections to maintain an available inventory for RCS makeup. (Pending Action 18) 2. 4160 Vac bus T11A/D (T21A/D) will be modified to allow connection of external 4160 Vac, three-phase portable diesel generator (see Figure 14) (Pending Action 15) 3. A Transfer switch will be installed in the feeder cable between 600 Vac bus 11CMC and MCC AB-C. One input to the transfer switch will come from the 600 Vac bus 11CMC circuit breaker 11CMC1 which is the normal source for MCC AB-C and the second input to the transfer switch will come from a jumper cable to spare compartment 2, 4, 7, or 12 in 600 Vac bus 11D. This will provide power to CVCS HUT recirculation pump 12-PP-28 to facilitate water transfers. (Pending Action 19)
Key Reactor Parameters	*List instrumentation credited or recovered for this coping evaluation.* Same instrumentation as Phase 1 except for instrumentation needed to operate portable equipment.

Deployment Conceptual Modification (Attachment 3 contains Conceptual Sketches)		
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*
Sufficient inventory will be made available to the charging pumps by providing makeup capability to the monitor tanks.	Primary water and hold up tank branch piping will be modified to increase size and install hose connections to facilitate draining water to the Monitor Tanks. In addition, the Monitor Tanks will be modified to install connection points for the portable hose. (Pending Action 18)	Connection points are located in Seismic Category I structure.
Provide power to CVCS HUT	A transfer switch will be installed	Connection points are located in

Maintain RCS Inventory Control		
PWR Portable Equipment Phase 3:		
Recirc. Pump (PP-28) from 600V Bus 11C to facilitate water transfers	in the feeder cable between 600 Vac bus 11D and MCC AB-C to provided power to CVCS HUT recirc. pump to facilitate water transfers. (Pending Action 19)	Seismic Category I structure.
Restore power to 4160 Vac bus T11A or T11D (T21A or T21D) (whichever is available)	4160 Vac bus T11A/T11D (T21A/T21D) will be modified to allow connection of external 4160 Vac, three-phase portable diesel generator (see Figure 14) (Pending Action 15) Preliminary size estimated at 2.25 MW.	Multiple connection points will be used for external connections. Internal connection points are in Seismic Class I structure protected from all hazards.
Notes: None		

Maintain Containment

Determine Baseline coping capability with installed coping[3] modifications not including FLEX modifications, utilizing methods described in Table 3-2 of NEI 12-06:

- Containment Spray
- Hydrogen igniters (ice condenser containments only)

PWR Installed Equipment Phase 1:

Provide a general description of the coping strategies using installed equipment including modifications that are proposed to maintain containment. Identify methods (containment spray/Hydrogen igniter) and strategy(ies) utilized to achieve this coping time.

There are no Phase 1 actions required at this time that need to be addressed.
I&M plans to replace all RCP seals with Westinghouse SHIELD® low leakage seals which will prevent significant leakage from the RCS seals into containment. During Phase 1 containment pressure is monitored, but there is no significant mass release to containment expected and the containment safety function is not challenged.

Details:

Provide a brief description of Procedures / Strategies / Guidelines	*N/A*
Identify modifications	*N/A*
Key Containment Parameters	*List instrumentation credited for this coping evaluation.*

Containment Essential Instrumentation	Safety Function
Containment Building pressure	Containment integrity

Notes: None

[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.

Maintain Containment	
PWR 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 spray/hydrogen igniters) and strategy(ies) utilized to achieve this coping time. Hydrogen igniters will be provided power with connection of a 500 kW portable generator to 600 Vac bus 11B and 11D (21B and 21D).	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* FSGs will be developed with consideration of both component power requirements based on plant conditions.
Identify modifications	*List modifications* The modifications required to allow the portable AC generating equipment to restore power to the hydrogen igniters are described in the "Maintain Core Cooling & Heat Removal" Phase 2 section. (Pending Action 11)
Key Containment Parameters	*List instrumentation credited or recovered for this coping evaluation.* Containment Essential Instrumentation: Safety Function Containment Building pressure: Containment integrity
Storage / Protection of Equipment: **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	*List how equipment is protected or schedule to protect* Storage of portable equipment will be within existing Class I structures, within existing structures qualified to the meet NEI 12-06 (Reference 2) requirements, or new structures will be constructed to meet NEI 12-06 (Reference 2) requirements. Temporary locations may be used until building construction completion. The schedule to construct permanent buildings is still to be determined. (Pending Action 1)

Maintain Containment	
Flooding	*List how equipment is protected or schedule to protect* Storage structures will be located to provide protection from flooding. The schedule to construct permanent buildings is still to be determined. Temporary locations may be used until building construction completion will be located above the maximum flood elevation, providing reasonable protection for FLEX mitigation equipment.
Severe Storms with High Winds	*List how equipment is protected or schedule to protect* Storage of portable equipment will be within existing Class I structures, within existing structures qualified to the meet NEI 12-06 (Reference 2) requirements, or new structures will be constructed to meet NEI 12-06 (Reference 2) requirements. Temporary locations that provide reasonable protection may be used until building construction completion. The schedule to construct permanent buildings is still to be determined. (Pending Action 1)
Snow, Ice, and Extreme Cold	*List how equipment is protected or schedule to protect* Structures (including temporary storage) will provide protection from extreme cold conditions (e.g., block heaters as applicable). FLEX equipment has been/will be procured such that it will operate in extreme cold conditions. Equipment will be available to transport the portable FLEX equipment in snow, ice, and extreme cold hazard conditions.
High Temperatures	*List how equipment is protected or schedule to protect* Storage structures will be ventilated to allow for equipment to function. Active cooling systems are not required as normal room ventilation will be utilized. The schedule to construct buildings is still to be determined and is an open item. (Pending Action 1)

Deployment Conceptual Modification (Attachment 3 contains Conceptual Sketches)		
Strategy	**Modifications**	**Protection of connections**

Maintain Containment		
Identify Strategy including how the equipment will be deployed to the point of use.	*Identify modifications*	*Identify how the connection is protected*
The strategy for the portable AC generating equipment to restore power to the hydrogen igniters are described in the "Maintain Core Cooling & Heat Removal" Phase 2 section.	The modifications required to allow the portable AC generating equipment to restore power to the hydrogen igniters are described in the "Maintain Core Cooling & Heat Removal" Phase 2 section.	The protection is described in the "Maintain Core Cooling & Heat Removal" Phase 2 section.
Notes: None		

Maintain Containment

PWR 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 (containment spray/hydrogen igniters) and strategy(ies) utilized to achieve this coping time.

The Phase 3 equipment for CNP includes a 4160 Vac generator for each unit. 4160 Vac Bus T11A/D (T21A/D) will be modified to allow connection of external 4160 Vac three-phase portable diesel generators (see Figure 14) (Pending Action 15). The generators will be used to repower one train of cooling.

Supplemental pumping capability will also be supplied as part of the Phase 3 strategy in order to provide alternate cooling to containment.

Containment integrity was reviewed by use of MAAP as part of Calculation PRA-TH-L1-1 (Reference 4). This calculation shows containment pressure increasing just 2 psi over the duration of the 24 hour event. The final pressure is far less than the containment design pressure of 12 psig specified in the UFSAR (Reference 1). I&M intends to perform further containment analysis to show that containment integrity can be maintained up until a point in time when containment cooling can be restored during Phase 3 (Pending Action 20). Since the MAAP analysis reflects that CNP can wait until a time in Phase 3 where containment cooling can be provided, I&M will implement resources received from offsite to provide power to the containment ventilation system thereby ensuring pressure control in containment. To accomplish this function, power would be supplied to a containment ventilation fan and a corresponding NESW pump by the 4160 Vac generator described above. Only one pump will be required to operate because the NESW system pumps are cross-tied. All NESW system valves that require power and air to allow the system to perform the cooling function are powered by the 250 Vdc buses (Reference 38).

If the NESW system is not available to provide cooling to the containment ventilation units, an alternate method to control containment atmosphere exists by using a CS pump taking suction from the containment recirculation sump with cooling provided by forebay water to the associated CS heat exchanger. Ice bed melt will provide adequate sump suction volume for CS pump operation. CS heat exchanger cooling can be provided via a portable self-powered pump discharging to a MDAFW pump ESW suction line (see Figure 5). The CS pump can be aligned per existing EOPs and the ESW piping connection modification performed per CNP Fire Pre-Plans (Reference 30) and ESW can be aligned as desired to support cooling the heat exchangers (References 31 and 32). In the event ice bed melt does not provide adequate sump suction volume for CS pump operation, a self-powered pump will be aligned to supply water from Lake Michigan to the RHR spray header as described in the CNP Fire Pre-Plans (Reference 30) or to the test connections located on the cross-ties between upper and lower containment spray headers.

Maintain Containment	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* 1) Phase 3 equipment brought to the site from the RRC will provide the capability to power containment ventilation units and non-essential service water (NESW) pump power (both 600 Vac loads) for containment cooling. 2) Enough water will exist in the containment recirculation sump due to ice bed melt to enable spray pump operation once a 4160 Vac vital bus is powered, or spray is initiated as required with a portable pump. 3) Additional power capability obtained from the RRC will enable an additional source of power to the hydrogen igniters, if necessary. 4) An alternate source to the containment spray header will be provided as part of the RRC response equipment.
Identify modifications	*List modifications* Ability to connect portable 4160 Vac from the RRC to plant vital buses (see Figure 14) (Pending Action 15)
Key Containment Parameters	*List instrumentation credited or recovered for this coping evaluation.* Same instrumentation as Phase 1 except for instrumentation needed to operate portable equipment.

Deployment Conceptual Modification (Attachment 3 contains Conceptual Sketches)		
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*

Maintain Containment		
Restore power to 4160 Vac bus T11A or T11D (T21A or T21D) (whichever is available)	4160 Vac bus T11A/D (T21A/D) will be modified to allow connection of external 4160 Vac, three-phase portable diesel generator (see Figure 14) (Pending Action 15) Preliminary size estimated at 2.25 MW.	Multiple connection points will be used for external connections. Internal connection points are in Seismic Class I structure protected from all hazards.
Notes: None		

Maintain Spent Fuel Pool Cooling	
Determine Baseline coping capability with installed coping[4] modifications not including FLEX modifications, utilizing methods described in Table 3-2 of NEI 12-06: • **Makeup with Portable Injection Source**	
PWR Installed Equipment Phase 1:	
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 via portable injection source) and strategy(ies) utilized to achieve this coping time. There are no Phase 1 actions required at this time that need to be addressed. The spent fuel pool (SFP) makeup requirements during ELAP events are based on the maximum design basis heat load in the spent fuel pool. Information obtained from CNP study PRA-STUDY-095 (Reference 33) shows that with neither unit defueled it takes the SFP approximately 26 hours to heat up to 200 °F. If one unit is defueled, it takes approximately 11.5 hours to reach 200 °F. Both conditions allow the operators enough time to arrange for SFP makeup. CNP study PRA-STUDY-095 confirms that the SFP heat up rates presented in CNP Document PRA-STUDY-091 (Reference 34) are conservative. NEI 12-06 (Reference 2) requires that the maximum design basis heat load of the SFP be used in the development of the required makeup flow rate. The bounding heat load for the SFP of 55.3 MBtu/hr is taken from CNP Calculation/Report NSA-SFP-001 (Reference 35). The maximum boil off rate for the bounding condition is equal to approximately 115 gpm (Reference 36).	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* ECA-0.0, "Loss of All AC Power" will remain the entry point and controlling procedure for ELAP Events with a LUHS. ECA-0.0 contains a step to periodically check the status of the SFP cooling by checking level greater than 23 feet and SFP temperature less than 150°F. If either condition is not met 12-OHP-4022-018-001, "Loss of Spent Fuel Pit Cooling," will be entered. This procedure prompts for review of Spent Fuel Pool Heat up data to determine projected time to reach 200°F. FLEX Support Guidelines will be developed and will be entered as directed by ECA-0.0 and if appropriate other procedures.

[4] 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.

	Emergency Operating Procedures, Shutdown Emergency Procedures, Emergency Contingency Actions, Abnormal Operating Procedures, and if appropriate other procedures will be updated as required to support the FSGs.
Identify modifications	*List modifications* No additional modifications are required to support Phase 1
Key SFP Parameter	Per NRC Order EA-12-051 (Reference 50) SFP level indication will be modified to provide enhanced indication to support SFP cooling strategies.
Notes: None	

Maintain Spent Fuel Pool Cooling	
PWR 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 via portable injection source) and strategy(ies) utilized to achieve this coping time. The spent fuel pool (SFP) makeup requirements during ELAP events are based on the maximum design basis heat load in the spent fuel pool. Information obtained from CNP study PRA-STUDY-095 (Reference 33) shows that with neither unit defueled it takes the SFP approximately 26 hours to heat up to 200 °F. If one unit is defueled, it takes approximately 11.5 hours to reach 200 °F. Both conditions allow the operators enough time to arrange for SFP makeup. CNP study PRA-STUDY-095 confirms that the SFP heat up rates presented in CNP Document PRA-STUDY-091 (Reference 34) are conservative. NEI 12-06 (Reference 2) requires that the maximum design basis heat load of the SFP be used in the development of the required makeup flow rate. The bounding heat load for the SFP of 55.3 MBtu/hr is taken from CNP Calculation/Report NSA-SFP-001 (Reference 35). The maximum boil off rate for the bounding condition is equal to approximately 115 gpm (Reference 36). The primary strategy is to use inventory from the PWST and/or the RWST. This water can be transferred with either a PW or refueling water purification (RWP) pump when power is provided by the 500 kW portable diesel generator. An alternate strategy is to supply water to the SFP via a hose connection. The hose will be routed to the Auxiliary Building at the 609 ft. elevation. The water source is from either the fire water header if it remains intact, or the portable equipment deployed for SG makeup as described in the Maintain Core Cooling & Heat Removal safety function section. Preliminary hose routes have been identified and assessed to support the alternate SFP makeup strategies (see Figure 10).	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* Currently, three procedures exist which provide SFP makeup guidance (one normal, one abnormal, and the B.5.b procedure). FSGs will be developed to incorporate use of all three based on conditions encountered during a FLEX event. New guidelines will include makeup from Lake Michigan with portable pumps. (Pending Action 8)

Maintain Spent Fuel Pool Cooling	
Identify modifications	*List modifications* No additional modifications are required to support Phase 2
Key SFP Parameter	Per NRC Order EA-12-051 (Reference 50) SFP level indication will be modified to provide enhanced indication to support SFP cooling strategies.
Storage / Protection of Equipment: **Describe storage / protection plan or schedule to determine storage requirements**	
Seismic	*List how equipment is protected or schedule to protect* Storage of portable equipment will be within existing Class I structures, within existing structures qualified to the meet NEI 12-06 (Reference 2) requirements, or new structures will be constructed to meet NEI 12-06 (Reference 2) requirements. Temporary locations may be used until building construction completion. The schedule to construct permanent buildings is still to be determined. (Pending Action 1)
Flooding	*List how equipment is protected or schedule to protect* Storage structures will be located to provide protection from flooding. The schedule to construct permanent buildings is still to be determined. Temporary locations may be used until building construction completion will be located above the maximum flood elevation, providing reasonable protection for FLEX mitigation equipment.
Severe Storms with High Winds	*List how equipment is protected or schedule to protect* Storage of portable equipment will be within existing Class I structures, within existing structures qualified to the meet NEI 12-06 (Reference 2) requirements, or new structures will be constructed to meet NEI 12-06 (Reference 2) requirements. Temporary locations that provide reasonable protection may be used until building construction completion. The schedule to construct permanent buildings is still to be determined. (Pending Action 1)

Maintain Spent Fuel Pool Cooling	
Snow, Ice, and Extreme Cold	*List how equipment is protected or schedule to protect* Structures (including temporary storage) will provide protection from extreme cold conditions (e.g., block heaters as applicable). FLEX equipment has been/will be procured such that it will operate in extreme cold conditions. Equipment will be available to transport the portable FLEX equipment in snow, ice, and extreme cold hazard conditions.
High Temperatures	*List how equipment is protected or schedule to protect* Storage structures will be ventilated to allow for equipment to function. Active cooling systems are not required as normal room ventilation will be utilized. The schedule to construct buildings is still to be determined and is an open item. (Pending Action 1)

Deployment Conceptual Design (Attachment 3 contains Conceptual Sketches)		
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*
Primary strategy is to use inventory from the PWST and/or the RWST.	No additional modifications necessary beyond that described in the Maintain Core Cooling & Heat Removal safety function for connecting the 500 kW portable diesel generator.	As described in the Maintain Core Cooling & Heat Removal safety function.
Notes: None		

Maintain Spent Fuel Pool Cooling	
PWR 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 via portable injection source) and strategy(ies) utilized to achieve this coping time. No additional requirement or strategies are noted for Phase 3.	
Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation* Currently, three procedures exist which provide SFP makeup guidance (one normal, one abnormal, and the B.5.b procedure). FSGs will be developed to incorporate use of all three based on conditions encountered during a FLEX event. New guidelines will include makeup from Lake Michigan. (Pending Action 8)
Identify modifications	*List modifications* No additional modifications are noted for Phase 3.
Key SFP Parameter	Per NRC Order EA-12-051 (Reference 50) SFP level indication will be modified to provide enhanced indication to support SFP cooling strategies.

Deployment Conceptual Design (Attachment 3 contains Conceptual Sketches)		
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*
No additional strategies are noted for Phase 3	No additional modifications are noted for Phase 3.	No additional connections are noted for Phase 3
Notes: None		

Safety Functions Support
Determine Baseline coping capability with installed coping[5] modifications not including FLEX modifications.
PWR Installed Equipment Phase 1
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. Phase 1 Safety Support functions are addressed with the function supported. **Control Room Environmental Condition** It may be desirable to open the control room complex doors during Phase 1 to provide control room cooling if it is determined that no unplanned radiological release is in progress. The limiting factor is control room habitability, not equipment survivability (Reference 40). **Lighting** Lighting is required for initial operator actions access in the plant to implement actions associated with plant procedures. Emergency Lighting will not be available due to being stripped from the batteries in order to extend battery capability. Available lighting will be the battery-backed Appendix R light units and portable lighting that personnel can use, such as head lamps and flashlights. The Appendix R lighting is expected to remain in service for 8 hours following loss of power (Reference 41). **Communications** Communication will be provided using the PBX, PA system (if available), and hand held radios. Additionally, satellite phones have been purchased that can be used to notify off-site agencies. Battery life is limited for the hand held radios and satellite phones. Enhancements to the plant communication system were provided by I&M's Response to NTTF Rec 9.3 Communication Assessment (Reference 42). **Access** Plant access to controlled areas will be provided by use of keys maintained in the Shift Manager's office if the security system is without power.

[5] 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.

Details:	
Provide a brief description of Procedures / Strategies / Guidelines	*Confirm that procedure/guidance exists or will be developed to support implementation.* Support functions have been identified in the sections associated with the safety function being supported earlier in this document.
Identify modifications	*List modifications and describe how they support coping time.* None
Key Parameters	*List instrumentation credited for this coping evaluation phase.* As noted in the applicable Safety Function areas.
Notes: None	

Safety Functions Support
PWR 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. The electrical support strategies described below have previously been included in discussion with the Safety Functions supported by these strategies. **Fuel** During Phase 2, the 500kW generators are expected to consume approximately 40 gph of fuel each, requiring refueling every 7.5 hours based on the 300 gallon tank. The 55kW generators consume 4.5 gph each, the 54 kW generators consume 3.8 gph each, and the 6kW generators consume 0.5 gph each. Additionally, the lift pumps consume 13 gph each, and the booster pumps consume 13 gph each. The capability will exist to draw fuel oil from the on-site fuel oil tanks into a fuel transfer trailer which can be towed to refuel the various components. Fuel consumption data is estimated based on typical manufacturer data and will be finalized when equipment has been procured and tested (Pending Action 26). **Control Room Environmental Condition** It may be desirable to open the control room complex doors during Phase 2 to provide control room cooling if it is determined that no unplanned radiological release is in progress. Portable fans will be available and are identified in existing procedures (Reference 43, Reference 44, Reference 45 and Reference 46) and can be implemented to further reduce room temperatures. Power for these fans will be provided by portable 6kW single phase 120/240 Vac generators. The limiting factor is control room habitability, not equipment survivability (Reference 40). **Lighting** Portable lighting units may be required to be set up outside in order to facilitate set up if a Beyond Design Basis External Event (BDBEE) occurs at night. Set up of these units must not detract nor delay the set up of portable generators and pumps. Initial setup needs to be simple enough that utilization of vehicle headlights and portable personal lighting such as head lamps and flashlights will be sufficient. Once in place, portable diesel-driven lighting units may be deployed in strategic locations to allow for refueling activities and preparation for Phase 3 equipment from the RRC. **Communication** Portable generators (6kW, 120/240 single phase) may be needed to power portable radio charging systems. A total of 153 batteries and 17 charging stations have been purchased for this purpose. A portable generator will be staged near the Operation Support Center (OSC) to allow for repowering of the OSC.

Safety Functions Support	
PWR 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 with a description of the procedure / strategy / guideline.* Support functions have been identified in the sections associated with the safety function being supported earlier in this document.
Identify modifications	*List modifications necessary for phase 2* As described in previous Safety Function sections
Key Parameters	*List instrumentation credited or recovered for this coping evaluation.* Instrumentation identified in the safety functions above are supported by the maintenance of power to the chargers or buses which supply the CRIDs 1 through 4.

Storage / Protection of Equipment : Describe storage / protection plan or schedule to determine storage requirements	
Seismic	*List how equipment is protected or schedule to protect* Storage of portable equipment will be within existing Class I structures, within existing structures qualified to the meet NEI 12-06 (Reference 2) requirements, or new structures will be constructed to meet NEI 12-06 (Reference 2) requirements. Temporary locations may be used until building construction completion. The schedule to construct permanent buildings is still to be determined. (Pending Action 1)
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* Storage structures will be located to provide protection from flooding. The schedule to construct permanent buildings is still to be determined. Temporary locations may be used until building construction completion will be located above the maximum flood elevation, providing reasonable protection for FLEX mitigation

Safety Functions Support		
PWR Portable Equipment Phase 2		
	equipment.	
Severe Storms with High Winds	*List how equipment is protected or schedule to protect* Storage of portable equipment will be within existing Class I structures, within existing structures qualified to the meet NEI 12-06 (Reference 2) requirements, or new structures will be constructed to meet NEI 12-06 (Reference 2) requirements. Temporary locations that provide reasonable protection may be used until building construction completion. The schedule to construct permanent buildings is still to be determined. (Pending Action 1)	
Snow, Ice, and Extreme Cold	*List how equipment is protected or schedule to protect* Structures (including temporary storage) will provide protection from extreme cold conditions (e.g., block heaters as applicable). FLEX equipment has been/will be procured such that it will operate in extreme cold conditions. Equipment will be available to transport the portable FLEX equipment in snow, ice, and extreme cold hazard conditions.	
High Temperatures	*List how equipment is protected or schedule to protect* Storage structures will be ventilated to allow for equipment to function. Active cooling systems are not required as normal room ventilation will be utilized. The schedule to construct buildings is still to be determined and is an open item. (Pending Action 1)	
Deployment Conceptual Design (Attachment 3 contains Conceptual Sketches)		
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 Strategy section for Maintain Core Cooling & Heat Removal safety function	See Modifications section for Maintain Core Cooling & Heat Removal safety function	See Storage / Protection of Equipment section for Maintain Core Cooling & Heat Removal safety function.

Safety Functions Support
PWR Portable Equipment Phase 2
Notes: None

<table>
<tr><th colspan="2">Safety Functions Support</th></tr>
<tr><th colspan="2">PWR Portable Equipment Phase 3</th></tr>
<tr><td colspan="2">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.

The electrical support strategies described below have previously been included in discussion with the Safety Functions supported by these strategies.

Fuel
In Phase 3, 4KV generators from the RRC will be deployed to the site. The fuel consumption for these generators will be determined when they are procured for the RRC. The Phase 2 generators will still be in service, so consumption from those generators must still be considered. A fuel bladder will be deployed from the RRC, and at this time fuel shipments may be received.

Lighting
Portable generators will be utilized to provide power to surviving and available installed emergency AC lighting. Portable lighting units will be deployed externally as needed.

Communication
Restoration of normal communications will be possible once generators from the RRC are placed in service. Satellite phones will still be available as needed, and portable radios will still be utilized and battery chargers will still be powered via small portable generators.</td></tr>
<tr><th colspan="2">Details:</th></tr>
<tr><td>Provide a brief description of Procedures / Strategies / Guidelines</td><td>Confirm that procedure/guidance exists or will be developed to support implementation with a description of the procedure / strategy / guideline.

Support functions have been identified in the sections associated with the safety function being supported earlier in this document.</td></tr>
<tr><td>Identify modifications</td><td>List modifications necessary for phase 3

Connection points will be installed to facilitate connecting the 4160 Vac generator from the RRC to the safety-related 4160 Vac buses. (Pending Action 15)</td></tr>
</table>

Safety Functions Support		
PWR Portable Equipment Phase 3		
Key Parameters	*List instrumentation credited or recovered for this coping evaluation.* As noted in the applicable Safety Function areas.	
Deployment Conceptual Design (Attachment 3 contains Conceptual Sketches)		
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*
As noted in the applicable Safety Function areas.	As noted in the applicable Safety Function areas.	As noted in the applicable Safety Function areas.
Notes: None		

PWR Portable Equipment Phase 2							
Use and (potential / flexibility) diverse uses						*Performance Criteria*	*Maintenance*
List portable equipment	Core	Containment	SFP	Instrumentation	Accessibility		Maintenance / PM requirements
Two (2) portable self- powered pumps (Lift)	**X**	**X**	**X**			**800 gpm at 450 ft.**	Will follow EPRI template requirements
Four (4) portable self- powered pumps (Booster)	**X**					**300 gpm at 1010 ft.**	Will follow EPRI template requirements
Two portable electric pumps	**X**					**150 gpm at 160 ft.**	Will follow EPRI template requirements
Three (3) portable self- powered pumps			**X**			**100 gpm, 50 psia**	Will follow EPRI template requirements
Hoses and fittings						**As described in Attachment 3**	Will follow EPRI template requirements
Two (2) portable electric pumps	**X**					**10 gpm, 3850 ft.**	Will follow EPRI template requirements
Two (2) 600 Vac, 3-phase Diesel Generators	**X**		**X**	**X**	**X**	**500 kW**	Will follow EPRI template requirements
Two (2) 120/208 Vac 3-phase Diesel Generators				**X**		**32 kW**	Will follow EPRI template requirements
Two (2) 600 Vac, 3-phase Diesel Generators	**X**			**X**		**55 kW**	Will follow EPRI template requirements

PWR Portable Equipment Phase 2							
Use and (potential / flexibility) diverse uses						*Performance Criteria*	*Maintenance*
List portable equipment	Core	Containment	SFP	Instrumentation	Accessibility		Maintenance / PM requirements
Six (6) 120/240 Vac, single-phase, Diesel Generator				**X**	**X**	**6 kW**	Will follow EPRI template requirements
Four (4) Portable Fans					**X**		Will follow EPRI template requirements

PWR Portable Equipment Phase 3							
Use and (potential / flexibility) diverse uses						*Performance Criteria*	*Notes*
List portable equipment	Core	Containment	SFP	Instrumentation	Accessibility		
Two (2) 4160 Vac Generators	**X**	**X**	**X**	**X**	**X**	**2.25 MW**	Portable 4160 Vac generator will power one installed shutdown cooling train per Unit.
Two (2) portable self-powered pumps		**X**				**1500 gpm at 150 ft.**	Alternate Containment Spray

Phase 3 Response Equipment/Commodities	
Item	**Notes**
Radiation Protection Equipment • Survey instruments • Dosimetry • Off-site monitoring/sampling	**To be provided during development of detailed deployment plans**
Commodities • Food • Potable water	**To be provided during development of detailed deployment plans**
Fuel Requirements	**To be provided during development of detailed deployment plans**
Heavy Equipment • Transportation equipment • Debris clearing equipment	**To be provided during development of detailed deployment plans**

References:

1. "DC Cook Nuclear Plant Updated Final Safety Analysis Report", Revision 24.
2. "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide", NEI 12-06, Revision 0, August 2012.
3. WCAP-17601, Reactor Coolant System Response to the Extended Loss of AC Power Event for Westinghouse, Combustion Engineering and Babcock & Wilcox NSSS Designs
4. PRA-TH-L1-1, "Select Level 1 PRA MAAP 4.0.5 Thermal-Hydraulic Analysis", Revision 1.
5. DB-12-SBO, Station Blackout, Revision 0, CS 1.
6. NUMARC 87-00, "Station Blackout", Revision 1.
7. Calculation No. TH-00-05 "Auxiliary Feedwater Pump Room Heat-Up temperatures", Revision 0, CS 1
8. GT 2011-8795, IER Level 1 (11-4): Near Term Actions to Address the Effects of an Extended Loss of All AC Power in Response to the Fukushima Daiichi Event.
9. 1-OHP-4023-ECA-0.0, "Loss of All AC Power", Revision 26.
10. 2-OHP-4023-ECA-0.0, "Loss of All AC Power", Revision 25.
11. 1-OHP-4022-055-003, "Loss of Condensate to AFW Pumps", Revision 11.
12. 2-OHP-4022-055-003, "Loss of Condensate to AFW Pumps", Revision 11.
13. MD-12-CST-002-N, "Operation of the Auxiliary Feedwater System Using the Condensate Storage Tank of the Other Unit", Revision 1.
14. DC Cook Drawing Number, OP-1-5106A-60, "Flow Diagram, Aux-Feedwater"
15. DC Cook Drawing Number, OP-2-5106A-55, "Flow Diagram, Aux Feedwater"
16. DC Cook Drawing Number, OP-12-5152S-5, "Flow Diagram, Fire Protection – Water Piping at N&S Storage Tanks, Units 1&2".
17. DC Cook Drawing Number, OP-1-12003-33, "250V DC Main One-Line Diagram Engineered Safety System (Train "A, B & N" and BOP)".
18. DC Cook Drawing Number OP-1-12065-11, "DC Aux One-Line 250 VDC Bus Engineered Safety System (Train "N")".
19. 1-OHP-4025-LS-3, "Steam Generator 2/3 Level Control", Revision 3.
20. 2-OHP-4025-LS-3, "Steam Generator 2/3 Level Control", Revision 4.
21. 1-OHP-4025-LS-4, "Steam Generator 1/4 Level Control", Revision 3.
22. 2-OHP-4025-LS-4, "Steam Generator 1/4 Level Control", Revision 3.
23. 1- OHP-4022-017-001, "Loss of RHR Cooling", Revision 22.
24. 2-OHP-4022-017-001, "Loss of RHR Cooling", Revsion 20.
25. 1-OHP-4025-LS-2, "Start-Up AFW", Revision 4.
26. 2-OHP-4025-LS-2, "Start-Up AFW", Revision 3.
27. 1-OHP-4021-018-008, "Operation of RWST Support Systems", Revision 016.
28. 2-OHP-4021-018-008, "Operation of RWST Support Systems", Revision 016.
29. DC Cook Design Basis document DB-12-NESW, "Design Basis Document for the Non-Essential Service Water System", Revision 6.
30. DC Cook Fire Pre-Plans, "Fire Protection Response to a Large Fire or Explosion Event", Revision 15
31. DC Cook Drawing Number 1-OP-5113-92, "Flow Diagram, Essential Service Water"

32. DC Cook Drawing Number 2-OP-5113-82, "Flow Diagram, Essential Service Water"
33. DC Cook Document PRA-STUDY-095, "Spent Fuel Pool (SFP) Heat Input and Removal Comparison"
34. DC Cook Document PRA-STUDY-091, "Spent Fuel Pool (SFP) Heat Up Rate in Response to Fukushima Daiichi"
35. DC Cook Calculation/Report NSA-SFP-001, "Spent Fuel Pool (SFP) Cooling Analysis", Revision 0
36. AREVA Document 32-9197975-000, "Sizing Calculations for DC Cook FLEX Conceptual Design", Revision 000.
37. Task Interface Agreement (TIA) 2004-04, "Acceptability of Proceduralized Departures from Technical Specifications (TSs) Requirements at the Surry Power Station," (TAC Nos. MC4331 and MC4332)," dated September 12, 2006. (Accession No. ML060590273).
38. DB-12-NESW, "Design Basis Document for the Non-Essential Service Water System", Revision 6.
39. 12-OHP-4021-018-002, "Placing In Service and Operating the SFP Cooling and Cleanup System" Revision 24
40. DB-12-HVCR, "Design Basis Document Control Room Ventilation System", Revision 3.
41. DC Cook "Fire Protection Program Manual", Revision 12, section 4.1.5
42. AEP-NRC-2012-83, Donald C Cook Nuclear Plan Units 1 and 2 Communications Assessment Requested by Nuclear Regulatory Commission Letter, "Request for Information Pursuant to Title 10 of the Federal Regulations 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3, of the Near-Term Task Force review of Insights from the Fukushima Dai-ichi Accident," dated March 12, 2012. (Submitted October 31, 2012).
43. 1-IHP-5040-EMP-012, "Control Room Air Handling Unit Fan Temporary Power", Revision 3
44. 1-OHP-4025-R-14, "Restore Control Room Ventilation", Revision2
45. 2-IHP-5040-EMP-013, "Control Room Air Handling Unit Fan Temporary Power", Revision 4
46. 2-OHP-4025-R-14, "Restore Control Room Ventilation", Revision 6
47. 1-OHP-4021-018-005, "Operation of Refueling Cavity and Support Systems", Revision 39
48. 2-OHP-4021-018-005, "Operation of Refueling Cavity and Support Systems", Revision 20
49. NRC Order EA-12-049, "Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events", March 12, 2012
50. NRC Order EA-12-051, "Issuance of Order to Modify Licenses with Regard to Reliable Spent Fuel Pool Instrumentation", March 12, 2012
51. JLD-ISG-2012-01, "Compliance with Order EA-12-049, Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events, Revision 0

Pending Actions:

1. Completion of FLEX equipment storage facilities.
2. Perform final validation of timing requirement to route alternate suction source to TDAFW pump.
3. Implement administrative controls program for FLEX related equipment.
4. A systematic approach to training will be used to evaluate training requirements for station personnel based upon changes to plant equipment, implementation of FLEX portable equipment, and new or revised procedures that result from implementation of the FLEX strategies.
5. Complete detailed load shedding and battery duration analysis of Train A and Train B 250 Vdc batteries to validate final FLEX implementation strategy, including required procedure changes.
6. Modification to TDAFW pump suction piping from ESW system to provide connection point from the discharge of the fire water pumps.
7. Complete detailed load shedding and battery duration analysis of N-Train battery to validate final FLEX implementation strategy, including required procedure changes.
8. Develop FSGs and associated procedure revisions to implement FLEX mitigation strategies.
9. Modify the fire protection header inside the Turbine Building to provide an adequately sized connection to enable transfer of water to AFW pump suction.
10. Permanent nitrogen bottle racks will be installed near each SG PORV operating station with hose and regulators to align for control to remain available in the control room.
11. Modification to connect portable diesel generator to 600 Vac bus 11B [11D] and 21B [21D].
12. Modification to connect portable diesel generator to CRP-3.
13. Modification to connect portable diesel generator to MCC ABD-B to provide alternate power supply to N-Train battery charger.
14. Modification for hose connection of all main Feed Water line flow nozzle inspection port flanges located near B.5.b connection.
15. 4160 Vac bus T11A/D (T21A/D) will be modified to allow connection of external 4160 Vac three-phase portable diesel generator.
16. Replace RCP seals with Westinghouse SHIELD® low leakage seals.
17. Modification adding connection point for portable electric pump to the safety-related 600 Vac buses (e.g., 11B and 11D (21B and 21D)) for the portable boron addition pump.
18. Modify monitor tanks installing temporary hose connections.
19. A transfer switch will be installed in the feeder cable between 600 Vac bus 11D and MCC AB-C to provided power to CVCS HUT recirc. pump to facilitate water transfers.
20. Perform containment analysis to validate that containment integrity can be maintained until containment cooling can be restored during Phase 3.
21. Modify CVCS cross-tie to allow connection of portable boron addition pump.
22. Modify the fire test header inside the Fire Pump House to allow for the hose connection.
23. Modify the boric acid transfer pump suction header to add a branch connection with quick disconnect fittings.
24. Modify the boric acid transfer pump discharge header to add a branch connection with quick disconnect fittings.

25. Install standpipe from the 609 ft. elevation in the Auxiliary Building crane bay just inside the personnel door near the roll-up door through a stairwell to the overhead of the 587 ft. elevation to a location near the charging pump room entries.
26. Fuel consumption will be finalized when equipment has been procured and tested.
27. Perform calculation to verify time required to establish flow to the RCS in MODE 6 with the Rx Cavity filled.
28. Modify vent connection downstream of the boron injection tanks for portable pump connection.

Attachment 1A
Sequence of Events Timeline

Action item	Elapsed Time	Action	Time Constraint Y/N [6]	Remarks / Applicability
	0	**Event Starts**	NA	Plant @100% power
1	60 seconds	TDAFW pump starts	N	Original design bases for SBO event
2	2 minutes	SBO procedures are entered	N	Original design bases for SBO event
3	15 minutes	Route alternate suction supply to TDAFW pump from the fire protection system (contingency if both CSTs are unavailable)	Y	NEI 12-06, 3.2.1.7 Supports completion of item 5 prior to SG Dryout
4	30 minutes	Begin DC bus load shed (250 Vdc and N-Train)	Y	IER L1 II-4 Response (GT 2011-8795–12) NEI 12-06, 3.2.1.7
5	55 minutes	Alternate suction source to TDAFW pump in service and TDAFW pump restarted (contingency if CSTs are unavailable)	Y	NEI 12-06, 3.2.1.7& WCAP-17601 (prior to SG Dryout)
6	1 hour	Complete DC bus load shed	Y	IER L1 II-4 Response (GT 2011-8795–12) NEI 12-06, 3.2.1.7
7	1 hour	Attempts to start EDGs and SDGs are unsuccessful, determination made that it will take > 4 hours to restore power via "normal" means	N	Per SBO procedure (ECA.0-0)
8	~ 2 hours	Start RCS cooldown	N	Per ECA.0-0 & Consistent with assumptions in WCAP-17601. Low leakage seals and TDAFW pump performance impact timing of this action

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

Action item	Elapsed Time	Action	Time Constraint Y/N [6]	Remarks / Applicability
9	~ 3 hours	Target SG pressure reached for RCS cooldown	N	Per ECA.0-0 & WCAP-17601 (based on C/D rate assumed in WCAP)17601
10	~ 6-8 hours	500 kW generators transported and aligned providing power to the 11D/21D 600 Vac bus. CRIDs no longer battery supplied	N	Per FSGs Based on performance by off-site resource. May be completed sooner if resources are available
11	~ 6-8 hours	Begin RCS boration to ensure subcriticality	N	Per ECA.0-0 and FSGs Time dependant on performance of Cooldown. If cooldown is performed later this action could be delayed similarly
12	6-8 hours	Transport/stage/align portable pumps to provide alternate low pressure FW source to SGs (initiation of action dependent on initial AFW suction source/time anticipated to depletion)	N	NEI 12-06, 3.2.1.7 Based on performance by off-site resource. May be completed sooner if resources are available
13	~ 8-12 hours	Address/implement water management for RCS and SGs based on source availability	N	Per FSGs Timing dependant on water source
14	~ 20-24 hours	Identify available method/prepare/implement SFP makeup	N	Per FSGs and existing plant procedures
15	~ 24-30 hours	Deployment/staging/alignment of Phase 3 resources/power	N	Per ECA.0-1 or 2 (Recovery with/without SI) and FSGs Timing based on interface with RRC
16	72 hours	End of generic WCAP analysis	NA	End of analytical simulation

Attachment 1B
NSSS Significant Reference Analysis Deviation Table

Item	Parameter of interest	WCAP value (WCAP-17601-P August 2012 Revision 0)	WCAP page	Plant applied value	Gap and discussion
N/A	N/A	None	N/A	N/A	N/A

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 6 month status reports.

Original Target Date	Activity	Status *{Include date changes in this column}*
October 2012	Submit 60 Day Status Report	Complete
February 28, 2013	Submit Overall Integrated Implementation Plan	Complete with this submittal
April 2013	Commence Engineering Modification Design – Phase 2 & 3	
August 28, 2013	Submit 6 Month Status Report	
February 2014	Submit 6 Month Status Report	
May 2014	Regional Response Center 1 Operational	
June 2014	Procure Equipment	
August 2014	Submit 6 Month Status Report	
June 2014	Commence Installation for Online Modifications – Phase 2 &3	
June 2014	Perform Staffing Analysis	
August 2014	Issue Maintenance Procedures	
September 2014	Implement Training	
September 2014	Issue Procedures updated for FLEX strategies	
November 2014	Unit 1 Implementation Outage	
December 2014	Implement Storage Unit 1	
February 2015	Submit 6 Month Status Report	
April 2015	Unit 2 Implementation Outage	
June 2015	Deployment Demonstration	
July 2015	Implement Storage Unit 2	
August 2015	Submit Completion Report	

Attachment 3
Conceptual Design Descriptions/Sketches

List of Figures

Figure 1: Long Term RCS Core Cooling — Two Pump Configuration

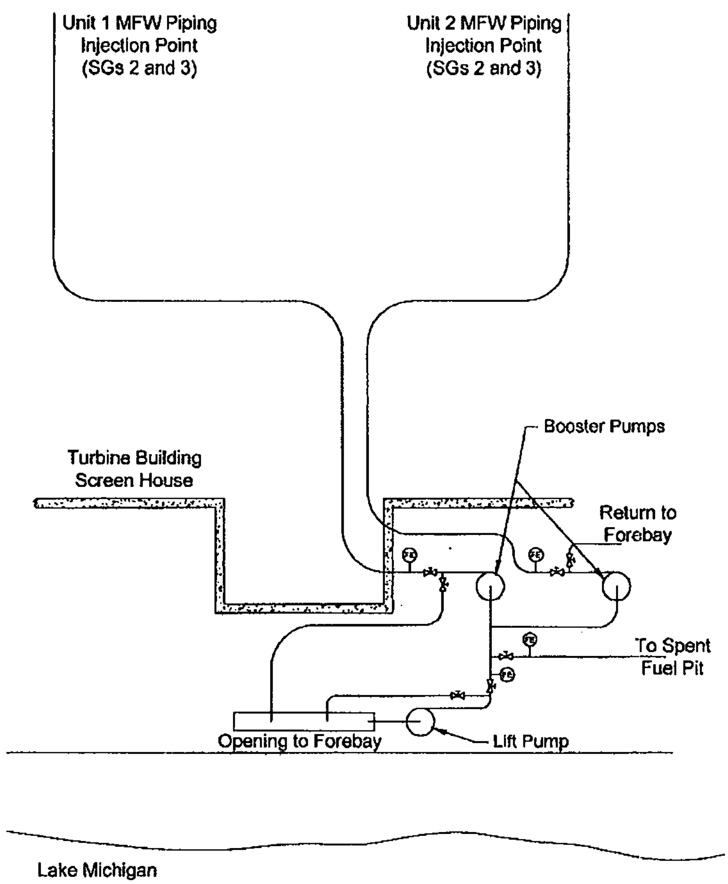


Figure 2: Long Term RCS Core Cooling — One Pump Configuration

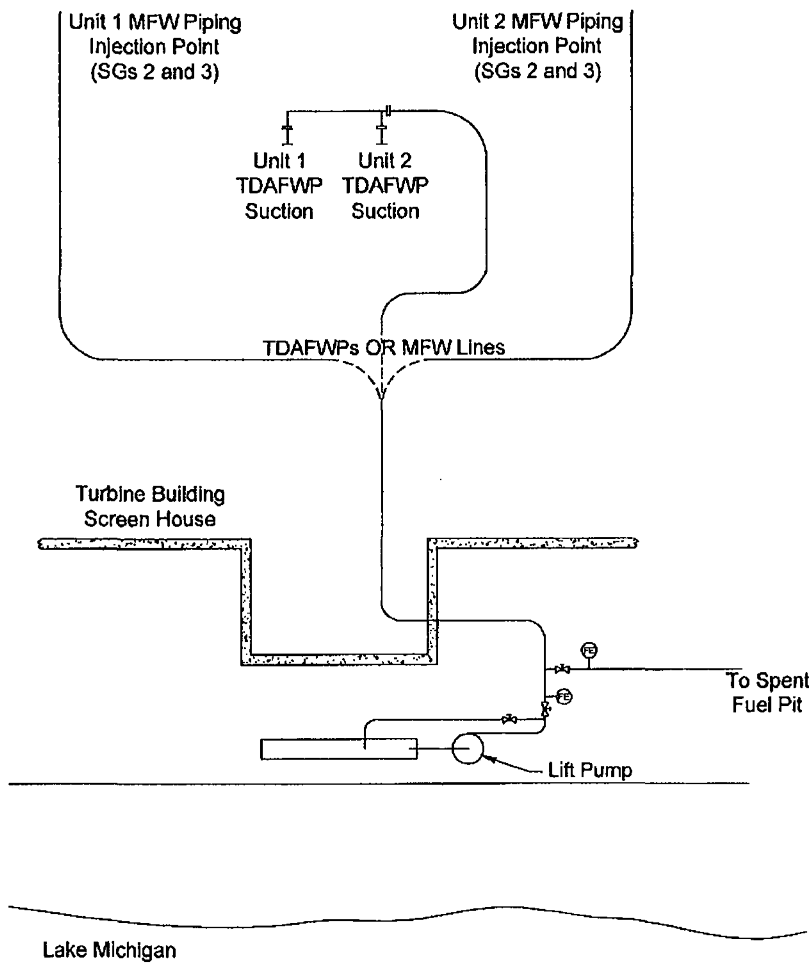


Figure 3: Fire Water Pump House Test Header Connections

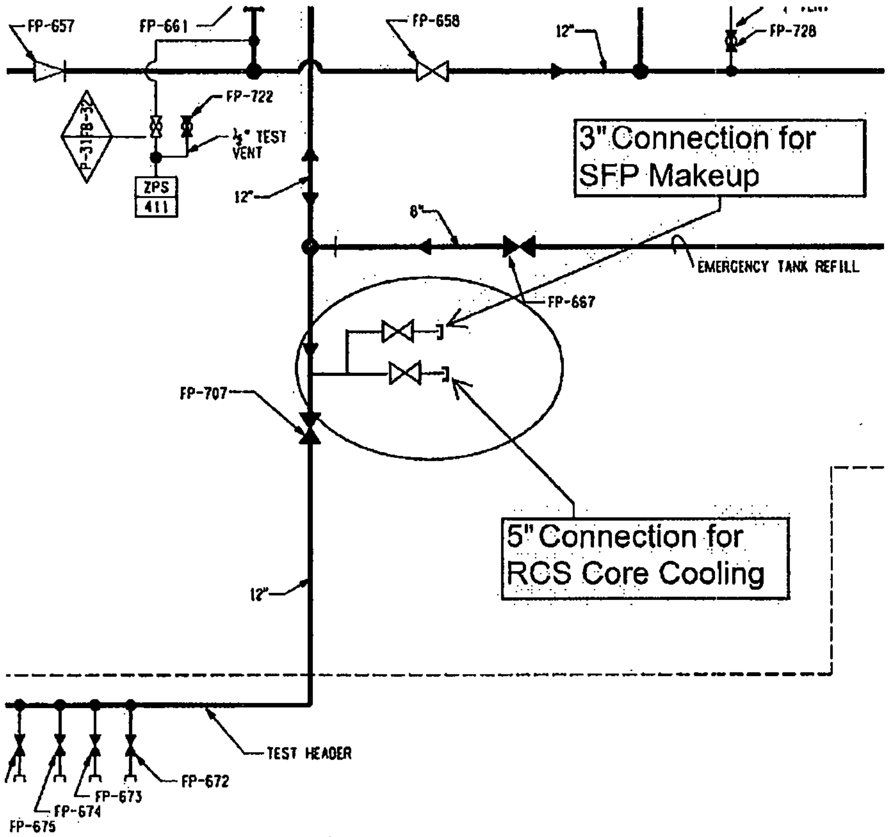
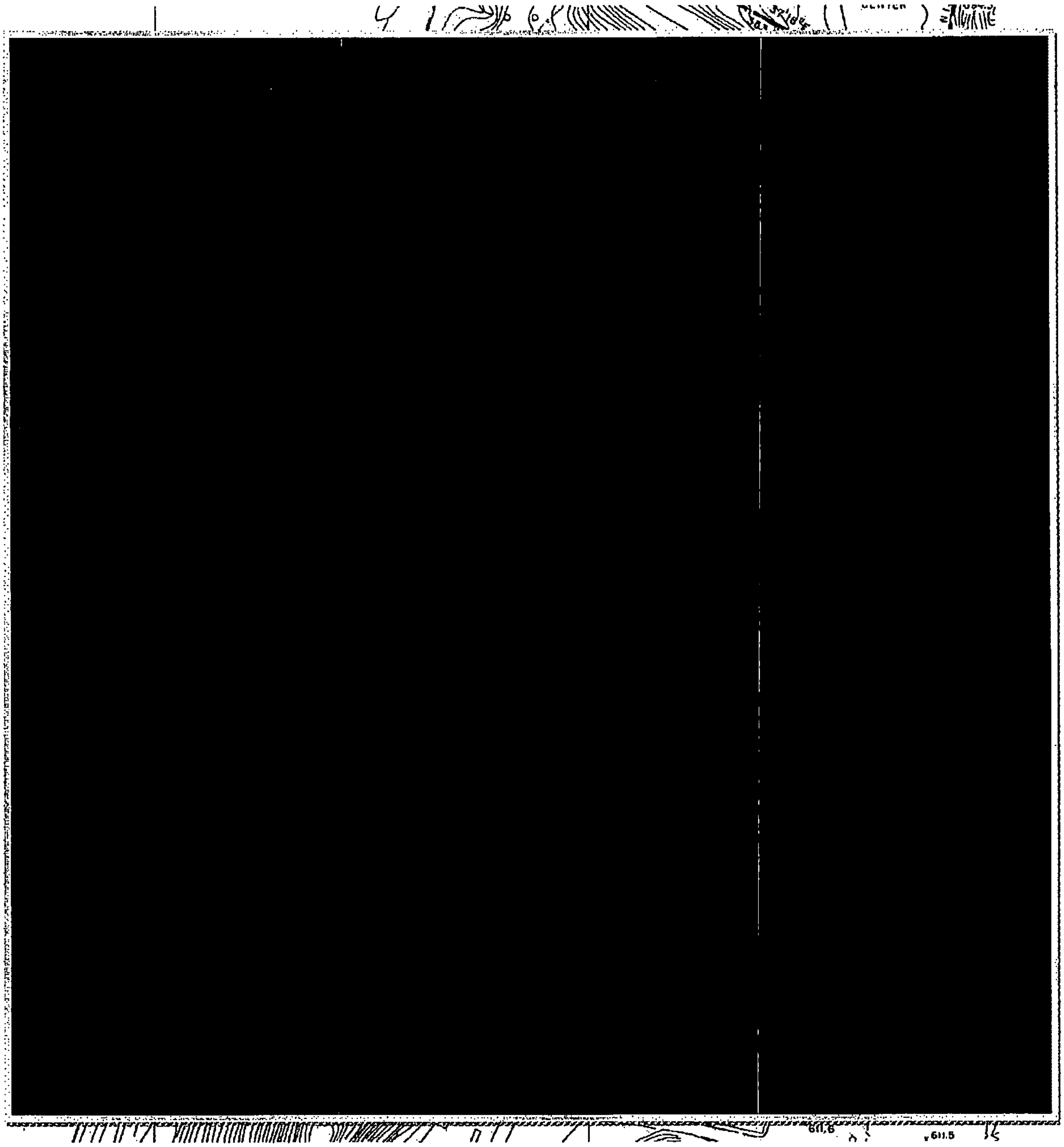


Figure 4: RCS Core Cooling Hose Route Options



[redacted]

Figure 5: AFW Supply Connection

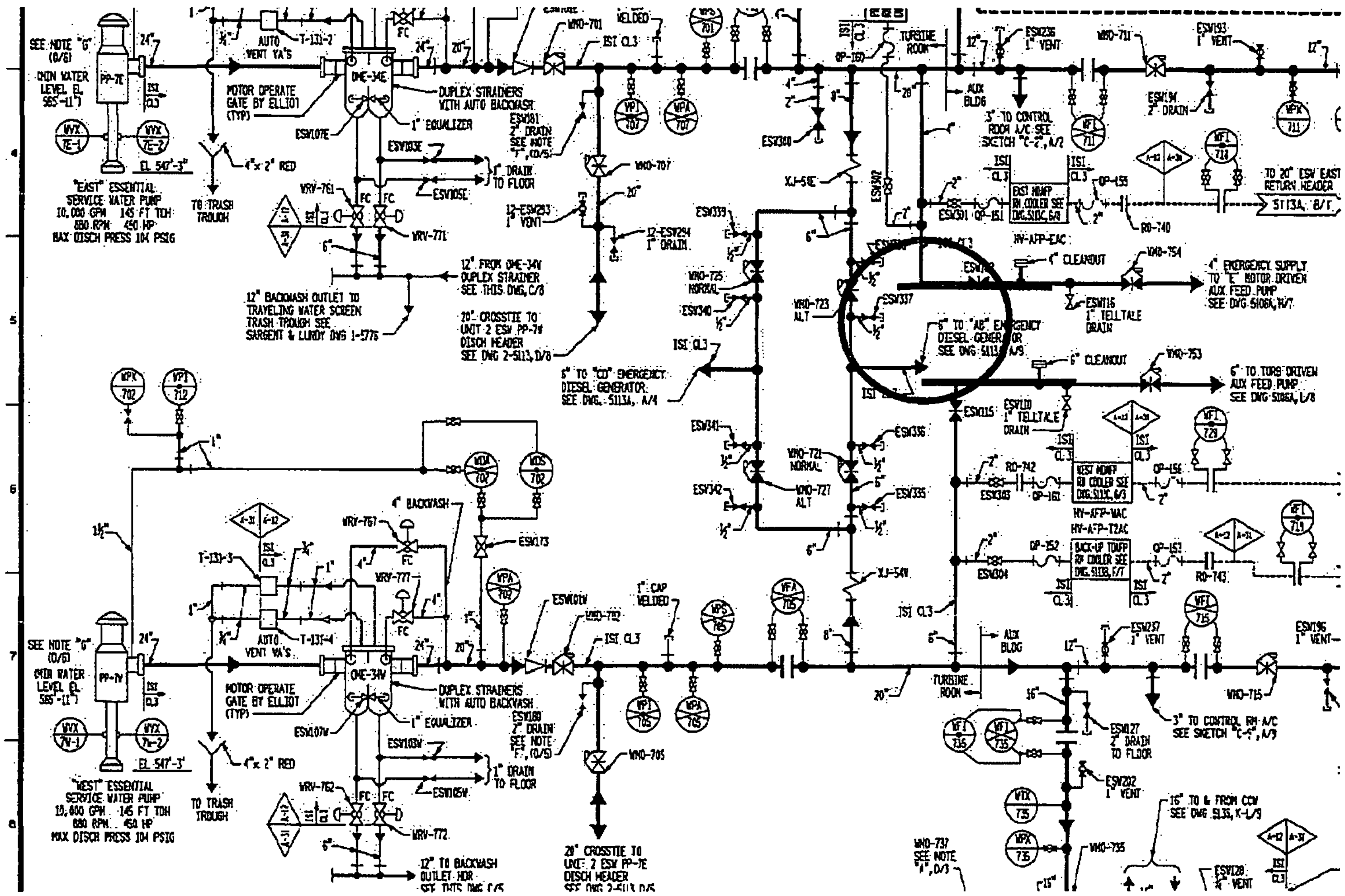


Figure 6: Long Term Core Cooling Hose Routing

[redacted]

Figure 7: Primary Water System Piping Connections

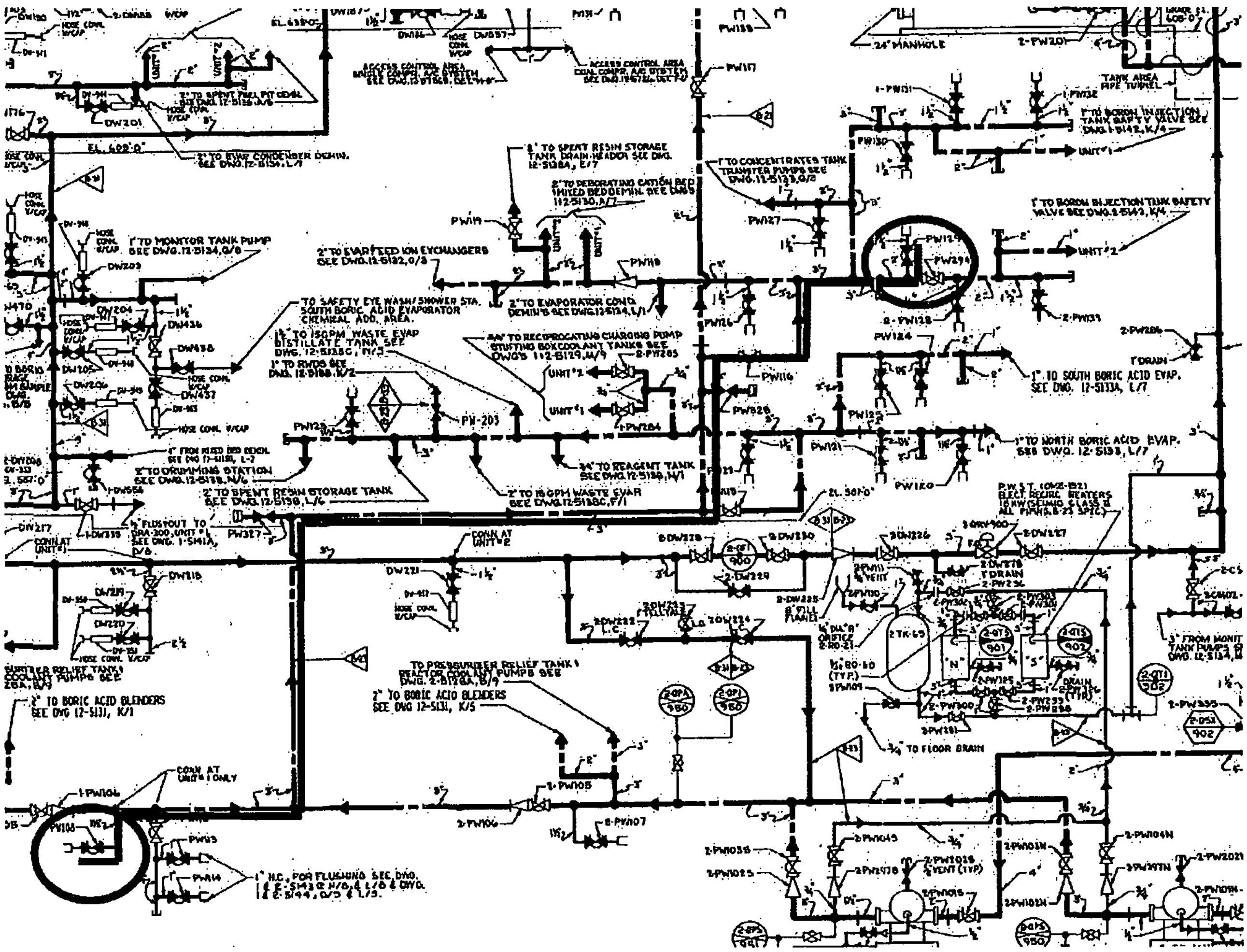


Figure 8: Monitor Tank Hose Drains to the Makeup Pumps

[redacted]

Figure 9: Makeup Pump Hose Connections from the Monitor Tanks

[redacted]

Figure 10: Spent Fuel Pool Hose Routing

[redacted]

Figure 11: Portable Generator Connection to 600 Vac Buses

[redacted]

Figure 12: CRID Power Restoration Alternate Strategy

[redacted]

Figure 13: N-Train Battery Charger Power Restoration Alternate Strategy

[redacted]

Figure 14: Phase 3 Generator Connection

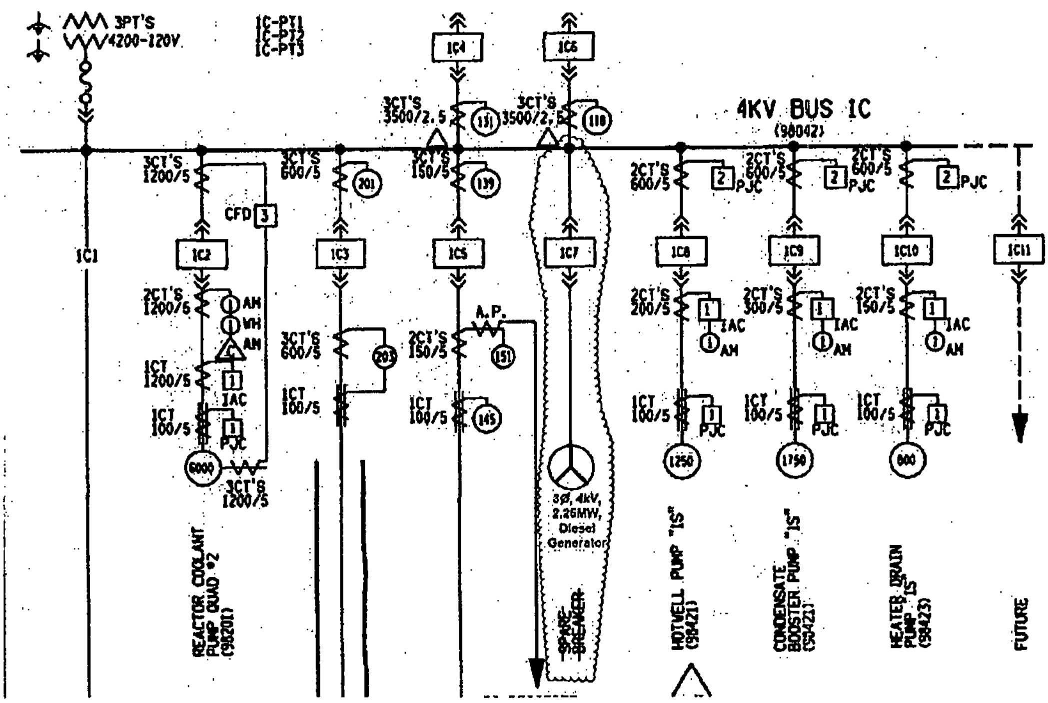
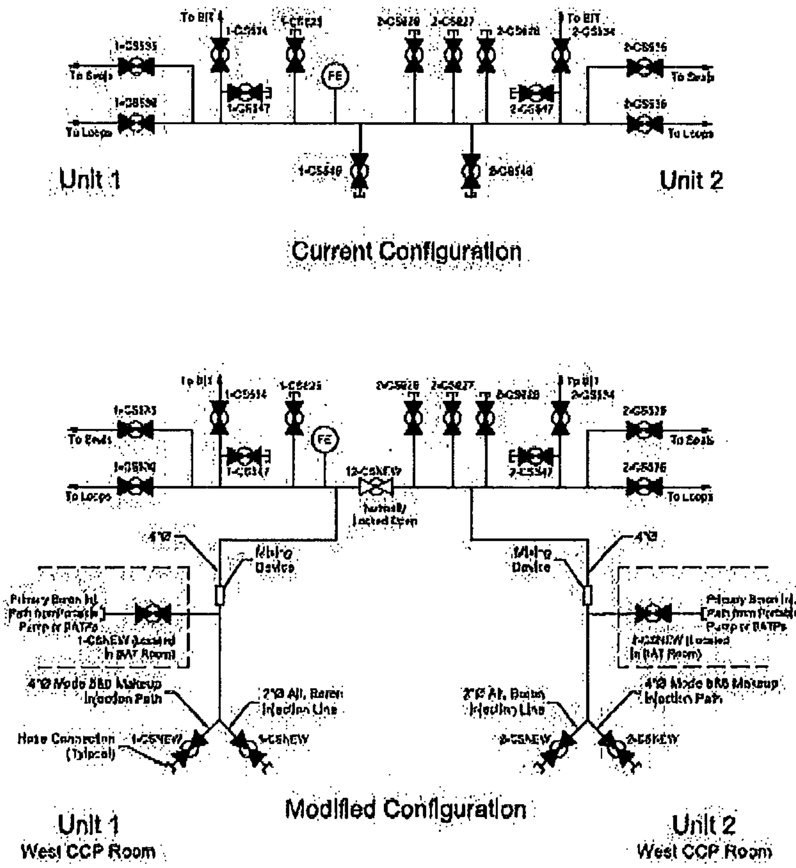


Figure 15: CVCS Cross-tie Configuration



Notes:
1. Reference DC Cook Drawings OP-1-5125-61 and OP-2-5125-61 for complete configuration.

Figure 16 – Cook Nuclear Plant – Protected Area Layout

Cook Nuclear Plant – Protected Area

[redacted]

Figure 17 – Cook Nuclear Plant – RCS Makeup Pipe and Hose Routing

[redacted]

Figure 18 – Cook Nuclear Plant – RCS Makeup Standpipe Arrangement – 609 ft. Elevation

[redacted]

Figure 19 – Cook Nuclear Plant – RCS Makeup Standpipe Arrangement – 587 ft. Elevation

[redacted]

Figure 20 – Cook Nuclear Plant – RCS Makeup Hose Routing MODES 5/6 – 609 ft. Elevation

[redacted]